



PS-33 Level Generator

for the frequency range 200 (50) Hz to 1.62 MHz



- Synthesizer for high frequency accuracy
- Frequency and level setting via keyboard or stepwise
- Digital frequency and level displays
- Output level adjustable in 0.1 dB steps
- Level display in dB/dB0 or dBm/dBm0 or in mV
- Coaxial and balanced outputs
- Output impedances of approx. 0; 50, 75, 150, 600 Ω
- Memory for 100 setups/fixed frequencies
- Battery or a.c. powered (external adapter/charger)
- Compact, lightweight and easy to operate
- Optional case for instrument and accessories

Applications

The compact and handy-sized PS-33 Level Generator provides a signal source for measurements on balanced and coaxial FDM transmission systems and for measurements at the base-band frequency level of radio-link and satellite systems with up to 300 channels. The lower frequency range limit also enables VF and AF ranges to be detected. The PS-33 Level Generator can also be used at 50 Hz. Because it is battery-operated and is unaffected by large temperature changes it is ideal for field operation. It can be used for in-service maintenance on communication systems as used by PTTs, railways and public utility companies in the energy sector. It can be operated in conjunction with the SPM-32, SPM-33 or SPM-34 Selective Level Meters to give a complete measuring setup, which is especially suitable for carrying out end-to-end measurements where different send and receive frequencies may be required. When the level generator is operated together with W&G measuring bridges, analog measurements on ISDN equipment can also be performed.

Characteristics

The PS-33 Level Generator stands out for its variety of functions and ease of operation. The use of large-scale integration (LSI) and surface mounted devices (SMD) has reduced the size and weight to a fraction of that of a conventional level generator.

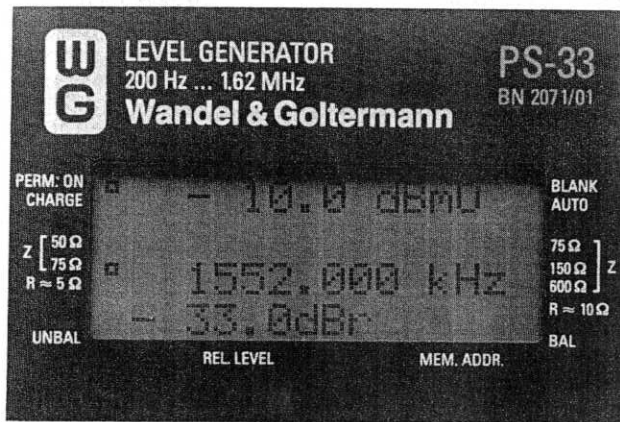
Frequency range	200 (50) Hz to 1.62 MHz
Frequency error limits	$\pm 3 \cdot 10^{-6} \pm 1$ Hz
Output level range (dependent on impedance)	
when matched	-60 to +15 dBm
Output impedance, coaxial	approx. 0 Ω ; 50 Ω , 75 Ω
balanced	approx. 0 Ω ; 75, 150 ^{*)} , 600 Ω
	^{*)} 124, 135 or 140 Ω as an option
Harmonic ratio, $f \geq 200$ Hz	≥ 50 dB
Operating error, $Z_{out} = Z_0 = 75 \Omega$, coaxial	
$f = 0.2$ to 620 kHz/1.62 MHz	$\pm 0.22/\pm 0.3$ dB
Ambient temperature, operating range	0 to +50°C
Recommended level meter	SPM-32, SPM-33, SPM-34

The send frequency is produced by a synthesizer and so has high accuracy and stability. Both frequency and level can be set via the numerical keypad, in steps or in quasi-analog mode, and can be read off very accurately from the display. 100 instrument setups and fixed frequencies can be stored in the memory to facilitate frequently performed measurements.

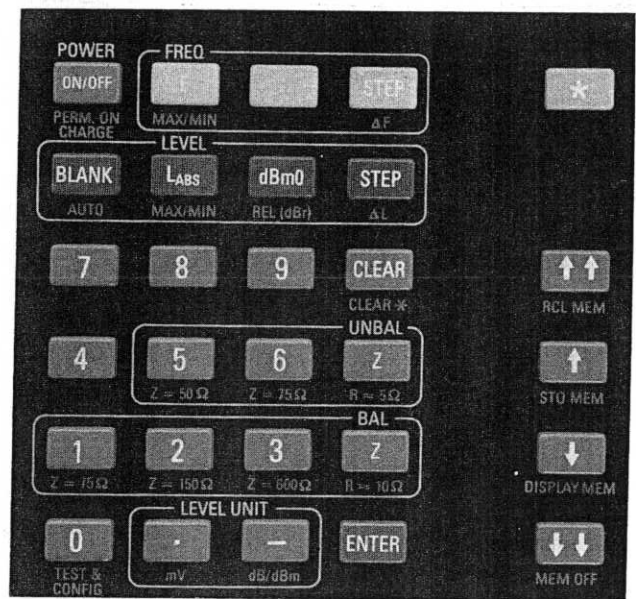
Battery operation is possible. The battery voltage is monitored to ensure that incorrect measurements cannot be made. For longer measurements the PS-33 Level Generator can be connected to an a.c. line adapter/charger unit. After switching on a self-test is performed and any errors are indicated in the display.

Further Characteristics and Applications

- Soft blanking of the output level: prevents unwanted frequencies occurring when changing frequency which could cause interference in transmission systems.
- Level and frequency range limits can be set to the user's requirements. The risk of causing system interference due to an incorrect setting (e.g. feeding in too high a level or the wrong frequency) is therefore greatly reduced.
- Voltage display and 50 Ω output: the PS-33 is also suitable for laboratory work as the signal source is accurate, stable and of high spectral purity and output impedance of 50 Ω and approximately 0 Ω are available.
- ISDN measurements: the PS-33 can be operated in conjunction with the SPM-33 (32) Selective Level Meter and the ISDN measuring bridges ISM-1 and IMB-1 (see separate data sheets) to form a handy measuring setup. It can be used to measure line and crosstalk attenuation on the transmission circuit as well as signal balance ratio and impedance on terminal equipment (TE) and network termination (NT). All the equipment can be accommodated in the ISDN MK-4 equipment case (BN 2092/04).



Display with all important setting parameters



PS-33 keypad

(The specifications are valid for the nominal ranges of use immediately after switch-on, unless otherwise stated)

Outputs

Coaxial output* . . . Versacon® 9 Universal Connector System, adapts to all standard connector systems

Output impedance (Z_{out})

switchable approx. 5 Ω (+0.5 μ H); 50 Ω , 75 Ω

Return loss for $Z_{out} = 50$ to 75 Ω ,

$f = 20$ kHz ≥ 40 dB

Balanced output¹⁾ 3 pole CF connector
BN 2071/01

Output impedance (Z_{out}),

switchable approx. 10 Ω (+1.1 μ H); 75, 150*¹⁾ and 600 Ω
*) 135 Ω for BN 2071/02

Return loss for $Z_{out} = 75$ to 600 Ω ,

$f = 20$ kHz ≥ 40 dB

Output signal balance to CCITT O.121 (O.9)

$Z_{out} \geq 75 \Omega$ ≥ 40 dB

Overload limits for all outputs

Applied DC voltage ± 1.0 V

Frequency

Frequency range 200 (50) Hz to 1.62 MHz

Frequency setting via keypad, resolution 1 Hz

or stepwise, smallest increment 1 Hz

quasi-analog via up/down keys,

in steps 1 or 50 Hz

Frequency display 7 digit, LCD

Frequency error including aging

for one year $\pm 3 \times 10^{-6} \pm 1$ Hz

Output level

Switchable; voltage levels (0 dB \triangleq 0.775 V) or power levels (0 dBm \triangleq 1 mW on Z_0) or voltage

Absolute level, display units dB, dBm

Level referred to 0 dB, display units dB0, dBm0

Relative level, display units dBr

Voltage, dependent on range, displayed in μ V, mV, V

Level setting:

via keypad, resolution 0.1 dB

or stepwise, smallest increment 0.1 dB

or quasi-analog via up/down keys,

increment fine, coarse 0.1 or 5 dB

Level display 3 digit, LCD

Output level ranges (operating range)

Highest level L_{max} or V_{max}

coaxial output	dBm	dB	V
$Z_{out} = Z_L = Z_0 = 50 \Omega$	+11	0	0.8
$Z_{out} = Z_L = Z_0 = 75 \Omega$	+9	0	0.8
$Z_{out} = Z_0 \approx 5 \Omega, Z_L \gg Z_0$	+6	+12	1.6

balanced output

	dBm	dB	V
$Z_{out} = Z_L = Z_0 = 75 \Omega$	+15	+6	1.6
$Z_{out} = Z_L = Z_0 = 124$ to 150 Ω	+12	+6	1.6
$Z_{out} = Z_L = Z_0 = 600 \Omega$	+6	+6	1.6
$Z_{out} = Z_0 \approx 10 \Omega, Z_L \gg Z_0$	+12	+12	3.2

lowest level, relative to L_{max} ≥ 75 dB

lowest voltage $\leq V_{max}/5000$

Output level can be soft blanked

Limits of error

for $Z_{out} = Z_L = Z_0$ (when matched)

Operating error²⁾

for L_{max} to $L_{max} - 64$ dB

	coax.	balanced
200 Hz to 620 kHz	± 0.22 dB	± 0.27 dB
200 Hz to 1.62 MHz	± 0.3 dB	± 0.35 dB
which includes		

intrinsic error³⁾

at 20 kHz and L_{max} : coaxial ± 0.1 dB
balanced ± 0.15 dB

attenuator error (at 20 kHz) ± 0.1 dB

frequency response

referred to 20 kHz, L_{max} to $L_{max} - 64$ dB

coaxial	± 0.15 dB	± 0.17 dB	± 0.25 dB
balanced	± 0.15 dB	± 0.2 dB	± 0.3 dB
	0.2	20 kHz	620 kHz 1.62 MHz

Spurious voltages

harmonic ratio

2nd and 3rd order; $f \geq 200$ Hz ≥ 50 dB

Suppression of discrete, nonharmonic

spurious signals

referred to output signal ≥ 60 dB

referred to L_{max} ≥ 100 dB

(which ever is the least)

Signal to noise ratio at 1 Hz bandwidth and L_{max}

100 dB at frequencies ≥ 20 kHz from f_{out}

110 dB at frequencies ≥ 200 kHz from f_{out}

1) BN 2071/02: connector (135 Ω) compatible with WECO 241A connector (600 Ω) compatible with WECO 310
BN 2071/03: connector compatible with I-241

2) Refers to the limits of operating error (IEC 359) within the nominal operating ranges for the influence quantities and the measurement ranges of the measurands. It includes variation due to the specified influence quantities and intrinsic error.

3) The intrinsic error (IEC 359) is valid for the reference values or reference ranges of the influence quantities and measurands.

Memory
 100 user programmable setups.
 Entry and recall using keypad,
 setups are cleared by being overwritten

General specification

Power supply

Battery or A.C. line operation

Dry batteries (fitted) 2×9 V IEC 6 LF 22
 Option NiCd batteries (2 reqd.) . . . e.g. Varta TR 7/8 No. 5022
 or Sanyo N-6 PT

Separate a.c. adapter/charger for recharging NiCd batteries.
 It is possible to charge the batteries and make measurements
 at the same time.

Operating time

(dependent on output level, ambient temperature, operating mode
 and type of battery)
 with dry batteries approx. 7 hours
 with NiCd batteries approx. 2 hours
 Auto off when batteries low; prevents deep discharging and
 incorrect results.

Ambient temperature

Operating range 0 to +50°C
 Limits operating range -10 to +55°C
 Storage and transport -40 to +70°C

Size (in mm) 110×200×60

Weight with batteries approx. 1 kg

Ordering information

PS-33 Level Generator* (CF connector) **BN 2071/01**
PS-33 Level Generator* (WECO connector) **BN 2071/02**
PS-33 Level Generator* **BN 2071/03**
 with socket for I-214 connector¹⁾

Supplied accessories: 2 dry batteries, carrying strap

Options (no extra charge)

124 Ω²⁾ instead of 150 Ω **BN 2071/00.61**
 135 Ω²⁾ instead of 150 Ω **BN 2071/00.62**
 140 Ω²⁾ instead of 150 Ω **BN 2071/00.63**

Accessories (charged extra)

NiCd batteries TR 7/8 (two required) **BN 820/00.50**
 with charger contact

LNT-1 A.C. adapter/charge **BN 2068/01**

Please specify type of power cord required³⁾:

Power cord with
 European plug **K 490**
 US plug **K 491**
 UK plug **K 492**
 Australian plug **K 493**

MK-1 Equipment case **BN 2090/04**

for PS-33, LNT-1, batteries, test cable and operating manual

MK-4 Equipment case **BN 2092/20**

for storing and transporting PS-33, SPM-32/33 or SPM-34
 and 2×LNT-1

ISDN Equipment case also available, BN 2092/04.

No 9 Leather case **BN 926/22**

Black leather case for PS-33 only

* Fitted with the Versacon® 9 75 Ω basic connector and BNC insert. Other
 types of insert (see Versacon® 9 data sheet) should be ordered with the
 PS-33.

1) On request cable K 438; I-214 (m)/CF, 1 m; K 474 2×I-214 (m), 1.5 m

2) To be ordered with the PS-33 (can only be factory fitted)

3) For BN 2071/03 on request