



INSTRUCTION MANUAL

TELECOM CDN

MODEL LSS-6330TEL

NOISE LABORATORY CO., LTD.

The 1.00 edition
AEE00692-00E-0

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1. IMPORTANT SAFETY PRECAUTIONS

The following instructions are very important for safe handling of the telecom CDN LSS-6330TEL (hereinafter "the Unit"). They must be kept strictly to prevent users of the Unit from receiving harm or damage through using the Unit. Read them carefully before use.

- **Only well-trained EMC technicians (electric technicians) are allowed to use the Unit.**

The Unit may cause a fatal wound. Carefully handle it. And it may radiate electromagnetic noise which exceeds the regulation value. Take applicable countermeasures such as faraday cage, shield room, etc. as the need arises.

- **The Unit should be used only for EMC testing described in this manual.**

Using it for other purposes may result in a fatal or serious accident.

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

It may result in a fatal or serious accident.

- **The Unit cannot be used in an explosive area, fire prohibited area, etc.**

Use of the Unit in such an area is liable to cause combustion or ignition.

A number of safety recommendations are listed in the later chapter "BASIC SAFETY PRECAUTIONS". Be sure to read them before test environment settings, connecting relating equipment and testing.

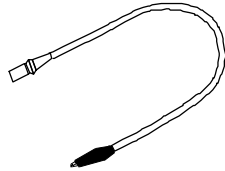
2. CHECK PACKAGE CONTENTS

Before using the instrument, check whether the included accessories are complete according to the following list.

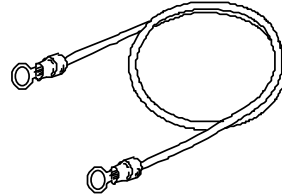
A



B



C



D



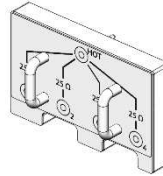
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F



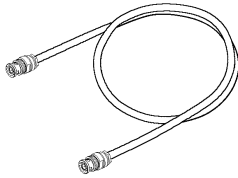
G



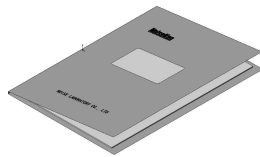
H



I



J



K



| | |
|---|---|
| A : Surge input cable (connector cover red & black) ----- | 1 |
| B : Telecom line output cable (1m)----- | 5 |
| C : FG cable (2m) (MODEL : 05-00070A M6—M6) ----- | 1 |
| D : Coupling arrestor unit (for coupling) ----- | 4 |
| E : Arrestor unit (For input protection)----- | 4 |
| F : Short plug ----- | 2 |
| G : Resistor conversion box ----- | 1 |
| H : FG connection short bar ----- | 1 |
| I : Interlock cable----- | 1 |
| J : Instruction manual----- | 1 |
| K : Accessories bag----- | 1 |

3. APPLICATION FORM FOR INSTRUCTION MANUAL

We place an order for an instruction manual.

Model: LSS-6330TEL

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, Sagamiara City,

Kanagawa Pref., 252-0237 Japan

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

Cut
line

4. PREFACE

We thank you very much for your purchase of our Telecom Coupling Unit for LSS-6330: LSS-6330TEL (“the Unit”). This instruction manual (“the Manual”) contains how to use the Unit and other important information. In order to obtain the highest performance from the Unit, thoroughly understand the contents of the Manual and use as ready reference for operation.

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

4–1. Features

The Unit complies with IEC61000-4-5 (Edition 3.0: 2014 version).

- Capable of conducting lightning surge tests for unshielded, symmetrical interconnection/communication lines as specified in IEC61000-4-5 (Edition 3.0: 2014 version)
- Capable of changing the matching resistor, when connected to the supplied resistor conversion box, to enable test settings for unshielded, outdoor, symmetrical communication lines (10/700us)
- Capable of switching between 2 lines and 4 lines, using the supplied short plug

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6. BASIC SAFETY PRECAUTIONS

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

6–1. Symbols of Hazard

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



DANGER

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



WARNING

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







CAUTION

The contents of this display indicate “the assumption that there is a possibility of harm and the assumption that there is a possibility of physical damage” if the Unit or related equipment is handled incorrectly.


6–2. Symbols of Instruction, Warning and Caution


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

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


| | |
|---|---|
|  | <p>Noticing possibility of an electric shock It indicates that there is possibility of an electric shock.</p> |
|  | <p>Noticing caution, warning and danger It indicates that there is a possibility of harm or physical damage if the Unit is or related equipment is handled incorrectly and that the Manual should be referred.</p> |
|  | <p>It indicates warnings for electric shock etc. and the Manual should be referred.</p> |
|  | <p>Notifying danger of electric shock and the Manual should be referred.</p> <p><u>Caution in handling</u> Lifting may damage back.</p> |


6—3. Danger

| | |
|---|---|
|  <p>Do not disassemble</p> | <p>Do not take the Unit apart or remodel. Do not open the cover.</p> <p>Imminent danger might occur resulting in death or serious injury. Repair, internal adjustment, and inspection of the Unit should be performed by a qualified service engineer. Ask the Company or its sales agent.</p> |
|---|---|


| | |
|---|---|
|  <p>Prohibited</p> | <p>Do not use the Unit in an explosive are or fire-prohibited area etc.</p> <p>Use of the Unit in such an area is liable to cause combustion or ignition.</p> <hr/> <p>A person who has a pacemaker on should not operate the Unit and also should not enter the area where it is operating.</p> <p>It may result in a fatal or serious accident.</p> |
|---|---|

6—4. Warning


| | |
|---|--|
|  <p>Compulsory</p> | <p>Stop operation if following unusual phenomena should occur.</p> <ul style="list-style-type: none"> ○ Emitting fumes, or smelling. ○ Water or an unusual substance being stuck ○ Being dropped or being damaged ○ AC cable being damaged (e.g. core lines being exposed etc.) <p>Continuing to operate in the above status may result in a fire, electric shock, or injury. If an unusual phenomenon occurs, turn off power supply immediately, pull AC plug out of an outlet, and ask the Company or sales agent repair. As there is potential danger, any user must not repair the product.</p> <hr/> <p>Insulate and protect the test facility against maximum output voltage of the Unit.</p> <p>If the test facility is not so insulated and protected, there is the dangerous possibility of an electric shock, leak or fire.</p> <hr/> <p>Turn off power supply of the LSS-6330 when setting or changing connection of related equipment.</p> <p>Failure to follow this notice may cause electric shock, injury, or malfunction.</p> <hr/> <p>Use the Unit after understanding instructions in the Manual fully.</p> <p>There may be danger causing a fatal or serious wound or emitting over-ristricted-value electromagnetic noise in using the Unit. 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.</p> |
|---|--|

| | |
|---|---|
| | <p>Watch equipment while the Unit is operating.</p> <p>If this instruction should not be followed, a third person or equipment related to the test may be exposed to a danger.</p> |
| | <p>Use proper connectors and cables and connect them securely.</p> <p>Avoid using a damaged connector or cable. The misuse may cause an electric shock or damage of equipment.</p> |
| | <p>Install the Unit on a stable place.</p> <p>If the Unit is installed on an unstable place, human body may be in danger due to drop or overturn of the Unit.</p> |
|  Prohibited | <p>Do not use the Unit for any other purpose than Surge test.</p> <p>The misuse may result in an electric shock, an injury, or damage of equipment.</p> |
| | <p>Do not put any substance into the Unit or its connectors.</p> <p>If some metal or flammable things are put into the Unit through a connector or a vent, it may result in a fire or an electric shock.</p> |

6—5. Caution

| | |
|---|--|
|  Compulsory | <p>Take actions against emission of electromagnetic waves.</p> <p>When a test is performed using the Unit, a great amount of electromagnetic waves are emitted according to the type of EUT, sometimes adversely affecting the neighboring electronic equipment and radio communication apparatus. The user is required to provide a Faraday gage, shield room, shielding cable, etc. as necessary.</p> |
| | <p>Do not connect an AC/DC power line to TELECOM LINE OUT terminal directly.</p> <p>Connecting the power line directly damages the internal unit.</p> |
| | <p>If dewing occurs, fully dry up the Unit before using it.</p> <p>Dews may cause an electric shock, a trouble, a fire.</p> |
| | <p>Use the Unit in proper environment.</p> <p>Operating temperature range is 15~35°C. Operating humidity range is 25~75%. If these precautions are not followed, the unit may be broken or the prescribed performance may not be warranted.</p> |
| | <p>When the body is dirty, wipe the body with a dry cloth.</p> <p>Do not wipe the Unit and Probe with thinner, alcohol or other solvent. When the body is very dirty, soak a cloth into neutral detergent, squeeze out the detergent from the cloth and wipe the body with the cloth.</p> |



| | |
|--|--|
| | <p>Make hazardous labels always noticeable.</p> <p>When the caution or warning label is peeled off, missing or dirty, attach a new one for securing safety. When the caution or warning label is missing, ask the sales department or maintenance section of our company to send a new label.</p> |
| | <p>Do not work alone when moving the installation.</p> <p>This unit is heavy. When moving the installation site, take safety measures by multiple people.</p> |
| | <p>Do not install the Unit on following places.</p> <p>Setting up the Unit on wrong places as follows may result in a fire, an electric shock, or an injury.</p> <ul style="list-style-type: none"> ○ A very humid or dusty place ○ A hot place, e.g. a place exposed to direct rays of the sun, a place close to a heater. ○ A place easy to bedew, e.g. a place close to a window. |

| | |
|---|--|
|  <p>Prohibited</p> | <p>Do not block a vent or do not use the Unit in a place poorly ventilated.</p> <p>If a vent is blocked, the internal heat is close. It may cause a fire. For ventilation, be sure to take notice following points.</p> <ul style="list-style-type: none"> ○ Do not lay the Unit on its back, sideways, or upside down. ○ Do not put the Unit into a small, poorly ventilated place. ○ Keep the Unit at least 10cm away from a wall or some substance. |
| | <p>Do not put any container containing water on the Unit.</p> <p>If water is spilled or gets into the Unit, it may result in a fire or an electric shock.</p> |
| | <p>Do not drop or shock the Unit excessively.</p> <p>The misuse may cause trouble or damage.</p> |
| | <p>Do not bump or rub the Unit against something hard.</p> <p>The misuse may damage a surface of the Unit.</p> |
| | <p>Do not put any heavy thing or sit on the Unit.</p> <p>The misuse may result in a dent on the body or damage of internal components.</p> |

7. INTRODUCTORY NOTES

7–1. Introductory Notes

The meaning of following symbols is as follows.

| | |
|---|--|
|  | Additional explanation. |
|  | Indicating items to be confirmed before usage. |
| [] | Indicating text on the panel of the Unit. |

7–2. Terms and Definitions

The terms and their definitions are shown as follows.

| Term | Definition |
|-------------------------|--|
| Surge | Transient wave of electrical voltage, current, or power, propagating along a line or a circuit. It is a single waveform characterized by a rapid increase followed by a slower decrease. The phenomenon occurs sometimes by lightening, sometimes by transient response of switching of a circuit. |
| Voltage surge | Surge which waveform is formed in as voltage. With this simulator, this waveform is defined as a voltage waveform which is observed when some load (EUT or DUT) is connected to the output including when the output is open. |
| Current surge | Surge which waveform is formed in as voltage. With this simulator, this waveform is defined as a current waveform which is observed when some load (EUT or DUT) is connected to the output including when the output is short-circuited. |
| Front time | Parameter defining rise time of surge waveform. Each of voltage surge and current surge has its own definition of front time. |
| Duration | Time interval between the instant at which the rise time to 50% of surge peakvalue, and then falls to 50% of its peak value |
| Output impedance | Effective output impedance of the surge generating circuit. The following formula is used to acquire it. (Peak voltage value in open) / (Peak current value in short-circuired) |
| DUT | Device Under Test. A device to be tested by test equipment. |
| EUT | Equipment Under Test. Equipment to be tested by test equipment. |

7-3. Definition of Surge Waveform

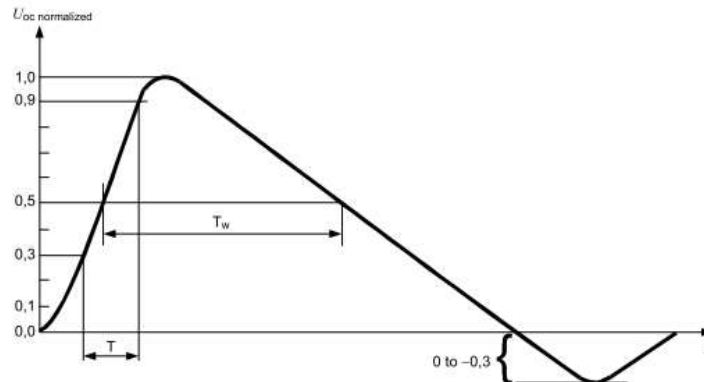
Voltage Surge Waveform

Fig 7-1 Voltage surge waveform

Front time (T_1): 1.67 times of the interval of time between the instants when the voltage value increases to 30% and 90% of the peak value.

Duration (T_2): Time interval between the instant at which the surge voltage rises to 0.5 of its peak value, and then falls to 0.5 of its peak value

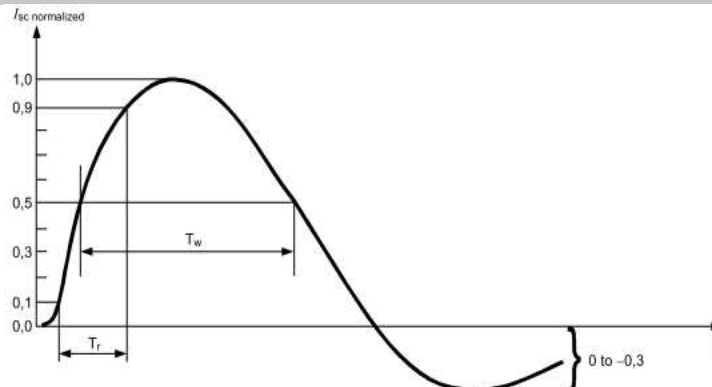
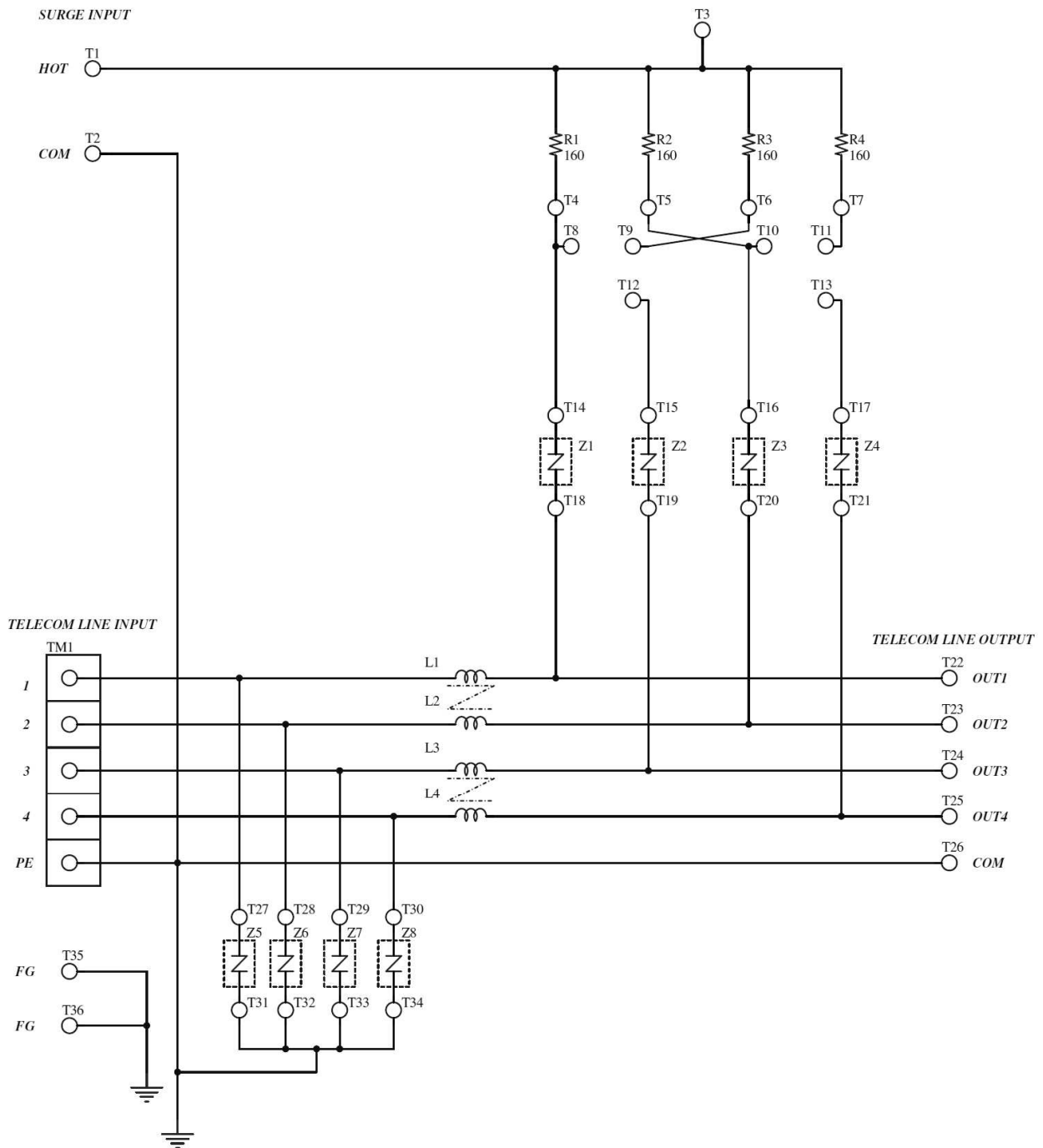
Current Surge Waveform

Fig 7-2 Current surge waveform

Front time (T_1): 1.25 times of the interval of time between the instants when the current value increases to 10% and 90% of the peak value.

Duration (T_2): virtual parameter defined as the time interval between the instant at which the surge current rises to 0.5 of its peak value, and then falls to 0.5 of its peak value (T_w) for $5/320\mu\text{s}$ waveform, and multiplied by 1.18 for $8/20\mu\text{s}$ waveform

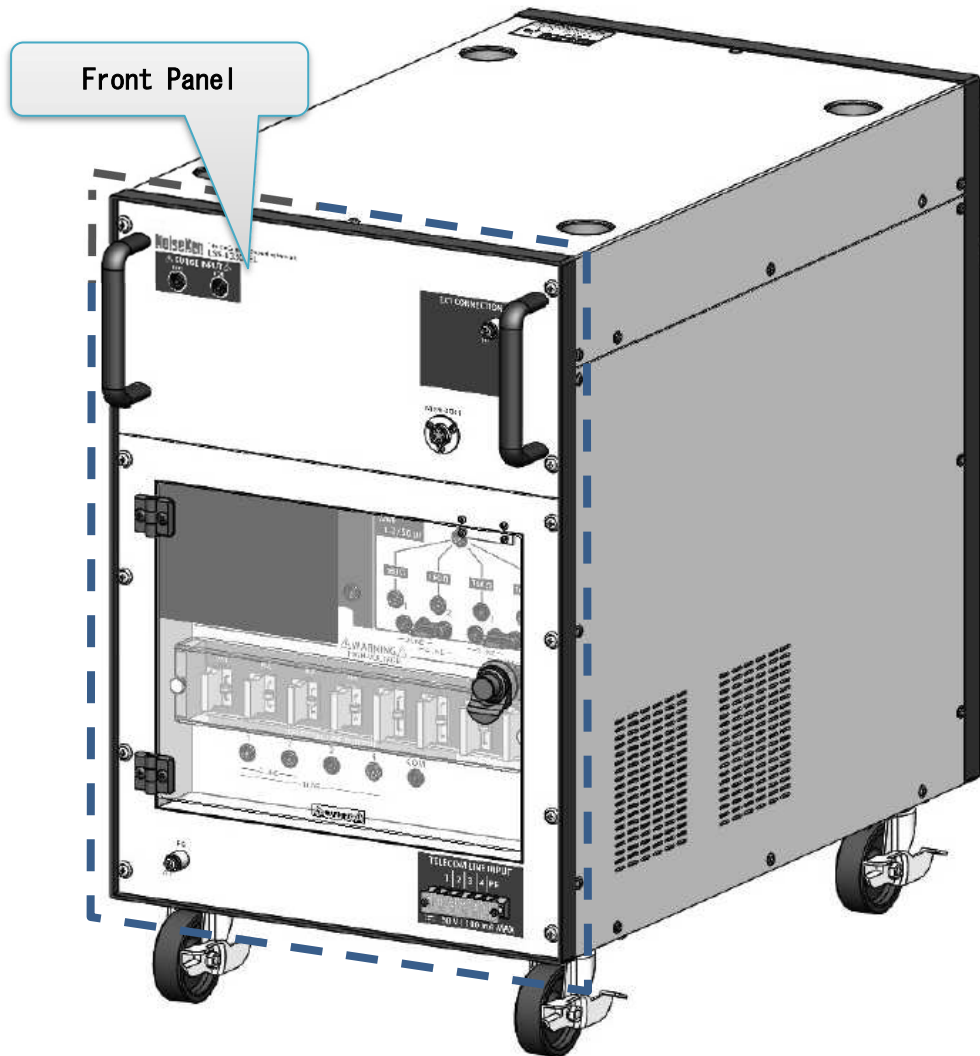
7-4. Block Diagram of LSS-6330TEL



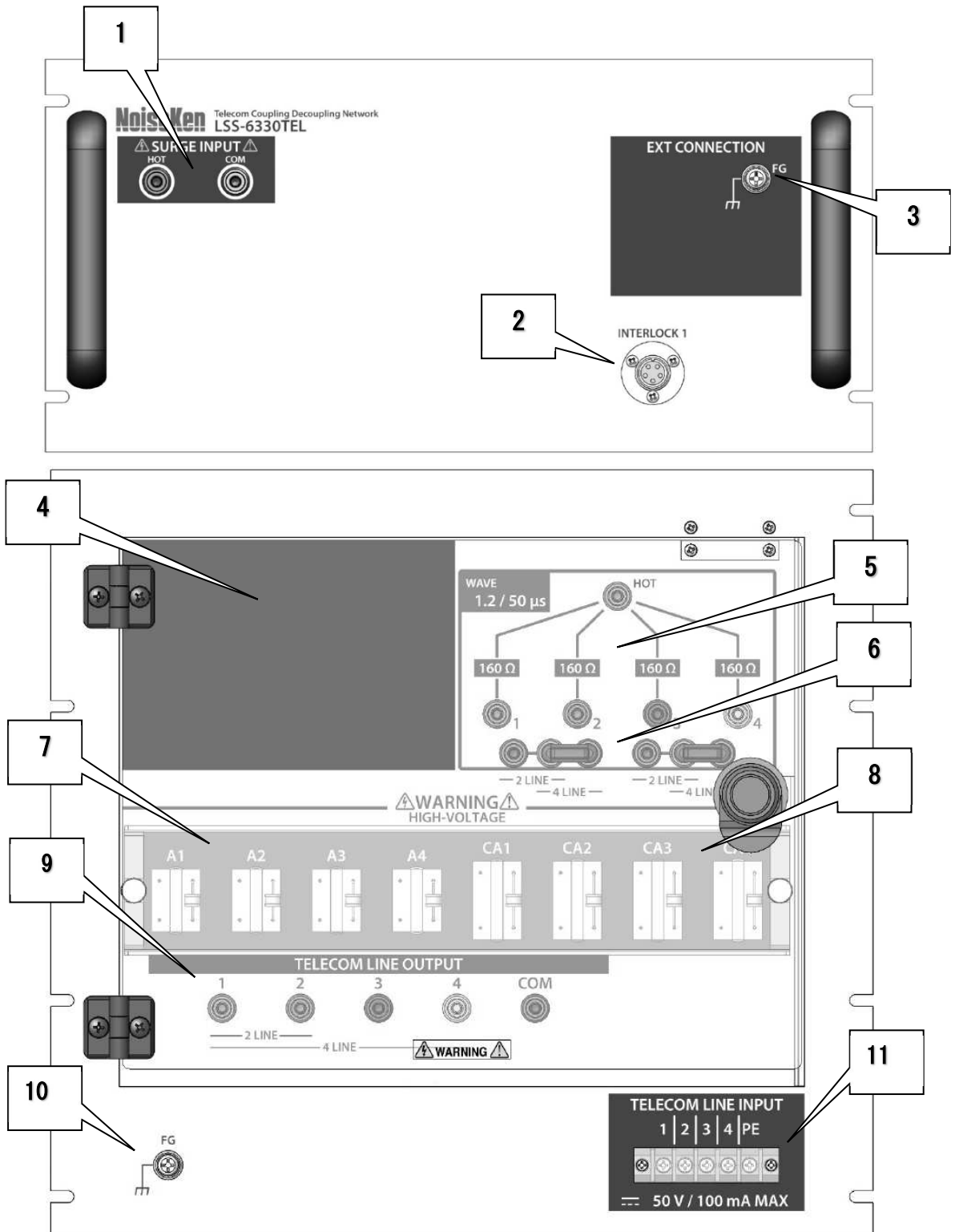
- T3 to T7: Connectors for resistor conversion
- R1 to R4: Matching resistors 160Ω
- T8 to T13: Connectors for switching between 2 lines and 4 lines
- L1 to L4: Decoupling inductances 20mH
- Z1 to Z4: Coupling arrestors
- Z5 to Z8: Decoupling arrestors

8. APPEARANCE AND FUNCTION OF EACH PART

8-1. Appearance of the Main Unit



8-2. LSS-6330TEL Front Panel



1. Surge input terminal [SURGE INPUT HOT / COM]

This surge input terminal is connected to LSS-6330. The supplied cable is used to connect it to the surge output terminal of LSS-6330.

2. Interlock terminal [INTERLOCK1]

This interlock connection terminal is connected to LSS-6330. The supplied cable is used to connect it to the [INTERLOCK] terminal of LSS-6330.

3. FG terminal [FG]

It is the FG terminal of the Unit. The supplied FG connection short bar is used to connect it to LSS-6330.

4. Resistor conversion box holder [RESISTOR BOX]

When the supplied resistor conversion box is not used, it is inserted into this space for storage.

5. Matching resistor change terminal [160Ω]

When conducting the 10/700μ waveform test, the supplied resistor conversion box is connected to set the resistor value to 25Ω.

6. 2-line/4-line switching terminal [2LINE / 4LINE]

The supplied short plug can be connected to set a 2-line or a 4-line configuration.

Do not use the short plug when conducting the 10/700μ waveform test in the 2-line configuration.

7. Arrestor unit [A1/A2/A3/A4]

This arrestor unit is for surge decoupling.

When conducting a test, make sure to attach all of the four arrestors for your safety.

8. Coupling arrestor unit [CA1/CA2/CA3/CA4]

This coupling arrestor unit is used for surge coupling. For the 2-line configuration of the Unit, use at least CA1 and CA2. For the 4-line configuration, attach all arrestor units, CA1 to CA4. It is recommended to use all of them.



Arrestor unit: Discharge voltage of 90V



Each arrestor is good for approximately 300 surges of 10/700us applied at 6kV. However, since its life depends on the surge output current, the life is extended exponentially, as the surge current decreases. It varies significantly, depending on the load conditions.



When the coupling arrestor unit and arrestor unit deteriorate, a surge cannot be applied to the product under test correctly. The arrestor unit, in particular, is attached for surge decoupling (for surge-back suppression). Be fully aware that when it deteriorates, the surge may go back to the non-test side.

9. Telecom line output terminals [TELECOM LINE OUTPUT 1/2/3/4/COM]

These are coupling output terminals for the telecom line. For the 2-line configuration, use output terminals 1 and 2. For the 4-line configuration, use output terminals 1 to 4. The COM terminal is connected when the EUT has an FG terminal.



These terminals output a high voltage surge. Mishandling or careless operation may result in a fatality. Handle them carefully.

10. FG terminal [FG]

It is the FG terminal of the Unit. Normally, it does not need to be connected as the grounding power cable of LSS-6330 is used for grounding. Use it, only if the power cable is not used for grounding.

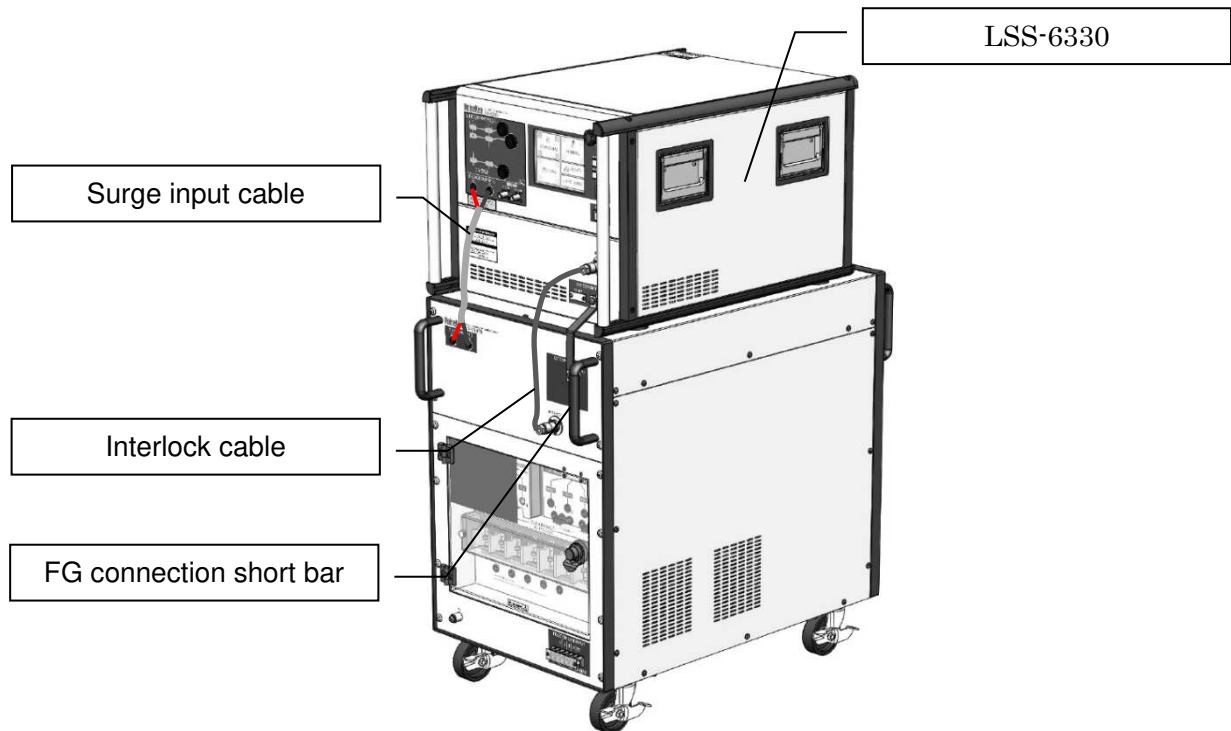
11. Telecom line input terminals [TELECOM LINE INPUT]

This input terminal block is used to input signals to the EUT from auxiliary equipment. It is used to connect signal lines from a pseudo switch or other device for communication. When conducting a test with the 2-line configuration setting, use terminals 1 and 2. Also use them within the rated input range (DC50V/100mA MAX).

9. DEVICE CONNECTIONS

9-1. Connection for coupling a surge waveform to the telecom line

Connecting the surge output LSS-6330 to LSS-6330TEL



Place LSS-6330 on the body of LSS-6330TEL.

Use the supplied interlock cable to connect LSS-6330 to the interlock terminal of LSS-6330TEL.

Use the supplied surge input cable to connect the surge output portion of LSS-6330 to the surge input terminal of LSS-6330TEL. As the connectors and plugs are colored in red or black, connect them to match each color.

Use the supplied FG connection short bar to connect the FG terminal of the Unit to the FG terminal of LSS-6330.



If the grounding power cable of LSS-6330 is not used for grounding, use the supplied FG cable to ground the FG terminal at the bottom of the Unit.

Connecting the telecom line input

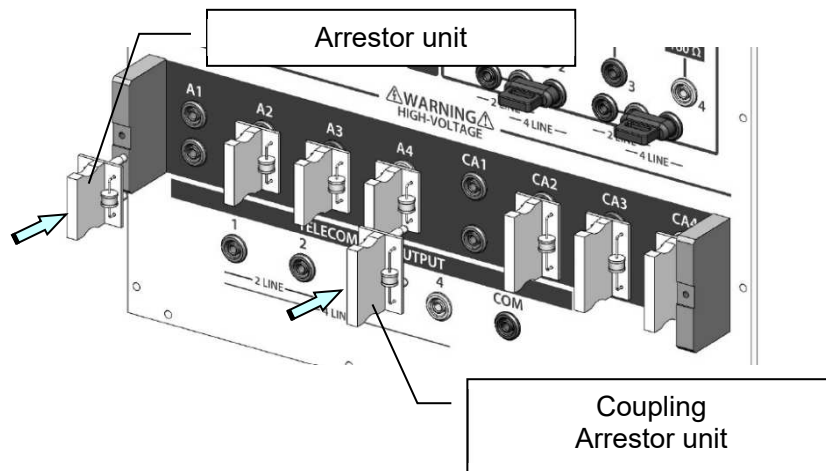
- ① Make sure that the power supply to the EUT is cut off and LSS-6330 is in OFF status.
- ② In the 2-line configuration, [TELECOM LINE OUTPUT 1] and [TELECOM LINE OUTPUT 2] are used to conduct tests. Connect to terminals 1 and 2 of the telecom line input terminal block [TELECOM LINE INPUT]. Install a crimped terminal of $\Phi 4$ and connect it.
- ③ Attach the protection cover after connecting.



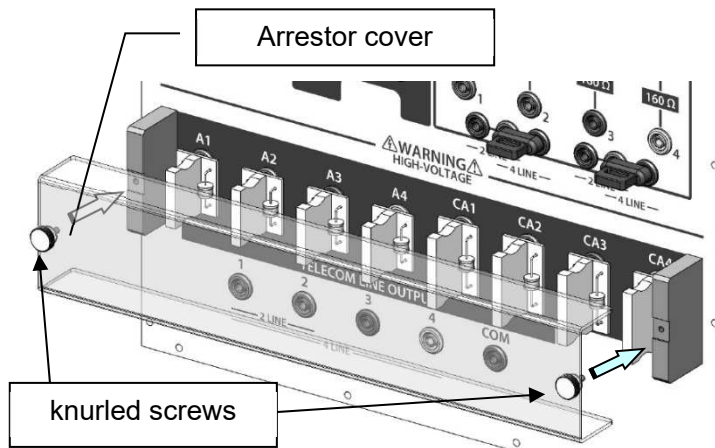
Use your own telecom line input cable.

Connecting the telecom line output

- ① Make sure to attach all of the four arrestors of the arrestor unit [A1/A2/A3/A4] and the coupling arrestor unit [CA1/CA2/CA3/CA4] for your safety.

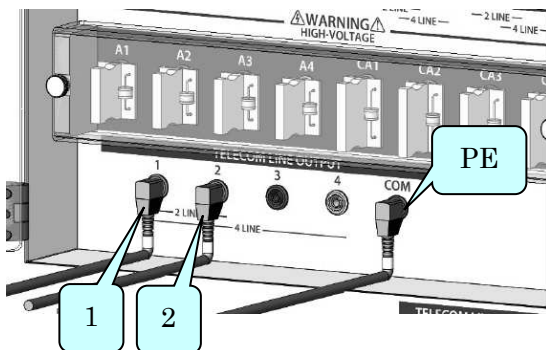


- ② Attach the arrestor cover for protection. Tighten the two knurled screws securely.

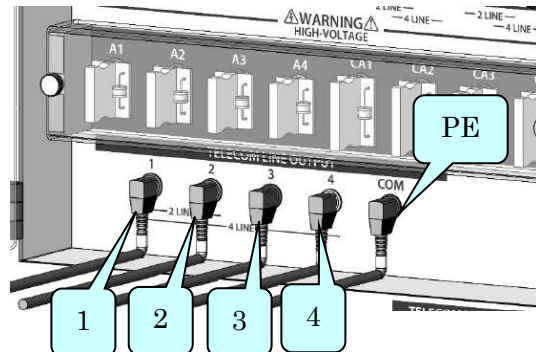


- ③ Connect the supplied telecom line output cable to the telecom line output terminal [TELECOM LINE OUTPUT] of the telecom line coupling portion.

2LINE with COM (1/2/COM)



4LINE with COM (1/2/3/4/COM)



9–2. How to set test conditions

Setting the resistor conversion box

The value of each matching resistor for the telecom CDN varies depending on the test waveform (1.2/50µs/10/700µs).

The Unit has built-in 160-Ω matching resistors. When conducting a test with the 1.2/50µs waveform, connect the supplied resistor conversion box to the resistor conversion box holder.

When conducting a test with the 10/700µs waveform, connect the supplied resistor conversion box to the matching resistor change terminal to set the resistor value to 25Ω.

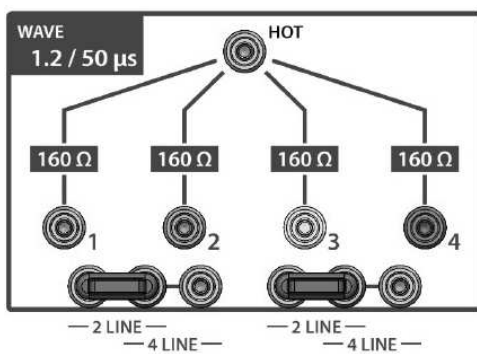
Setting 2 lines and 4 lines when setting each waveform

The Unit has built-in 160-Ω matching resistors for the 1.2/50µs waveform (4 lines).

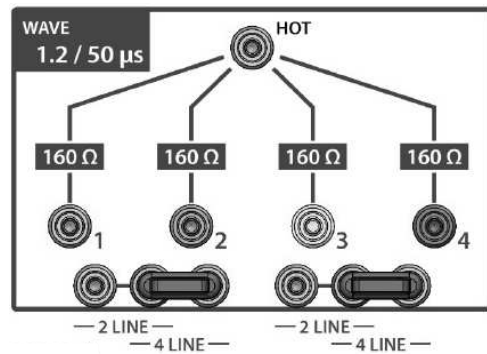
The line setting varies between 2 lines and 4 lines, depending on the applied surge waveform and the number of lines.

Each setting method is explained below.

Connection for 1.2/50µs test waveform

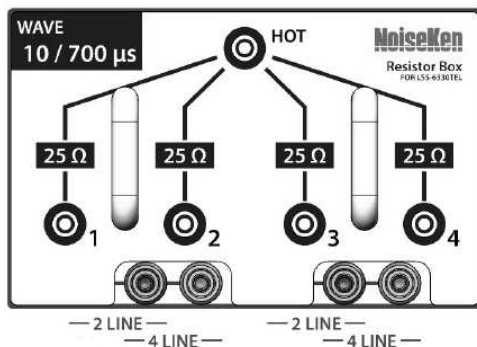


1.2/50us 2-line setting diagram

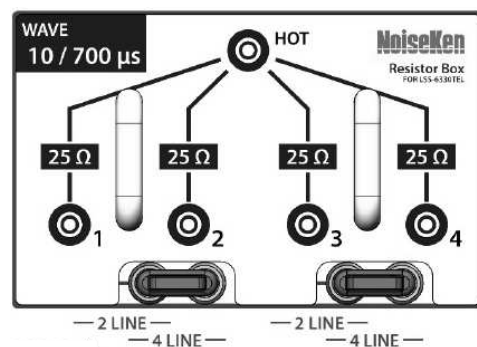


1.2/50us 4-line setting diagram

Connection for 10/700µs test waveform



10/700us 2-line setting diagram



10/700us 4-line setting diagram

10. SPECIFICATIONS

| ITEM | SPECIFICATIONS | | REMARKS |
|--|---|---|-------------------------|
| Injection surge waveform | 1.2/50 μ s-8/20 μ s Combination waveforms 10/700 μ s-5/320 μ s Combination waveforms | | |
| Maximum injectable surge voltage / current | Up to 6kV/300A | | |
| Matching resistor | 40 Ω ±10% | 1 line 80 Ω : at 2 line 1 line 160 Ω : at 4 line | 1.2/50 μ s waveform |
| | 25 Ω for each line | | 10/700 μ s waveform |
| Coupling mode | Common mode | | |
| 1.2/50 μ s -8/20 μ s Combination waveform coupled to the TELECOM CDN | Open circuit voltage | 2kV ±10% | *1 |
| | Rise time | 1.2 μ s ±30% | *2 |
| | Duration | 45 μ s ±30% | |
| | Short circuit current | 48A ±20% | |
| | Rise time | 1.5 μ s ±30% | |
| | Duration | 45 μ s ±30% | |
| 10/700 μ s-5/320 μ s Combination waveform coupled to the TELECOM CDN | Open circuit voltage | 4kV ±10% | *1 |
| | Rise time | 8 μ s ±30% | *2 |
| | Duration | 250 μ s ±30% | *3 |
| | Short circuit current | 145A ±20% | |
| | Rise time | 3.2 μ s ±30% | |
| | Duration | 250 μ s ±30% | |
| EUT line | 2 Line / 4 Line | | Selectable |
| | DC50V/100mA MAX | | |
| Decoupling coil | 20mH | | |
| Operational environment | Temperature : 15~35 $^{\circ}$ C Humidity : 25~75%RH | | |
| Dimensions | W430×H695×D686 mm | | Projection excluded |
| Mass | Approx. 75kg | | |
| Interlock function | the protective door status, and the status of connectors for connecting LSS-6330. | | |

*1) open circuit measurement with all lines connected together with reference to PE on the EUT side and with all lines shorted to PE on the AE (auxiliary equipment) side

*2) Short-circuit measurement with all lines shorted to PE on the EUT side and with all lines shorted to PE on the AE (auxiliary equipment) side

*3) in case of 2-line (1 pair)

11. 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

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.

12. 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 the 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 the Unit.

13. 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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