

ESD System

ISO 10605 and EN/IEC 61000-4-2

Complete System for ESD Test and ESD Set-Up Verification



NOISEKEN – NOISE LABORATORY

NOISEKEN is a Japanese Company Specialist in pulsed EMI simulation.

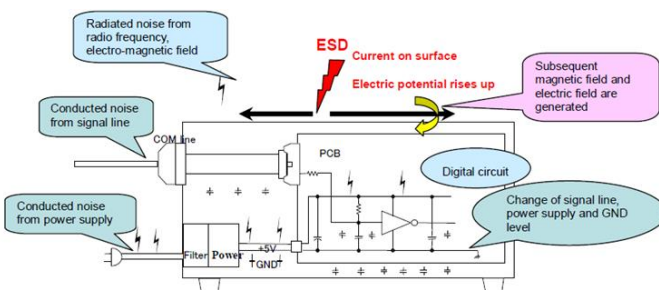
For over 30 years from its foundation in 1975, Noise Laboratory has been focusing on immunity test equipment and related solutions. Now their product lines include various types of immunity test equipment ranging from those conforming to IEC 61000-4 series standards, other international or national immunity standards and even to customer's in-house test standards.

OVERVIEW

Spark phenomena which may be generated when taking a sweater off and touching onto a door knob of a vehicle in dry condition are called "Electrostatic discharge (ESD)". In our ordinary lives, 30kV electricity can be easily generated only with putting shoes on and walking on a carpet.

TESEO, in collaboration with Partners offers ESD simulators systems that can reproduce and simulate the ESD from a charged human body intentionally for testing whether electronic equipment become malfunctioned or work correctly with the ESD influence, and the simulators conform to IEC61000-4-2 and Automotive ISO 10605 Standards.

Beside ESD equipment for testing laboratories, TESEO also has a complete set of equipment and accessories for ESD guns calibration and verification, to completely fulfill the International Standards requirements.



ESD BASIC GENERATOR



Cost-oriented basic model ESD Simulator the light weight discharge gun attachable.

The output voltage can be selected either max. 30kV (B3011A) or max. 16kV (L1611A) and compliant to both EN/IEC61000-4-2 Standard (both B3011A and L1611A) and ISO10605 Standard (only B3011A, used with 2k Ω discharge network).

- Pre-checking function for quick gun verification.
- CR constant checking function (No indicator) to check the correct unit attachment.
- Discharge Detecting Function to check the air-discharge ready-to use gun.
- White spotlight LED to facilitate the visualization of the discharging area.
- Easy exchange of gun head and CR unit.

The ESD system employing the generator basic model is designed for those laboratories which need to have a ESD system at very affordable cost, but with the confidence to be compliant to the main International Standards, such as EN/IEC61000-4-2 or ISO 10605 Automotive requirements.

This generator may be equipped with most of the additional accessories, in order to build-up a complete system with all the needed expectancies.



Basic Generator front Panel

ESD SMART GENERATOR

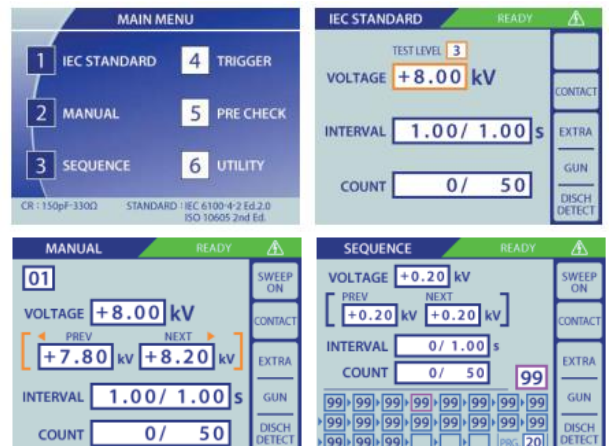


Advanced ESD simulator for EMC test equipment with smart built-in functions.

This can be available for evaluating malfunctions or functions declines of electronic equipment against the ESD.

Programmable simulator to ease some complex tests. The output voltage is up to 30kV to comply IEC61000-4-2 & ISO 10605 Standards.

- 3 pre-checking functions for quick gun verification.
- CR constant indicator to to check the correct unit attachment.
- Discharge Detecting Function to check the air-discharge ready-to use gun.
- White spotlight LED to facilitate the visualization of the discharging area.
- Easy exchange of gun head and CR unit.
- Ten-key & Rotary knob for a easy setting.
- Infra-red Remote Controller to allow to remotely set the generator.
- Lightest-weight discharge gun in the market
- Control Software for test result reporting and control via Personal Computer.



Smart Generator LCD Display Menu

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ESD GUNS

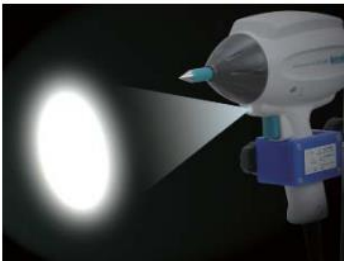
All the ESD Generators can be matched with ESD guns performing the International Standards.

An easy-to-use configuration is the main features of these guns.

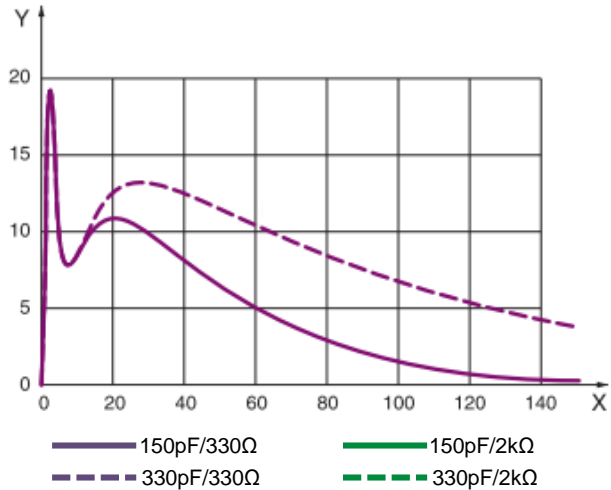
The tips, gun heads and CR discharge units can be replaced and configured easily by the operator in a while, without complex assembly/disassembly operations.

The gun is equipped with a LED spot light to easily identificate the discharging point.

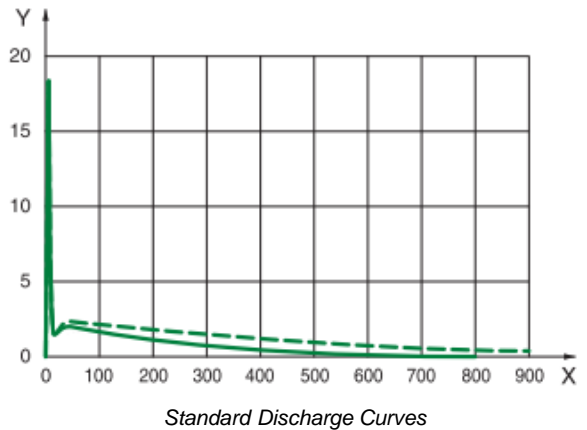
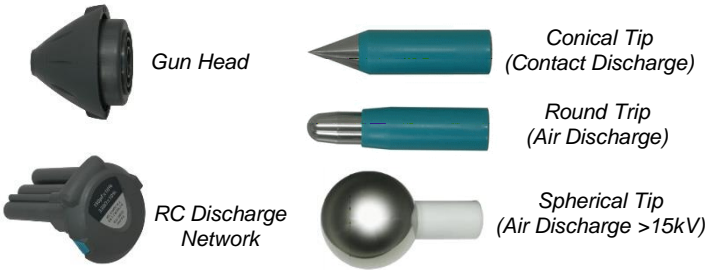
EN/IEC61000-4-2 and ISO 10605 compliant discharge modules available.



Gun Components



The Gun main body can be equipped by different Gun Heads, RC discharge Networks and Gun Tips, to fulfill the needed International Standards



Standard Discharge Curves

ESD GUNS MODELS AND CONFIGURATIONS

Components	GT-30RA IEC 61000-4-2	GT-30R3320KA IEC 61000-4-2 and ISO 10605
Conical Tip	✓	✓
Round Tip	✓	✓
Spherical Tip	✗	✓
CR Unit 150pF-330Ω	✓	✓
CR Unit 330pF-330Ω	✗	✓
CR Unit 150pF-2kΩ	✗	✓
CR Unit 330pF-2KΩ	✗	✓

ESD GENERATORS TECHNICAL SPECIFICATIONS

Parameter	ESS-B3011A Basic Generator	ESS-S3011A Smart Generator
Output Voltage	0.20kV-30kV $\pm 5\%$	0.20kV-30kV $\pm 5\%$ -10.0kV: 0.01kV -30.0kV: 0.1kV step
Polarity	Positive / Negative	
Repetition Cycle	0.05s-9.99s $\pm 10\%$ / Manual Steps: 0.01s step	0.05s-600s $\pm 10\%$, / Manual Steps: 0.01s (0.05-9.99s), 0.10s (10.0-600.0s)
No. of discharges	1-999 times, 1 time step or continuous preset	1-60000 times, 1 step or continuous preset
Discharge mode	Contact / Air Discharge	
Trigger mode	Gun trigger / Manual trigger	Gun trigger / Manual trigger / external trigger
Operation Panel	Display: 5x7 Dot matrix LED Operation: via pushbuttons	Display: Color LCD Operation: via pushbuttons
Radion Mode Select Switch	Extra / Normal switching built-in	
Discharge Detection	Built-in Discharge detection function for air-discharge mode	
Pre-checking Function	High voltage output checking	<ol style="list-style-type: none"> 1. High voltage output checking 2. Withstanding voltage checking 3. Discharge relay operation checking
CR & GUN head checking	CR type and gun type matching check (to prevent wrong combinations)	
IEC LEVEL Test mode	Contact discharge mode: 2kV, 4kV, 6kV, 8kV step; Air discharge mode: 2kV, 4kV, 8kV, 15kV step	
MANUAL test mode	Not Available	Contact/air discharge mode arbitrary setting in the range 0.2kV-30.0kV. Sweeping function built-in. Recordable up to 99 units
SEQUENCE test mode	Not Available	Allows MANUAL mode use in continuously operation. Max 22 steps / 1 program Up to 20 recordable programs
Warning Lamp	Lighting at voltage output from the generator; Blinking at electrostatic discharge	
Charge capacitor / resistor	150pF $\pm 10\%$, 330 $\Omega \pm 10\%$ (built-in unit for discharge gun GT-30RA)	
Generator Charge resistor	10M Ω	
AUX connector	Not Available	D-SUB 15 pins female connector (to connect patrolight, automatic ESD suppressor, external interlock input, external trigger input)
Optical communication	Not Available	Optical connector (serial interface) for PC connection
Power Supply consumption	AC100V – AC240V $\pm 10\%$ 50Hz-/60Hz 62VA	AC100V – AC240V $\pm 10\%$ 50Hz-/60Hz 75VA
Generator Dimensions	(W)270mm x (H)263mm x (D)200mm	(W)392mm x (H)312mm x (D)295.3mm
Discharge gun Dimensions	Discharge gun: (W)83.3mm x (H)217.2mm x (D)229.3mm	
Generator Weight	Approx. 4.8kg	Approx. 7.5kg
Discharge gun Weight	Approx 800g excluding cables and connectors	

CR UNITS TECHNICAL SPECIFICATIONS

CR Unit	1 st discharge peak current	t ₁ Current	t ₂ Current
150pF/330 Ω	3.75A/kV $\pm 10\%$	2A/kV $\pm 30\%$ (t ₁ =30ns)	1A/kV $\pm 30\%$ (t ₂ =60ns)
330pF/330 Ω	3.75A/kV $\pm 10\%$	2A/kV $\pm 30\%$ (t ₁ =65ns)	1A/kV $\pm 30\%$ (t ₂ =130ns)
150pF/2k Ω	3.75A/kV +30%-0%	0.275A/kV $\pm 30\%$ (t ₁ =180ns)	0.15A/kV $\pm 50\%$ (t ₂ =360ns)
330pF/2k Ω	3.75A/kV+30%-0%	0.275A/kV $\pm 30\%$ (t ₁ =400ns)	0.15A/kV $\pm 50\%$ (t ₂ =800ns)

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ESD TESTING ACCESSORIES

Standard ESD table with HCP (Horizontal Coupling Plane) and GRP (Ground Plane to be placed beneath the table)

Standard table for ESD measurements applications, in conformance to the ISO 10605 Standard.

The main structure is made in high quality wood for a perfect dielectric support.

Table dimensions: 1000 x 2000 x 800 mm (LxWxH)

Other dimensions are available upon request

Including:

- One 1.2 meters shorting cable
- One 1.2 meters load cable (2 x 470k Ω)

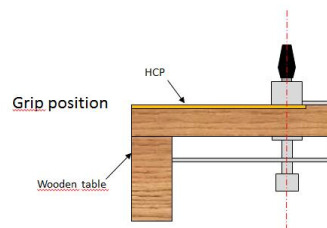
Optional:

- Swevel caster



Grounding Grip

The standard table is provided of one grounding spot connector, placed in one of the corners. In case this is not enough, as option can be Ordered a movable multi-spot grounding grip unit. The grip is secured to the table by means of a double gripping vise.



Gun Stand

Gun stand used to support the discharge gun (Out of ISO Standard)

Including the adapter for discharge gun GT-30R series.

- Height: 300mm
- Pedestal diameter: 160mm
- Weight: Approx. 1.6kg



Hand-free Gun Stand

Allows to move discharge gun vertically and horizontally to arbitrary desirable discharging point. (Out of ISO Standard)



Gun Holder

Handly holder for discharge gun during the test. Also used as pre-checking fixture in combination with ESS-S3011A and GT-30R series.



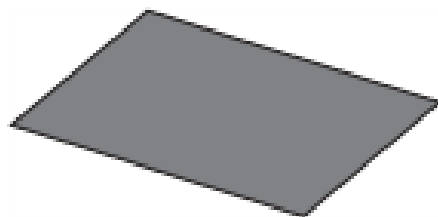
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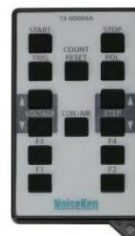
ESD Mat

Mat to be laid out between DUT and HCP for the ESD susceptibility test in the packaging and handling.
Surface resistance $10^7 \sim 10^9 \Omega$, as per Standard
Dimensions: W1000mm × D500mm × thickness 2mm



Infrared Remote Controller

Remote controller for an easy remote management of the ESD generator.
The remote controller function is available for ESS-S3011 model only.



ESD Suppression Brush

A dedicated brush to eliminate the electrification of EUT / DUT before starting the ESD test.



ESD Indirect Discharges Islands Compliant to ISO 10605 Annex F

The ISO 10605, in its Annex F describes an additional approach to ESD test for powered-up devices, in order to grant a better correlation between ESD test and the real world.

In order to do this, the Standard introduces a special fixture allowing to produce direct or indirect discharges on the EUT.

While direct discharges are applied directly to the EUT, indirect discharges are applied through “discharge islands” placed at fixed distances and by conductive metal strips.

Dimensions and form factor of the fixture is defined by the Standard for a reliable test repeatability.

- Standard: ISO 10605 Annex F
- Total length: abt. 1900 mm
- Discharge Island distance: 500 mm
- Coupling Plane dimensions: 160x350 mm
- Coupling support material (coupling plane, strip, islands): Copper



ESD Current Target

Load resistor to measure, verify and calibrate ESD current waveform defined in IEC61000-4-2 Standard and ISO 10605 Ed.2 Standard

- Frequency Specifications:
 - 300kHz-1GHz: $\pm 0.5\text{dB}$
 - 1GHz-4GHz: $\pm 1.2\text{dB}$
- Conversion ratio: 2V/1A (50 Ω termination)
- Weight: Approx. 400g

Remark: The ESD Target shall be mounted on a metallic plate for testing. Different plates and Faraday cages are available and shown in the next page.



ESD Current Target Calibration Set

A complete set to calibrate the ESD target in conformance with IEC61000-4-2 Ed.2.0 (2008).

The Set is contained into a transportation case

Remark: The ESD Target shall be mounted on a metallic plate for testing. Different plates and Faraday cages are available and shown in the next page.

Set with carrying case



Coupling Adapter

Adapter coupled with ESD target



High-Impedance High-Voltage Meter

High performance and cost effective high-impedance high-voltage meter. It features significantly high input impedance ($\geq 100\text{ G Ohm}$), high accuracy and high resolution measurement, and a wide measurement range (Measurement range $\pm 1\text{V} \sim 100\text{ kV}$). Compliant to requirement of ISO 10605 Annex A, Par. A.2.2

- Measurement range $\pm 1\text{V} \sim 100\text{ kV}$ (Auto ranging 1~19,999 V and 10~100,000V)
- Measurement Resolution 1V for low range and 10 V for high range
- Measurement Accuracy $\pm 1\% \pm 2\text{ counts}$
- Input Impedance $\geq 100\text{ G Ohm}$
- Display 4 ½ Digit LCD
- Power AC 100-240 V or 9V Battery
- Working Temperature 32 to 122°F (0 to +50°C)
- Working Humidity 0 to 70% RH
- Dimension 0×15×50 cm (7.85×5.91×19.68 inch)
- Weight 2 kg (4.41 lb)



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ESD Target Mounting Board

Metallic board for ESD system verification. The board allows to fix the load resistor (ESD target) for measuring the discharge current waveform defined in IEC61000-4-2. Standard and ISO 10605 Ed.2 Standard

Two available models:

- 0.6m x 0.6m dimension
- 1.2m x 1.2m dimension

The ESD target is not included



ESD Target Faraday Cage Mounting Box

Faraday Cage for ESD system verification. The Cage has a metallic plate with an ESD target (included) and a shielded box on the back to host an oscilloscope. The box has fans for forced cooling.

As option, a wooden support with metallic ground plane on the top is available.

Dimensions:

Faraday Cage

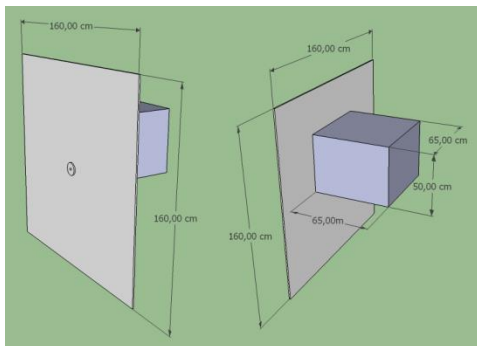
Front Plate: 160 x 160 cm

Back shielded box: 65 x 65 x 50H cm

Wooden support:

100 x 100 x 80H cm

Other dimensions upon request



Dimensions



Front view



Wooden support



Shielded box on the back

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TESEO S.p.A. designs, manufactures and distributes: EMC and RF Turn-key Systems, EMI shielded Optical links, Field probes, CW and Pulse RF Amplifiers, Amplifiers and preamplifiers modules, 2-quadrant and 4-quadrant LF amplifiers, Antennas, Anechoic and shielded chambers, TEMPEST chambers, Antenna Test Range and RCS chambers, Reverberation chambers, RF absorbers, EMC and RF accessories, Coaxial cables, LISNs, CDNs, Attenuators, Couplers, Injection and Absorbing clamps and probes, ESD and Pulse equipment, EMC Measuring Systems, EMC turntables, Antenna Mast and Positioners, EMC measurement Software, ISO17025 Accredited Calibration Services, Customized and Standard Test Benches for EOL, R&D, HIL, CM applications

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