Plug-in for Generator System NSG 2050

PNW 2051

OPERATING INSTRUCTIONS

601-213A

Contents

WARNING:

Lethal danger from high voltages and the risk of radiating illegal electromagnetic interference.

The NSG 2050 may only be installed and used by authorised and trained EMC specialists (electrical engineers).

The NSG 2050 must only be used for EMC tests as set down in these operating instructions.

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1 Safety advice

The generators and their accessories work at high voltages.

Improper or careless handling can be fatal!

These operating instructions form an integral part of the equipment and must be available to the operating personnel at all times. All the safety instructions and advice notes are to be observed.

Neither SCHAFFNER Elektronik AG, Luterbach, Switzerland nor any of the subsidiary sales organisations can accept any responsibility for personal, material or consequential injury, loss or damage that results from improper use of the equipment and accessories.

1.1 General

Use of the generator is restricted to authorised and trained specialists.

The generator is to be used only for the purposes set down by the manufacturer.

The construction of the unit renders it unsuitable for use in an explosive atmosphere.

Persons fitted with a heart pacemaker must not operate the instrument nor approach the test rig while it is in operation.

Only approved accessory items, connectors, adapters, etc. are to be used to ensure safe operation.

Safety measures are described in these instructions as follows:

WARNING: For potential dangers that could result in serious injury or death.

CAUTION: For potential dangers or where careless handling could cause light injuries or material damage.

1.2 Installation

The instrument conforms to protection class 1, but with an increased leakage current.

Local installation regulations must be respected to ensure the safe flow of leakage currents.

Operation without a protective earth connection is forbidden!

Two independent protective earth connections are necessary (instrument and EUT supply) connected back to the local permanent installation or to a fixed, permanent protective earth conductor.

Operate the equipment only in dry surroundings. Any condensation that occurs must be allowed to evaporate before putting the equipment into operation. Do not exceed the permissible ambient temperature, humidity or altitude.

Use only nationally approved connectors and accessory items.

Ensure that a reliable return path for the interference current is provided between the EUT and the generator. The reference ground plane and the earth connections to the instruments as described in the relevant test standard serve this purpose well.

The instruments must generally not be opened. This may only be undertaken by a qualified specialist if specifically instructed to do so in the operating manual. Depending on the Pulse Network (PNW) utilised, the equipment can work with two independent power supplies, one for the generator and one for the EUT. Besides the mains supply itself, certain instruments or parts thereof, also operate at high voltages which are not provided with any internal form of extra protection against being touched.

1.3 Test execution

The test area must be so organised that no unauthorised persons have access during execution of a test. If a safety contact (interlock) is used as a means of access control to the test zone (e.g. Faraday cage), then an additional contact in series is necessary to provide protection for parts of the EUT that are in danger of being touched.

EUTs, together with their accessories and cables, are to be considered as being live during a test. The test generator must be stopped and the EUT supply interrupted before any work is carried out on the EUT. This can be implemented by opening the interlock circuit, but depends on the type of generator in use.

The EUT is to be tested only in a protective cage or under a hood which provides protection against electric shock and all manner of other dangers pertaining to the particular EUT (see “Dangers concerning the EUT”).

The safety instructions concerning all the instruments and associated equipment involved in the test rig are to be observed.

The configuration of the test rig is strictly to be in compliance with the methods described in the relevant standard to ensure that the test is executed in a standard-conform manner.

1.4 Dangers concerning the generator

- Local burning, arcing, ignition of explosive gases.
- Danger from the resultant EUT supply current caused by a flash-over or breakdown resulting from the superimposed high voltage effects.
- Dangers from a disrupted EUT.
- Disturbance of unrelated electronics, telecommunications, navigational systems and heart pacemakers through unnoticed radiation of high frequency energy.

1.5 Dangers concerning the EUT

EUTs are often simply functional samples that have not previously been subjected to any safety tests. It can therefore happen in some cases that the EUT is quickly damaged by internal overloads caused by the control electronics being disrupted or it may even start to burn.

- As soon as the EUT shows signs of being disrupted the test should be stopped and the power to the EUT switched off.
- Internal disruption of the electronics can result in the interference voltage or the EUT supply voltage being present on the EUT's housing.
- Electrical breakdown or arcing in plugged connections that are over-stressed voltage-wise during the test.
- Explosion of electronic components with fire or fragmentation as a result of the energy dissipated, e.g. from the resultant supply current or ignition of vaporised plastics materials.
- Faulty behaviour by the EUT, e.g. robot device strikes out, temperature controller fails, etc.

1.6 Applicable safety standards

Development and manufacture is in compliance with ISO 9001.

The equipment conforms to the safety requirements of IEC 1010-1 / EN 61010-1 (Safety requirements for electrical equipment for measurement, control and laboratory use).

All mains driven types of generators are equipped for high voltage working safety in accordance with VDE 0104.

The interference immunity has been tested in conformity with EN 50082-1.
It is the user's responsibility to ensure that the test set-up does not emit excessive radiation that may affect other equipment. The generator itself does not produce any illegal radiation, however the EUT and/or the associated cables may start radiating EMI.

Since the purpose of this instrument is to produce interference signals for interference immunity tests, the requirements of EN 50081-1 to limit the radiated EMI can only be complied with by operating the system inside a Faraday cage.

2 PNW 2051

The pulse network module type PNW 2051, in conjunction with the NSG 2050, produces the following pulses to satisfy the requirements of the standards:

IEC 1000-4-5 (IEC801-5) / CCITT / NF C98-010 / etc.

Telecom pulse 0.5/700µs
10/700µs

2.1 Operating modes

CAUTION: Switch the mains switch on the rear panel off, before you slide the module into the main housing.

- Set the instrument to “STAND-BY” with the mains switch on the rear panel. “POWER” button and the INTELOCK RESET button light up. Wait 10 sec. for processor self-test.

- Switch from “STAND-BY” to ON with the “Power” button on the front panel. Display is activated and shows default settings.

- Check the interlock circuit (INTL)

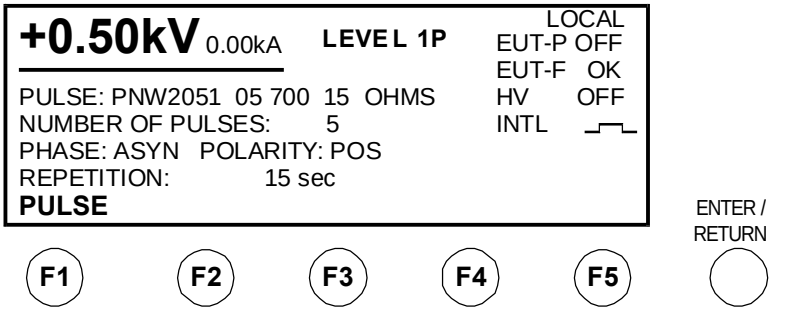
  Circuit open: Display shows ⎽╱⎽
  Instrument cannot be switched to RUN mode nor can the EUT power be switched on.

  Circuit closed: Display shows ⎽⎼⎽
  Instrument is ready to RUN.

Push the INTERLOCK button to reset the Interlock. The light will go out.

2.2 The LEVEL menu

The following menu will appear when the unit is switched on:



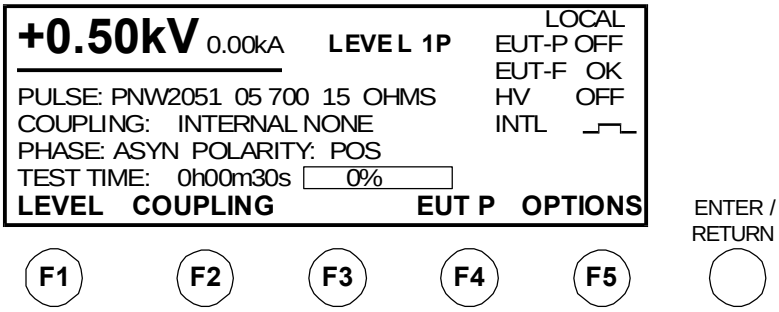
PULSE
The various rise times and the impedances are shown on the display in inverse video when the function key F1, PULSE, is pressed. The required setting is chosen with the rotary knob and confirmed by pressing ENTER.

Selection	0.5/700µs 15 Ohm	0.5/700µs 40 Ohm
	10/700µs 15 Ohm	10/700µs 40 Ohm

Function The generator setting will specify the pulse rise time and the internal impedance of 15Ω or 40Ω depending on the test set-up required in the standard.

ENTER/RETURN

The following menu will appear when the ENTER key is pressed.



LEVEL

The standard level is shown on the display in inverse video when the function key F1 is pressed as well as 8 USER levels per pulse definition (0.5/700µs - 15/40Ω, 10/700µs - 15/40Ω) for customised settings. The levels are the same for all pulse types. The required value is chosen with the rotary knob and confirmed by pressing ENTER.

Selection	LEVEL 1P;	LEVEL 1N;	LEVEL 1A;
	LEVEL 2P;	LEVEL 2N;	LEVEL 2A;
	LEVEL 3P;	LEVEL 3N;	LEVEL 3A;
	LEVEL 4P;	LEVEL 4N;	LEVEL 4A;
	USER 1; 2; 3; 4; 5; 6; 7; 8		

Function The set value for the standard output voltage test can be adjusted by selecting LEVEL and then turning the rotary knob. The output voltage will be the value shown on the display together with the polarity, i.e. **P**ositive, **N**egative or **A**lternate. The voltage levels are in accordance with the IEC 61000-4-5 (IEC 1000-4-5) / CCITT / NF C98-010 / standard.

LEVEL	VOLTAGE	POLARITY	REPETI-TION	PHASE	NUMBER OF PULSES
1P	0.50kV	Positive	15s	Asynch.	5
1N	0.50kV	Negative	15s	Asynch.	5
1A	0.50kV	Alternate	15s	Asynch.	5 (2 Pos; 3 Neg)
2P	1kV	Positive	15s	Asynch.	5
2N	1kV	Negative	15s	Asynch.	5
2A	1kV	Alternate	15s	Asynch.	5 (2 Pos; 3 Neg)
3P	2kV	Positive	15s	Asynch.	5
3N	2kV	Negative	15s	Asynch.	5
3A	2kV	Alternate	15s	Asynch.	5 (2 Pos; 3 Neg)
4P	4kV	Positive	15s	Asynch.	5
4N	4kV	Negative	15s	Asynch.	5
4A	4kV	Alternate	15s	Asynch.	5 (2 Pos; 3 Neg)

Turning the rotary knob further causes USER level 1 up to 8 to appear. It is possible to change parameters and save these under the chosen USER level.

When USER is selected and confirmed with the ENTER key, the VOLTAGE (F3) will be displayed.

NOTE: **It is only in USER mode and by using the option key that the number, phase, repetition time and polarity is shown and can be changed.**

COUPLING

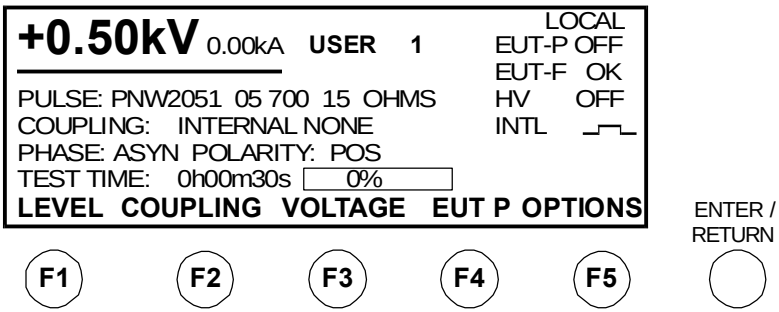
The coupling facility is not used for this plug-in: The coupling is always via the HIGH/LOW output from the main frame.

EUT-P

EUT-P is not applicable to this plug-in because the pulse is always produced at the HIGH/LOW output on the NSG 2050 main frame.

OPTIONS
The previous menu will re-appear when the OPTIONS key (F5) is pressed.

2.3 The USER menu



LEVEL
The same standard level is shown on the display with the same functions as described in the previous menu descriptions.

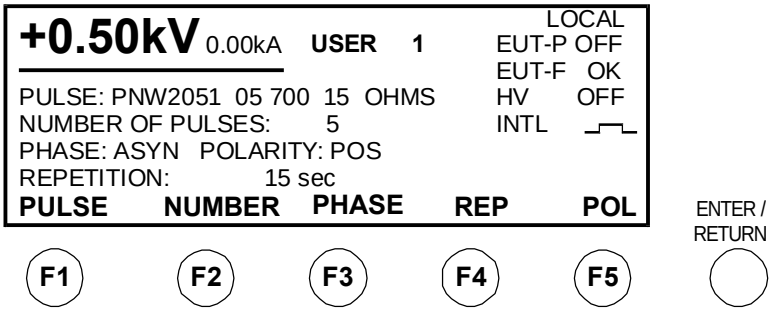
COUPLING
The coupling facility is not used for this plug-in. The coupling is always via the HIGH/LOW output from the main frame.

VOLTAGE
The voltage level is shown on the display in inverse video when the function key F3 is pressed and the USER level is set from 1 up to 8. The required value is chosen with the rotary knob and confirmed by pressing ENTER.

Selection	200 ... 6,600V in 10 volt steps
Function	Sets the output voltage level

EUT-P
The EUT power function is not used for this plug-in.

OPTION
A switch to the OPTION sub-menu is made when the function key F5 is pressed. Options are only available in a USER level with following menu:



PULSE
The various rise times and impedances are shown on the display in inverse video when the function key F1, PULSE, is pressed. The required value is chosen with the rotary knob and confirmed by pressing ENTER.

Selection	0.5/700µs 15 Ohm	0.5/700µs 40 Ohm
	10/700µs 15 Ohm	10/700µs 40 Ohm

Function The generator setting will specify the pulse rise time and the internal impedance of 15Ω or 40Ω depending on the test set-up required in the standard.

NUMBER
The NUMBER of pulses is shown on the display in inverse video when the function key F2 is pressed. The required value is chosen with the rotary knob and confirmed by pressing ENTER.

Selection	1 ... 9,999
Function	Sets the number of pulses

PHASE
The PHASE appears on the display in inverse video when function key F3 is pressed. The selection is made with the rotary knob and confirmed with ENTER.

Selection	ASYN; 0° ... 359° in 1° steps
Function	Angle refers to the phase angle of the EUT supply. Pulses will be sent regardless of phase angle in the asynchronous mode. Pulses may be sent at a specific phase angle when operating in the synchronous mode.

REPetition
The REPetition appears on the display in inverse video when function key F4 is pressed. The selection is made with the rotary knob and confirmed with ENTER.

Selection	15 ... 10,000s in 1s steps
Function	The repetition time defines the period, in seconds, between the pulses.

POLarity
The POLarity appears on the display in inverse video when function key F5 is pressed. The selection is made with the rotary knob and confirmed with ENTER.

Selection	POSitve; NEGative; ALTernate
Function	Polarity controls whether the pulse is to be injected in a positive or negative sense. If Alternate is selected then the test will be performed using both polarities alternately, executing positive polarity first. If the number of pulses is odd then the positive polarity pulses will number one less.

2.4 Save settings

All the parameters will be automatically saved as soon as the ENTER button is pressed while in the selected USER mode.

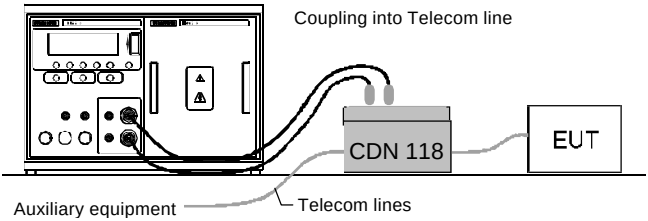
3 Test set-up

Telecom pulses, as described in the standards K17 and K20 from the CCITT have been accepted by many national standards committees as being the fundamental test pulses for the telecommunications industry. The definition of the telecom pulses incorporates special characteristics. The pulse network has been precisely specified and the pulse shape is only defined under open-circuit conditions, except the 10/700µs at 40Ω condition. By using standard-conform test rigs it is possible to achieve a very high degree of reproducibility of the test results that give the user considerable assurance and confidence in the test procedures.

3.1 Using the coupling network CDN 118

The coupling network type CDN 118 is suitable for surge voltage tests on telecom lines. This complies with the requirements of IEC 1000-4-5 and CCITT.

The requisite test parameters can be found in the standards and test specifications.



Ensure that all cable connections are properly made before powering up the test rig. Suitable connecting cables are available for all CDNs and the NSG 2050.

4 Technical data

Pulse form:	0.5/700µs (open-circuit) 10/700µs (open-circuit)
Voltage:	200V ... 6,600V ± 10% adjustable in 10V steps
Short-circuit current:	13.3A ... 440A ± 10% into 15Ω impedance 5A ... 165A ± 10% into 40Ω impedance
Impedance:	15Ω, 40Ω
Polarity:	P (positive), N (negative), A (alternating)
Pulse outputs:	Earth-free (floating)
Repetition:	15s ... 10,000s
Number of pulses:	1 ... 9,999
Dimensions:	410 x 212 x 262mm (D x W x H)
Weight:	11kg approx.
Optional accessories:	CDN 118