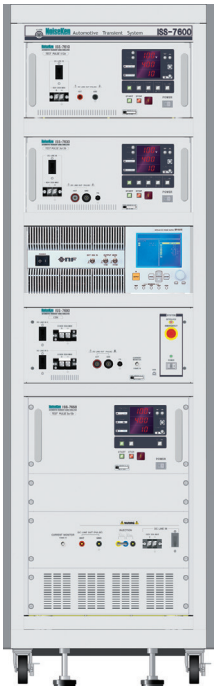
NoiseKen NOISE LABORATORY CO., LTD.

ISO Standard Compliant Automotive Transient Surge Simulator

ISS-7600 Series

This tester simulates various transient surge phenomenon noise in vehicles required by the international standard ISO 7637-2 (2011 version) and evaluates the resistance of on-board electronic devices.



- Highly accurate output waveforms
- Waveforms guaranteed not only at the output terminal of each generator but also at the output terminal of the Coupling Network.
- Capable of running either as a system or as individual generators.
- PC Remote Control Software can control ISS-7600 through USB interface connection.
- Supports 12 V / 24 V / 42 V systems
- 60 V / 50 A big volume Coupling Networks available
- Up to 200 A Power supply available.
- Electric shock-free safety plugs are used for every output terminal.
- Load resistors meeting the loading conditions (specified in Annex D of the standard) for the verification of the output characteristics optionally available.
- Equipped with a high accuracy current monitor. An oscilloscope allows measurement of the current waveform flowing into the DUT. Current and voltage waveforms can be examined at the same time with an oscilloscope because the current monitor output circuit is floating with respect to the SG and FG. The monitor's frequency response characteristic is from DC to 150 kHz.
- Japanese software is also available.

* Private standards or specifications by manufactures can be responded upon request.

Pulse 1 / 2a Generator

ISS-7610

Pulse 1 : Simulation of transients due to supply disconnection from inductive loads. It is applicable to DUTs which, as used in the vehicle, remain connected directly in parallel with an inductive load.

Pulse 2a : Simulates transients due to sudden interruption of currents in a device connected in parallel with the DUT due to the inductance of the wiring harness

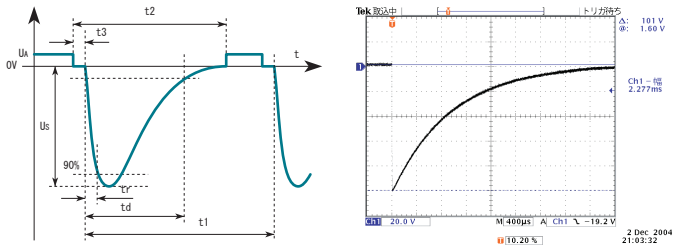
- Compliant tests to ISO 7637-2 (2011) Standard (Pulse1/Pulse2a generator)
- Stand-alone usage possible with 60V 30A CDN built-in.

Parameter	Specification (Pulse 1)	Specification (Pulse 2a)
Output voltage (Us)	-5 V ～ -720 V (-1 V step)	5 V ～ 300 V (1V step)
Output impedance (Ri)	10 Ω, 30 Ω, 50 Ω	2 Ω, 4 Ω, 10 Ω, 30 Ω, 50 Ω
Pulse width (td)	50μs, 200μs, 300μs, 500μs, 1ms, 2ms	50μs, 200μs, 300μs, 500μs
Rise time (tr)	1μs : -0.5μs /+0μs 3μs : -1.5μs /+0μs	1μs : -0.5μs /+0μs
Pulse repetition period (t1)	0.5s ～ 99.9s (0.1s step), P2a : 0.1s ～ 99.9s (0.1s step)	
DUT power capacity	DC 60 V / 30A	
Dimensions	(W)430 × (H)200 × (D)522 mm	
Weight	Approx. 20 kg	Power consumption 260 VA

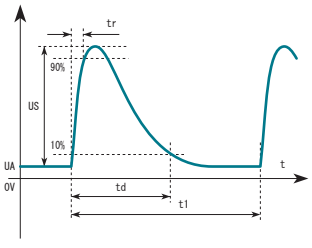
Parameter	Q'ty
Output cable (2 m)	Each 1 pc. of red & black color one
DC input cable (2 m)	1 pc.
Short lead for waveform verification	1 pc.
Interlock plug	1 pc.
Fuse (3.15 A)	2 pcs.
AC cable	1 pc.
Instruction manual	1 volume

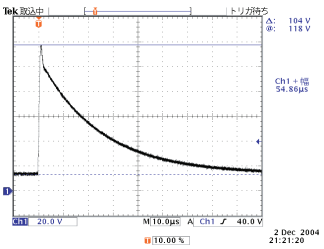
Output waveform

pulse1



pulse2a





Pulse 3a / 3b Generator

ISS-7630

Simulation of transients which occur as a result of the switching processes. The characteristics of these transients are influenced by distributed capacitance and inductance of the wiring harness.

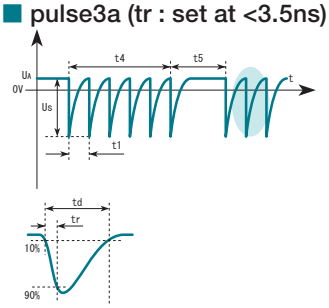
- **Compliant tests to ISO 7637-2 (2011) Standard (Pulse 3a/Pulse 3b generator)**
- **Stand-alone usage possible with 60V 30A CDN built-in.**
- **Frequency sweep (10 kHz - 100 kHz - 10 kHz) test possible (Option)**
- **Faster than 3.5ns rise time realized so as to conduct more severe test than the Standard.**

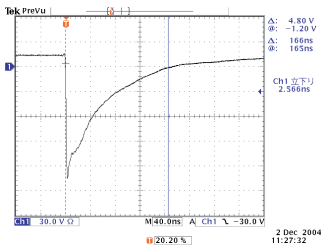
Parameter	Specification
Output voltage (Us)	-20 V ～ -350 V (-1 Vstep) 20 V ～ 350 V (1 Vstep)
Output impedance (Ri)	50 Ω
Pulse width (td)	150ns ± 45ns
Rise time (tr)	5ns ± 1.5ns, <3.5ns
Pulse repetition period (t1)	10μs ～ 999μs (1μs step) *1 kHz ～ 100 kHz Frequency sweep possible (option necessary)
DUT power capacity	DC60V/30A
Dimensions	(W)430 × (H)200 × (D)522 mm
Weight	Approx. 17 kg　Power consumption 110 VA

Parameter	Q'ty
Output cable (0.5m)	Each 1 pc. of red & black color one
DC input cable (2m)	1 pc.
BNC conversion adaptor	1 pc.
50Ω coaxial cable (BNC equipped)	1 pc.
G cable	1 pc.
Waveform verification lead	1 pc.
Interlock plug	1 pc.
Fuse (3.15A)	2 pcs.
AC cable	1 pc.
Instruction manual	1 volume

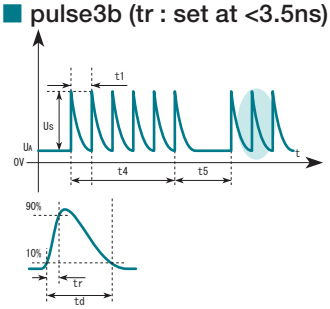
Output waveform

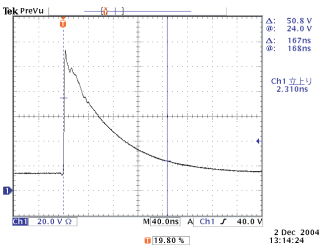
pulse3a (tr : set at <3.5ns)





pulse3b (tr : set at <3.5ns)



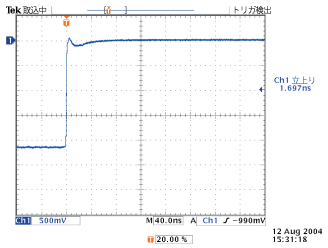


Difference of the impulse response among measurement probes

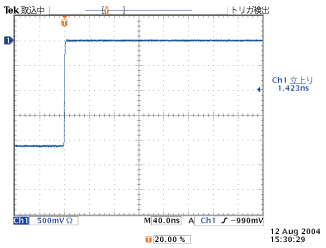
Since Pulse 3a / 3b contain high frequency components, the waveform measurement should be paid attention.
It can be done easily with the optional attenuator.

BNC conversion adaptor for the measurement

Attenuator in No-load (Option)



Measurement with a 100:1



Measurement with the NoiseKen no-load attenuator

ISS-7600 Series

Pulse 2b / 4 Generator
BP4610

Pulse 2b : Simulates transients from DC motors acting as generators after the ignition is switched off.
Pulse 4 : Simulates supply voltage reduction caused by energizing the starter-motor circuits of internal combustion engines.

- Compliant tests to ISO 7637-2 (2011) Standard (Pulse 2b generator)
- Compliant to ISO 7637-2 (2004) Standard pulse 4 generator
- ± 60 V 10 A DC - 150 kHz bipolar amplifier built-in.
- Works as a power source replacing an external battery for testing with the other pulses.
- Expandable to be 15 A or 30 A upon addition of an optional external power supply.

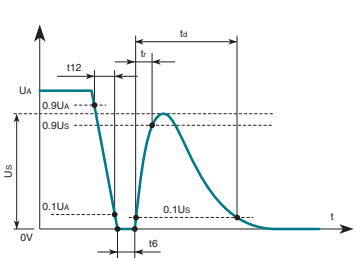
* Requirement of 100 A / 200 A can be responded upon request.
* Optional software shall be necessary for putting Pulse 2b / 4 out.

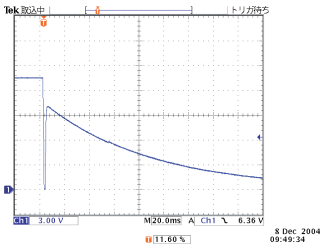
Parameter		Specification
Pulse 2b	UA, Us*	0 V ～ 60.0V ± 10% ± 0.5 V 0.1 V step
	Ri	0 Ω ～ 0.05 Ω
	Td	0.1s, 0.2s ,0.5s ,1s ,2s ,4s ±20%
	t12, tr, t6*	1ms ,2ms ,5ms ±50%
Pulse 4	UB	0 V ～ 60.0 V ± 10% ± 0.5 V 0.1 V step
	Us, Ua	0 V ～ -UB ± 10% ± 0.5 V -0.1 V step
	Ri	0Ω ～ 0.02 Ω (at shipment)
	t7, t8 ,t10 ,t11*	1ms ～ 999ms ± 10% 1ms step
	t9	0.1s ～ 99.9s ±1 0% 0.1s step
Dimensions		(W)430 × (H) 177 × (D)550 mm
Weight		Approx. 26 kg Power consumption 1200 VA

*Each parameter can be set individually.

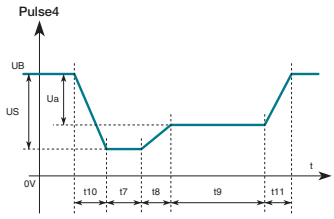
■ Output Waveform

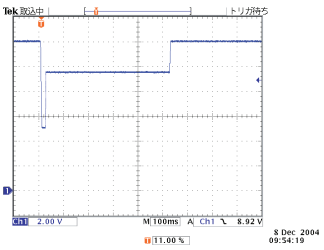
■ pulse2b





■ pulse4





Pulse 5a / 5b Generator
ISS-7650

Pulse 5a : Simulation of load dump transient, occurring in the event of a discharged battery being disconnected while the alternator is generating charging current and with other loads remaining on the alternator circuit at this moment.
Pulse 5b : Simulation of the above load dump transient when a Zener diode is inserted to the battery route.

- ISO 7637-2 (2004) compliant pulse 5a
- Pulse 5a and Pulse 5b generating unit
- A built-in 60 V / 30 A Coupling Network allows independent operation.
- Equipped with a programmable clip circuit that can produce Pulse 5b clipped waveform in steps of 0.1 V without externally attaching a zener diode.

*The ISO standard requires pulse 5a and 5b have the same value for their td. Due to the effects of the integrated clip circuit, pulse 5b width is different from that of pulse 5a. Pulse 5b non-compliant to ISO 16750 (2012) Test B

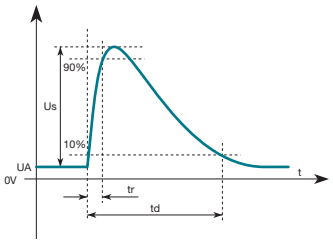
ISS-7600 Series

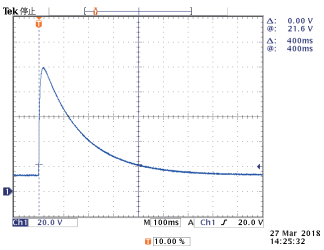
Parameter	Specification	
Pulse5a	12 V system	24 V system
Output voltage (Us)	20 V ～ 100 V (0.5 V step)	20 V ～ 200 V (0.5 V step)
Output impedance (Ri)	0.5 Ω ～ 8 Ω (0.5 Ω step)	1 Ω ～ 8 Ω (0.5 Ω step)
Pulse width (td)	40ms, 100ms ,200ms, 350ms ,400ms	100ms ,200ms ,350ms ,400ms
Rise time (tr)	10ms (+0, -5ms)	10ms (+0, -5ms)
Pulse5b	12 V system	24V system
Output voltage (Uss)	10 V ～ 40 V (0.1 V step)	
Pulse width (td)	Td of pulse 5b is dependent on Us, Uss and Ri settings, the same value as pulse 5a td not available	
DUT power capacity	DC 60 V / 30 A	
Dimensions	(W)488 × (H)670 × (D)660 mm	
Weight	Approx. 100 kg	Power consumption150 VA (in stand-by) / 600 VA (in charging)

Parameter	Q'ty
Output cable (2 m)	Each 1 pc. of red & black color one
DC input cable (2 m)	1 pc.
Coaxial cable for current monitoring	1 pc.
DC coupling switching plug	1 pc.
Short lead for waveform verification	1 pc.
Interlock plug	1 pc.
Fuse (6.3 A)	2 pcs.
AC cable	1 pc.
Instruction manual	1 volume

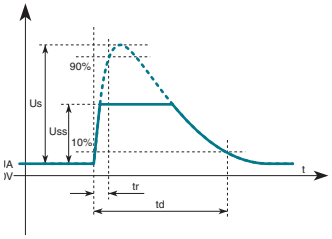
Output Waveform

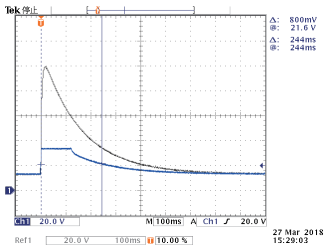
pulse5a





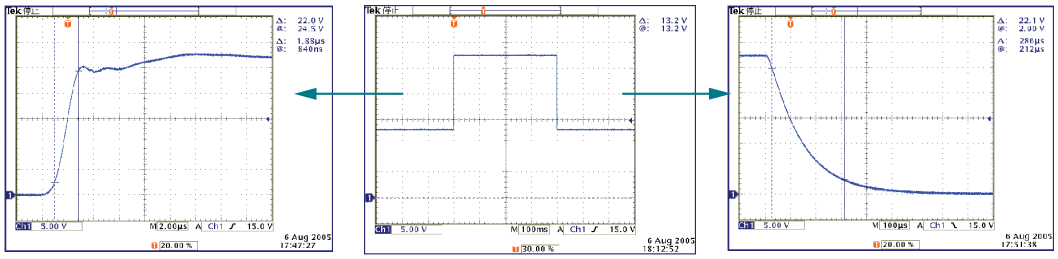
pulse5b





pulse5c (Customized waveform)

* Responded upon the particular request. If required, please contact us.



*1ms - 500ms (1ms)

Coupling Network & System Rack

ISS-7690 / ISS-7602

System rack that all pulse generating units can be mounted on (ISS-7602).
ISS-7690 Coupling Network unit centralizes all pulse outputs of the system-configured generators in the single output port.

- **Software selectable pulse generators and DC supplies**
- **In addition to the built-in DC power supply (BP4610), two external power supplies (battery) connections are available**
- **Switches three independent power supplies (BP4610 (LINE 1), LINE 2, LINE 3)**
- **A high speed DC interruption switch with < 1µs fall time capability is standard built-in**
- **Equipped with a high accuracy current monitor.**
- **The pulse 3a and 3b waveforms meet the ISO standard specifications at the output ports of the Coupling Network Unit.**

Insure high frequency Pulse 3a / 3b waveforms which may be dulled due to the wiring length with the centralized CDN output port.

Parameter	Specification
DUT power capacity	60 V / 50 A
DC input	2 channels (Amplifier power supply & battery) *Including Pulse 2b, Pulse 4 and arbitrary waveform.
Pulse input	Pulse1, Pulse2a/2b ,Pulse3a/3b ,Pulse4, Pulse5a, Pulse5b
Interruption test	≦ 1µs (in DC interruption), Not switched in fluctuation of the interruption
Current monitor	Monitoring terminal (BNC)output 10m V/A (DC)150 kHz
System rack	(W)555 × (H)1800 × (D)790 mm

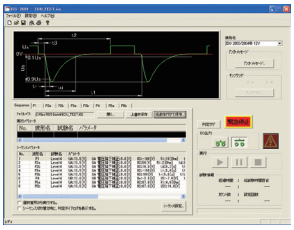
ISS-7600 Series

Control software
ISS -7601

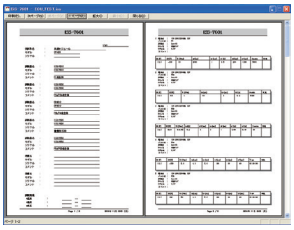
Comprehensive control software for the all pulse generators.

- Comprehensive control software for the all pulse generators.
- Enables to control the each pulse generator comprehensively.
- One touch output possible even in Pulse 2b and Pulse 4 whose waveforms assembly may be troublesome.
- Easy setting of the test conditions with its programming function.
- Reporting function available to realize the test conditions, comments as well as the result (Preview and print-out also possible).

Sequence setting screen



Preview screen for printing the test result out



Fast Pulse /Slow Pulse Generators
ISS-7630 / ISS-7610-N1229

The ISO 7637-3 2007 standard provides evaluation of the immunity of devices under test (DUTs) to transient transmission by coupling via lines other than supply lines. The test transient pulses simulate both fast and slow transient disturbances, such as those caused by the switching of inductive loads and relay contact bounce. Also it provides 3 kinds of the coupling methods.

ISS-7630 (Fast Pulse)

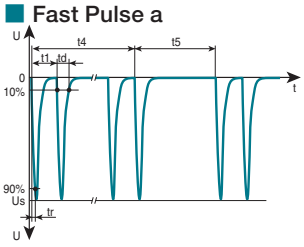
Parameter	Specification
Output voltage (Us)	-20 V ～ -350 V (-1 V step) 20 V ～ 350 V (1 V step)
Output impedance (Ri)	50 Ω
Pulse width (td)	150ns ± 45ns
Rise time (tr)	5ns ± 1.5ns, < 3.5ns
Pulse repetition period (t1)	10μs ～ 999μs (1μs step)
DUT power capacity	DC 60V / 30 A
Dimensions	(W)430 × (H)200 × (D)522 mm
Weight	Approx. 17 kg　Power consumption 110VA

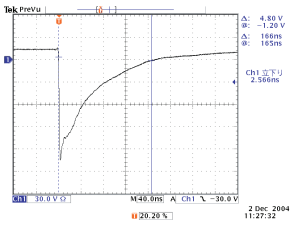
ISS-7610-N1229 (SLOW Pulse)

Parameter	Specification
Output voltage (Us)	5 ～ 50 V (0.1 V step) -5 ～ -50 V (-0.1 V step)
Output impedance (Ri)	2 Ω
Pulse width (td)	50μs ± 10μs
Rise time (tr)	1μs
Pulse repetition period (t1)	0.1 ～ 99.9s (0.1s step)
DUT power capacity	–
Dimensions	(W)430 × (H)200 × (D)522 mm
Weight	Approx. 20 kg　Power consumption 50VA

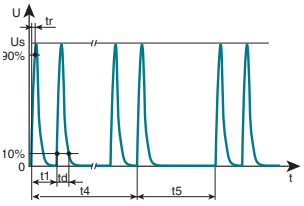
Output Waveform

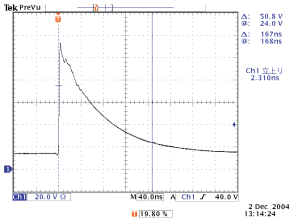
Fast Pulse a



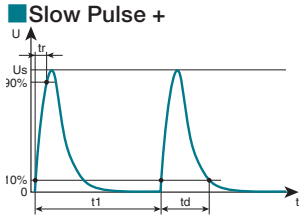


Fast Pulse b

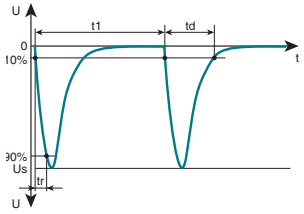




Slow Pulse +



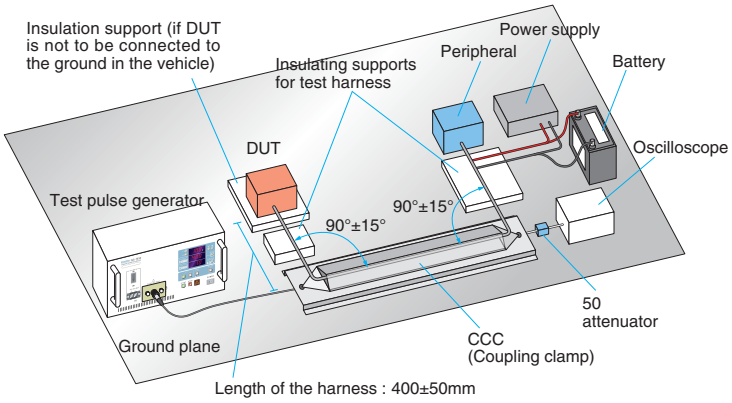
Slow Pulse –



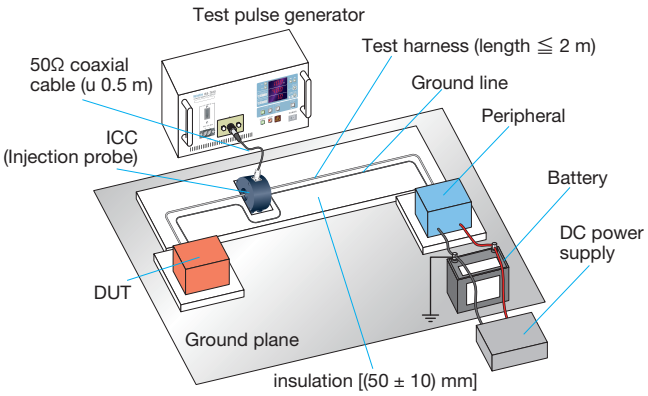
ISS-7600 Series

Test Setup (ISO 7637-3)

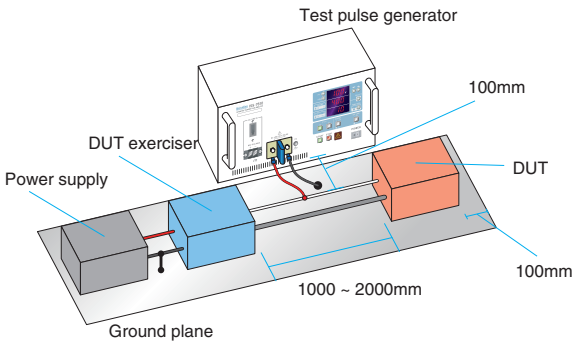
· Capacitive coupling clamp (CCC) method (Only for Fast Pulse)

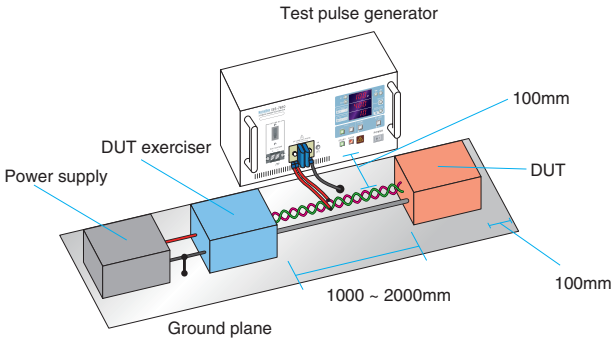


· Inductive coupling clamp (ICC) method (Only for Slow Pulse)



Direct capacitor coupling (DCC) method (For Fast Pulse and Slow Pulse)

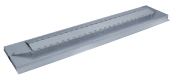




* DCC test setup for CAN bus.

Options

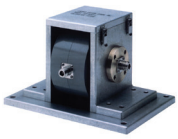
Coupling Clamp MODEL : ISS-7630-Cup



Coupling clamp for testing for lines other than supply lines. Capacitively couples 3a and 3b pulses into the lines under test.
Contents: Coupling clamp, BNC Coaxial cable 0.5m, BNC coaxial cable 0.1 m, 50Ω 5W terminator, Metal fasteners

● Compatible model : ISS-7630

Injection Probe MODEL : F-120-2



Clamp used for the Inductive coupling clamp (ICC) test method provided in ISO 7637-3 Standard. Calibration fixture (FCC-BCICF-1) is also available.
* The left photo is the figure including the calibration fixture.

DCC BOX

- Inject pulse noise into the I / O signal line through a 100pF coupling capacitor regulated by ISO 7637-3.
- With a check terminal to check the pulse
- The pulse decoupling inductor can be attached to and detached from the sample (hereinafter referred to as EUT1 and EUT2).
- Since the pulse generator to the DCC BOX is a balanced transmission line and the DCC BOX to EUT 1 and EUT 2 is an unbalanced transmission line, a balanced / unbalanced balun is built in to suppress disturbance of the pulse waveform.

Waveform Verification Set Model: 06-00059B

A set of resistor and attenuator for observing the pulse of Test Pulse 1 / Test Pulse 2a / Test Pulse 2b / Test Pulse 3a / Test Pulse 3b / Test Pulse 5a of ISS-7610, BP4610, ISS-7630, & ISS-7650.

1 Ω resistor, 2 Ω resistor, 10 Ω resistor, 50 Ω resistor, 2.5 k Ω 40 dB ATT, 50 Ω 20 dB ATT × 2

● Compatible models: ISS-7610, ISS-7630, ISS-7650

* Resistors can also be purchased individually.

Waveform Verification Attenuator under No Load Conditions Model: 00-00007A

The attenuator for observing high frequency and high voltage pulses of Test Pulse 3a / Test Pulse3b of ISS-7630.
2.5 k Ω 40 dB ATT (Pulse 3a / Pulse 3b)

● Compatible model: ISS-7630

50Ω Load Waveform Verification Attenuator Model: 00-00006B

The attenuator for observing high frequency and high voltage pulses of Test Pulse 3a / Test Pulse 3b of ISS-7630.
50 Ω 20 dB ATT × 2 (Pulse 3a / Pulse 3b)

● Compatible model: ISS-7630