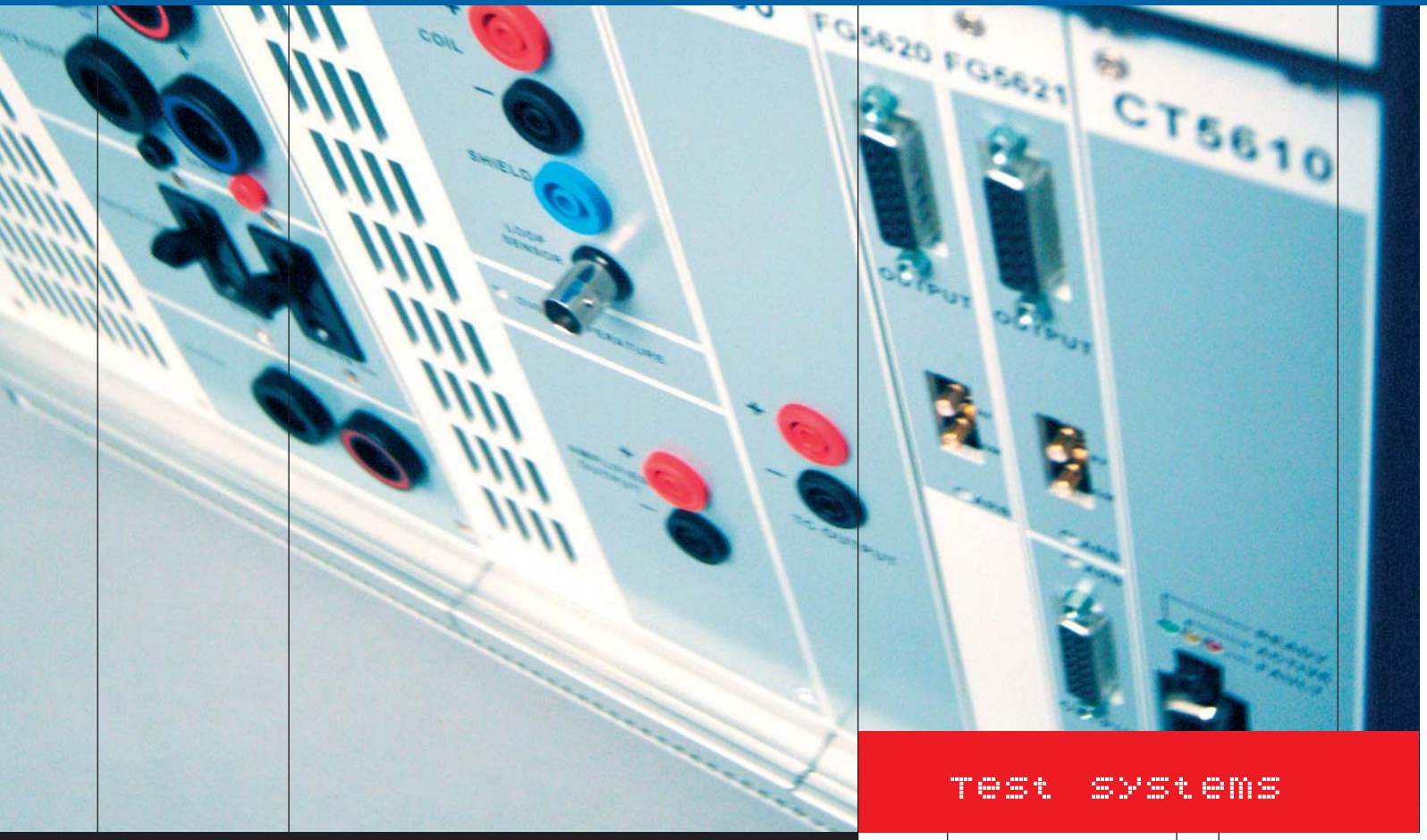




# Advanced Test Equipment Rentals

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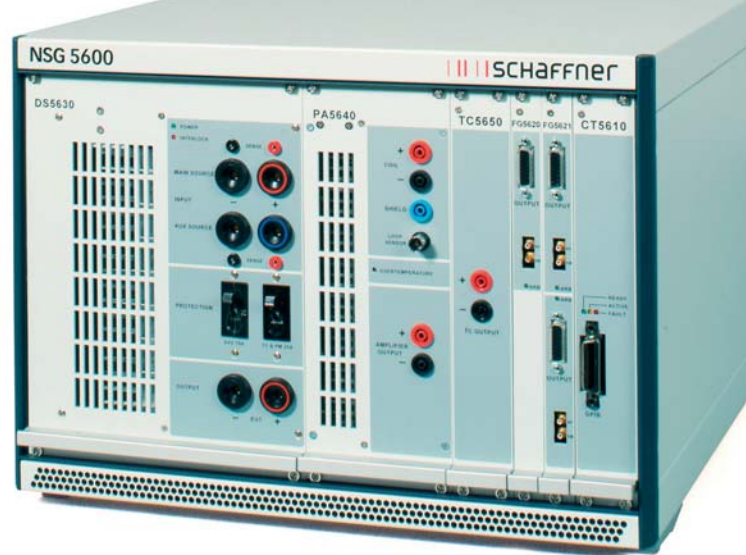
TEST SYSTEMS

## NSG 5600

Complex voltage variations, magnetic field test, sinusoidal burst



safety for electronic systems



## NSG 5600

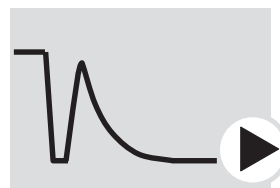
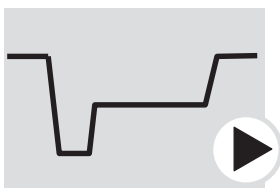
### Complex voltage variations, magnetic field test, sinusoidal burst

Utilizing the only automotive EMC specific synchronized, multi-channel function generator (FG) in the world, the software integrates the various system components seamlessly into the overall system concept with uniform operating procedures and user guidance together with a comprehensive test result reporting facility.

**NSG 5600.** Designed to be used either alone or in combination with a NSG 5500 system, the NSG 5600 is designed to simulate events that include voltage dropouts, sinusoidal noise and other events superimposed on the automotive battery: Dips and drops, and ISO and SAE pulse 2b and pulse 4 and other starting profiles. The NSG 5600 is the leader in synchronized voltage variations, such as power cycling tests (on up to four FGs) as required by various standards such as CI 250 defined in the Ford ES-XW7T-1A278-AB and AC standards. Additionally, the NSG 5600 may be configured for magnetic field immunity testing. The basic NSG 5600 includes one FG 5620 but additional capability may be added using any of the modules on the following pages.

**NSG 5600 concept.** Schaffner continues to utilize its well accepted modular concept of a 19" basic chassis containing all the power supply components and, if required, the sinusoidal burst-transformer, the control and signal bus boards as well as the common inputs and outputs for the safety circuits and signals for the expanded control and monitoring of the test. The CAN-bus, already well known in automotive technology circles, is used as the system bus.

Therefore, as with the complimentary NSG 5500, Schaffner's modular concept, new capabilities can be quickly implemented. Modular and flexible test systems equal protection of investment for the user. Schaffner offers rack-mounted solutions with suitable internal cabling and mains control panel as accessories, configured to the user's needs.





Combined with a power amplifier/battery simulator, the NSG 5600 represents the most powerful solution for battery voltage variation simulation.

**Technical specifications NSG 5600**

AC operating voltage & frequency ranges:	100V / 120V / 220V / 240V, 47 - 63Hz
Dimensions:	19" desktop housing (rack mountable), height 330mm (13"), depth 510mm (20")
Interface:	IEEE 488 (GPIB)
Rack weight:	NSG 5601: 18kg (39.7lbs) NSG 5602: 26kg (57.4lbs)
Safety interlocks:	Yes
Auxiliary input signals:	DUT FAIL / EXT / PAUSE / RESUME
Auxiliary output signals:	CRO-TRIG / TEST-END





## FG 5620 Function generator

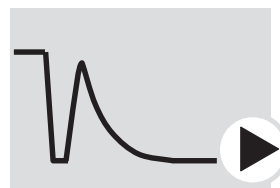
Single-click programming plus the powerful Clone™ function make this the most powerful automotive EMC function generator in the world.

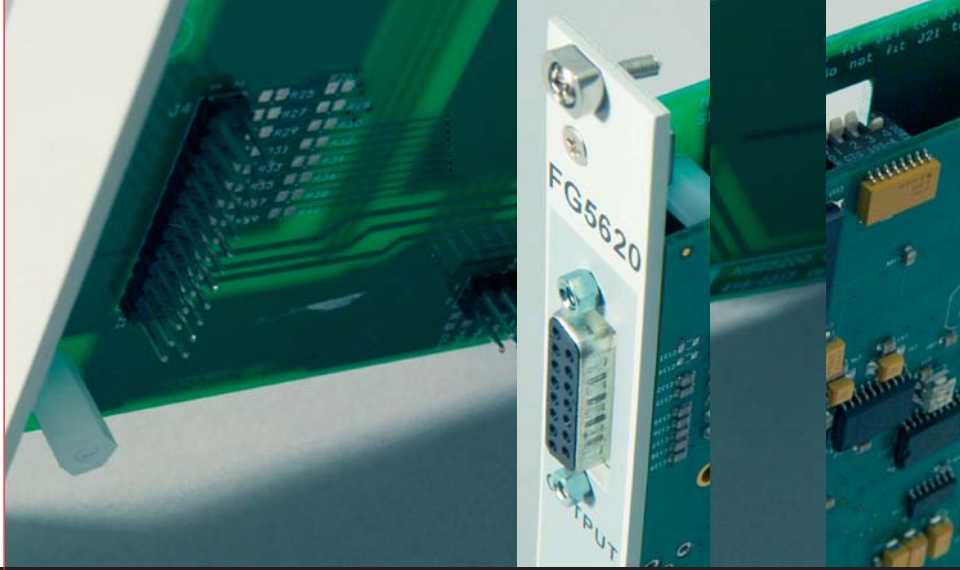
The function generator FG 5620 is used universally throughout the NSG 5600 for the control of DC sources and power amplifiers. The AutoStar™ software defines the necessary voltage/frequency conditions. The controller converts this information into algorithms for the FG (function generator), which creates an image of the requirements in its own memory and then generates the output signals for the addressed power modules during the test run. All the requisite waveforms can be created numerically from the basic functions or by loading a Clone™, e.g. a memory map of values from a storage oscilloscope or other external application, the FG also generates waveforms that can be difficult to describe mathematically or where real-world events need to be simulated. AutoStar supports any external application that can output an ASCII list, MathCAD or Microsoft Excel, for example. Every card incorporates a second channel for the

control of a further source with a programmable, steady state voltage as well as an output for setting the current limiting of the source. The main output signal consists of analog voltage of -10 to +10V – a standard that is used by the majority of voltage sources. Limits are only imposed by the sources used for a particular application. For this reason, Schaffner offers a full range of standard-compliant battery simulators.

The FG 5620 is a module equipped with a function generator board. A second board can be added subsequently at any time. The FG 5621 is delivered equipped with two function generators.

Two of these modules can be used in a system, i.e. up to four function generators are available to control the relevant number of sources. All the generators used are programmed separately and run synchronously based on a master-slave relationship.

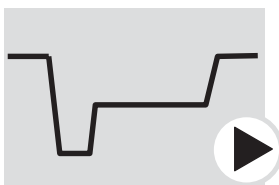




All the requisite waveforms can be easily created from the basic functions or by loading a memory map of values.

#### Technical specifications FG 5620

Basic functions:	DC voltage, sine, square, triangle, ramp and exponential function
Ramping capabilities:	Amplitude, frequency, DC offset
Output voltage:	-10V - +10V
Resolution:	10mV
Accuracy:	±10mV
Impedance:	10Ω
Short circuit protection:	Yes
Number of segments per waveform:	1 to 100
Frequency range:	DC -320kHz
Frequency resolution:	0.01Hz
Amplitude & offset ramping:	Linear
Frequency ramping sine / square / triangle:	Linear, log (base 10)
Phase angle:	0 - 360° in 15° steps
Rectification:	None, positive, negative
Test duration:	1ms - 100h, 1 - 9,999 cycles
Clone™ memory for oscilloscope capture or imported Excel or text files:	80k samples





## DS 5630

### Dips and drops switch

A powerful electronic switch for fast dips and drops applications.

The DS 5630 switches the voltage source through to the EUT connection under program-control. The primary input and the auxiliary connection enable two sources to be used. The DC switching capacity of 70V/75A is capable of coping with high power requirements and is ready for the 42V era.

The selectable switching conditions are:

Output (EUT)

- to primary source
- to auxiliary source
- switched off (open)
- dip and drop from primary to auxiliary source and back again
- to primary source with  $2\Omega$  extra impedance (SAE J 1113-11 pulse 2b)

Due to the rapid switching times, the requirements of every standard that calls for drop-outs and voltage jumps in the  $\mu\text{s}$  range can be fulfilled by using a battery simulator and an auxiliary source. The DS 5630 also acts as the DC input for the transformer coupled sine wave noise or for magnetic field immunity tests when high field strengths are required.



#### Technical specifications DS 5630

Primary input voltage:	-4V to 70V
Current:	0 - 75A
Voltage drop:	1Vmax @ 75A
Auxiliary input voltage:	0 - 70V
Current:	0 - 75A
Switch time ON:	0.2 - 1.5 $\mu$ s
OFF:	0.5 - 1.5 $\mu$ s (13.5V - 0V with 1k $\Omega$ load)
SAE pulse 2 output impedance:	2 $\Omega$
Overvoltage protection:	75V
Overcurrent protection:	>75A

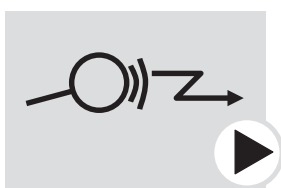


## PA 5640 Power amplifier

The bandwidth and bipolar operation of this amplifier ensure that it will find a wide range of applications.

Matching the capabilities of the FG 5620, up to  $\pm 15\text{V}$  and  $5\text{A}$  can be delivered by the power amplifier module, which means that for many applications – namely for small  $12\text{V}$  component and subassembly testing – the use of an external battery simulator is unnecessary. The frequency range and bipolarity ensure that the module will find a wide range of applications. The EUT current can be measured and a program-controlled current limit can be specified. The PA 5640 also serves as a power driver for the electromagnetic coils used in magnetic field tests and as an amplifier for conducted sine wave tests. Separate current measurements for the two types of tests ensure correct control of the test conditions.

**Magnetic field tests.** The NSG 5600 configuration is expanded by the addition of magnetic field antennae for the execution of magnetic field tests. Either simple current loops or Helmholtz coils are used depending on the relevant test standard. The PA 5640 is equipped with a control input for the connection of a magnetic field measuring sensor for the precise regulation of the generated field.

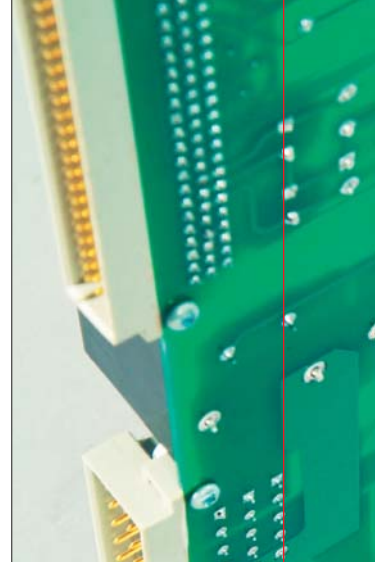






**Technical specifications PA 5640**

Operating modes:	Continuous voltage / Continuous current
Output voltage:	-15 to +15V
Resolution:	0.1V
Accuracy:	±0.1V
Current:	-5 - +5A
Impedance:	0.5Ω
Current limit range:	0.1 - 5A
Resolution:	0.1A
Accuracy:	±0.1A
Frequency range:	DC - 320kHz
Resolution:	±(0.1% + 1Hz)
Accuracy:	±(0.1% + 1Hz)
Short circuit protection:	Yes



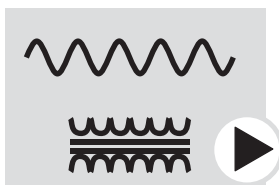
## TC 5650

### Transformer coupled conducted sine waves

The perfect solution for transformer coupled sine wave noise simulations.

Conducted sinusoidal interference simulations are described in various standards with differing conditions pertaining to them. The TC 5650 module contains the necessary circuitry for pulse

superimposition, selectable impedances and the connection mechanism to the transformer as required by SAE J 1113-11 etc.





Supports numerous features required by sine wave noise simulation standards.

#### Technical specifications TC 5650

Transformer frequency:	50 - 250kHz
Resolution:	1Hz
Accuracy:	$\pm(1\% + 1\text{Hz})$
Current:	-5 - +5A
Source impedance:	$<0.5\Omega$
Battery DC current:	0 - 25A
Transformer turns ratio:	2 : 1
Connection:	Positive or negative lead
Bypass capacitor, switchable:	100 $\mu$ F
MCB protection:	25A



safety for electronic systems

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690-820A April 2005

Printed in Germany

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