



**INSTRUCTION MANUAL**  
**AUTOMOTIVE TRANSIENT**  
**SURGE SIMULATOR**  
**MODEL ISS-7610**

**Noise Laboratory Co., Ltd.**

2.00 Edition  
AEJ00367-00E-1-E

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## **1. IMPORTANT SAFETY PRECAUTIONS**

The following instructions are very important for safe handling of ISS7610 (the "Unit"). Read them carefully before use.

- 1. Do not use the Unit near flammable materials or fire sources. When used, there is a risk of fire due to pulses, etc.**
- 2. Any person with medical electronics such as a heart pacemaker is not to operate the Unit. And, do not enter the test area while the Unit is operating.**
- 3. To avoid electric shock, be sure that the power of the Unit, the power source, and the device under test ("DUT") are all turned OFF, and make sure there is no residual voltage before making any connections.**
- 4. A number of safety recommendations are listed in the later chapter "BASIC SAFETY PRECAUTIONS". Be sure to read them before test environment settings, connecting and testing.**

## Memorandum

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## 2. APPLICATION FORM FOR INSTRUCTION MANUAL

We place an order for an instruction manual.

**Model: ISS-7610**

**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 Chuo-ku Sagami-hara City,**

**Kanagawa Pref., 252-0237 Japan**

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

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

Cut  
line

Memorandum

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## 4. PREFACE

Thank you very much for purchasing ISS-7610 (the “Unit”). Please read this instruction manual thoroughly prior to use of the Unit in order to attain the maximum and safe use of the Unit.

An optional Remote Control Software to control the Unit by a PC is also available. When you control the Unit through the software, please read the instruction manual of Remote Control Software thoroughly in addition to the Manual to ensure safety and correct procedures.

- The Manual will let you operate ISS-7610 safely and make the most use of it if you strictly follow the operational procedures and the safety instructions.
- Keep the Manual handy whenever you operate ISS-7610.



## 5. BASIC SAFETY PRECAUTIONS

### 5-1. Symbols of Hazard

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#### WARNING



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。

NOISE LABORATORY CO.,LTD. IS EXCLUDED ALL THE  
LIABILITY OF ANY FORMS OF DAMEGE, OF EQUIPMENT  
OR HUMANS, CAUSED BY USER'S MISHANDLING DURING  
OPERATION.  
誤った操作による損害に対しては、一切責任を負いません。

#### Indication of Warning

The following warning indication is placed on the upper left of the rear-panel of the Unit, and alerts a risk of electric shock.



This sign indicates the presence of “dangerous voltage/current” that may endanger persons.



This sign indicates “handle with care”.  
Refer to the Manual to protect human bodies and devices.



This sign indicates a protective ground terminal.



This sign indicates a connection to FG (steel case).

### 5-2. Basic Safety Precautions

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1. The Unit is grounded by the three line AC cord with a grounding conductor. To avoid electric shock, be sure to insert it to an outlet with a ground terminal.  
【Precautions regarding connection and use】
2. Use the AC cord which matches the source voltage, as the shape of the AC cord differs depending on the source voltage.  
【Precautions regarding connection and use】

3. When changing fuses, choose the same melt off type and rating. Also, be sure to unplug the AC chord before changing fuses.  
【Precautions regarding use and safety】
4. Do not supply the Unit with voltage or overload beyond the specification range. The Unit may be damaged if this is not obeyed.  
【Precautions regarding connection and use】
5. Use the input and output cables which meet the current and power capacity requirements.  
【Precautions regarding connection and use】
6. Before connecting the Unit, turn OFF the DC power source and the Unit, and make sure that there is no residual voltage. Connect each cable securely. Nonobservance may cause electric shock or damage to the internal parts of the Unit and connected devices.  
【Precautions regarding bodily injury and connection】
7. When a protective cover, etc. of the Unit is removed for connection to the Unit, be sure to place the protective cover before supplying electricity. There is a risk of short-circuiting or electric shock.  
【Precautions regarding connection and use】
8. Use accessories and optional items supplied by the Company to ensure safe operation.  
【Precautions regarding connection and use】
9. Do not open the Unit's cover, as voltages are generated within the Unit's enclosure,  
【Precautions regarding bodily injury】
10. Do not block any ventilation openings of the Unit. Install in accordance with the Manual.  
【Precautions regarding environment】
11. Do not utilize or store the Unit under extremely high or low temperature environment. (Operating environment :  $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$  / Operating Humidity Range : 25 - 75 %)  
【Precautions regarding environment】
12. Do not use the Unit under high humidity or dusty conditions.  
【Precautions regarding environment】
13. Should condensation form, fully dry the Unit before usage.  
【Precautions regarding environment】

14. Do not wipe the body of the Unit with solvents such as lacquer thinner or alcohol. When the Unit gets dirty, wipe it with a detergent moistened fabric etc.

**【Precautions regarding use】**

15. Do not use the Unit near flammables or fire sources. When used, there is a risk of fire due to discharge, etc.

**【Precautions regarding bodily injury and environment】**

16. The Company and its sales agent assume no responsibility for any bodily injury, loss, damage or resultant damage arising from derelict misuse of the Unit on the part of the user.

**【Precautions regarding bodily injury, use, environment, and connection】**

17. Should the necessity of services such as repair, maintenance, or internal calibration arise, leave them to qualified service personnel only.

**【Precautions regarding use and safety】**

### **5-3. Loss of Warning Label**

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1. If the warning label is peeled off and missing or gets dirty, replace it with a new one for safety.
2. If the warning label is lost, order a new one from our sales agent or the technical service center of the Company.

## 6. MAIN FEATURES

### 6-1. Distinctive Features

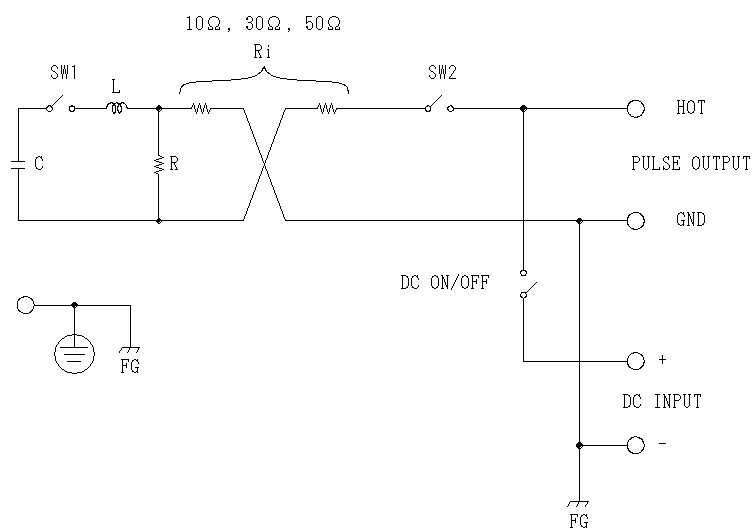
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- Capable of performing tests of Test Pulses 1/2a (“Pulse”) in accordance with ISO/DIS 7637-2.2 (2002-07-16), ISO/DIS 7637-2.3 (2003-05-20), ISO7637-2 (Second edition 2004-06-15), and ISO 7637-2 (Third edition 2011-03-11).
- Fully satisfies the requirements of Annex D of ISO7637-2 standard.
- Capable of performing tests under harsher conditions than the Standards.
- Capable of setting detailed parameters for voltage / pulse width of the output waveforms, output resistance of the equipment, and pulse intervals.
  - Pulse 1 output voltage  $U_s$  is variable from -5V to -720V in steps of 1V.
  - Pulse 1 pulse width  $t_d$  can be selected from 50 $\mu$ s, 200 $\mu$ s, 300 $\mu$ s, 500 $\mu$ s, 1ms, and 2ms.
  - Pulse 1 output resistance  $R_i$  can be selected from 10 $\Omega$ , 30 $\Omega$ , and 50 $\Omega$ .
  - Pulse 1 pulse interval  $t_1$  is variable from 0.5s to 99.9s in steps of 0.1S.
  - Pulse 2a output voltage is variable from 5V to 300V in steps of 1V.
  - Pulse 2a pulse width  $t_d$  can be selected from 50 $\mu$ s, 200 $\mu$ s, 300 $\mu$ s, and 500 $\mu$ s
  - Pulse 2a output resistance  $R_i$  can be selected from 2 $\Omega$ , 4 $\Omega$ , 10 $\Omega$ , 30 $\Omega$ , and 50 $\Omega$ .
  - Pulse 2a pulse interval  $t_1$  is variable from 0.11s to 99.9s in steps of 0.1S.
- Capable of setting Pulse input repetitions from 1 to 99900 times.
- Maximum DUT (Device Under Test) capacity is 60V 30A.
- Output terminal are the electric shock free safety plugs which protect against electric shock.
- Compatible with AC INPUT of 100V, 110V, 120V, 200V, 220V, and 240V by selecting jump cable placements on the rear panel.
- Capable of creating test conditions not limited to the Standards by utilizing optional Remote Control Software.
- Capable of noise unsusceptible stable transmissions by using an optional Optical Interface Unit and Remote Control Software for the purpose of communication between the Unit (ISS-7610) and the PC. (When used standalone without mounting to a rack)
- An optional ISS-7690 is capable of integrated pulse output when the Unit is installed onto System Rack ISS-7602 (Optional). The optional 50A type ISS-7690 can expand DUT capacity to 60V max, 50A max.

## 6-2. Schematic Circuit Diagram of the Unit

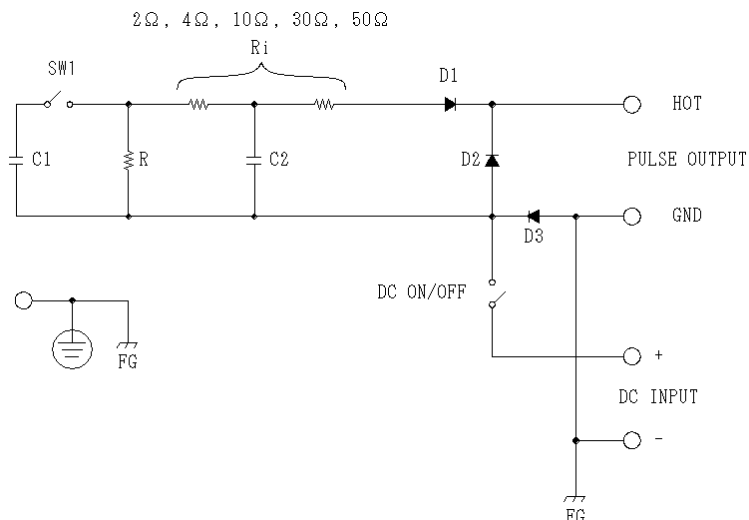
The injection methods of Pulse 1 and Pulse 2a to DC are different, and the Unit generated the Pulse 1 and Pulse 2a by switching *within* the internal circuit. DC input for both Pulse 1 and 2a is controlled by DC LINE switch. Be extra careful about the electric current, since **the input DC voltage is outputting to the terminal, while the power switch is ON.**

Fig.1 gives the schematic circuit diagram for Pulse 1. Generating Pulse 1 is realized by outputting DC and Pulse alternately. At the time of DC output, ON/OFF switch is ON and SW2 is OFF. When Pulse is generated, ON/OFF switch is OFF and SW2 is ON. Afterwards, setting SW1 ON generates negative pulses discharging the electric charge from C. After 200ms, SW1 and 2 switches turn OFF and DC output turns ON.



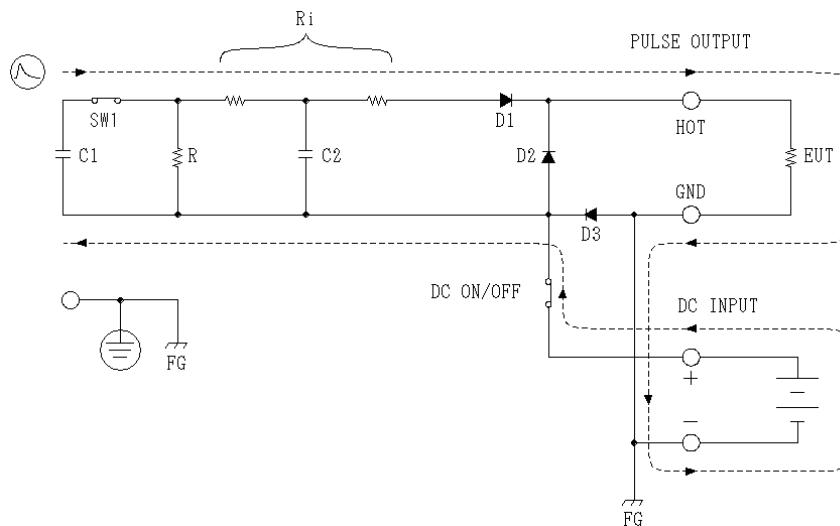
**Fig. 1 Pulse 1 Schematic Circuit Diagram**

Fig. 2 gives schematic circuit diagram for Pulse 2a. A pulse generating capacitor C1 is connected to the positive DC input. The resultant output waveform is the sum of the DC voltage and the pulse voltage.



**Fig. 2 Pulse 2a Schematic Circuit Diagram**

The path taken by the Pulse 2a current in the Unit is shown in Fig. 3. First, the electric charge stored in C1 flows through the circuit as the pulse current. Next, pulse current from HOT terminal flows through DUT to GND. The current goes to negative (-) DC INPUT terminal, and flows back to C1 after flowing through the power source, etc.

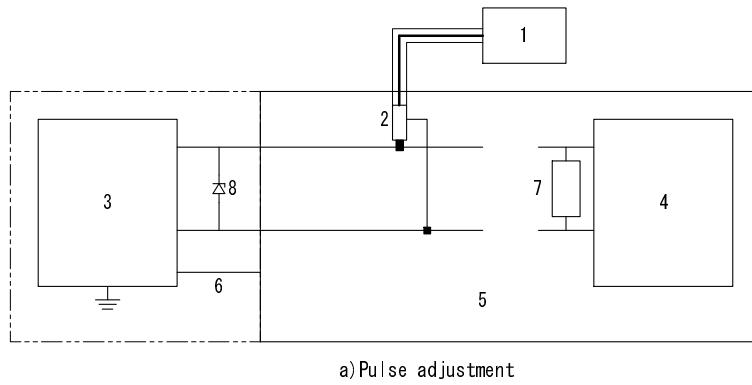


**Fig. 3 pulse current flow for Pulse 2a**

Due caution should be exercised in monitoring the current capacity of DC source. The pulse current could fluctuate depending on DUT impedance and simulator setup and possibly rise up to 170A. As this current flow into the DC source, it is recommended that the tests should be performed with DC sources (such as batteries), which is capable of allowing such current flows. Take caution, as the DC source with small capacities may be destroyed if tests are performed on them.

### **6-3. Regarding ISO7637-2 (Second edition 2004-06-15)**

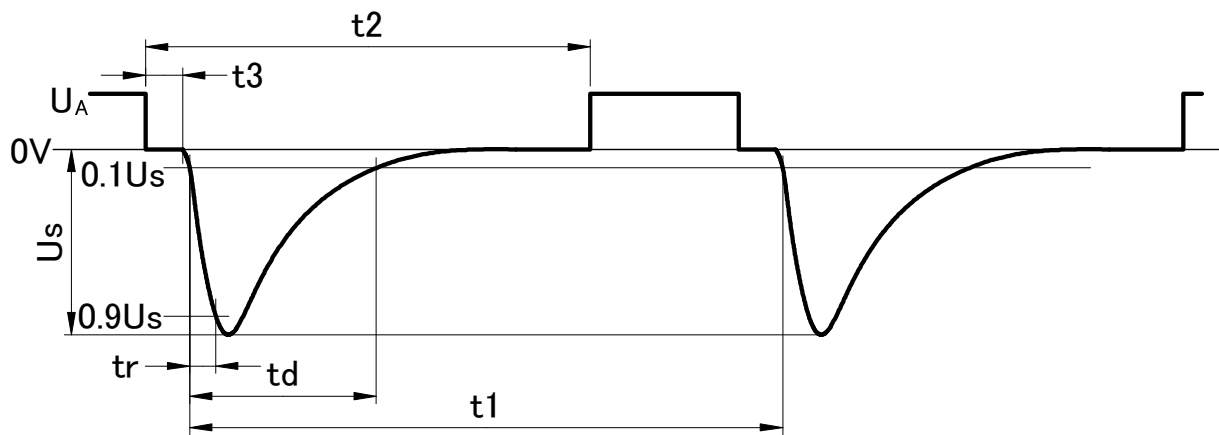
ISO7637-2 (Second Edition 2004-06-15) specifies the standards relevant to the transient pulse simulator for in-vehicle devices. This standard specifies the configurations of the test, the pulse voltage waveforms, the testing voltage level and the testing environment, etc. The Unit is capable of performing tests in accordance with this standard. The schematic test setup is excerpted from the standard and shown below. For details, be sure to refer to the ISO Standards.



**Fig. 4 Test Configuration (For Pulse Veification)**

When verifying the Unit waveform, do not connect DUT with the output open-circuited. Turn the DC LINE ON (also set the circuit breaker ON), while positive (+) and negative (-) terminals of DC INPUT are short-circuited. Do not connect resistor 7 and diode 8 in Fig. 4 in test environment of Pulse 1, and Pulse 2a.

**Pulse 1 Waveform Standard (ISO7637-2 (Second edition 2004-06-15))**



**Fig. 5 Pulse 1 Waveform**

**Table 1 Pulse 1 Parameters**

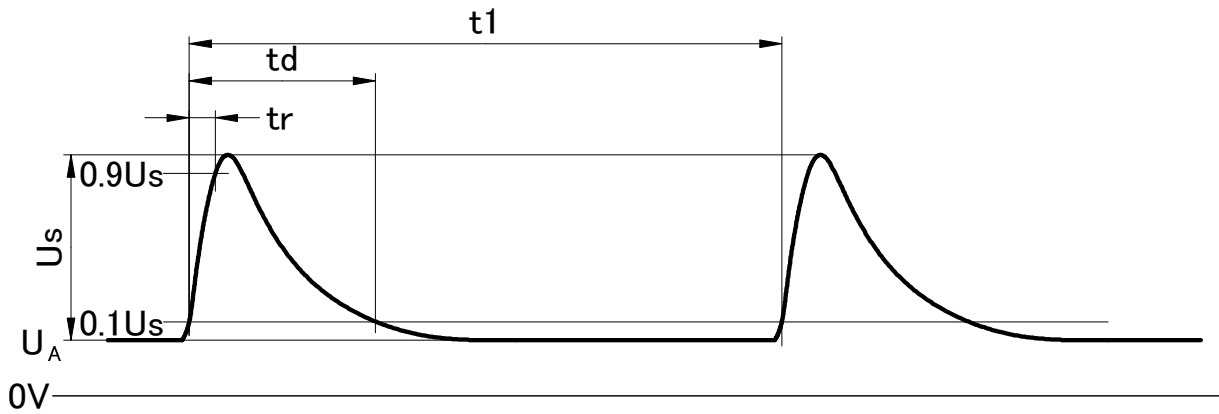
	Parameter	12V System	24V System
Output Open	$U_s$	-75V ~ -100V	-450V ~ -600V
	$R_i$	10 $\Omega$	50 $\Omega$
	$t_d$	2ms	1ms
	$t_r$	1 (+0, -0.5) $\mu$ s	3 (+0, -1.5) $\mu$ s
	$t_1$	0.5s ~ 5s	
	$t_2$	200ms	
	$t_3$	< 100 $\mu$ s	

**Table 2 Pulse 1 Annex D Parameters**

	Test Pulse 1	$U_s$	$T_r$	$T_d$
12V System	No Load	-100V $\pm$ 10V	1 (+0, -0.5) $\mu$ s	2000 $\mu$ s $\pm$ 400 $\mu$ s
	10 $\Omega$ Load	-50V $\pm$ 10V	—	1500 $\mu$ s $\pm$ 300 $\mu$ s
24V System	No Load	-600V $\pm$ 60V	3 (+0, -1.5) $\mu$ s	1000 $\mu$ s $\pm$ 200 $\mu$ s
	50 $\Omega$ Load	-300V $\pm$ 30V	—	1000 $\mu$ s $\pm$ 200 $\mu$ s



**Pulse 2a Waveform Standard**



**Fig. 6 Pulse 2a Waveform**

**Table 3 Pulse 2a Parameters**

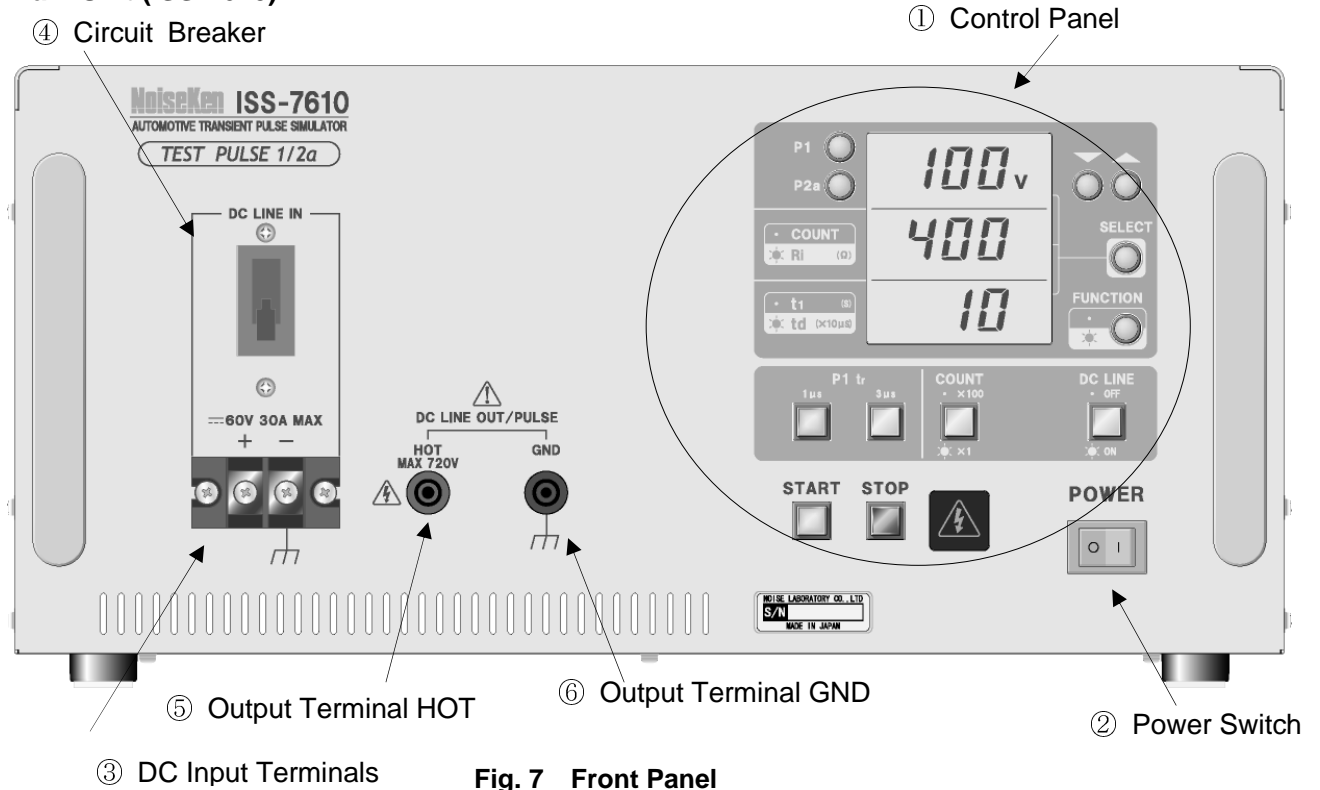
	Parameter	12V System	24V System
Output Open	U <sub>s</sub>	+37V ~ +50V	
	R <sub>i</sub>	2 Ω	
	t <sub>d</sub>	0.05ms	
	t <sub>r</sub>	1 (+0, -0.5) μs	
	t <sub>1</sub>	0.2s ~ 5s	

**Table 4 Pulse 2a Annex D Parameters**

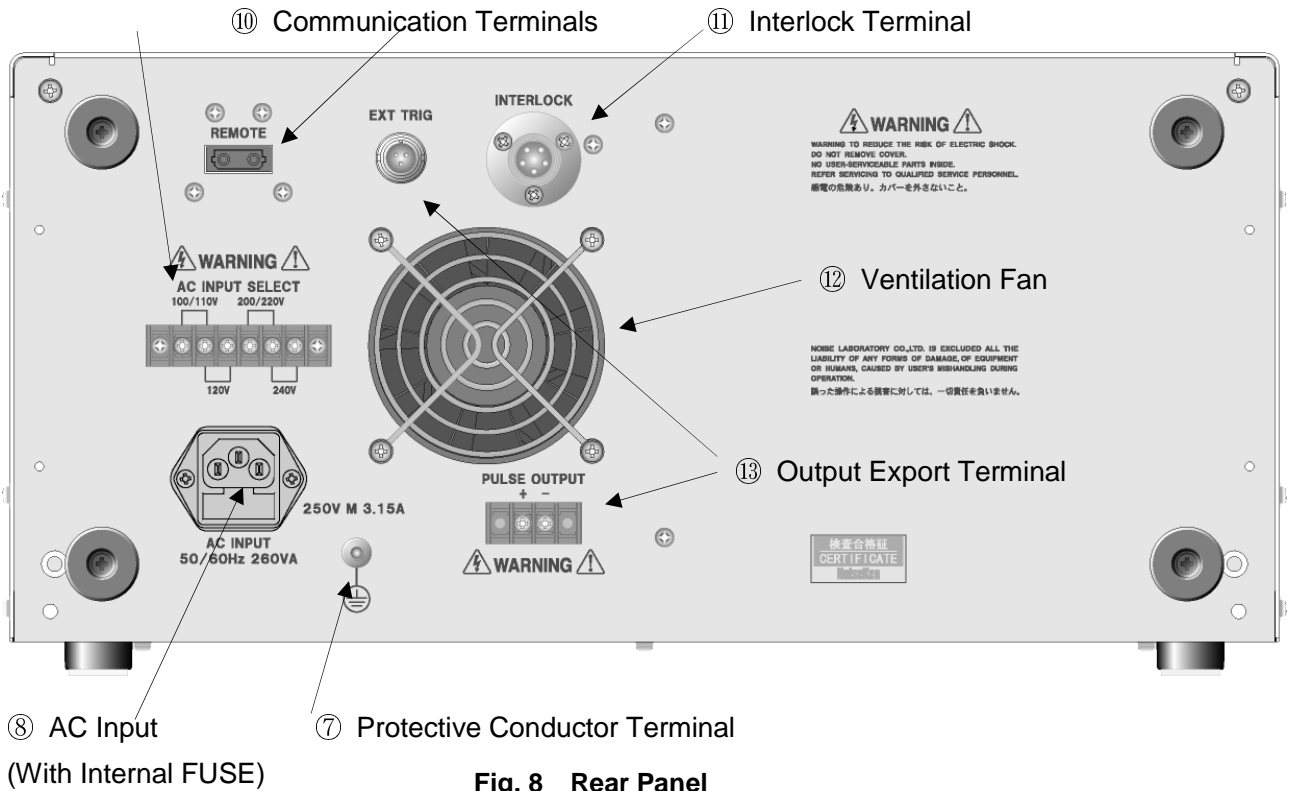
	Test Pulse 2a	U <sub>s</sub>	T <sub>r</sub>	T <sub>d</sub>
12V/24V System	No Load	50V ± 5V	1 (+0, -0.5) μs	50 μs ± 10 μs
	2 Ω Load	25V ± 5V	—	12 μs ± 2.4 μs

# 7. PART NAMES AND FUNCTIONS

## Main Unit (ISS-7610)



## ⑨ AC Source Voltage Selection Terminals



① **Control Panel**

The control panel located on the front of the Unit lets you set local settings.



**Fig. 9 Control Panel**

**A** Pulse Selection Buttons

The “Pulse Selection Buttons” let you select Pulse 1 or Pulse 2a waveform output. The waveform with the light ON is output. The settings should be altered in STOP mode, as they cannot be altered at START mode.

**B** Us Display

The “Us Display “ displays Us value. Pulse voltage will be displayed regardless of **G** FUNCTION Button” light’s ON/OFF. Us can be set within the range of -12V~-720V for Pulse 1, and within 12V~300V for Pulse 2a.

**C** COUNT / Ri Display

The “COUNT / Ri Display “ displays either COUNT or Ri value. It displays COUNT when FUNCTION is not lit, and Ri when lit. It automatically displays COUNT when the START button is pressed (FUNCTION will become unlit).

COUNT is the number of output repetitions under the same settings. The numbers between 1~999 will be displayed, and the number of output repetitions will be different depending on the state of the **J** COUNT Multiplier Button. Refer to **J** COUNT Multiplier Button section for details.

Ri is the output resistance of the Unit. It can be selected from 10Ω, 30Ω, and 50Ω for Pulse 1, and from 2Ω, 4Ω, 10Ω, 30Ω, 50Ω for Pulse 2a.

#### **D** t1 / td Display

The “t1 / td Display “ displays either t1 or td value. t1 will be displayed when FUNCTION is not lit, and td when lit. When the START button is pressed, the display will automatically change to t1 (FUNCTION will become unlit), and the remaining time to pulse output will decrease 0.1 second by 0.1 second.

t1 is the pulse formation interval. It can be set every 0.1s at 0.5s~99.9s for Pulse 1, and 0.1s~99.9s for Pulse 2a.

td is the length of wave decay. It can be selected from 50 $\mu$ s, 200 $\mu$ s, 300 $\mu$ s, 500 $\mu$ s, 1000 $\mu$ s, and 2000 $\mu$ s for Pulse 1 and from 50 $\mu$ s, 200 $\mu$ s, 300 $\mu$ s, and 500 $\mu$ s for Pulse 2a.

The value displayed will be **1/10 of the value selected**. Thus, td = 200 $\mu$ s will be displayed as “20.”

#### **E** UP / DOWN Buttons

The “UP / DOWN Buttons” let you raise or lower the value of currently selected parameter. The increment/decrement speed is accelerated by keeping holding down the button. Also, the value will stop when it reaches the allowable limits.

#### **F** SELECT Button

The “SELECT Button “ lets you select one of the 3 displays. The selected parameter’s display will blink repeatedly. By pressing the button the selected parameter will change from line 1 → line 2 → line 3 → line 1.

#### **G** FUNCTION Button

The “FUNCTION Button “ lets you change the content displayed. When the button is not lit Us, COUNT, t1 will be displayed from the top to the bottom, and Us, Ri, td will be displayed when lit. When the START button is pressed, FUNCTION button becomes unlit and the displays will automatically become Us, COUNT, and t1. Even in the START mode, this button can be pressed to light the lamp and observe the Ri and td values.

#### **H** DC LINE Button

The “DC LINE Button “ is the button to control the DC output, and moves the DC ON/OFF switch shown in Fig. 1 and Fig. 2. It is OFF immediately after inputting electricity. Once turned ON, the DC input from external sources will be output from the HOT output terminal side. This button works independently of the START button.

Also, the button can be turned off (ON→OFF) in the START mode. When this is done, the Unit will go into the STOP mode just like the STOP button.

#### **I** COUNT Multiplier Button

The “COUNT Multiplier Button “ lets you configure the actual repetitions of output as a multiple of the number displayed in **C** COUNT / Ri. When the button is unlit, the multiplier is set as 100, and pulses will be output 5000 times if the number 50 is displayed. When the button is lit, the multiplier is 1, and the pulses will be output the number of times displayed.

#### J tr Configuration Switch

The “tr Configuration Switch” is only functional for Pulse 1, and sets the rise time. Light the 1 $\mu$ s button when performing 12V tests, and 3 $\mu$ s button when performing 24V tests. Both buttons will be unlit for Pulse 2a.

#### K START Button

By pressing the “START Button” for 1 second, the Unit will go into START mode keeping the current settings. When the test is finished or stopped by the STOP button, 5 seconds of electricity purge time is pre-set, and all the displays are kept lit. When you keep pressing this button for 1 second during the electricity purge, the Unit will go into standby mode, and will return to START mode after the purge is complete. Other buttons are functional during the purge time (except standby mode), and you can modify the settings.

#### L STOP Button

The “STOP Button” lets you stop START mode (incl. standby mode). At this time, the Unit will return to STOP mode without outputting pulses from the Output Terminals. **As STOP Button does not work with DC output , DC output is not turned OFF.** Turn DC Output OFF with DC LINE Button.

#### M Warning Lamp

The “Warning Lamp” turns ON when DC LINE is ON during STOP mode. Be aware that DC is output from the Output Terminals while the Warning Lamp is ON.

Also, it blinks while the capacitor is charging, and will return to the pre-START mode when charge/discharge is complete (See the table below).

**Table 5 Condition of Warning Lamp**

START/STOP	DC LINE ON/OFF	Display
STOP mode	DC LINE OFF	Unlit
	DC LINE ON	Lit
START_mode	DC LINE OFF	Blink
	DC LINE ON	Blink

#### ② Power Switch

The “Power Switch” powers the Unit. When flipped to the right, the power turns ON, and settings will be displayed on the control panel. The power turns OFF when flipped to the left.

#### ③ DC Input Terminals

The “DC Input Terminals” is capable of receiving input up to 60V 30A. Connect the accessory DC Input Cable or an equivalent one that match the DUT current. Make sure that “+” and “-” are connected as directed by the signs. The DC voltage input from these terminals will be output from “⑤, ⑥ output terminals (HOT, GND),” and input into the DUT.

#### ④ **Circuit Breaker**

The “Circuit Breaker” serves as protection against DUT short circuits. It is inserted between the “+” of DC Input Terminal ③ and the Output Terminal (HOT) ⑤. Raise the lever for electrical continuity. It goes down (or trips) when an over current is detected. It trips when the current exceeds 40A .

#### ⑤, ⑥ **Output Terminals (HOT, GND)**

The “Output Terminals (HOT, GND)” output the pulse. The red terminal is HOT, and black is GND. The black GND Terminal is connected to FG. (Refer to Fig. 1 and Fig. 2).

#### ⑦ **Protective Conductor Terminal**

The “Protective Conductor Terminal” grounds the Unit. It is connected to FG (Frame Ground).

#### ⑧ **AC Input (Fuse)**

The “AC Input (Fuse)” is the driving power connector for the Unit. Input the voltage set on the “⑨ AC Voltage Selection Terminals.” If you can not ground the Unit with the power supply cable, be sure to ground it with the “⑦ Protective Conductor Terminal.”

Also here is the FUSE for the power source. It will melt off in emergencies such as excessive current. Should the melting off occur, turn the Unit and connected equipment powers OFF, and check out the symptoms, model name, and the serial number and contact our sales agent or the technical service center.

In the event of fuse check-up or replacement, disconnect the power cable from the Unit and other connected devices and DUT INPUT power supply before proceeding.

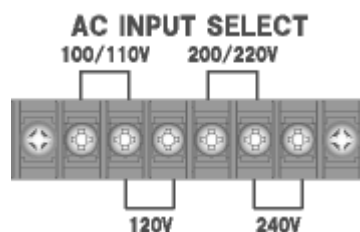
**Do not use fuse other than the specified  $\phi$  5mm  $\times$  20mm 250V M 3.15A (M: Medium Slow).**

#### ⑨ **AC Voltage Selection Terminals**

The “AC Input Voltage Selection Terminals” let you select AC Input Voltage. The Unit is capable of running at 6 different voltages 100V, 110V, 120V, 200V, 220V, and 240V. AC Input ⑧ Voltage can be chosen by short-circuiting a pair of the terminals shown on Figure 10.

The factory default voltage is set to 100/110V. Be sure to adjust the setting when you use the Unit under different voltage. Never fail to unplug the AC plug from the outlet when changing configurations.

Also, be sure to input electricity after placing the terminal covers since there is danger of electric shock if you touch the terminals.



**Fig. 10 AC Input Selection Terminals**

## ⑩ Communication Terminal

By connecting the Unit to a PC using the optional parts Optical Interface Unit and Remote Control Software through this “Communication Terminal”, parameter settings, START, and STOP can be controlled from the PC. Refer to section “9. Remote Controlling by PC” for connection procedures.

## ⑪ Interlock Terminal

The “Interlock Terminal” is for inserting the accessory Interlock Plug. Either removal of the Interlock Plug or opening connection between the Pins 1 – 3 on the Interlock Plug will result in disconnection of Interlock, and the screen shown in Figure 10 appears. Once this occurs, it cannot be recovered unless the power is turned OFF and turned ON again.

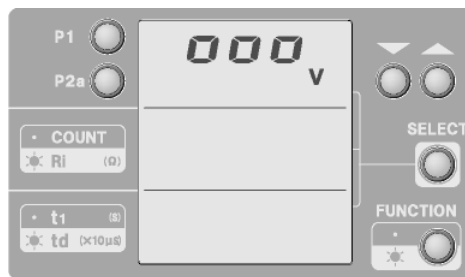


Fig. 11 Display when Interlock is disconnected

### Remote Controlling Interlock

1. The 1 and 3 pins on the accessory Interlock Plug on the rear panel are short circuited. Open this connection. This will result in Interlock disconnection.
2. Control the number 1 and 3 pins by shorting or opening them at the contact point or with the Open Collector. While opening, input sequential signals for 100ms or more. Opening these pins will result in Interlock disconnection.
3. The remote control procedure is shown in Fig. 12

Pin 1 voltage is approximately 4V (when open, with Pin 3 as the reference)

Pin 3 voltage: 0V (the same electric potential as FG)

Pin 1 - Pin 3 short circuit current: less than 2mA.

Voltage identified as error: 2V to 4V

Voltage identified as normal: 0V to 0.4V (0.4V to 2V is undetermined range.)

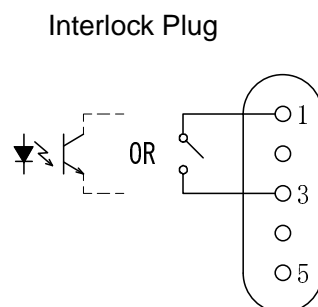


Fig. 12 Interlock Control Procedure

⑫ **Ventilation Fan**

The “Ventilation Fan” is for cooling the internal devices. Do not block the vents.

⑬ **External Output Terminals**



The “External Output Terminals” are for outputting P3a/P3b pulses from ISS-7690 (CDN). Do not connect anything to these ports when using standalone. There is a risk of electric shock. Do not touch these terminals



## 8. TEST PROCEDURE

### 8-1. Pre-Operation Check

---

Check the installation environment, wiring, and terminal connections.

- **Confirming the Installation Location**

Read the “Important Safety Instructions” and set the Unit in accordance with the ISO Standards or the test plan.
- **Inserting Interlock Plug**

Connect the accessory Interlock Plug onto “⑪ Interlock Terminal” on the rear panel. Confirm that the number 1 – 3 pins on the Interlock Plug are shorted or that interlock remote control signals (refer to Fig. 12 Interlock Control Procedure) are input.
- **Connecting DC Input Cable**

First, be sure to turn the “④ Circuit Breaker” OFF (lower the lever). Connect the accessory DC Input Cable to the “③ DC Input Terminals” of the Unit, correctly connecting the [+] and [-]. Use appropriate DC Input cable, as there could be high amount of current flow depending on the DUT load. Connect the other end of the DC Input Cable to a DC power source or batteries. Output the specified voltage from the DC source.
- **Connecting Output Cable**

Connect the plug side of the accessory Output Cable to “⑤, ⑥ Output Terminals (HOT, GND).” The Unit is able to output high voltage/large currents. Confirm that the connector is inserted completely, as there is a significant risk of electric shock if the metal part of the connector is exposed.

Connect the other end of the output cable to the DUT. To ensure compatible and replicable tests, it is important to keep the same cable-to-cable distance, the same cable length to DUT, and the same height from the ground plane every time.
- **Confirming the AC Source Voltage**

Be sure to confirm that “⑨ AC Source Voltage Selection Terminals”\_jumper setup on the rear panel is set to the currently used AC source voltage. The Unit will be damaged if these do not match.
- **Connecting AC Cable**

Insert the accessory AC Cable into the “⑧ AC Input” on the rear panel of the Unit. Insert the plug on the other end into the outlet. If the Unit cannot be grounded with the AC cable, be sure to ground it using the “⑦ Protective Conductor Terminal.”
- **Turning the Unit Power ON**

Once all these confirmations are made, turn the power on with the “② Power Switch.”
- **Turning on and setting up DUT**

Turn the “Circuit Breaker ⑧” ON (raise the lever up). No current will flow to DUT at this time because the “DC LINE Button H” of the Unit is OFF. Next, set up DUT, peripheral devices, and testing environment according to the test plan.

## 8-2. Setting Parameters

---

The previous settings except DC LINE ON/OFF are preserved immediately after the Power Switch is turned ON. The displays are also the same as the settings immediately before turning OFF.


- Selecting Pulse 1 / 2a  
Use “**A** Pulse Selection Button” to select the Pulse to be used in the test.
- Setting Pulse Output Voltage Us  
Press the “**F** SELECT Button” several times until “**B** Us Display” begins to **blink**. Then **select** the value in “**B** Us Display” according to the test plan using the “**E** UP/DOWN Buttons.”
- Setting COUNT  
Confirm that the “**G** FUNCTION Button” lamp is **not lit**, and press “**F** SELECT Button” until “**C** COUNT / Ri Display” begins to **blink**. Next, set the multiplier (\* 1 or \* 100) with “**I** COUNT Button.”  
**Set** the value in “**C** COUNT / Ri Display” according to the test plan using the “**E** UP/DOWN Buttons.”
- Setting the Output Resistance Ri  
Confirm that the “**G** FUNCTION Button” lamp is **lit**, and press the “**F** SELECT Button” until the “**C** COUNT / Ri Display” begins to **blink**. **Set** the value shown in “**C** COUNT / Ri Display” according to the test plan using the “**E** UP/DOWN Buttons.”
- Setting the Pulse Cycle Length t1  
Confirm that the “**G** FUNCTION Button” lamp is **not lit**, and press the “**F** SELECT Button” until the “**D** t1/td Display” begins to **blink**.  
**Set** the value shown in “**D** t1/td Display” according to the test plan using the “**E** UP/DOWN Buttons.”
- Setting the Pulse Output Decay td  
Confirm that the “**G** FUNCTION Button” lamp is **not lit**, and press “**F** SELECT Button” until “**D** t1/td Display” begins to **blink**.  
**Set** the value shown in “**D** t1/td Display” according to the test plan using the “**E** UP/DOWN Buttons.”
- Setting tr  
Only when using Pulse 1, set the pulse rise time tr with “**J** tr Configuration Button”. Set it to 1 $\mu$ s for 12V tests and 3 $\mu$ s for 24V tests.
- Turning DC LINE ON  
While the DC source is outputting, turn the “DC LINE Button **H**” ON (**the button lights**) to output DC voltage from the “Output Terminals (HOT, GND) ⑤, ⑥” of the Unit.  
Voltage will drop in the injection circuit when the current flows to DUT. Adjust the DC source voltage if the voltage across the DUT does not fall within the range specified in the test plan.

### 8-3. Starting and Finishing Test

---

Be sure to carry out “11 Pre-Start Checkup (Waveform Verification)” prior to proceeding with a test

Start the test after completing the checkups and various settings.

- Start  
Keep pressing the START Button for 1 second or more. A beep sounds, “Warning Lamp ” begins to **blink** and the Unit will enter START (run) mode.
- Finish  
The test finishes when the “COUNT” display becomes “0.0.” The Unit will discharge electricity internally and return to the STOP mode. It takes about 5 seconds to discharge, and the test cannot be resumed while discharging.
- Stop  
Pressing STOP Button during START mode is defined as “Stop”. When a test is stopped, the Unit will discharge its electricity internally just like “Finish” and the Unit goes back to STOP mode.  
The energy stored up by charging is all discharged internally in the Unit. As the internal circuit must bear the loading, repeating “Stop” and “Start” more than necessary may shorten the life of the Unit. Do not repeat start and stop intentionally.

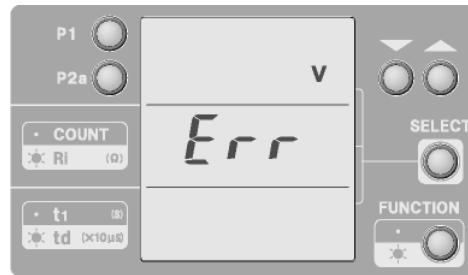
Turn OFF the power of the Unit after the test has been finished (or stopped) and the displays become ready to enter (one of the displays will blink). Also, when the DC is input, reduce the output of the DC source to 0V before turning the Unit to reduce damage to the DC source. The procedure for turning the Unit power OFF is listed below:.

1. Put the Unit into STOP mode.
2. Turn DUT power OFF, or make ready to turn it OFF.
3. Reduce output of DC power source to 0V.
4. Turn DC LINEOFF.
5. Turn the Unit power OFF.

## 8-4. FAN Stop Error

---

In addition to “⑫ Ventilation Fan” , the Unit has fans for internal ventilation. When these internal fans stop for any reason, the LED will display “Err” as shown in Fig.13. When this happens, contact our sales agent or the Technical Service Center for repair service.



**Fig. 13 FAN Stop Error Display**

## 9. REMOTE CONTROL BY PC

### 9-1. Preparation

- The Remote Control Software on a PC (Personal Computer) lets you control the Unit externally. FG, SG, and PE of the Unit and the FG of the PC can be isolated. Once communication with the Remote Control Software is established, you cannot control the Unit locally any more. To enable local control, the Unit must be turned off once.

The following items are necessary:

- Remote Control Software (Option ISS-7601)
- Optical Interface Unit (Option 07-00022A)
- PC (Personal Computer) (To be procured separately by the user)

### 9-2. Hardware Setup

Connect following the procedure below.

- Confirm that the power of the Unit and PC are both OFF
- Remove the protective rubber caps on the optical cable plugs.  
Insert the plug of the optical cable that comes with the Optical Interface Unit 07-00022A, into the Communication Terminal ⑪, and insert the other plug into the Optical Interface Unit. See Figure 14.
- Turn the Unit power ON
- Turn the PC power ON and start up the OS.
- Log in as a user with administrative authority
- Hot-plug the USB plug of the Optical Interface Unit into the PC.

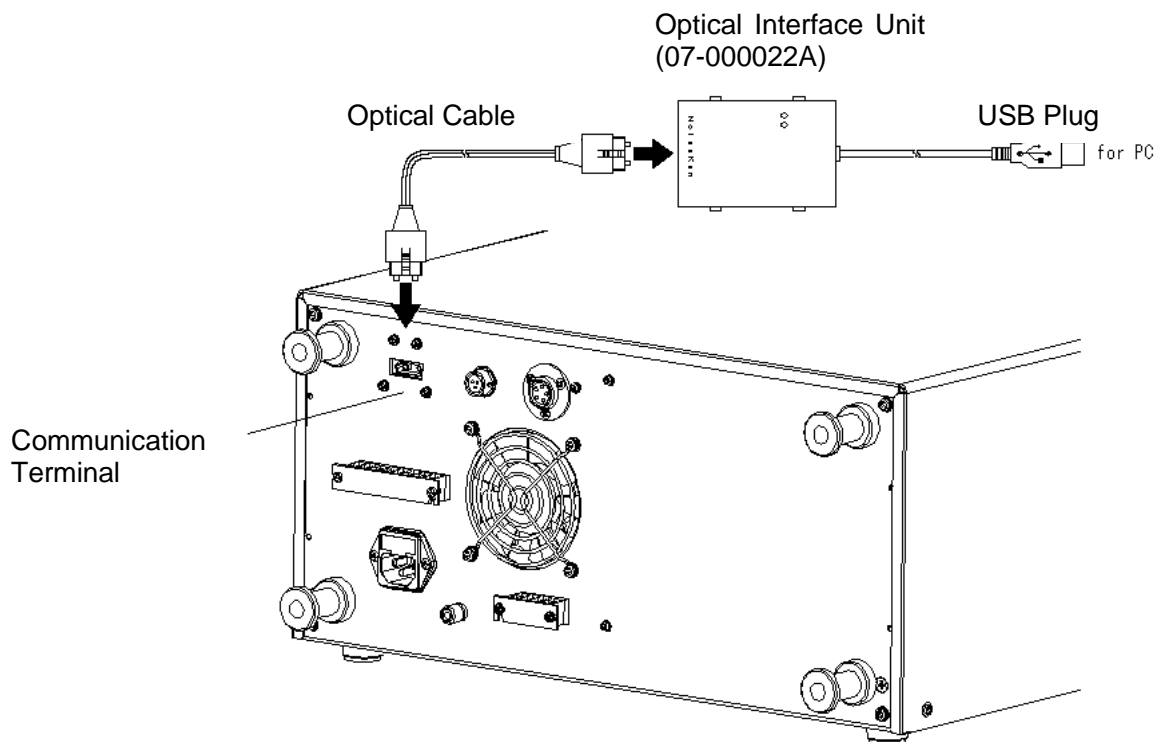


Fig. 14 Hardware Set Up

### 9-3. Installing the Software

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Install the “Remote Control Software”ISS-7601 onto PC using the DISK of the Remote Control Software. Refer to the instruction manual of Remote Control Software for installation procedure (shown in Figure 15).

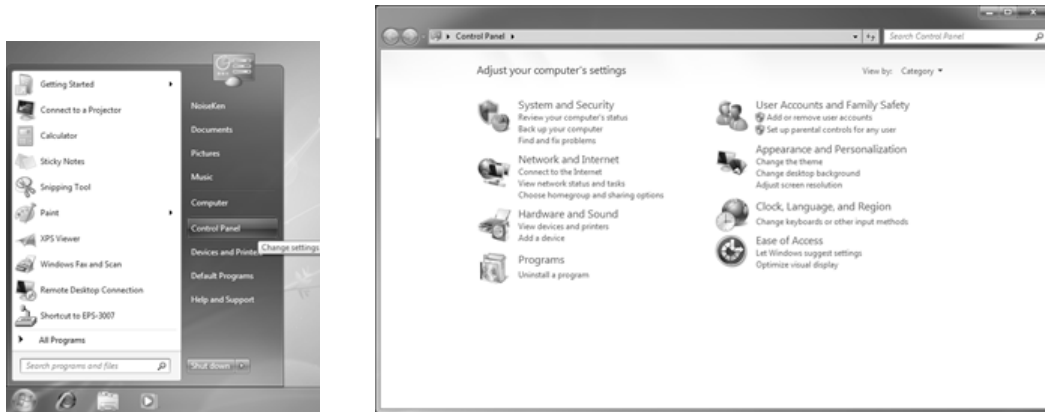


Fig. 15 Installing Software

### 9-4. Installing Remote Control Software

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Refer to the instruction manual of Remote Control Software for installation procedure.

### 9-5. Installing Serial Port Drivers(At the time of Stand-alone Use)

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Refer to the instruction manual of Remote Control Software for installation procedure.

### 9-6. Using Remote Control Software

---

Run the Remote Control Software and remote control the Unit. Refer to the instruction manual of the Remote Control Software for operation procedures.

### 9-7. Turning Off the Remote Control Software and the Unit

---

- **Be sure to** do the following steps;
- Set the Unit to “STOP” and “LINE OFF” with the Remote Control Software.
- Shutdown PC after closing Remote Control Software.
- Turn the Unit power switch OFF.
- Remove USB Cable.

# 10. PRODUCT SPECIFICATIONS

**Table6 Product Specifications - Common Parameters**

Parameter	Specification	
	Test Pulse 1	Test Pulse 2a
Corresponding Standards	ISO 7637-2(Third edition 2011-03-01) ISO 7637-2(Second edition 2004-06-15) ISO/DIS 7637-2.3(2003-05-20) ISO/DIS 7637-2.2(2002-07-16)	
Us	-5V ~ -720V ± 10% -1V intervals (waveform guaranteed -20V ~ -720V)	5V~300V ± 10% 1V intervals (waveform guaranteed 12V~300V)
Ri	10Ω, 30Ω, 50Ω (Tolerance according to Annex D)	2Ω, 4Ω, 10Ω, 30Ω, 50Ω (Tolerance according to Annex D)
Td	50μs, 200μs, 300μs, 500μs, 1000μs, 2000μs every ± 20%	50μs, 200μs, 300μs, 500μs every ± 20%
Tr	1μs (+0 μs, -0.5μs) *** 3μs (+0μs, -1.5μs)	1 μs (+0μs, -0.5μs)
t1	0.5s ~ 99.9s 0.1s steps	0.1s ~ 99.9s 0.1s steps
t2	200ms	—
t3	< 100μs	—
COUNT	1~99900 times 7 segment LED	
Circuit Breaker	Rated current 40A	
Interlock	Control by Foreign Input, Contact Point, or Open Collector L Level: 0V~0.4V H Level: 2V~4V	
Remote Control from PC	Interface	Option 07-00022A (Optical Interface Unit)
	Software	Option ISS-7601
	Compatible OS	Windows 7/10 (ISS-7601 requires version 2.1.0.0 or later)
DUT Capacity	DC 60Vmax, 30Amax	
Pulse Injection Method	DC OFF by FET	Diode Series Injection
Equipment Input Voltages	AC100V, 110V, 120V, 200V, 220V, 240V (50/60Hz) Capacity Difference : ± 10% for all Select with terminals on the rear panel of frame ground.	
Operational Temperature Range	23°C ± 5°C	
Operational Humidity Range	25%~75%R.H. (with no condensation)	
Dimensions	(W)430mm×(H)200mm×(D)522mm (excluding abutments)	
Weight	Approximately 20kg	
Electricity Use	Approximately 260VA	

\*\*\*With Ri=30Ω or 50Ω settings, the tolerance of tr is less than 2μs at the range Us=-5V~-100V.

**Table 7 Tolerance specified by Annex D**

Test Pulse 1

	Load	Us	Tr	td
12V System	No Load	-100V ± 10V	1 (+0, -0.5) μs	2000μs ± 400μs
	10 Ω Load	-50V ± 10V	—	1500μs ± 300μs
24V System	No Load	-600V ± 60V	3 (+0, -1.5) μs	1000μs ± 200μs
	50 Ω Load	-300V ± 30V	—	1000μs ± 200μs

Test Pulse 2a

	Load	Us	Tr	td
12V/24V System	No Load	50V ± 5V	1 (+0, -0.5) μs	50μs ± 10μs
	2 Ω Load	25V ± 5V	—	12μs ± 2.4μs



# 11. WAVEFORM VERIFICATION

Before starting the test, verify that the Unit is outputting the pulse normally. The verification is made in accordance with Annex D of ISO Standards.

## Waveform Verification Procedure

1. Be sure to short circuit the + and - of the “DC Input Terminals ③” with the accessory Short Lead Cable (for Waveform Verification). This is because  $U_A=0V$  is specified in Annex D of ISO Standards for waveform verifications.
2. Be sure to raise the “④ Circuit Breaker” Lever ON (up).
3. Insert the accessory Output Cable into “⑤, ⑥ Output Terminals (HOT, GND).” Confirm that “HOT” and “GND” are correctly connected.
4. Turn ON the “② Power Switch.” Always have “ DC LINE Button” ON.
5. Configure the Unit according the Table 8 below.

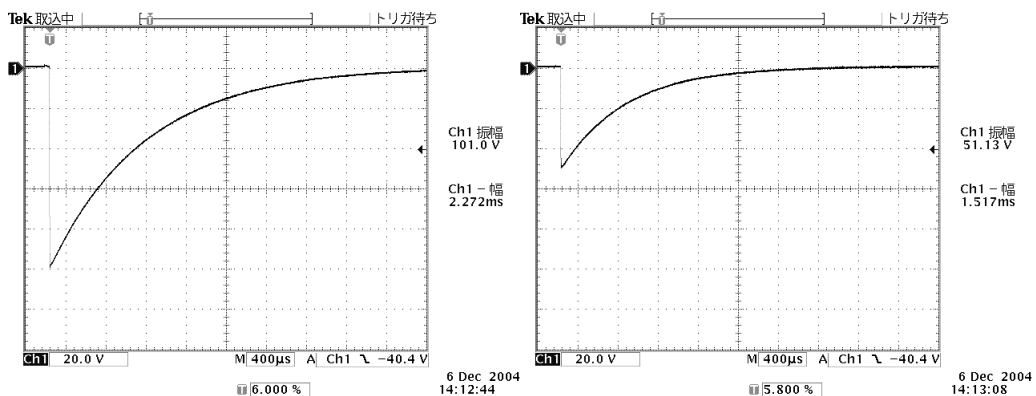
**Table 3 Setup for Waveform Verification**

Parameter	Pulse 1 12V	Pulse 1 24V	Pulse 2a
Us	-100V	-600V	50V
Ri	10 Ω	50 Ω	2 Ω
Tr	1 μs	3 μs	—
Td	2000 μs	1000 μs	50 μs

6. Press the “ START Button” to set the Unit to START mode. Observe the waveform on the oscilloscope, and make comparison with Table 2 and Table 4 to verify the waveform.

If the measurement does not fall within range, contact our sales agent or the Technical Service Center, as the Unit may need repair or adjustments.

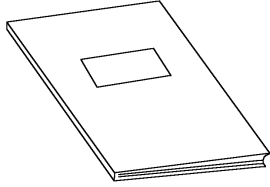
Be sure to verify that the required waveform is output prior to performing the tests in accordance with the ISO Standards.



**Fig. 16 Sample Waveform for Pulse 1 12V (Left: No Load, Right: 10Ω Load)**

## 12. ACCESSORIES

Instruction Manual



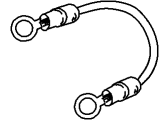
Replacement FUSE  
3.15A



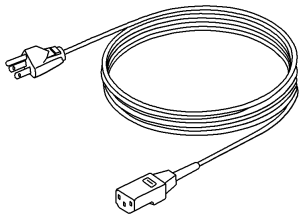
Interlock Plug



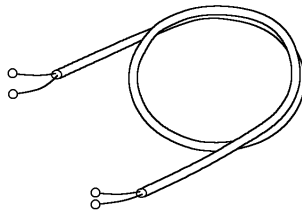
Short Lead Cable  
(For waveform check)



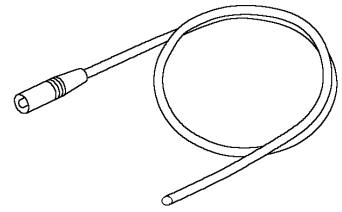
AC Cable



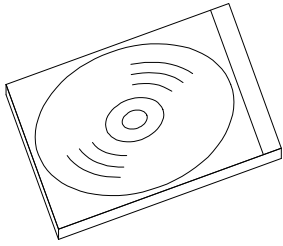
DC Input Cable 2m



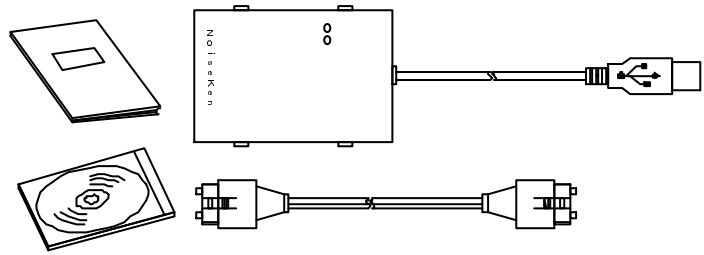
Output Cable 2m  
(one red, one black)



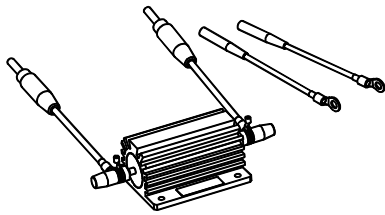
## 13. OPTIONS



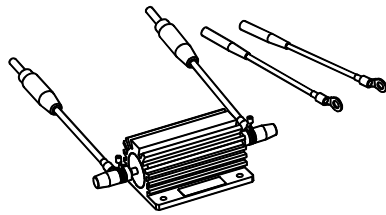
Remote Control Software  
ISS-7601



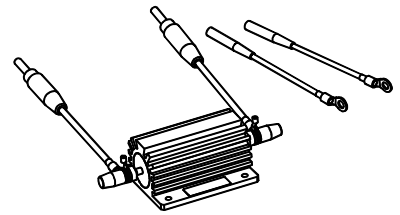
Optical Interface Unit  
07-00022A



Waveform Verification Load (2Ω)  
06-00061A



Waveform Verification Load (10Ω)  
06-00062A



Waveform Verification Load (50Ω)  
06-00063A

## 14. WARRANTY

### Services

The following terms are applicable to the services provided by the Company to maintain and repair the Unit.

1. Scope

The Unit and accessories and options provided by the Company are covered under this section.

2. Technical Service Fee

Any repairs provided by the Company during the warranty period will be free of charge in accordance with the Limited Warranty. After expiration of the warranty period, actual cost for the repair will be charged to the user.

3. Ownership of Defective Parts

All the defective parts replaced during the warranty period become the property of the Company. For paid repairs, they also become the property of the Company unless otherwise directed by the user.

4. Maximum Compensation

In the event the user incurs damage due to malfunction of the Unit arising solely from the negligence and/or improper repair on the part of the Company, the Company will compensate for the damage. The maximum compensation amount shall be limited to the amount paid by the user at the time of purchase of the Unit. In no event, shall the company be liable or in any way responsible for incidental or consequential damages such as loss of profit or third party's claims to the user.

5. Wrong Parts, Missing Parts and Damage

The company shall not be liable for loss of profit, business interruption, other incidental damage, special loss, punitive damage or third party's claims to the user directly or indirectly arising from suspension of testing activities due to wrong parts, missing parts, or damage of the Unit.

6. Service Refusal

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

1.

## Limited Warranty

In the event of failure during the warranty period, the Unit will be repaired or replaced free of charge. Decision of the repair method shall be left at the discretion of the Company. This limited warranty is applicable in Japan only.

### 1. Scope

This warranty is applicable only to the Unit and its accessories.

### 2. Warranty Period

One year from the date of delivery.

For a location once repaired, the warranty period for same parts / same problems is 6 months from the time of repair completion.

### 3. Exceptions

Regardless of the above, following will be excluded from the warranty.

Consumable parts replacement, including High Voltage Relay (if used)

- ◇ Failure caused by negligence, or damage to the Unit.
- ◇ Failure due to modifications made without the Company's authorization.
- ◇ Failure due to repairs made by personnel not authorized by the Company.
- ◇ Failure directly or indirectly arising from force majeure including but not limited to, acts of god, fire, war, rebellion and others
- ◇ Failure due to shipping, vibration, falling, or impact shock after delivery
- ◇ Failures due to use of the Unit under the improper environment.
- ◇ When the Unit is taken out of the country

## 15. MAINTENANCE

1. Should the necessity of services such as repair, maintenance, or internal calibration arise, leave them to qualified service personnel only.
2. Limit your own maintenance works to exterior surface cleaning and functional tests.
3. When checking or changing replaceable fuses, turn OFF the power switches of the Unit and connected devices (if any).
4. Before cleaning the Unit, turn OFF the power switches of the Unit and connected devices (if any).
5. When face panels get dirty, wipe them lightly with a cloth moistened with water or mild detergent.
6. Do not open the Unit's covers unless such an action is expressly specified in the Manual.

## 16. 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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**NOISE LABORATORY CO., LTD.**

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

TEL: +81-(0)42-712-2051 FAX: +81-(0)42-712-2050

URL: <http://www.noiseken.co.jp>

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