SCHAFFNER

NSG 5000 / NSG 5200

EMC Test Systems for Automotive Electronics

Contents

EMC test systems for automotive electronics.

The use of electronic and electrical sub-systems in automobiles continues to escalate as manufacturers exploit the technology to optimise performance and add value to their products. With automobile operation and safety increasingly dependent on the reliable functioning of complex control and monitoring systems, integrity in the face of electromagnetic interference is of vital importance. The electromagnetic compatibility (EMC) test standards with which automobile manufacturers must comply are determined by bodies such as ISO and SAE. Additionally, most manufacturers also develop and specify their own custom EMC tests to meet a wide-ranging - and fast evolving - set of requirements. The need for a flexible test resource has never been greater.

Building on Strength

Schaffner has been at the forefront of the pioneering work to establish EMC tests for motor vehicle electronics. Automotive manufacturers and suppliers worldwide have come to trust test systems from Schaffner. Active involvement in the standardisation committees ensures that the latest advances are continuously reflected in our test systems.

International and In-house Standards

Well-proven system architecture and a modular concept ensure that the test systems keep pace with changes in demands required by the standards, as well as with the special needs of vehicle manufacturers. The system's test specifications exceed the conditions set down in relevant standards, which results in the requisite flexibility for the user and the necessary test margins. The pulse parameters are so broadly dimensioned that many company-specific test specifications are covered automatically, eliminating the need to take any additional action.

New Requirements

Besides the classical pulse tests generated from the NSG 5000, variations and disturbances on a vehicle's power supply lines are assuming greater significance. These, simulations are insufficiently reflected in international standards with the result that a broad range of manufacturer-specific specifications have become established. The NSG 5200 performs these tests plus more. Magnetic field tests and tests with conducted sinusoidal oscillations are also important in view of the increasing utilisation of sensors and peripheral sub-assemblies. Schaffner has expanded the test system with new components in order to fulfil these applications in an optimal and future-secure manner. The forthcoming use of 42 Volt technology in passenger cars will have a profound influence on test equipment. The new generation of test equipment has been appropriately specified and adequately dimensioned to cope with the expected higher supply levels. The software Implementation is the key element in ensuring the efficient utilisation of complex test systems.

Transient Immunity Tests with the System NSG 5000

The compact and modular System NSG 5000 offers all the generators necessary for tests with pulsed interference as well as voltage variations as called for by ISO and SAE, and others. The established test specifications for passenger cars together with the new standards for commercial vehicles published by the ISO, SAE and other bodies are fully covered, as are most company-specific standards from larger vehicle manufacturers. The construction adopted enables trends in the standards and changing market requirements to be followed consistently through the introduction of new developments or upgrades to the generator modules. Hence, investments in test equipment are optimally protected.

NSG 5000 System Chassis

This compact mainframe houses the common system components and accommodates all the standard pulse generators. A high performance processor controls all the real-time tasks, cares for system integrity, handles monitoring of the EUT and communication with the Windows-based user interface. The control unit, the power supply, high voltage unit and control electronics for the EUT are all housed in a package mounted at the rear of the mainframe. This modularity provides the flexibility to adapt to changing requirements. The front of the chassis is available for the insertion of various pulse generators and for the connection and practical handling of test objects. Interrupt-free test sequences comprising all types of pulse at one and the same EUT connector are made possible through the use of a high voltage pulse bus configuration.

An electronic switch to connect and disconnect the battery supply is incorporated in the NSG 5000. Furthermore, the processor also controls the external battery simulating power source.

The test setup and the power sources are protected by built-in MCB's. Additional inputs and outputs are located on the rear panel for test execution control purposes and the monitoring of error signals, oscilloscope triggers, gate start/stop commands, etc. Larger systems can be created by installing additional generators in an expansion chassis and these generators are instantly recognised automatically by the software. Overall control is via a PC running under Windows. The AutoStar software integrates all the individual components into a uniform and clear test setup control platform.

NSG 5000 Modules

NSG 5000. The NSG 5000 offers unprecedented flexibility for transient testing. Schaffner has designed a solution for customers with various transients in one modular and upgradeable chassis. The basic ISO 7637 pulse 1, 2, 3, 5 tests are integrated into one chassis. Optional Pulse 4 and Pulse 2b control is available, however, use with the NSG 5200 offers several benefits over this budget solution.

Additionally, when standards change, as they do every year, the NSG 5000 system may be upgraded with different modules so that your new and old modules may both be retained. Based on our exclusive Gemini technology, Schaffner offers the most flexible and upgradeable system in the world to protect the users' investment in test equipment.

Schaffner continues to maintain backwards compatibility and yet push the state of the art for EMC immunity testing.

1| NSG 5000
The exclusive modularity of the NSG 5000 System means that you are always ready for the future.

Technical Specifications NSG 5000

Instrument power supply: 100 – 120 Vac ±10%, 47 – 63 Hz · 220 – 240 Vac ±10%, 47 – 63 Hz
Dimensions: 19" desktop housing (rack mountable) · Height 33 cm (13") Depth 51 cm (20")
EUT supply: From an external source, e.g. battery or NSG 527X battery simulator
Computer interface: IEEE 488 (recommended) or RS232
Control connections: EUT failure/Start-Stop/Test end/Trigger for oscilloscope

ISO Pulse 1, 2, 6 and Variants. Surge Pulse Generator NSG 5041.

Switching actions with inductive loads on the vehicle supply harness, DC motors that operate as generators when the vehicle supply is switched off and the effects that occur when an ignition coil is switched off can all create disturbances that have to be simulated and their consequences checked.

ISO and SAE have specified these tests under pulse designation 1/2/6. The NSG 5041 produces these test pulses in conformance with the relevant standard. In order to be able to cope with a company's own test methods, the generator module also provides a much greater range of selectable parameters, considerably higher test voltages, additional impedances and pulse widths. INA 5020 battery switch provides the often-required automatic battery switch-off and restore functions. The NSG 5041 is the first module utilizing Gemini technology. For other Gemini solutions, and an overview of Gemini technology see page 8.

Technical Specifications NSG 5041

	Pulse Amplitude	Impedance	Rise Time	Pulse Duration	Repetition	Polarity
Pulse 1	20 – 200 V	10, 20, 50 Ohms	1, 3 µs	2 ms	0.5 – 5 s	-
	150 – 600 V	20 Ohms	1 µs	1 ms	0.5 – 5 s	-
Pulse 1 (24 V)	150 – 600 V	50 Ohms	3 µs	1 ms	0.5 – 5 s	-
Pulse 1 (50 µs)	12 – 220 V	2, 10, 50 Ohms	1 µs	50 us	0.2 – 5 s	-
Pulse 2	12 – 220 V	2, 10, 20, 50 Ohms	1 µs	50 us	0.2 – 5 s	+
Pulse 6	10 – 500 V	30 Ohms	< 60 µs	300 us	0.5 – 15 s	-
CI 220-A	20 – 110 V	10 Ohms	1 µs	2 ms	0.5 – 5 s	
CI 220-B	30 – 300 V	4 Ohms	1 µs	50 us	0.2 – 5 s	
CI 220-C	20 – 150 V	4 Ohms	1 µs	50 us	0.2 – 5 s	

ISO Pulse 3a/3b and Variants. EFT Generator NSG 5003. **Fast transient interference signals injected onto a vehicle's wiring harness through switching of associated peripheral devices can affect the correct functioning of adjacent electronic units. In conformance with the standards (ISO/SAE pulse 3a/3b), the NSG 5003 simulates these interference phenomena by means of EFT pulse bursts.**

The rapid developments of electronic devices for the automotive industry means that better and faster test methods are required. The EFT generator more than meets these increasing demands; its technical properties exceeding the specifications laid down in the standards by several factors. Higher pulse voltages, burst frequencies and pulse burst specifications are just part of it; there are also automated functions for weak spot analyses and long-term trials. The EUT

connection, as well as the separate connector for the coupling clamp used in data line tests, has been optimised to suit the high frequency conditions prevailing in such a fast pulse environment.

Technical Specifications NSG 5003

Pulse amplitude: 20 to 800 in 1 V steps
Impedance: 50 Ω
Pulse rise time: 5 ns
Pulse duration: 100 ns (into 50 Ω) + 100/-0 uS
Burst frequency: 1 to 100 kHz in 0.1 kHz steps
Pulse per burst: 1 – 200
Burst repetition: 90 ms to 99.9 seconds in 10 ms steps
Pulse modes: Single, continuous, programmed 1 to 99999

Load Dump Generator NSG 5005A.

Alternators produce a high-energy (load dump) pulse on a vehicle's power harness when the battery is disconnected. The NSG 5005A simulates the corresponding pulse 5, specified by numerous standards, and the clamped load dump pulse 5b. Some vehicle manufacturers have expanded upon these specifications – in most cases by making them more stringent. The generator takes this into account.

Contrary to the classic concept, the unit is built around an active pulse shaping circuit. While still compliant with ISO 7637-2 Annex E, this is the best and most cost-effective method to reach the full range of pulse requirements. For example, ISO 7637-2 requires 40 – 400 mS, which the NSG 5005A meets easily. Other manufacturers, utilizing older technology, take shortcuts and do not allow the full range as required by the standards. This also enables much greater variability of the pulse parameters to be achieved and facilitates better reproducibility. The INA 5025 impedance module is available, which sets up the generator impedance using power resistors.

Technical Specifications NSG 5005A

Pulse amplitude: 20 to 200 V in 0.5 V steps Clamping: 18 – 180 V in 1 V steps
Impedance: According to resistor installed, see INA 5025 below
Pulse rise time: 0.1 to 10 ms
Pulse duration: 30 – 700ms
Pulse repetition: 15 to 600 s in 0.1 s steps
Pulse modes: Single, continuous, programmed 1 to 99999
Pulse monitor: 1:100, BNC
INA 5025, hardware impedance: 0.5 – 10 Ω in 0.25 Ω steps

Protection of Investment through Easy Upgrades.

History has shown that each year several automotive standards change or are newly developed. Schaffner's exclusive Gemini technology allows rapid, cost effective development of new pulses to comply with rapidly changing standards.

Using Schaffner's industry leading AutoStar software, and flexible, modular technology, we maintain a system, which is compliant today and in the future.

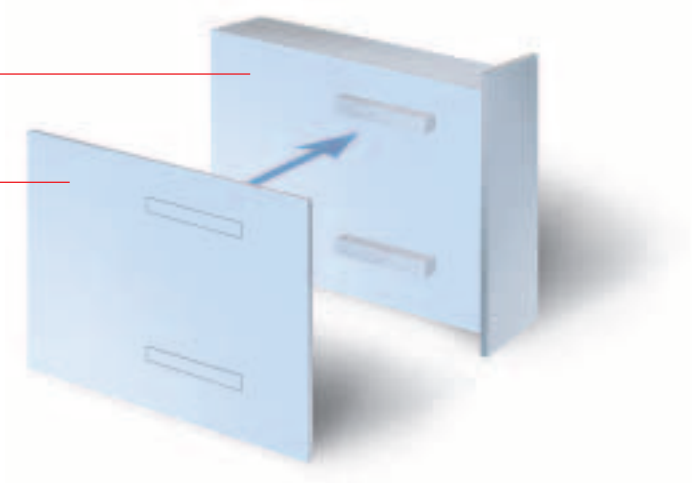
Our flexible technology includes a proven Smart Card and chassis that fits in the existing NSG 5000 series of EMC pulse generators. Utilizing proprietary advanced simulation tools; Schaffner's experienced team of engineers develops new pulse modules in a matter of weeks to fit into these verified Smart Cards that are then inserted into the NSG 5000 system. This new capability is then detected and installed in less than five minutes.

Gemini is an intelligent system where the module automatically knows what it is capable of and the programmed limits and parameters. New software functionality is then automatically detected and can be installed with no software upgrade required.

With other systems, the entire unit must be sent back for upgrade. Our users experience the freedom of simply plugging a module into the NSG 5000 chassis and utilizing the new functionality immediately.

The bottom line is that Schaffner customers are ensured cost-effective, fast and easy compliance in a rapidly changing marketplace.

Some examples of modules built on Gemini technology:
NSG 5041: Ford ES-XW7T-1A278-AB and -AC, ISO/DIN 7637-2.3, SAE J1113-11
NSG 5054: JASO D1, JASO A1
NSG 5055: JASO A-2, JASO B-2, JASO D-2, Nissan B-2, JASO B-1, JASO E, Nissan B-1



1| Gemini technology
Gemini allowes fast development in a rapidly changing environment so that new standards are always met.

Hardware Impedance Module INA 5025.

Enables resistors to be added to the high-energy pulse generator type NSG 5005A to modify the generator's impedance.

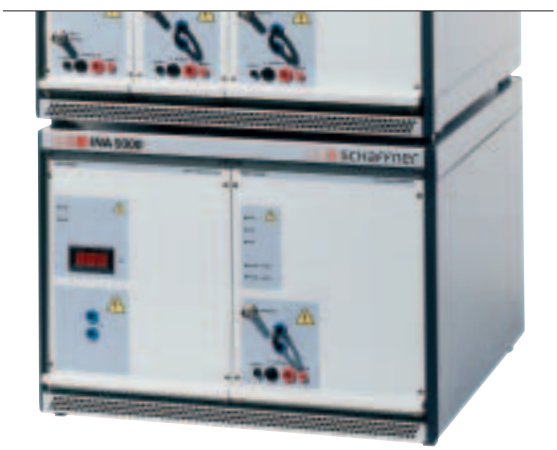
Impedances of 0.5 Ω to 10 Ω, in steps of 0.25 Ω are selectable under software control. The INA 5025 can be operated in either the NSG 5000 basic system chassis, the expansion chassis type INA 5000 or in a special housing type INA 5026.

Technical Specifications INA 5025

Selectable impedances: 0.5 to 10 Ω, programmable in steps of 0.25 Ω
Dimensions W x H x D mm: 225 x 311 x 220

Expansion Chassis INA 5000.

Additional generator modules can be accommodated in the expansion chassis to permit the assembly of larger systems.



All the control functions remain effective and the system incorporates the modules in the INA 5000 through an auto-configuration feature.

Compact Coupling. Battery Switch INA 5020.

The INA 5020 provides a means for pulse-controlled or program-controlled on and off switching of the power supply to the EUT from a battery or an appropriate source such as the battery simulator NSG 527X.

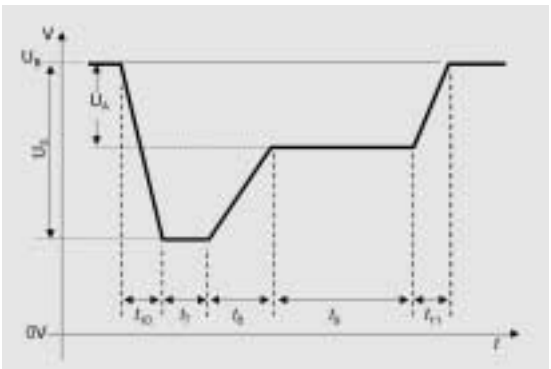
The switch is a rearward-facing module in the NSG 5000 system chassis and, hence, takes up no generator module space.

Technical Specifications INA 5020

Input DC voltage range: 60 V max.
DC current: 25 A max.
Switch On/Off time: 2 µs
MCB rating: 30 A (3x I max/50 ms, 2x I max/100 ms)

ISO Pulse 4 and 2b. Pulse 4 and 2b Driver Board INA 5027. This driver board is required to control external sources for the simulation of the pulse 4 and pulse 2b voltage variation as specified by ISO and SAE.

When more complex and freely programmable voltage variations are required, the System NSG 5200 should be used.



1| INA 5027
Simple ISO-type pulse 4 and 2b are programmable in the most cost-effective way.

42 Volt High Current Coupler CDN 5010A

There is considerable progress in the 42 Volt vehicle supply concept and hybrid 14V/42V installations that will soon be market-ready. The need for higher power devices is also developing in step with the introduction of the higher supply voltage. The permissible EUT voltage of 60V for the basic NSG 5000 system chassis at 25A is sufficient for many applications concerning component and sub-assembly tests. The System 5000 can be expanded with a high current coupler for pulse tests on installations with a high current requirement.

The high current coupler type CDN 5010A, equipped with both a switch and decoupling filter rated at 60V and 60A, is controlled by the system controller. The pulses are fed to the CDN 5010A via a cable from the output on the generator module in the System NSG 5000 and are superimposed on the battery voltage. All the functions, such as battery

42 Volt High Current Coupler CDN 5010 A
ISO 7637-3. Capacitive Coupling Clamp CDN 500

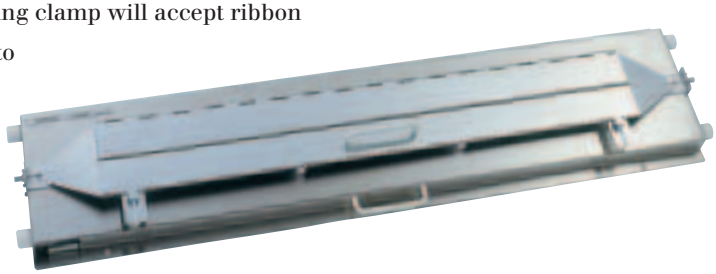
switch off before pulse triggering, etc, are also applied to the high current path and are controlled by the software in an unmodified manner.
Other coupling devices are also available.

Technical Specifications CDN 5010A High Current Coupler

Instrument power supply: 100 to 120 Vac ± 10 %, 47 – 63 Hz · 220 to 240 Vac ± 10 %, 47 – 63 Hz
EUT power supply: From an external source, 60 Vdc / 60 A max. continuous, Switching under software control, 60 A MCB
Peak current: 3x I max/50 ms, 2x I max/100 ms
Dimensions: 19" benchtop housing, can also be rack-mounted

The coupling clamp CDN 500 is manufactured exactly in accordance with the drawings and specifications of IS0 7637-3 for Test Pulses a and b. It is, above all, the fast nanosecond pulse bursts (ISO 3a and 3b) that are injected on cable runs. The characteristic impedance of the unit is 50 Ω.

The CDN 500 coupling clamp is connected to the generator via a coaxial cable. The far side of the clamp must be terminated with a 50 Ω load resistor. A suitable terminating load is available as an accessory under the type number INA 5030, which also provides a measurement output via a 40dB attenuator. The coupling clamp will accept ribbon cables as well as round cables of up to 40mm diameter. The effective coupling capacitance depends on the cross section and the material of the cable used; a typical value being around 100pF.



Technical Specifications CDN 500

Typical coupling capacitance: 100 pF approx. (200 pF max.)
Active length: 1000 mm (39")
Diameter of round cables: 40 mm (1.6") max.
Breakdown voltage: > 500 V
Characteristic impedance: 50 Ω ± 10 %
Connectors: 50 Ω BNC (1 each side)
Dimensions L x W x H mm: 1300 x 300 x 106 (51.2 x 11.8 x 4.2")
Weight: 11.5 kg (25 lbs) approx.
Construction: Brass, with plated surface; coupling panel with roller hinges for precise positioning

Complex Voltage Variations, Magnetic Field Test, Sinusoidal Burst with System NSG 5200

A complementary system is available that is optimally designed to cope with the demands imposed by the newer and multiple requirements met today especially in matters of voltage variation. Again, great importance is placed on modularity to ensure that systems can be ideally configured, expansions are possible at any time and a solid platform is provided to cater for future developments in this test area. Utilizing the only automotive EMC specific synchronized, multi-channel function generator 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 5200 Concept

A 19" system chassis serves as the basis for all test configurations. Control of the chassis is performed by a controller module that takes care of communication with the PC and serves the bus to which all modules have access. All the generators and function units are designed for plug-in mounting in the front of the chassis. As a result, all the connections to the EUT and to the sources are brought out on the front to the test fixture and the unit under test. Where necessary, the individual modules are further modularised through a concept of motherboards and plug-in functional units.

Typical Configurations:

The modular instruments can be used either as freestanding units or they can be installed in a 19” rack/cabinet. Schaffner offers instrument housings with suitable internal cabling and mains control panel as accessories. Starting with three basic configurations, the rack systems are configured and equipped in accordance with each customer's specifications. Due to Schaffner’s modular concept, new pulses can be quickly implemented using our “Gemini” technology. Modular and flexible test systems equal protection at investment for the user.

NSG 5200 Modules

NSG 5200. **Designed to be used either alone or in combination with an NSG 5000 system, the NSG 5200 is designed to simulate events that include voltage dropouts, sine waves and other events superimposed on the automotive battery: Dips and Drops, Starting Profiles, and Sinusoidal Noise. Additionally, the NSG 5200 may be configured for magnetic field immunity testing. A basic configuration of the NSG 5200 would be with one ARB 5220, the world leader in automotive specific function generators. Additional capability may be added using any of the modules on the following pages.**

The NSG 5200 is also the leader in synchronized ARB events, such as Power Cycling Tests (on up to four ARBs) as required by various standards such as CI 230 defined in the Ford ES-XW7T-1A278-AB and -AC standards.

Basic Chassis NSG 5201 and NSG 5202. **The 19" basic chassis contains all the power supply components and, if required, the burst-transformer, the rear-facing fans, 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 procedures.**

The CAN-bus, already well known in automotive technology circles, is used as the system bus. Additionally, the NSG 5202 contains the transformer sub-assembly required for conducted sine wave tests required by SAE and others. A chassis type NSG 5201 can also have this transformer sub-assembly added subsequently at any time by a Schaffner Service Center.

Technical Specifications NSG 5200

AC Operating Voltage & Frequency Ranges: 100 V / 120 V / 220 V / 240 V 47 – 63 Hz
Dimensions: 19" desktop housing (rack mountable) · Height 33 cm (13") Depth 51 cm (20")
Rack Weight: 18 kg (NSG 5201) · 26 kg (NSG 5202)
Safety Interlocks: Yes
Auxiliary Input Signals: DUT FAIL / EXT / PAUSE / RESUME
Auxiliary Output Signals: CRO-TRIG / TEST-END

Dips and Drops – DC Switch DCS 5230.

The DCS 5230 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 DCS 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 2Ω extra impedance (SAEJ1113-11 pulse 2b)

Current and voltage at the output can be measured at any point during a test and be recorded in the test report. Due to the rapid switching times, the requirements of every standard that calls for drop-outs and voltage jumps in the µs range can be fulfilled by using a battery simulator and an auxiliary source.

Technical Specifications DCS 5230

Primary Input Voltage: -4 V to 70 V
Current: 0 to 75 A (derate for inductive loads >300 mH)
Voltage Drop: 1 V max @ 75 A
Auxiliary input voltage: 0 to 70 V
Current: 0 to 75 A
Switch time ON: 0.2 to 1.5 µs
OFF: 0.5 to 1.5 µs (13.5 to 0 V, 1 KΩ load)
Pulse 2 output impedance: approx. 2 Ω
Overvoltage protection: 75 V
Overcurrent protection: >75 A
Module width: 40 HP

Controller CTR 5210.

The controller controls all the addressing, real-time and synchronisation tasks on the CAN-bus as well as maintaining communication with the PC and, hence, with the AutoStar user-software.

RS 232C and IEEE 488 interfaces are available as standard. As a further facility, live waveforms can be measured and stored on a digital oscilloscope and downloaded to the ARB 5220 / 5221 modules for subsequent playback.

Technical Specifications CTR 5210

Module width: 8HP
Control Bus: CAN
Interfaces: IEEE 488 (GPIB) & RS 232 (recommended only for special applications or debugging)

Power Amplifier AMP 5240. **Up to ±15 V and 5 A can be delivered by the power amplifier module, which means that for many applications – namely for 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 AMP 5240 also serves as a power driver for the electro-magnetic 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.

1| AMP 5240
Compact amplifier available for small EUT's.

Technical Specifications AMP 5240

Operating Modes: Constant Voltage / Constant Current
Output Voltage: -15 to +15 V
Resolution: 0.1 V
Accuracy: ±0.1 V
Current: -5 to +5 A
Impedance: 0.5 Ω
Current limit Range: 0.1 to 5 A
Resolution: 0.1 A
Accuracy: ±0.1 A
Frequency Range: DC to 320 kHz
Resolution: ±(0.1% + 1 Hz)
Accuracy: ±(0.1% + 1 Hz)
Short circuit protection: Yes
Module width: 20 HP

Magnetic Field Tests

The 5200 system 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 AMP 5240 is equipped with a control input for the connection of a magnetic field measuring sensor for the precise regulation of the field generated.

Conducted Sine Waves CSW 5250. **Conducted sinusoidal shaped interference simulations are described in various standards with differing conditions pertaining to them.**

The CSW 5250 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.

Technical Specifications CSW 5250

Transformer frequency: 30 – 250 kHz
Resolution: 1 Hz
Accuracy: ±(1% + 1 Hz)
Current: -5 to +5 A
Source impedance: < 0.5 Ω
Battery DC current: 0 to 25 A
Transformer turns ratio: 2 : 1
Connection: Positive or negative lead
Bypass capacitor, switchable: 100 µF
MCB protection: 25 A
Module width: 8 HP

Function Generators ARB 5220 / ARB 5221. **The function generator is used universally throughout the System NSG 5200 for the control of sources, battery simulators and amplifiers.**

The task definition in the Autostar application software specifies the necessary voltage/ frequency conditions. The controller converts this information into algorithms for the ARB (arbitrary waveform generator), which creates an image of the requirements in its own processor and 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. By loading a bit map, e.g. a table of results from a storage oscilloscope or Microsoft® Excel, the ARB also generates waveforms that can be difficult to describe mathematically.

Technical Specifications ARB 5220 / ARB 5221

Basic functions: SINE, TRIANGLE, SQUARE, RAMP (Including DC)
Ramping Capabilities: Amplitude, Frequency, DC offset

Every card incorporates a second channel for the control of an auxiliary source with a programmable, steady state voltage as well as an output for current limiting one of the sources. The main output signal consists of analogue voltage of -10 to +10 V – a standard that is used by the majority of voltage sources. Limits are only imposed by the sources used for a particular application.

NSG 5200 Modules

ARB 5220. The ARB 5220 is a module equipped with a function generator board. A second board can be added subsequently at any time. The ARB 5221 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.

Technical Specifications ARB 5220

Output Voltage: -10 to +10
Resolution: 10 mV
Accuracy: ±10 mV
Impedance: 10 Ω
Short circuit protection: Yes
Standard Segment types: Sine, Square, Triangle & Ramp (including DC)
Number of segments per waveform: 1 to 100
Frequency range Sine: DC – 320 kHz
Square /Triangle: DC – 320 kHz
Frequency resolution: 0.01 Hz
Amplitude& offset ramping: Linear
Frequency ramping Sine/ Square/ Triangle: Linear, Log (Base 10)
Phase angle: 0 to 360° in 15° steps
Rectification: None, Positive, Negative
Test duration: 1 ms to 100 hours, 1 to 9999 cycles
Module width: 4 HP
Memory for oscilloscope capture or imported excel or text files: 80 KB

NSG 5200 System Configurations

NSG 5200 System Configurations.

Voltage variation configuration:

NSG 5201 / CTR 5210 / ARB 5220 / DCS 5230 / Autostar software / Battery Simulator eg. NSG 5004

Pulsed magnetic configuration:

NSG 5201 / CTR 5210 / ARB 5220 / DCS 5230 / AMP 5240 / Autostar software / Magnetic coil

Conducted sine wave configuration:

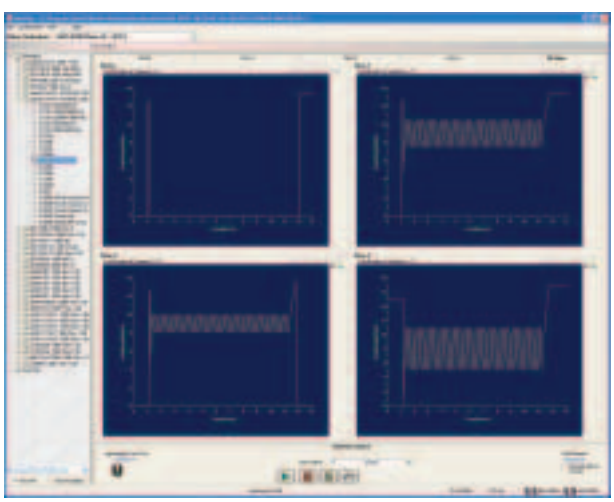
NSG 5202 / CTR 5210 / ARB 5220 / DCS 5230 / AMP 5240 / CSW 5250 / Autostar Software / NSG 5004 or other DC source

AutoStar™ Software

AutoStar is more than just an operating program for test routines - it is, in fact, a Test Management Platform. Based on the concept of an open system, it integrates all the generators and other circuitry present in the installation into a consistent presentation and a uniform graphical user interface. Additional components can be incorporated as required through the support of 'Active-X' elements and drivers. AutoStar presents the operator with a clear, structured, visual interface with menu bars, test lists, test sequence information and, when appropriate, with graphical pulse representations.

The test management platform AutoStar sends strings of commands to the system chassis control computer, receives test and measurement data for further processing and undertakes all necessary coordination tasks. All hardware associated tasks, together with time-critical and safety related control matters, are managed at the chassis controller level.

Graphical presentations are particularly informative in applications with complex supply voltage variations. The linear or logarithmic scaling and a zoom function ensure a clear overview of the whole test sequence and an opportunity to check details.



1| AutoStar
AutoStar includes unmatched flexibility for arbitrary functions.

Test program

Test programs are grouped together as follows:
Pulse 1, 2, 3 and 6
Load dump (Pulse 5 and 5b)
Supply voltage variations type Pulse 4, Dips and Drops, Pulse 2b
Other special tests (Gemini and others)
Power Magnetics
Conducted Sine Waves
Oscilloscope capture
Text or Excel Import

The test library contains not only the pre-programmed test routines in accordance with international standards such as ISO and SAE, but also test conditions that conform to manufacturers' in-house standards. The user can implement these tests directly, modify them and store them under a new designation or create new test definitions from the ground up and include them in the list as well.

AutoStar™ Software

Sequences consisting of tests of the same or differing categories can be arbitrarily merged and then also be stored for later use. The user-guidance facility contains not only information regarding limiting values but also a protective feature against prohibited parameter combinations with appropriate warning flags.

Test Evaluation and Reporting

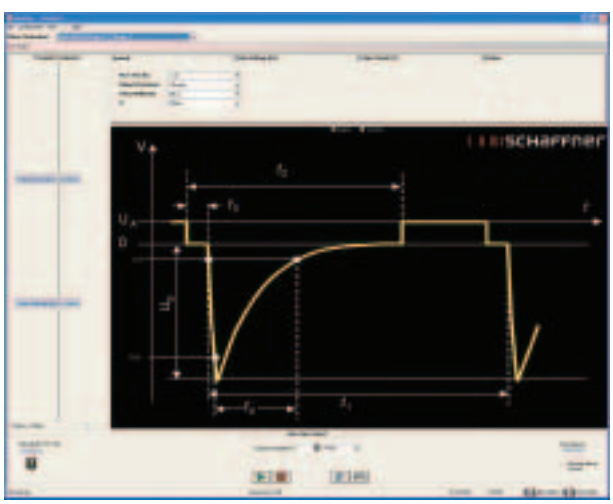
Reports concerning individual tests and test sequences are produced automatically and are in a form which can be used for technical files and quality assurance documents. The user is provided with a range of editable fields for remarks and specification of the task in hand. The test data and results are stored in a database form that can be retrieved by macro- programming into applications such as WORD, Excel, Access, etc.

Auto-configuration

At start-up, the software automatically detects and recognises the generators and other elements that are present in the system. This auto-configuration feature provides the user with all the available functions automatically.

1| Reporting
Reports can be configured by the user for logo and company, EUT information, etc.

2| AutoStar
AutoStar also includes the most flexible user interface for transient tests.



Requirements

Recommended System Requirements: Pentium III 400 MHz, 128MB RAM
Minimum System Requirements: Pentium II 233 MHz, 64 MB RAM, 100MB Hard Disk Space, Resolution 1024x768
Operating Systems: Windows 98, Windows 2000, Windows XP

Battery simulators

Battery simulators replace the vehicle battery in the test environment. These sources have to fulfil various criteria concerning power rating, voltage, slew rate, impedance, etc. depending on the particular application. Bi-polar current sources are called for in certain cases.

Furthermore, reactions to the EUT's characteristics regarding such matters as in-rush current, spikes and damping have to be taken into account. Regulation with sense-lines in a closed loop is often required. Simulation of rapid voltage changes may require the use of two sources with the DCS 5230 power switch commutating between the two. This can represent an economic solution since the sources used need only to have a modest specification, especially the second source as it would only have to deliver a considerably lower static power output. The open architecture of the hardware and AutoStar software permits sources to be integrated with control being affected by means of a 0 – 10 V analogue signal. The control units, INA 5027 in the System NSG 5000 and ARB 522x in the System NSG 5200, are precise and fast enough to fulfil the test requirements.

NSG 527x Series

Designed specifically for automotive EMC testing, Schaffner's 42 V ready amplifier sets the pace for automotive battery simulation with a wide bandwidth, fast slew rate and automotive EMC specific features. Isolated inputs, low output impedance, current limiting function and fast regulation provides the maximum flexibility for tests involving voltage variations.

Sense-lines permit automatic correction for voltage losses in the cabling. The NSG 527x series of amplifiers comes in 30, 75, 150, 250A (peak) versions respectively called the NSG 5271 through NSG 5274.

Technical Specifications NSG 527x Battery Simulator

Output voltage: +60 Vdc, -10 V
Currents: 10, 25 and 50 A, 3x Inom for 200 ms; 100 A, 2.5 x Inom for 200 ms
Impedance: <0.01 Ω
Bandwidth: DC up to 70 kHz (special, higher bandwidth applications are available)
Output Slew Rate: <10 us
Current limiting: 0.1 A to Imax. adjustable in 0.1 A steps

NSG 5004A

For lower cost solutions, Schaffner offers a standard solution for all applications in the classic voltage and current supplies using this battery simulator. The bipolar source outputs 12.5 A at -30 V to +30 V and can be delivered as a cascaded unit with a current rating of 25 A.

Technical Specifications NSG 5004A Battery Simulator

Output voltage: ±30 Vdc
Current: 12.5 A/25 A, short-term 3x I for 100 ms
Impedance: 0.01 Ω eff.
Regulation response: ≤30 V/ms
Current limiting: 0.1 A to Imax. adjustable in 0.1 A steps

Other Sources

Other sources can be used according to the test requirements. This encompasses simple power supplies as well as highly specified dc amplifiers with extended bandwidth, extra high current capabilities, enhanced stability or other features.

As long as the source accepts an analogue control signal (± 10 V), it can be integrated seamlessly into the System NSG 5200 and the AutoStar software package. The technical data published by the manufacturers must be considered when determining the suitability and limits for specific tests and the particular EUT.

Product Index

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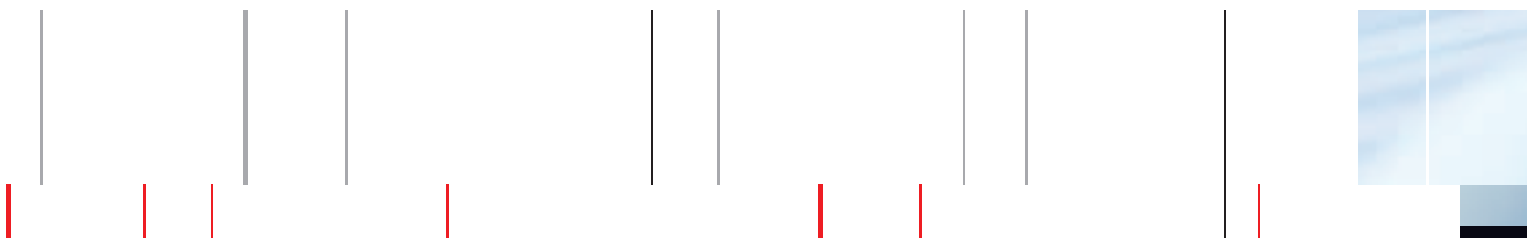

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