

EMC Test Equipment Catalog



- Electrostatic Discharge Simulator
- Impulse Noise Simulator
- Fast Transient / Burst Simulator
- Lightning Surge Simulator
- Voltage Dip & Swell Simulator
- Damped Oscillatory Wave Simulator
- Emission Measurement System
- Broadband Sleeve Antenna
- TEM Horn Antenna
- EMC Test Systems for Automotive Electronics

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www.noiseken.com

Impulse Noise Simulator (semi-conductor type)

INS-S220

To solve the real trouble in the market

Noise simulator can simulate high frequency noise generated ON/OFF at contact point of switch or relay, arc caused by electric motor. It can evaluate the resistibility of electric devices.

Pulse contains high frequency and by energy volume is changable by adjusting pulse width. The high reproduction noise test of noise trouble in the market can be conducted.



- Repetition cycle becomes faster. Due to high repetition, mal-function occurrence rate is up and test time is to be shortened.
- Pulse width setting becomes easier.
Just by pushing button, pulse width setting is available by 50 ns step. Setting time and connection mistake can be reduced.
- Pulse waveform stability is improved, so high reproduction test is available.
- Cost is cut down because consumable parts are reduced.
- Common mode/normal mode test is easily to switch by short plug.
- Wiring becomes easier because 50 Ω resistor is built in simulator.
- AC plug of EUT can be inserted directly by outlet panel.(option)
- Various tests are available by using different probes and coupling clamp.(option)
- EUT test with 3 phase 5 lines is available by external CDN.(option)

Feature

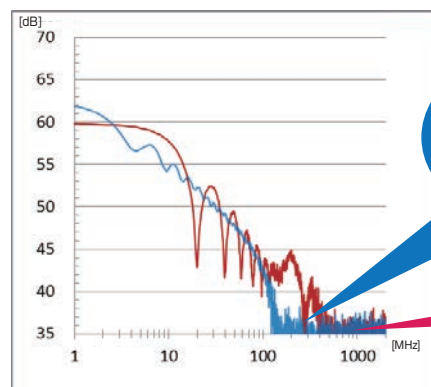
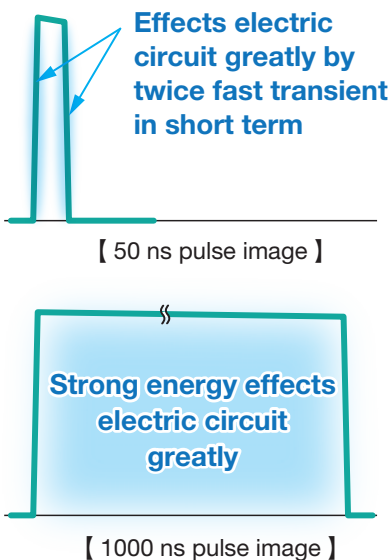
To solve the trouble in the market high frequency, energy volum of test pulse can be ajustable

Even narrow pulse with 50 ns ~ 100 ns width contains less energy, twice fast transient due to rise and fall and inducted coupling occurred by sharp electromagnetic field effect electric circuit greatly.

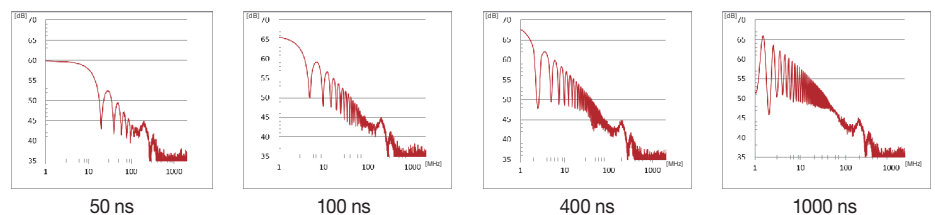
Wide pulse with 800 ns ~ 1000 ns contains more energy, so voltage fluctuation is easily to effect circuit.

The rise time of impulse simulator is faster than IEC61000-4-4 fast transient/burst test, so spectrum is high. When it injects noise to EUT, noise is easier to invade electric circuit internally.

Spectrum and amplitude is different due to Impulse width, so it is recommended to test with different pulse width.

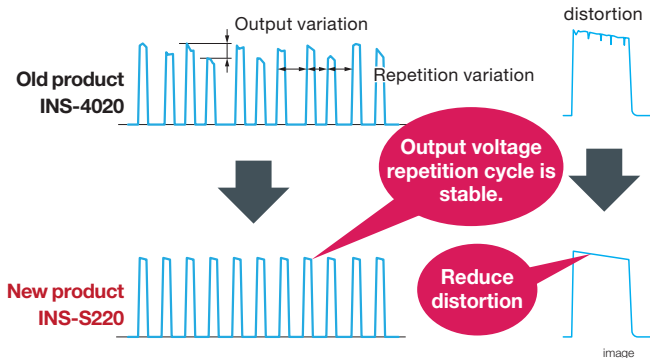


Y-axis : Spectrum density [dB]
X-axis : Frequency [MHz]



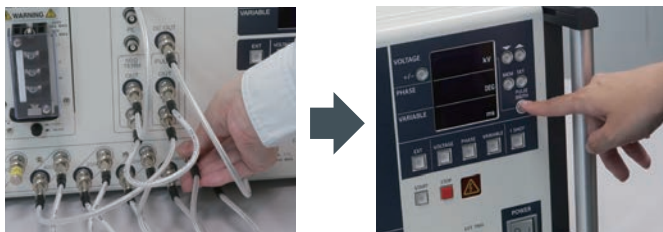
**Test reproduction is improved.
More quantitative test is available.**

The usual mercury relay changes into semiconductor relay, so test pulse stability is improved. More quantitative and high reproduction test is available. Also, waveform distortion due to mercury relay's deterioration.



**Setting is simplified.
Setting time is shortened.**

It is troublesome to change the special coaxial cables manually in old way. Setting time and connection mistake can be reduced because setting can be operated by button.

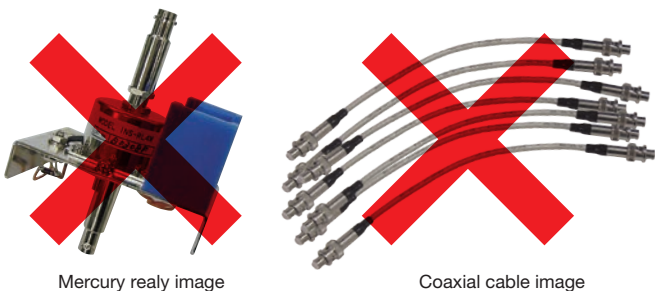


Settings for complex cable connections.

Easy with button operation !!

**Cost is cut down.
Consumable parts are reduced.**

We adopt semiconductor type relay instead of the mercury relay in old type. Also, cost on consumable exchange is reduced because pulse width setting cable (consumable) is no longer needed.



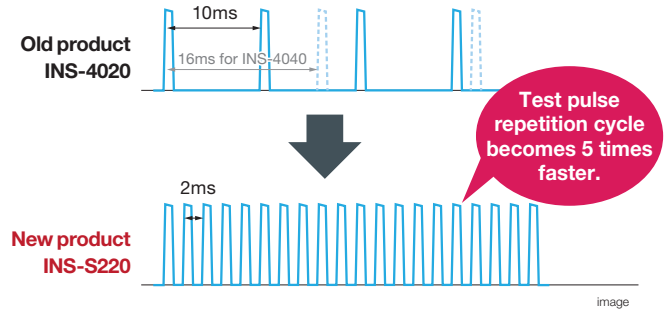
Mercury relay image

Coaxial cable image

**Mal-function rate is up.
Test time is to be shortened.**

The repetition of pulse in test is faster than the old product. Mal-function rate is up and test time is expected to be shortened.

Example) In case that the repetitive cycle is 2 ms



* There are restrictions on the pulse repetition period.

**Connection is simplified.
Connection time is shortened.**

Outlet panel to which EUT is easily to be connected is adopted. EUT is easy to connect by using outlet panel (option) complying to each country's socket shape.



**Noise countermeasurement is easy.
The malfunction generating position can be identified.**

From power supply line, signal line, harness, enclosure to PCB, various noise injection options are ready. The malfunction generating position is easy to identify.



Noise Simulator
INS

INS-S220

Noise Simulator
INS

Specification

Parameter	Specification	
Pulse setting-1	Pulse output voltage	0.50 kV ~ 0.99 kV ± 10% 0.01 kV step
	Pulse width	100 ns ~ 1000 ns ± 10% 50 ns step
	Pulse repetition	1 ms ~ 999 ms ± 10% 1ms step
Pulse setting-2	Pulse output voltage	1.00 kV ~ 2.00 kV ± 10% 0.01 kV step
	Pulse width	50 ns ~ 1000 ns ± 10% 50 ns step
	Pulse repetition	10 ms ~ 999 ms ± 10% 1 ms step
Output voltage	0.5 ~ 2.00 kV ± 10% (10 V step)	
Polarity	+ / -	
Rise time	< 3 ns	
Output impedance	50 Ω	
Terminal resistor	50 Ω	
Pulse repetition mode	LINE PHASE	50 Hz / 60 Hz coupling phase angle 0 ~ 360° ± 10° synchronized with L-N of EUT supply or external CDN
	VARIABLE	1 ms ~ 999 ms ± 10% (~ 1 kV) 10 ms ~ 999 ms ± 10% (1 kV ~ 2 kV)
	EXT TRIG	Period : > 10 ms Input signal level : TTL/open collector negative logic Pulse width : > 1 ms Also functions for timing reference signals input from an external injection unit.
	1 SHOT	Single pulse generation, each time the 1 SHOT button is pressed. Synchronized (phase angle set on the PHASE control) or asynchronous pulse period.
Memory storage	5 tests	
Test time	1s ~ 999s ± 10% 1s step	
Coupling switch	L(+), N(-), PE / PULSE OUT ※manual switch by coaxial cable	
Coupling mode	common-mode / normal-mode ※manual switch by short plug	
EUT power capacity	Single phase AC 240 V / DC 125 V 16 A (L(+), N(-), PE)	
Power supply	AC 100 ~ 240 V 50 Hz / 60 Hz	
Operatig temperature / operatig humidity	15 ~ 35°C 25 ~ 75%	
Dimensions / Weight	(W)430 × (H)249 × (D)540 mm (projection excluded) / approx. 20 kg	
HV coaxial cable	NMHV our customized type	
Accessory	coaxial cable 30 m (02-00013A): 2 pcs, SG short plug (02-00106A): 1 pc, SG cable (05-00103A): 1 pc, outlet panel: 1 pc, AC cable: 1 pc, manual instruction: 1 volum, accessory bag: 1 pc	



Attenuator for waveform check MODEL : 00-00017A



Attenuator for measuring high voltage pulse.

Parameter	Specification
Attenuation rate	DC ~ 2 GHz : 40 dB (100 : 1)
Input pulse peak voltage	4000V MAX
Tolerable continuous pulse examples	Pulse peak voltage : Max. 4000 V Pulse width : 50 ns ~ 1000 ns Pulse width repetitive frequency : Max. 60 Hz at 4000 V output Max. 100 Hz at 2000 V
Input impedance	50 Ω (50 Ω ± 1 % at DC)
Output impedance	50 Ω (50 Ω ± 1 % at DC)
Interface connectors	INPUT : HN(F) OUTPUT : N(F)
Dimensions/ Weight	(W)154.5 mm × (D)105mm × (H)37 mm / approx. 1350 g

Attenuator MODEL : 00-00011A



It is attenuator protecting measuring instrument.

It is recommend to use waveform checking attenuator (00-00017A) to protect measuring instrument.

Attenuating rate 20 dB • N type connector

Outlet Panel MODEL : 18-00059C/60B/84A



Outlet panel to be available for different types of connectors in line output of INS-S220.

Model	Specification
18-00059C	JP / USA Type AC 125 V 20 A MAX
18-00060B	CEEType AC 240 V 16 A MAX
18-00084A	multi outlet type

Coupling Clamp MODEL : 15-00014A



Enable for testing characteristics against the noise only with clamping interconnection cable of electronic equipment in combination with INS series. The calibration fixture (15-00015A) for this clamp is also available.

- Enable to inject the noise without cutting signal, DC, AC, GND, etc.
- It can test noise tolerance of electric device separately.
- Realize to test the noise resistibility effectively since the injection can be directly to lines.
- Enable to clamp bundle of lines whose maximum diameter is 20mm

Parameter	Specification
Input voltage	4000 V Max
Input pulse width	50 ~ 1000 ns
Coupling method	Capacitive coupling
Dimensions / Weight	(W) 350 × (H) 145 × (D) 140 mm / Approx 3 kg
Adequate cable Dimensions	maxium diameter 20 mm
Terminal resistor	none
Coaxial connectors	NMHV(J) NoiseKen custom for the both of input and termination sides

Coupling Adaptor MODEL : CA-805B (Capacitive coupling)



Enable for testing characteristics against the noise only with clamping interconnection cable of electronic equipment in combination with INS series.

- Enable to inject the noise without cutting signal, DC, AC, GND, etc.
- It can test noise tolerance of electric device separately.
- Realize to test the noise resistibility effectively since the injection can be directly to lines.
- Enable to clamp bundle of lines whose maximum diameter is 26mm

Option

Coupling Adaptor MODEL : 15-00007A (CA-806 / Magnetic field coupling)



Enable for testing characteristics against the noise only with clamping interconnection cable of electronic equipment in combination with INS series.

- Enable to inject the noise without cutting signal, DC, AC, GND, etc.
- It can test noise tolerance of electric device separately.
- Termination resistance built-in.

Parameter	Specification
Structure	Magnetic field coupling noise injection clamp
Input voltage	2000 V Max.
Input pulse width	50 ~ 1000 ns
Coupling ratio	1/10±10% of input voltage
Termination resistance	54 Ω system built-in
Max. diameter of ground cable	27 mm
Dimensions/ Weight	(W) 89 × (H) 64 × (D) 120 mm / approx. 1000 g
Coaxial connector	NMHV(J) NoiseKen custom

Pulse Injection Cable

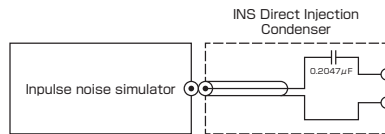


It is noise injection cable combed with noise impulse simulator.
*It can't be used to injected onto where current flows like power supply line.

INS Direct Injection Condenser MODEL : 01-00047A



CDN and the same condenser for coupling are built in the box.
It is supposed to be used in the case that EUT capacity is 5 V. The power doesn't turn on through CDN.



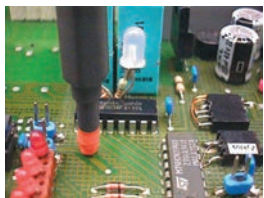
Item	Specification
Coxial connector	NMHV
Connector	Crimp terminal for 6mm
Dimensions / Weight	80 × 80 × 150 mm (projection excluded) / 0.4 kg

EMS Probe Kit MODEL : H2-B



Probes set to enable the noise injection onto PCB patterns, flat cables, etc. in the connection with the generator. The probes can be selected per electric fields or magnetic fields and the irradiation in the near field can be performed.

- Arbitrary noise injection to where it is desired on PCB or harness.
- Enable to detect point which the noise resistibility is weak per electric field and magnetic field with the probes differentiation.
- Each 3 pieces of different figure and size are contained for electric field and magnetic field.
- Enable to pinpoint where the noise resistibility is weak since the injection can be done in such small range several mm.
- Enable to detect point where the noise resistibility is weak in particular frequency in combination with a signal generator
- Suited for locating noise sensitive spots by using with the INS or FNS equipment



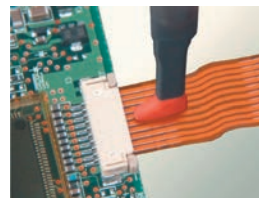
BS05DB



ES02



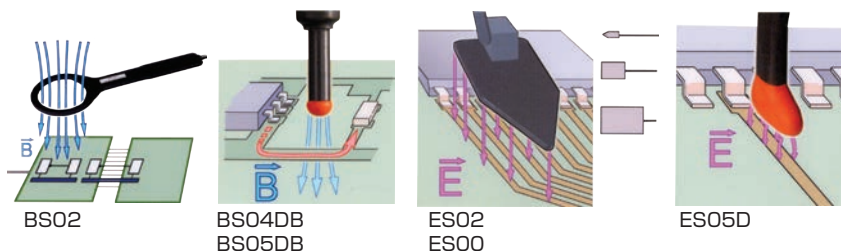
ES00



ES05D



BS02



Option

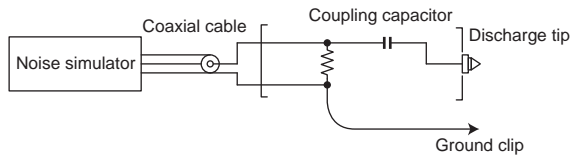
Noise Injection Probe MODEL : 01-00034A



- Enable to test the noise resistibility in a board level since the direct injection to LSI pin by pin is possible
- Possible for the noise injection up to 500 V utilizing the INS or FNS simulator on hand.
- Possible to exchange the coupling capacitor (Option)
- 50 ohm termination resistor built-in

[Option]

Coupling capacitors: 06-00039A : 220 pF, 06-00040A : 330 pF, 06-00041A : 3 pF, 06-00042A : 500 pF,
 * 01-00034A. does not contain the coupling capacitors



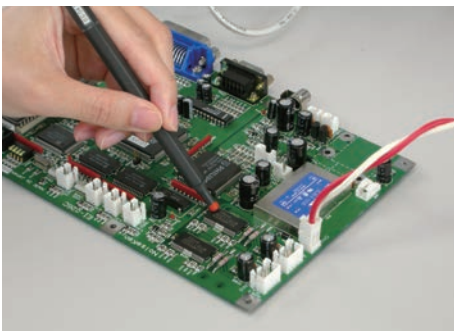
Radiation Probes MODEL : 01-00006A / 7A / 8A / 9A / 10A



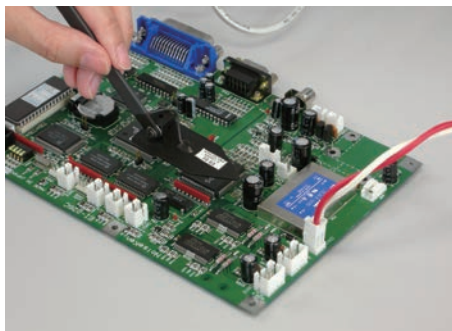
Probes to irradiate the radiation noise to wiring on PCB of electronic equipment so that point where the radiation noise resistibility is weak can be detected.

Parameter	Specification
Input voltage	4000 V Max
Input pulse width	50 ns ~ 1μs
Loop diameter	01-00006A : φ 50 mm, 01-00007A : φ 75 mm, 01-00008A : φ 100 mm 01-00009A : φ 150 mm, 01-00010A : φ 200 mm, 01-00031A: 250 mm, 01-00050A: 30 mm
Cable length	Approx. 2 m
Approx. Weight	180 g = 220 g
Applicable connector	NMHV type

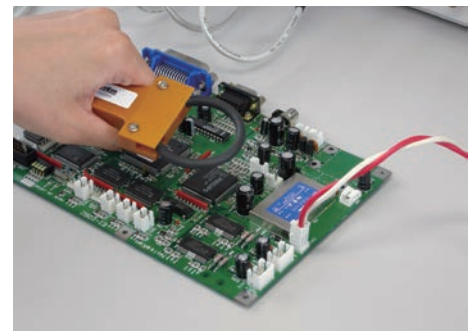
Application Example of Probes



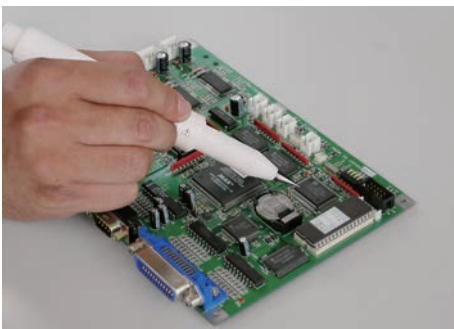
H2-B



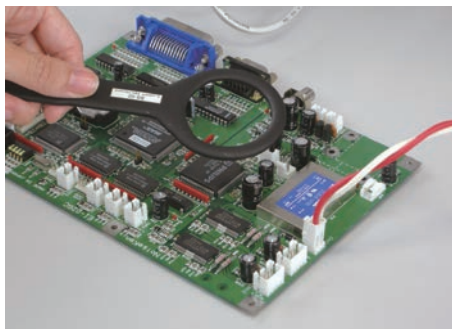
H2-B



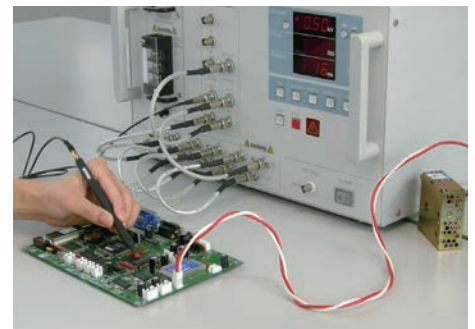
Radiation probe



Noise injection probe



H2-B



H2-B

Option

Injection Unit MODEL : IJ-4050



Unit to enable the noise injection for power supply lines of EUT up to 3-phase 5 lines (L1, L2, L3, N, PE) in combination with main units of INS series. Setting for Normal mode and Common mode is simple and easy only with change of the connectors configurations
In case of the combination with INS-4020 / 4040 / S220, test synchronized with EUT lines can be conducted.

Parameter	Specification
Input impulse voltage	Max. 8 kV without 50 Ω termination Max. 4 kV with 50 Ω termination
EUT power capacity	3-phase 5 lines (L1, L2, L3, N, PE) AC 415 V 50 A (Unavailable for DC) AC 415 V between L1 - L2, L2 - L3, L3 - L1 AC 240 V between L1, L2, L3 - N
Change of injection line	With connectors configurations L1, L2, L3, N, PE
Coupling mode	Normal / Common (Setting with short plug connection)
Line synchronization detection	Detects between L1 - L2 add put out the synchronizatoin signal from SYNC OUT terminal
EUT line protection circuit	Detects current in L1, L2 and L3 lines and breaks L1, L2, L3 and N lines
EUT line input terminal	Terminal block, screw connection
EUT line output terminal	Exclusive contact for φ6
Attenuation characteristics on coupling	≤ -10 dB 10 kHz ~ 1 GHz without load
Residual voltage at input	≤450V Residual voltage without load when 4000V impulse is injected with 50Ω termination
Termination resistance	Nothing (Termination resistance in the main unit is applied)
Power supply	AC 100 V ~ 240 V ± 10% 50 / 60Hz 20 VA Max
Operating temperature / humidity range	15 ~ 35°C 25 ~ 75%
Dimensions / Weight	(W) 430 × (H)199 × (D) 535 mm (protrusion excluded) / approx. 25 kg

Injection Unit MODEL : IJ-5100Z



Unit to enable the noise injection to power supply lines of EUT up to AC480V / 100A 3 phase 5 lines (L1, L2, L3, N, PE) in combination with main units of INS series. In case of the combination with INS-4020 / 4040 / S220, test synchronized with EUT lines can be conducte.

Parameter	Specification
Input impulse voltage	Max. 8 kV without 50 Ω termination Max. 4 kV with 50Ω termination
EUT Line	3-phase 5 lines (L1, L2, L3, N, PE) AC 415 V 50 A (Unavailable for DC) AC 415 V between L1-L2, L2-L3, L3-L1 AC 240 V between L1, L2, L3 - N
Maxium voltage of EUT line	AC 480 V
Maxium current of EUT line	100 A
Line synchronization output	1/2 of EUT line input voltage
Through characteristic	within -10 dB under 10 kHz ~ 1G Hz
CDN power supply	AC 100 ~ 240 V ± 10% 50/60 Hz
Dimensions / Weight	(W)488 ×(H)520 × (D)825 mm (protrusion excluded) / approx. 115 kg

Option

Circuit Breaker Box MODEL : 18-00072A (20A) / 18-00073A (50A)



Parameter (18-00072A)	Specification
Rated operating voltage	AC 250 V 50 / 60Hz DC 65 V
Standard Arated current	20 A
Switching life	≥ 10000 times (Test conditions: rated switching 6000 times, switching without load 4000 times, switching frequency 6 times/min)
Operating temperature / humidity range	15 ~ 35°C 25 ~ 75% (without dew)
Dimensions / Weight	(W) 180 × (H)92 × (D) 100mm (protrusion excluded) / 0.75 kg

Isolation Transformer MODEL : TF-2302P



Model TF-2302P is a single-phase isolation transformer rated AC240V/30A and dielectric strength of 4kV. For safety reason, an isolation transformer is indispensable for AC powered testing for equipment.

Parameter	Specification
Maximum input voltage	Single phase AC 240 V Max (50/60 Hz)
Maximum output current	30 A Max
Dielectric strength	Primary winding to core AC 4 kV (1 minute) Secondary winding to core AC 4 kV (1 minute) Primary to secondary windings AC 4 kV (1 minute)
Insulation resistance	100MΩ or more at DC 500 V
Dimensions	(w)350 × (h)475 × (d)400 mm (Eye bolts and handles excluded) / approx. 60 kg

Noise Canceller Transformer NCT series



It has superb attenuation characteristics against impulse noises. It can be used for insulate in the impulse noise test.
*Connection cable is needed to be modified when it is connected with the transformer. Please inquire us for details.

MODEL	Primary Voltage / Secondary Voltage	Rated current	Frequency
NCT-160	120 V	5 A	50/60 Hz
NCT-1120		10 A	
NCT-1240		20 A	
NCT-260	240 V	2.5 A	
NCT-2120		5 A	
NCT-2240		10 A	

Line input cable MODEL : 05-00160A Line output cable MODEL : 05-00161A

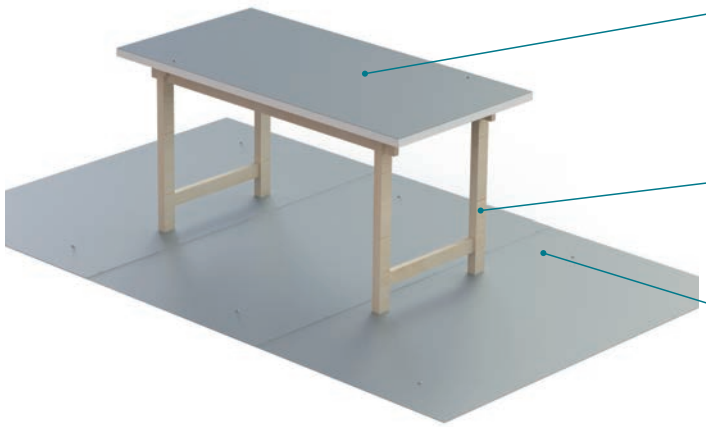


The connection cable between noise impulse simulator and noise canceller transformer on primary winding. Pleas inquiry us for details.

Description	MODEL	Description
Line input cable	05-00160A	Single phase 20 A 3 m Cabtyre cable. "Ring terminal end" - "Stripped end" (termination at customers)
Line output cable	05-00161A	Single phase 20 A 2 m Cabtyre cable. "Ring terminal end" - "Ring terminal end"

Option

Noise Simulator
INS



Horizontal Coupling Plate (HCP) MODEL : 03-00020A

Metal plate placed on the table for the testing of tabletop EUT.
W1600 × D800 × t1.5 mm × 1 sheet (Made of Aluminum)
* Used as a horizontal coupling plate in ESD testing and also can be used as a ground plane

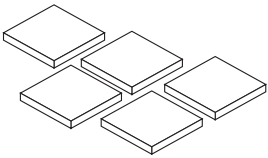
Test Table MODEL : 03-00039A

Wooden table to be used for the test to devices under test (DUT).
W1600 × H800 × D800 mm

Ground Reference Plane (GRP) MODEL : 03-00007A

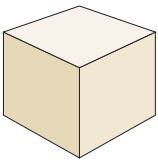
Ground plane to be placed just under the wooden table.
W1800 × D1000 × t1.5 mm × 3 pcs. in 1 set (Made of aluminum)

Insulating Block MODEL : 03-00054A



Blocks to float (isolate) wirings of DUT from GRP.
W300 × D300 × H50 mm, 5 pcs. in 1 set

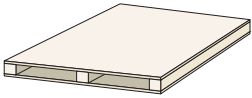
Cubic Insulating Block100 MODEL : 03-00029A



Used for floating EUT 10cm upper than the ground plane in case of testing to floor-standing EUT

Size : W100 × D100 × H100 mm
Material : Wood
Withstanding loads: 500 kg

Insulating support MODEL : 03-00024A



When doing the electrostatic discharge test to floor-standing equipment, to be used for floating the equipment 10cm higher than the ground reference plane.

Size : W 1200 × D 1200 × H 100 mm
Material : Wooden
Withstanding loads : 500 kg

SG cable MODEL : 05-00103A



Braided wire cable to connect between SG terminal of the main unit and the ground reference plane.
Length : 0.1 m

SG Connection Plate MODEL : 03-00112A



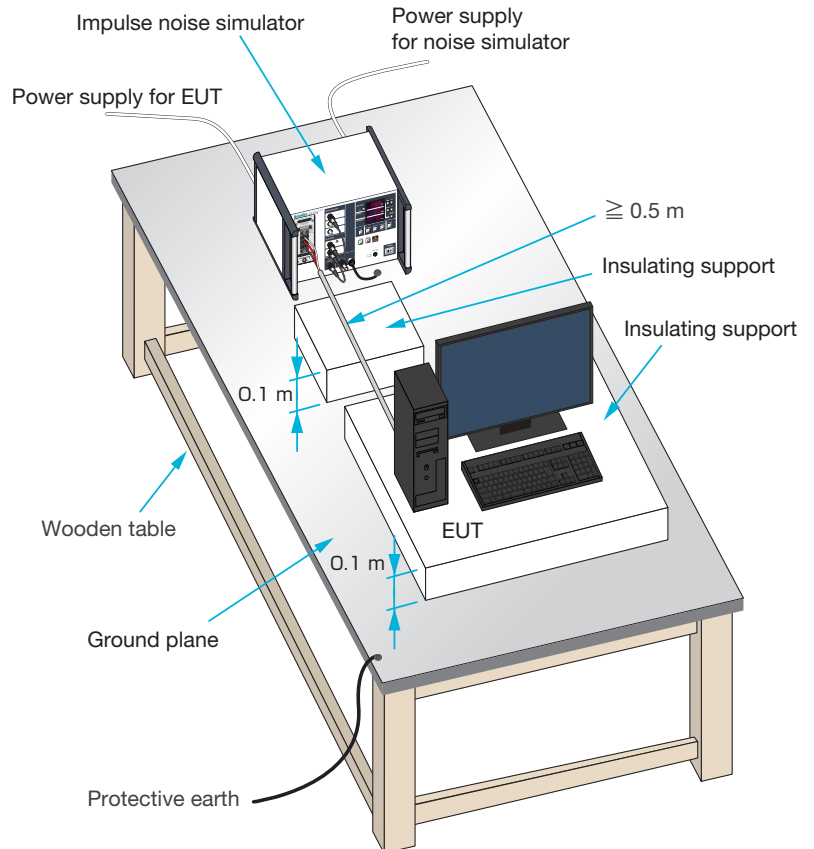
It is metal plate connecting simulator's SG and ground plane.
There is no need to screw on ground plane, so the simulator becomes easy to move.

INS Test Setup Summary

INS Test Method

Method or test to power supply lines

- ① Connect power supply line for EUT to EUT LINE INPUT on the simulator main unit (hereafter called as main unit) through an isolation transformer
- ② Lay a ground plane and insulation sheet under main unit and EUT, and ground the ground plane for safety
- ③ Connect power supply cable of EUT to main unit (Fold and bind the cable so it can be short in case the length is long)
- ④ Connect SG short plug to SG terminal. Connect SG terminal of main unit and FG terminal (In case it is there) of EUT to ground plane with low impedance braided wire shortly and securely
- ⑤ Connect 50 Ω TERM OUT connector to connector of phase (L1 or L2, PE if necessary) the noise is intended to be injected with coaxial cable



Method or test to interconnection lines

- ① Lay a ground plane and insulation sheet under main unit and EUT, and ground the ground plane for safety
- ② Open coupling adaptor 15-N1636 (Option) and clamp interface cable with the adaptor. Connect connector of the adaptor to PULSE OUT of main unit. Connect the one another connector of the adaptor to 50 Ω TERM IN of main unit.
- ③ Connect power supply cable of EUT to any power source since no high voltage pulse is injected in this test
- ④ Connect SG terminal and FG terminal of EUT to ground plane

