

# Impulse Noise Simulator

## INS-S100

Test noise resistance  
during product development!



**Make EMC Test Easier !**

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Impulse Noise Simulator

# INS-S100

## Pulse output settings from 50V Test noise resistance of circuit boards and low voltage components



The impulse noise simulator tests the resistance of electronic equipment by simulating quick rise-time high-frequency noise due to discharge between the contacts of switching devices and arc discharge generated from electronic motors.

The impulse noise simulator INS-S100 can output pulses from 50V, allowing to evaluate the noise resistance of circuit boards and low voltage components during product development, and during analysis of malfunctions occurred in the market.



※ illustration image only

- Easy testing of circuit boards' noise resistance due to the pulse output voltage from 50V.
- Easy noise immunity assessment due to possibility to change the output voltage during pulse output.
- "TEST TIME" setting available.
- Lightweight and compact due to no decoupling network (CDN) included.
- Test the noise resistance of signal lines using optional coupling adapters.
- Test the noise resistance of circuit boards using optional radiation probes.

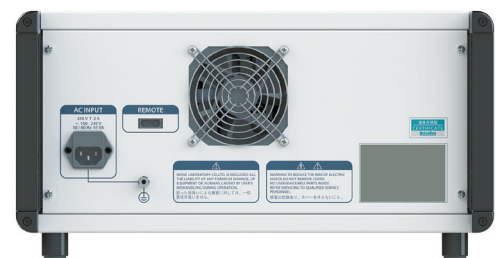
Impulse noise simulators - Specifications Table -			
Parameter	INS-S100	INS-S220	INS-S420
Pulse output voltage	0. 05kV ~ 1. 00kV	0. 50kV ~ 2. 00kV	0. 50kV ~ 4. 00kV
Pulse width	50ns ~ 1000ns	100ns ~ 1000ns ※output voltage : ~ 0. 99kV 50ns ~ 1000ns ※output voltage : 1. 00kV ~	50ns ~ 1000ns
Repetition cycle	10ms ~ 999ms	1ms ~ 999ms ※output voltage : ~ 0. 99kV 10ms ~ 999ms ※output voltage : 1. 00kV ~	10ms ~ 999ms
Rise time	< 3ns ※ when 50Ω terminated		
Decoupling network (CDN)	none	equipped	

### Specifications

Parameter	Specifications	
Pulse output voltage	0. 05kV ~ 1. 00kV ±10% 0. 01kV step ※1 Parameters can be changed during pulse output	
Pulse width	50ns ±15% 100ns ~ 1000ns ±10% 50ns step ※1	
Repetition cycle	10ms ~ 999ms ±10% 1ms step	
Rise time	< 3ns ※1	
Polarity	+ / -	
Output impedance	50Ω ※2	
Terminal resistance	50Ω	
Pulse repetition modes	VARIABLE	10ms ~ 999ms
	EXT TRIG	Input connector : BNC Operating cycle : > 10ms Input signal level : TTL / open collector negative logic Pulse width : > 1ms
	1 SHOT	Single pulse generation each time the 1 SHOT button is pressed. In PHASE mode, output is synchronized to the set phase angle
Test time	1s ~ 999s ±10% 1s step	
HV coaxial cable connector	NMHV ※3	
External control	Communication function RS-232C compliant optical communication	
Power supply	AC100V ~ 240V ±10% 50Hz / 60Hz ±10%	
Dimensions / weight	(W) 430× (H) 199× (D) 370mm (protrusions excluded) / approx. 11kg	
Accessories	coaxial cable 30cm (02-00155A) : 2pcs, SG short plug (02-00106A) : 1pc, SG cable (05-00103A) : 1pc, outlet panel : 1pc, AC cable : 1pc, Instruction Manual : 1 volume, accessories bag : 1pc	
Notes	※1 when 50Ω terminated ※2 Impedance matching using a 50Ω series resistor ※3 NoiseKen custom product	



Front image of INS-S100



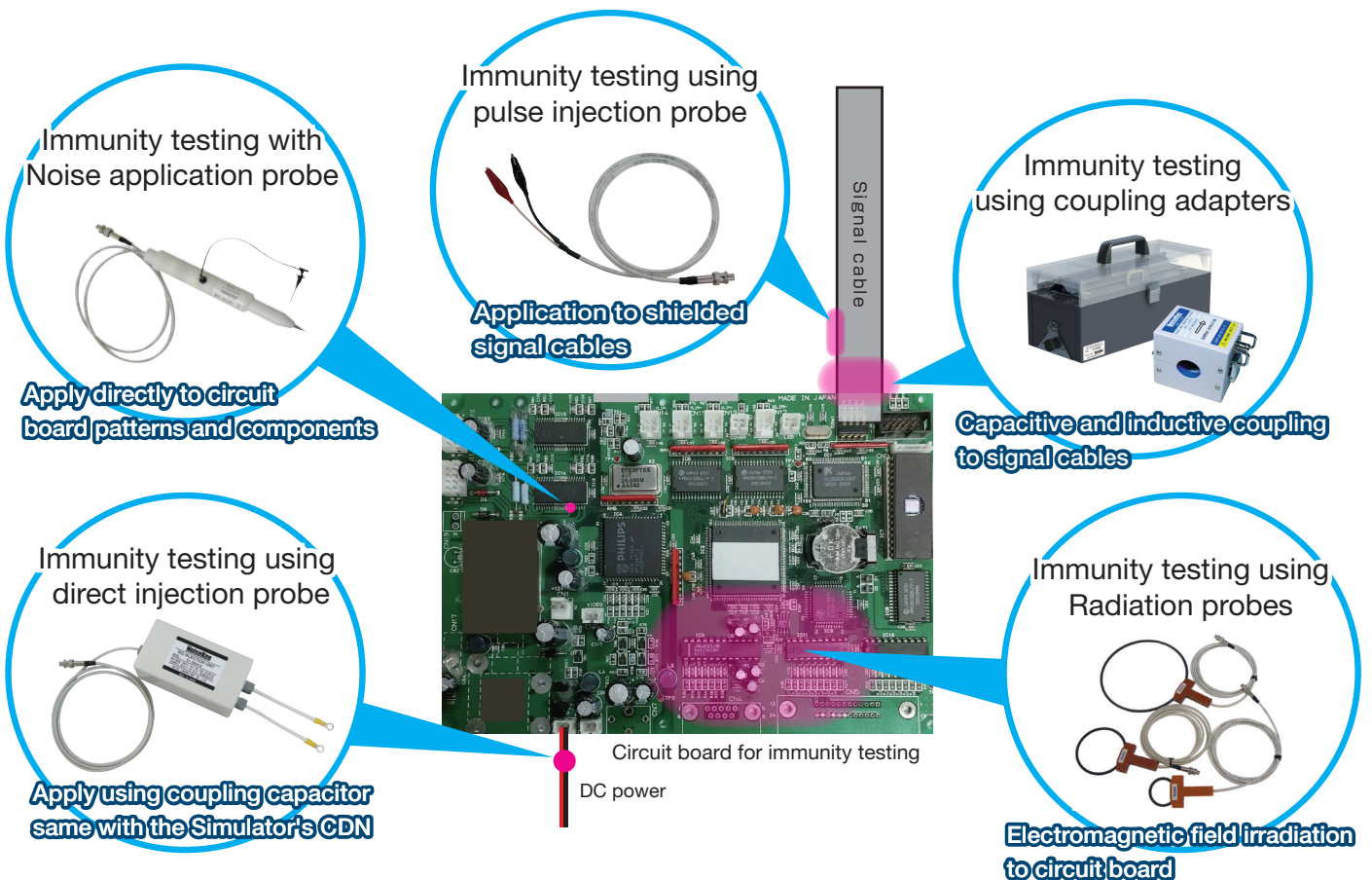
Rear image of INS-S100

※ illustration image only

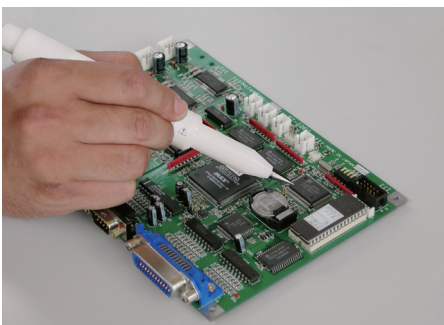
Feature

**Improve the Product Quality !**  
**Choose the application method best suiting your testing purpose**

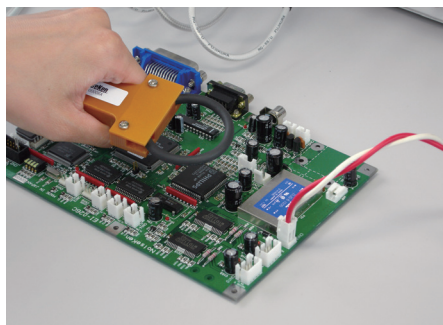
The purpose of noise resistance testing is to ensure a certain level of social safety by clearing the limits of international and industry standards, and to improve product quality by confirming and reproducing malfunctions occurring in the market. Generally, impulse noise testing is performed by injecting noise into the power supply system to check the product's noise resistance, but resistance can also be tested on circuit boards by the application method according to the purpose. You can easily test the noise immunity by clamping the coupling adapter to the signal cable and applying the voltage, or by using a radiation probe to identify the malfunction location due to the near magnetic field on the circuit board.



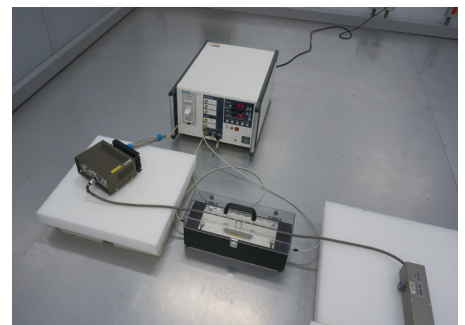
Noise immunity testing with Impulse Noise Simulator



Noise immunity testing using noise application probe



Noise immunity testing using radiation probe



Noise immunity testing using coupling adapter



## INS-S100 Options

### Noise Injection Probe MODEL : 01-00034A



A probe for injecting noise directly into the pattern and parts of the printed circuit board.

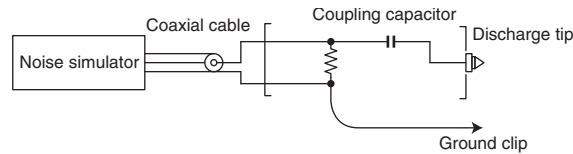
\*Input pulse repetition period: 10 ms or more

- Noise immunity can be tested at the board level because noise can be injected directly into each pin of the LSI.
- Up to 500V noise injection is possible utilizing INS or FNS simulator.
- Possible to exchange the coupling capacitor (Option)
- 50 ohm termination resistor built-in

[Options]

Coupling capacitors: 06-00039A 220pF. 06-00040A 330pF. 06-00041A 3pF. 06-00042A 500pF.

\* 01-00034A does not include the coupling capacitors

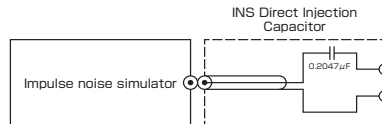


### INS Direct Injection Capacitor MODEL : 01-00047A



A unit for directly applying the pulse output of the Impulse Noise Simulator without passing through the simulator's internal CDN. A coupling capacitor same with the CDN is built-in.

It can be used when the power supply capacity of the test product is a weak current such as a DC5V line, and when it cannot be energized when passing through the simulator's CDN.



Item	Specifications
Coaxial connector	NMHV
Connector	M6 ring crimp terminals
Dimensions / weight	80×80×150 mm (protrusions excluded) / 400g

### Pulse Injection Cable MODEL : 02-H1834



This cable is used for direct noise injection in combination with an Impulse Noise Simulator.

\* It cannot be used for applying current to places where current flows, such as power lines.

### Radiation Probes MODEL : 01-00006A / 7A / 8A / 9A / 10A / 31A / 50A



These probes, in combination with Impulse Noise Simulator allows to emit electromagnetic field radiation noise to the wiring of PCB inside electronic equipment, and is used to search for areas vulnerable to radiation noise.

Parameter	Specifications
Input voltage	4000V Max
Input pulse width	50~1000ns (1μs)
Loop diameter	01-00006A : φ50mm, 01-00007A : φ75mm, 01-00008A : φ100mm, 01-00009A : φ150mm, 01-00010A : φ200mm, 01-00031A : 250mm, 01-00050A : 30mm
Cable length	Approx. 2m
Weight	Approx. 180g~220g
Termination Resistance	N/A

### EMS Probe Kit MODEL : H2-B

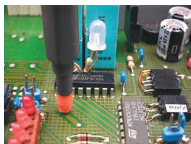
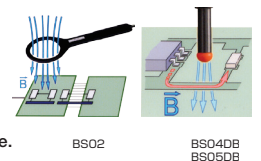


Probes for noise injection onto PCB patterns and flat cables using the Impulse Noise Simulator.

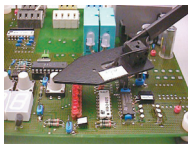
By choosing different probes, it is possible to separate the electric field/magnetic field and perform near field irradiation.

\* Max. pulse voltage: 1kV, max. pulse width: 50ns, fastest repetition period: 10 ms)

- Noise can be applied to any part of a PCB or harness.
- Allows to detect noise immunity weak points by separating and combining use of electric/magnetic field probes.
- A set of 3 electric field probes and 3 magnetic field probes with different shapes and sizes.
- Noise can be applied in the range of several millimeters, allowing to easily identify weak points.
- Allows to identify weak points for specific frequencies by using a signal generator as a wave source.
- Suited for locating noise sensitive spots by using with the INS or FNS equipment



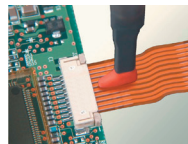
BS05DB



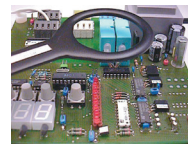
ES02



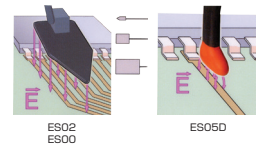
ES00



ES05D



BS02



ES02  
ES00

ES05D



## INS-S100 Options

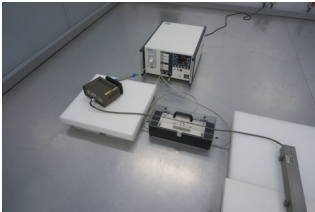
### Coupling Adaptor MODEL : 15-00014A



Allows noise application combined with an Impulse Noise Simulator by simply inserting a cable of an electronic device. Calibration fixture (15-00015A) for this clamp is also available.

- Allows to injecting the noise without cutting signal, DC, AC, GND, etc.
- Allows to test noise immunity of electric devices separately.
- Allows highly-effective noise immunity testing since the noise can be injected directly to signal lines.

Parameter	Specifications
Input voltage	4000V Max
Input pulse width	50~1000ns
Coupling method	Capacitive coupling
Dimensions / Weight	(W)386×(H)155×(D)140mm (protrusions excluded) / Approx 4kg
Adequate cable dimensions	maximum diameter 20mm
Terminal resistor	N/A
Coaxial connectors	Coaxial cable NMHV(P)-NMHV(P)-1. 5M 2pcs



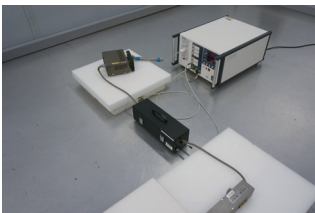
### Coupling Adaptor MODEL : CA-805B (Capacitive coupling)



Allows noise application combined with an Impulse Noise Simulator by simply inserting a cable of an electronic device.

- Allows injecting the noise without cutting signal, DC, AC, GND, etc.
- Allows to test noise immunity of electric devices separately.
- Allows highly-effective noise immunity testing since the noise can be injected directly to signal lines.
- Allows to clamp bundle of lines whose of maximum diameter up to 26mm.

Parameter	Specifications
Input voltage	4000V MAX
Input pulse width	50~1000ns
Coupling method	Capacitive coupling
Dimensions / Weight	(W)350×(H)105×(D)110mm (protrusions excluded) / Approx 3kg
Adequate cable dimensions	maximum diameter 26mm
Terminal resistor	N/A
Coaxial connectors	Coaxial cable NMHV(P)-NMHV(P)-1. 5M 2pcs (MODEL 02-00025A)



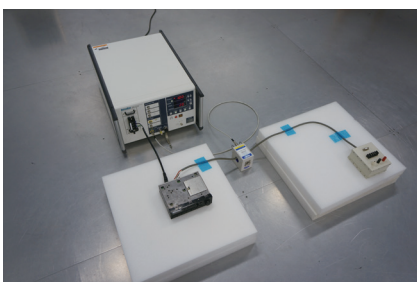
### Coupling Adaptor MODEL : 15-00007A (CA-806 / Magnetic field coupling)



Allows noise application combined with an Impulse Noise Simulator by simply inserting a cable of an electronic device.

- Allows injecting the noise without cutting signal, DC, AC, GND, etc.
- Allows to test noise tolerance of electric devices separately.
- Termination resistance built-in.

Parameter	Specifications
Structure	Magnetic field coupling noise injection clamp
Input voltage	2000V Max.
Input pulse width	50~1000ns
Coupling ratio	1/10±10% of input voltage
Termination resistance	50Ω built-in(54Ω)
Max. diameter of ground cable	27mm
Dimensions / Weight	(W)89×(H)64×(D)120mm / Approx 1000g
Coaxial connector	NMHV(P)-NMHV(P) 1m: 1pc. (MODEL: 02-00053A)



## INS-S100 Options

### Attenuator for waveform check **MODEL : 00-00017A**



#### Attenuator for measuring high voltage pulse.

Parameter	Specifications
Attenuation rate	DC~2GHz : 40dB (100 : 1)
Input pulse peak voltage	4000V MAX
Tolerable continuous pulse examples	Pulse width : 50ns~1000ns Pulse repetition frequency : Max. 60Hz at 4000V output; Max. 100Hz at 2000V 1 hour continuous use
Input impedance	50Ω (50Ω ± 1% at DC)
Output impedance	50Ω (50Ω ± 1% at DC) *If using an oscilloscope with high input impedance (1 MΩ), a 50 Ω termination is required.
Interface connectors	INPUT : HN(F) OUTPUT : N(F)
Dimensions/ Weight	(W)154.5mm × (D)105mm × (H)37mm / Approx 1350g
Accessories	Input cable (HN(P)-NMHV(P) 0.5m) 1pc. , Output cable (N(P)-BNC(P) 1m) 1pc. , Instruction Manual 1pc.

### Attenuator **MODEL : 00-00011A**



#### Attenuator for protecting measuring instruments.

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

Attenuating rate 20dB, N type connector INS-S220/S420 → coaxial cable → 00-00017A → 0000011A → coaxial cable → oscilloscope

### PULSE DIVIDER for INS **MODEL : 00-00021A**



#### Voltage divider enabling low voltage test by dividing and outputting high voltage pulses at a ratio of 4:1.

Parameter	Specifications
Attenuation rate	DC~2GHz : 12dB (4 : 1)
Input pulse peak voltage	2000V MAX
Tolerable continuous pulse examples	Pulse width : 10ns~1000ns Pulse repetition frequency : 2000V output ≤ 62.5Hz (continuous output)
Input / Output impedance	50Ω (50Ω ± 1% at DC)
Interface connectors	HN(F)
Dimensions / Weight	(W)169mm × (D)119mm × (H)37mm / Approx 1490g
Accessories	I/O cables (HN(P)-NMHV(P) 0.5m) 2pcs. , Output cable (HN(P)-HN(P) 0.3m) 1pc. , Instruction Manual 1pc.

### Horizontal Coupling Plane (HCP) **MODEL : 03-00020A**

Metal plate placed on the table for the testing of tabletop EUT.  
(W)1600 × (D)800 × (t)1.5 mm × 1 sheet (made of Aluminum)  
\* Used as a horizontal coupling plane 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 equipment (EUT) and devices under test (DUT).  
(W)1600 × (H)800 × (D)800 mm

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

Ground plane to be placed under the wooden table.  
(W)1800 × (D)1000 × (t)1.5 mm × 3 pcs. in 1 set (made of aluminum)

### Insulating Block **MODEL : 03-00054A**



Blocks to float (isolate) wirings of EUT from GRP.  
(W)300 × (D)300 × (H)50mm, 5 pcs. in 1 set

Material: Polyethylene foam

### Insulating support **MODEL : 03-00024A**



Used for floating EUT 10cm above the ground plane in case of testing to floor-standing EUTs.

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

### Cubic Insulating Block100 **MODEL : 03-00029A**



Used for floating EUT 10cm above the ground plane in case of testing to floor-standing EUTs.

Size : (W)100 × (D)100 × (H)100mm  
Material : Wood  
Withstanding load: 500kg

### SG Cable **MODEL : 05-00103A**



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

Length : 0.1m

INS-S100 Options

USB Optical Module Kit **MODEL : 07-00022A**



Connection adapter used for remotely controlling the simulator from a PC.  
Equipped with USB-Optical conversion fiber optic cable (5m)

Impulse Noise Simulator (semi-conductor type)

# INS-S series RemoteW Model:14-00069A

INS-S420 series (Model:14-00069A) is the dedicated software for remote control of INS-S series simulators.

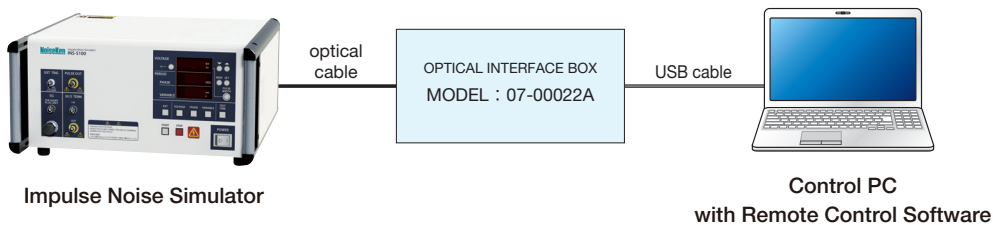
Using this software, you can set the application mode as well as test parameters such as pulse output voltage, pulse width, phase angle and repetition period. Test conditions can be controlled in sequences, which contributes to reducing the test time and man-hours.

- Manual tests can be performed by setting test parameters such as pulse output voltage, pulse width, phase angle, repetition period, and test time.
- Sequence tests can be performed by arbitrarily combining manual test data.
- Test information such as test conditions, test list, etc, can be generated into a Test Report and exported in Excel format.
- EUT FAIL signal detected using digital I/O.
- Compatible with Windows 10,11 64 bit versions with English and Japanese supported languages.
- Various settings data can be protected by the "Settings Protection" function.

\*phase angle settings available when used with an external CDN.

**Hardware Configuration**

**PC Remote control of INS-S100**



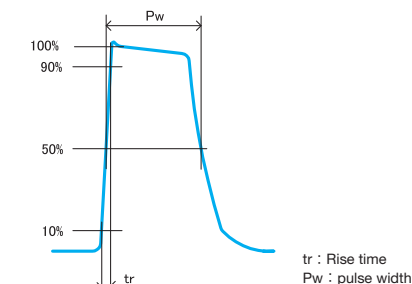
**Software System Requirements**

Parameter	Specifications
OS	Windows 10, 64bit (English or Japanese ver. ) Windows 11, 64bit (English or Japanese ver. )
CPU	Dual-Core over 2.4GHz or better recommended
RAM	8GB or more recommended
Storage	5GB available free space
Display	1920×1080 pixels (FullHD) or more recommended

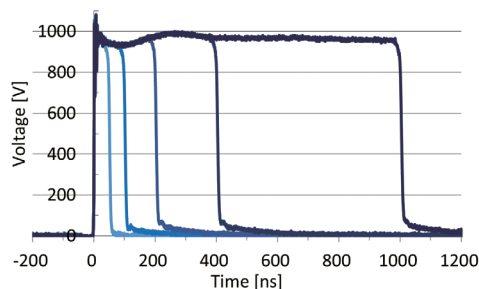
**【Attention】**

- Operation is not guaranteed when using software on cloud services or using online storages.
- For correct "Report Export" function, be sure to have installed Microsoft Excel compatible with the OS and within the support period. (Please use the Desktop version, not the Store App version.)
- Optical USB Interface unit is required (models 07-00022A or 07-00023A).
- Available USB ports required.
- (2 USB ports required. In case of using Digital I/O - 3 USB ports required.)
- CD-ROM or DVD-ROM drive required for installing drivers for the Optical USB Interface.

**Output waveform image**



Output waveform (rise time and PW specification)



Output waveform (50ns, 100ns, 200ns, 400ns, 1000ns)



## International Sales & Marketing Section

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