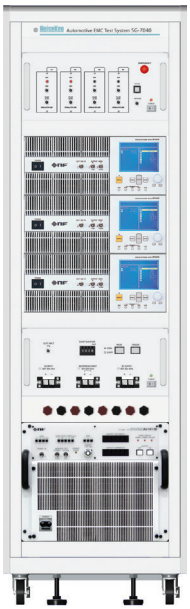
DC Power Supply Voltage Fluctuation Simulators

SG-7040A System

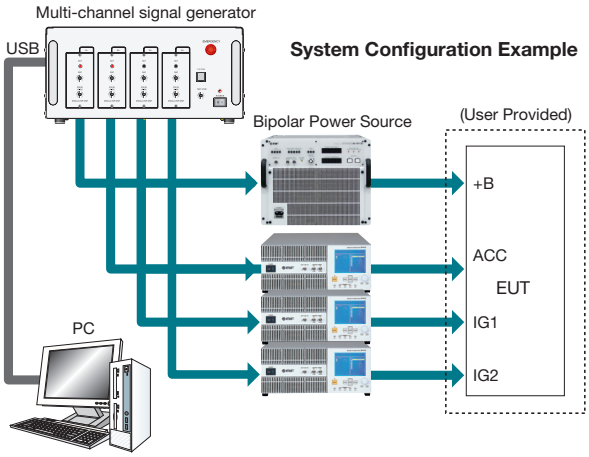
Simulator to reproduce power supply voltage fluctuation to electronics devices in a vehicle and evaluate the immune resistibility against the fluctuation.
Max. 4 channels not only +B connection but also ACC, IG (and IG2), etc. can be synchronized for the reproduction.



- ISO 16750 Standard compliant test (Possible to respond to private standards of the manufacturers).
- High resolution and high accuracy for the waveforms output realized with waveforms operation circuits built in the each channel.
- Easy and precise reproduction of the fluctuation phenomena not only in the Standard but also arbitrarily enabled with the software control (USB).
- Insures less than 1μs for the synchronizing variation among the channels.
- Enable to reproduce waveforms by using CSV data collected from real vehicle oscilloscope measurements.
- Automated testing operation can be customized for reducing the man-hour.

*Please contact us for the specification details.
*Load dump test A and B pulses not available

Specifications



The system is primarily comprised of the following three elements: multi-channel signal generator, bipolar power source(s), and arbitrary waveform creation software.
Appropriate bipolar power sources shall be selected and the multi-channel signal generator shall be configured according to test requirements.

1. Multi-channel signal generator

・Modular construction for a maximum of four channels
・Arbitrary waveform creation (DC, ramp wave, sine wave, exponential wave, frequency modulation, amplitude modulation)
・Waveform sequence creation

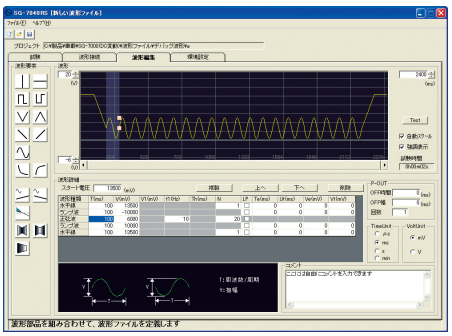
2. Arbitrary Waveform Creation Software

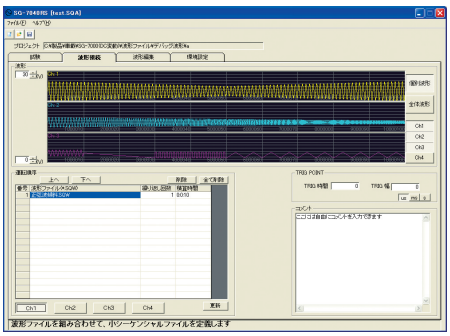
The arbitrary waveform creation software easily creates complicated waveforms with repeated voltage and time ramping with its superb GUI.

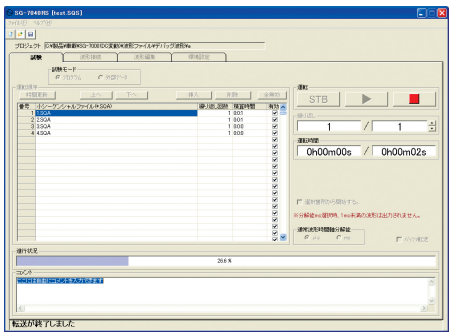
3. Bipolar Power Source

High-speed bipolar power source is selected according to the DUT power rating.

Software







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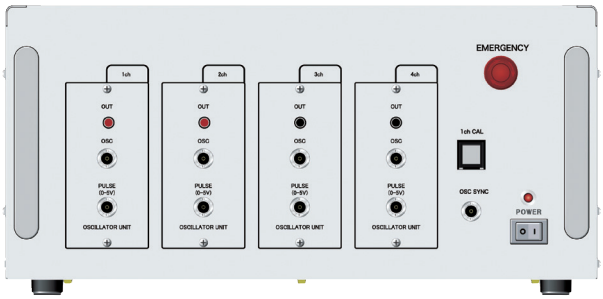
Multi-channel signal generator SG-7040A



Specifications

Parameter	Specifications / Functions
Channel Number	1 ch ～ 4 ch
Oscilloscope Trigger Output	BNC Connector 0 ～ 5 V Set the desired point as the trigger point with the waveform creation software and monitor waveform generation with the external trigger function of the oscilloscope.
Waveform Generator Method	Sampling waveform output based on partial waveform memory and DSP circuit output CSV data
Output Voltage	0.00 ～ ± 6.00 V
Output Current	5 mA Max.
Output Impedance	50 Ω
Setting Resolution	0.01 V
Output Resolution	1.221 mV
Offset Voltage	± 6.0 V
Frequency Response	150 kHz Max. (± 6.00 V Amplitude Sine Wave)
Characteristics	150 kHz Max. (± 6.00 V Square Sine Wave)
Frequency Precision	± 20ns + 50 ppm (over the entire frequency rang)
Waveform Rise / Fall Time	Less than 100ns (0±1.00V Swing)
Slew Rate	20 V /μs
Synchronization accuracy	Adjustable at a step of 1.0uS up to 10uS, to compensate differences in response time of the amplifiers connected. Synchronization with <1.0uS accuracy at the outputs of the bipolar power amplifiers connected.
Calibration Output	1 kHz 1V (Test Use)
PC Interface	USB 1.1
Operating Temperature	25℃ ±10℃
Operating Humidity	20 ～ 90% RH
Drive Power Source	Local AC supply voltage ±10% 50 / 60Hz 15 VA
External Dimensions	approx. (W)430 × (D)400 × (H)200 mm
Weight	approx. 10 kg

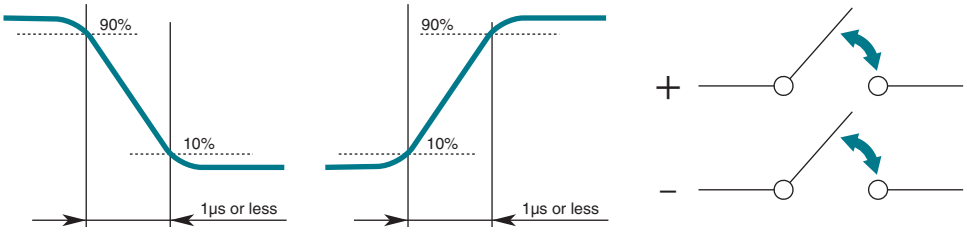
Accessories

Item	Q'ty
Coaxial cable (BNC-BNC/2m)	For number of channel
Output cable (1m)	For number of channel
Crimping terminal (M4)	For number of channel × 2 pcs.
Crimping terminal (M6)	For number of channel × 2 pcs.
Crimping terminal (M8)	For number of channel × 2 pcs.
Fuse (3.15A)	1 pc.
Application software	1 pc.
AC cable	1 pc.
USB cable	1 pc.
Instruction manuals (for main unit and software operation)	Each 1 volume
Accessories bag	1 pc.

DC Cut Module MODEL : SG-7044

- **Disconnects DC supply circuits**
- **Open and Sink Modes**
- **Rise and fall time < 1μs**
- **Controllable from SG-7040A**
- **Sink currents up to -30 V**
- **DC 50 A**

Optional equipment for the SG-7040A Series to carry out supply interruption test with <1μs rise/fall time requirement.



Specifications

Parameter	Specification
Output voltage	0 ～ DC 60 V
Steady-state current	Max. 50 A
Short mode	Open / Short (Current intake)
Cut off mode	Only + / Only - / Both polarities
Cut time	Open : Input terminal or trigger switch
	Short : Set at short duration or set at 2 - 9999μs
Rise / Fall time	≦ 1μs (10 % - 90 % short mode output open at DC 12V)
Dimensions / Weight	(W)430 × (D)400 × (H)200 mm / approx. 10 kg

Accessories

Item	Q'ty
Coaxial cable (BNC-BNC / 2 m)	1 pc.
Output cable (1m)	1 pc.
Crimping terminal (M4)	4 pcs.
Crimping terminal (M8)	4 pcs.
Fuse (2 A)	2 pcs.
AC cable	1 pc.
Instruction manuals	1 volume
Accessories bag	1 pc.

* In case the units are cabined in the rack, AC cable shall be connected inside of the rack.

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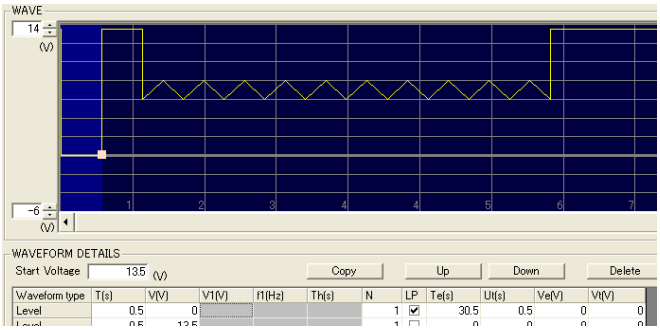
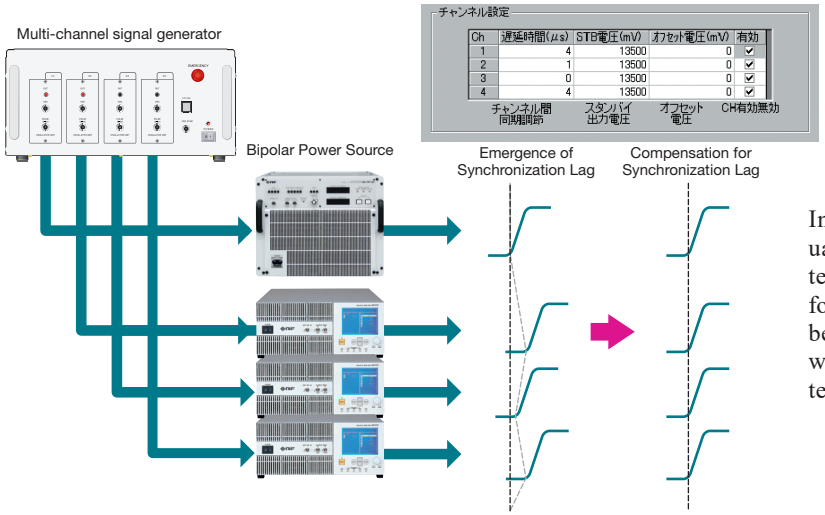
Sweep Setting Function



Easily and reliably creates a loop waveform using the sweep function detailed at left for a long test duration requiring varying T (times) and V (voltages).

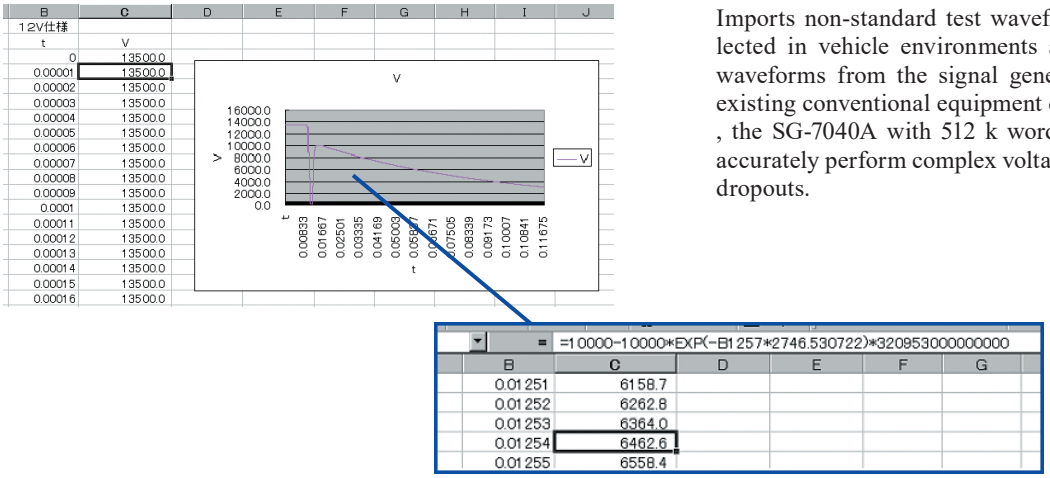
T (ε) = Start
Te (ε) = Stop
Ut (ε) = Step
N = Loop Number
LP = Loop Setting

Delay Set Function



In multichannel tests it is important to ensure each individual channel is precisely synchronized. This system guarantees a synchronization delay of 1μs or less by compensating for output timing differences from the power amplifiers being connected, whereas other systems are not equipped with similar capability, which often leads to a erroneous test.

CSV Waveform EXCEL Operation Example



Imports non-standard test waveforms such as waveforms data collected in vehicle environments as CSV files, and generates these waveforms from the signal generator. Not available thus far with existing conventional equipment due to the limited memory capacity , the SG-7040A with 512 k words memory is a perfect solution to accurately perform complex voltage variations, fluctuations, dips and dropouts.

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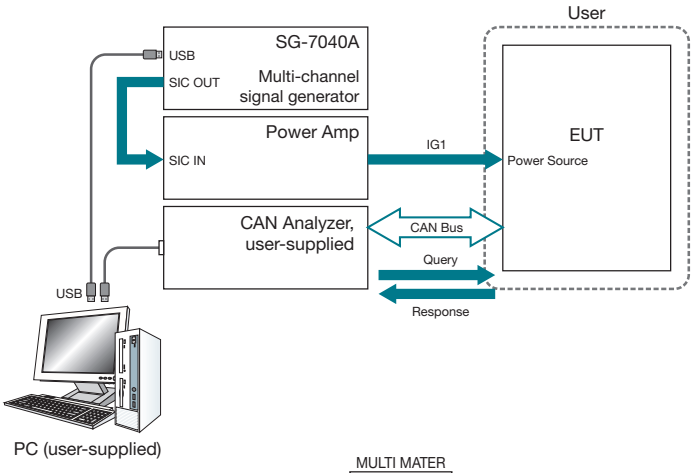
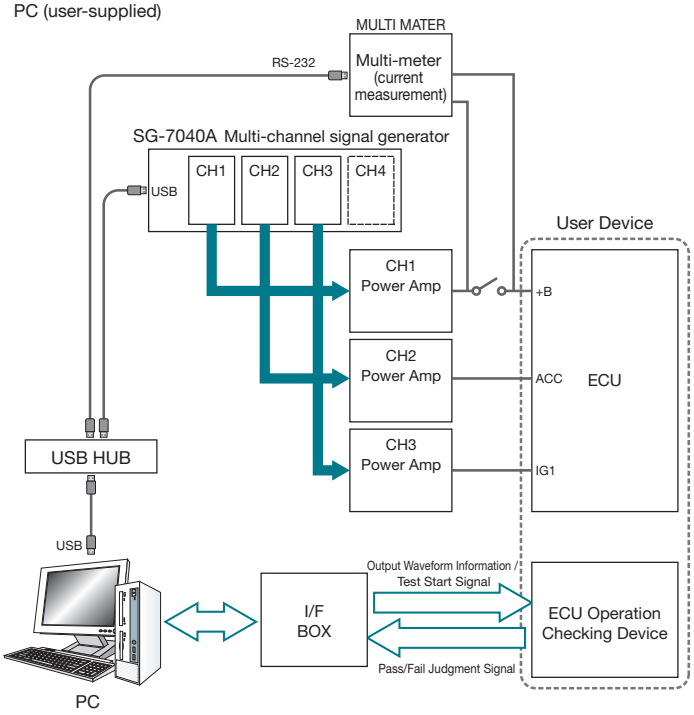
Automated Simulations



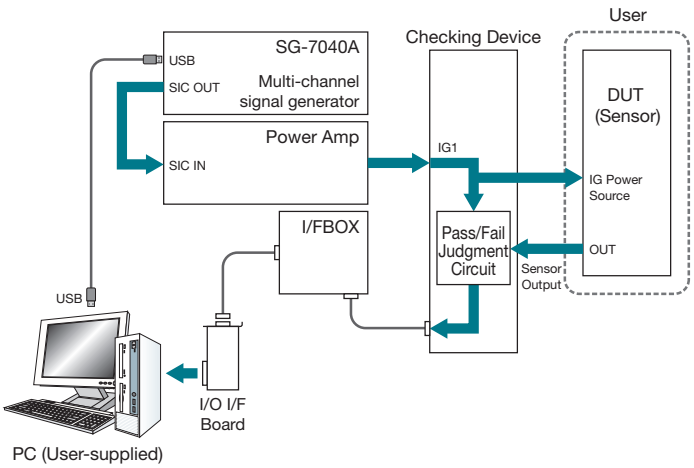
Example 1: CAN Communication Control

CAN is one of the most widely adopted system bus in automotive technology. Automated testing can be done by reading CAN communication protocols into the software and defining malfunction of the DUT.



Example 2: “Dark Current” Measurement

Some automobile manufacturers implement “Dark Current” measurements. This system allows dark current measurements in conjunction with voltage fluctuation simulations.



Example 3: Check Device

Automated testing by incorporating Pass/Fail judgment circuit with received signals from the DUT such as voltage, current, and frequency.

SG-7040A System

Regarding the Bipolar Power Source

Points to be considered for bipolar power source for automotive test applications

1. Amplifier gain linearity	A stable output voltage required over a wide range in response to the input signal
2. Capacitive loading capability with electrolytic capacitor resembling actual loads	Minimum distorted waveforms for various loads
3. Existence of oscillations with a capacitor connected	Large oscillation may damage the DUT
4. Low output impedance	Needs to resemble an extremely low impedance of actual automotive battery

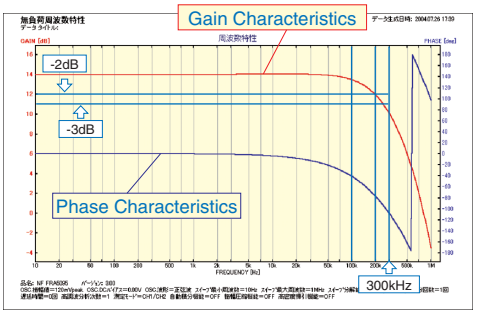
In order to meet the above requirements, NoiseKen recommends NF Corporation's bipolar power sources

AS-161 Series line-up

Model	Output voltage	Output Current peak current	Output Current DC	Frequency Characteristics
As-161-30 / 60	-15 V ～ +60 V	±30 A	15 A	DC ～ 150 kHz
As-161-60 / 60		±60 A	30 A	
As-161-120 / 60		±120 A	60 A	DC ～ 100 kHz
As-161-60 / 30	-10 V ～ +30 V	±60 A	30 A	DC ～ 150 kHz
As-161-120 / 30		±120 A	60 A	
As-161-240 /30		±240 A	120 A	DC ～ 100 kHz

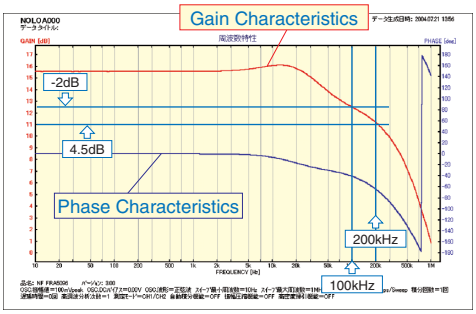
Competitive Comparison 1: Broadband Gain Characteristics

NF Corporation Model: As-161 Broadband Gain Characteristics (under no load conditions)



Gain characteristics stable to 100 kHz
A slight deviation of 1 - 2dB up to 200kHz only

Company A: Broadband Band Gain Characteristics (under no load conditions)



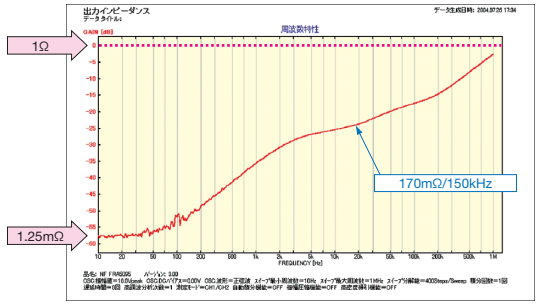
There is variation in 10kHz - 20k Hz range
Gain variation of 2.5 dB is evident up to 100 kHz and variation of 3.5 dB up to 200 kHz.

Obtaining gain linearity within the guaranteed frequencies prevents possible malfunctions other than from the intended simulations

Competitive Comparison 2: Impedance Characteristics

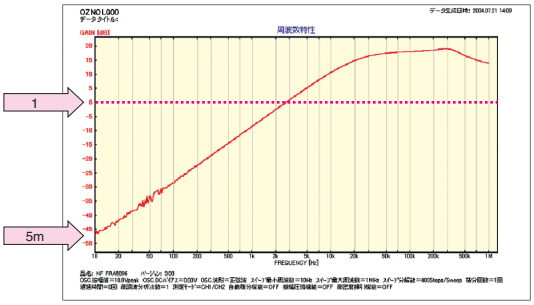
NF Corporation Model: As-161 Impedance Characteristics

Under 1 Ω value over a range beyond the 150 kHz specifications



Company A: Impedance Characteristics

Characteristics of 1 Ω or less are only achievable at 3 kHz or less.



A bipolar power amplifier with value close to the battery's impedance characteristics (≒0 Ω) performs testing to best resemble vehicles.