

Compliance to a standard or to the real world?

No one could have doubt as to the importance of the pulsed EMI test.

In fact, in the scheme of international compliance, the Electrical Fast

Transient/ Burst test is a must for almost all products.

As logic circuits get faster, they tend to be more susceptible to higher frequency disturbances.

Does your test program represent this scenario?

Noise-related malfunctions of electronic equipment containing electronic control devices, such as information technology equipment, are now becoming a serious problem in today's society.

One of the best-known sources of interference is the inductive component through which a current is interrupted. It is represented by the switching on and off of a relay. This type of noise has a broadband interference spectrum; thus it is coupled to wires and printed circuits in equipment, reflecting and resonating and being amplified by an IC to cause equipment malfunction.

A market proven conducted immunity test method

The Impulse Noise Simulator (abbreviated to INS) design comes from test equipment invented by an American computer manufacturer in early 1970's when events of malfunctions of digital equipment had just begun to emerge in society. Now the INS method is the established test method in Japan and other Asian countries. In fact, the number of INS units shipped exceeds 5,000.

The first priority is to reproduce the upset of digital equipment

If you are facing an immunity problem, the first priority should not be just testing, but rather built-in solutions in your equipment. The simulator you are about to use must reproduce the identical phenomena happening in the field.

Complementary to the IEC61000-4-4 EFT/Burst test

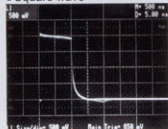
The NoiseKen INS-series Impulse Noise Simulators with unique valuable features and capabilities, most of which are not met by Electrical Fast Transient/Burst generators, greatly helps to enhance your test program to ensure your products are really immune from real world phenomena.

■ FEATURES

- 1ns rise time square pulse containing a frequency component of up to 2 GHz regions
- Variable pulse widths from 50ns to 1 μ s in 50ns steps for compensation for the lack of a specific interference frequency band
- Line to line and line to ground coupling modes
- Synchronous and asynchronous pulse placement with AC phase angle
- Dedicated capacitive and inductive coupling clamps are optionally available
- A market proven test method with a 30-year history

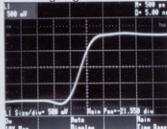
■ WAVEFORMS

- Square wave



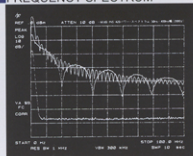
V:500V/Div H:500ns/Div
50 Ω termination

- Leading edge



V:500V/Div H:0.5ns/Div

■ FREQUENCY SPECTRUM



+60dB INS series pulse power spectrum,
50ns and 400ns width (2000V)

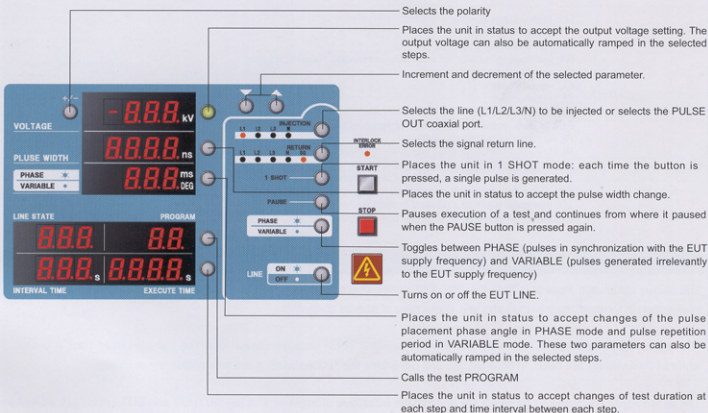
INS-AX2 series 220/420/250/450

INS-AX2 series simulators are the advanced version of the conventional manually operated INS-4020/4040 simulators, maintaining the identical interference signal characteristics while offering a new level of ease of use.

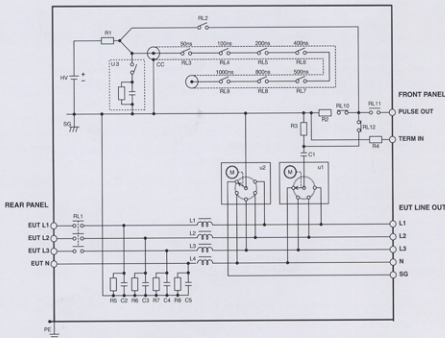
FEATURES

- An innovative, motor driven coaxial switch mechanism eliminates the need to manually plug and unplug coaxial connectors, allowing a preset test sequence to be carried out seamlessly including pulse width and coupling mode changes, automatic voltage ramp and others.
- As well as manual control, the simulator can be remote-controlled through a fiber optic computer interface. A Windows control software package is supplied as an included accessory.
- Floating output
- 8 pulse widths installed: 10ns, 50ns, 100ns, 200ns, 400ns, 500ns, 800ns and 1000ns
- Internal switchable terminators
- Easily changeable and safety-interlocked outlet panel (EUT interface)
- 3 channels EUT fail input

CONTROL PANEL



INS-AX2 series 220/420/250/450



INS-AX2-250/450 (4-wire 3-phase) schematic

- HV: high voltage supply
- R1: charging resistor
- R2, R3: terminating resistor
- R4: terminating resistor for externally connected coupling adapter
- C1: coupling capacitor
- CC: coaxial cable
- RL1: contactor
- RL2: mercury relay
- RL3 to RL9: coaxial reed relays, for pulse width selection
- RL10: relay for terminator setting
- RL11: relay for PULSE OUT (turns on when an external device is used)
- RL12: relay for EUT line coupling
- U1: motor driven coaxial switch unit, for coupled line selection
- U2: motor driven coaxial switch unit, for signal return line selection
- U3: triangular wave unit (factory option)
- L1 to L4, R5- to R8 and C2 to C5: components to form LC filter circuitry.

For the basic INS series simulators operating principle, refer to page 9.

The above schematic illustrates how the INS-AX2 series simulators have achieved complete elimination of the operator's intervention in terms of manual plugging and unplugging of coaxial connectors.

The coaxial reed relay RL3 to RL9 work to form given lengths of the charged coaxial line. The pulse width of 10ns is available when all these relays are open. In contrast, the unit generates the 1000ns width pulse with all the relays closed.

The relays RL10, RL11 and RL12 select the route of the pulse output between PULSE OUTPUT and EUT LINE OUT as well as the termination method.

The units U1 and U2 are controlled and provide all the combinations of the coupling modes.

The above schematic shows the states of the relays and switches for the set-up of:

10ns pulse width, charged line 50-ohm terminated, interference signals coupled in common mode (of N to SG).

INS-AX2 series 220/420/250/450

■ SPECIFICATIONS

Parameters		specifications
Pulse output voltage		0.01 ~ 2.00kV±10%(220/250) at 0.01kV step 0.01 ~ 4.00kV±10%(420/450) at 0.01kV step ±0.04kV allowance for <0.1kV setting When the output is terminated by the internal resistors.
Output polarity		Positive /Negative
Pulse	Pulse width	50,100,200,400,500,800,1000ns ±10%, 10ns ±3ns
	Rise time	<1 ns
	Output impedance	50Ω system (53. 5Ω)
Pulse repetition mode	PHASE	Injection phase angle 0 to 360 degrees±10 degrees EUT power supply : > AC90V, 50Hz/60Hz±10%.
	VARIABLE	10ms ~ 999ms ±10%(220/250) 16ms ~ 999ms ±10%(420/450)
	1SHOT	Single pulse generation, each time the 1 SHOT button is pressed. Synchronized output with phase angle setting in PHASE mode
Power capacity of EUT		Single phase AC240V/DC65V, 20A(220/420) 3-phase (4-wire) AC500V/DC250V, 50A(250/450) 50/60Hz±10%
Power supply		AC100 ~ 240V±10% 50Hz/60Hz±10%
Power consumption		110VA
Operating temperature		15 ~ 35°C
Operating humidity		25 ~ 75%
Dimensions (mm)		W 430×H 350×D 470 mm, projection excluded
Weight		Approx. 30kg (220/420) Approx. 38kg (250/450)
Mercury relay unit		Models 04-00014A and 04-00015A for 2kV and 4kV models, respectively

■ Triangular pulse addition (Factory Option)

Parameters		specifications
Output pulse waveform		Triangular pulse
Pulse output voltage		2kV (220/250) and 4kV (420/450) max (when the output is terminated by the internal resistors)
Output polarity		Positive /Negative
Pulse	Duration	1μs ± 30 %
	Rise time	<40 ns

When the triangular pulse generator has been built-in, the original model numbers become INS-AX2-220T/420T/250T/450T with an affix of "T"

INS-AX2 series 220/420/250/450
Remote Control Software (Included accessory)

Complete, comprehensive ready-made Windows software to control the INS-AX2 simulator remotely from your PC. To be free from the EM interference from the simulator, an optical fiber cable and conversion adapter for your PC are included.

- Controls INS-AX2 via a personal computer.
- Easily creates and manages tests and sequence of tests.
- Manual mode test offers static tests. Sweep mode test offers tests at ramped voltages and placement phase angles or repetition periods. Program mode provides the selected sequence of tests.
- Test report generation, preview and printing are available.



Test set up Window

All test parameters can be set in this window. In Sweep mode, the order of parameters to be ramped can be changed; Voltage changes first or either Phase or Variable changes first.

A complete set of all test parameters settings is called "Unit". One unit can be a Manual test or a Sweep test. In Program test, units can be freely combined and run according to the user-defined sequence.



Test run Window

While the Program test is run, "units" are listed. The unit currently done is highlighted for easier identification.

OPTIONAL ACCESSORIES FOR INS-AX2 series
Outlet Panel MODEL:18-00069A

 JP/USA type
AC125V/20A max

Outlet Panel MODEL:18-00071A

 Multi type
AC240V/15A max

Circuit breaker box MODEL:18-00073A

3-phase AC415V/50A 50/60Hz

Outlet Panel MODEL:18-00070A

 CEE7/Schuko type
AC240V/16A max

Circuit breaker box MODEL:18-00072A


Single phase AC240V/20A 50/60Hz, DC65/20A

Optical Interface Box MODEL:07-00022A

Mercury relay unit for replacement

 Model: 04-00014A for INS-AX2-220, 250
 Model: 04-00015A for INS-AX2-420, 450

INS series

OPTIONAL ACCESSORIES FOR INS

Coupling Adapter Model:CA-805B



Input voltage: 4,000V max
Input pulse width: 50n~1 μs
Diameter for clamping cable: 26mm max

Coupling Adapter MODEL:CA-803A



Input voltage: 2,000V max
Input pulse width: 50n~1 μs
Coupling ratio: 20:1
Terminator: 50Ω terminator built-in
Diameter for clamping cable: 15mm max

EMS Probe Kit MODEL:Model: H2-B



A diagnostic tool for locating sensitive spots on the circuits under test to the electric or magnetic transient field. This kit consists of 3 electric and 3 magnetic field probes, all in a different probe head size for a variety of applications. Connected to the INS or FNS (Electrical Fast Transient Burst) simulator, each probe works as a transient field source.

Features

- Detects possible noise immunity problem spots
- Generates transient electrical or magnetic fields
- Application for modules, components, conductors and ICs
- Convenient handling by pencil shape, light plug-type cable with snap-action coupling

Radiation Probe Model:01-00006A ~ 10A



Input voltage: 4,000V max
Input pulse width: 50n~1 μs
Loop diameter: 50, 75, 100, 150, 200mm
Cable length: Approx. 2m

Coupling Adapter CA-806 Model:15-00007A



Input voltage: 2,000V max
Input pulse width: 50n~1 μs
Coupling ratio: 10:1
Terminator: 50Ω terminator built-in
Diameter for clamping cable: 27mm max

Attenuator for waveform observation MODEL:AT-810



Input voltage: 4,000V max
Input pulse width: 50n~1 μs
Attenuation: 1:100 (40dB)
Input impedance: 50Ω
Output impedance: 50Ω
Frequency characteristics: DC to 500MHz (-4dB)