



PS-15 Level Generator

for the frequency range 50 Hz to 10 MHz

IEEE 488
IEC 625



- Synthesizer ensures that the send frequency is highly accurate and stable
- Digital display for frequency and level
- Coaxial and balanced outputs
- Low distortion factor
- Simple operation via keyboard
- External tuning from SPM-15 Level Meter
- Can be expanded to give a level standard
- A.C. line and battery operation
- Compact, handy and light
- Version BN 954/02 has female connectors for WECO male connectors

Applications

The PS-15 Level Generator provides a signal source for measurements on coaxial and balanced FDM communication systems, for measurements at the baseband frequency level of radio-link and satellite systems with a max. of 1872 channels and for measurements on single voice channels and sound-programme channels.

Because the PS-15 is compact and robust it is ideal for mobile, field service (e.g. maintenance and in-service measurements) on postal systems, systems run by the railways or by public utility companies providing energy. As the PS-15 is highly accurate and has a high spectral purity it can be used in

research and development, in production departments or in test departments. When used with the SPM-15 Level Meter, a complete Measuring Setup is created for level, loss and gain measurements. As the PS-15 has a remote control capability, it can be incorporated in measuring systems.

Characteristics

The send frequency of the PS-15 is generated by a synthesizer and has exceptionally high spectral purity, accuracy and stability. Both the frequency and the send level, which has a wide range, can be set rapidly via a keyboard or a step facility. The results are shown on an easy-to-read display. The low-distortion send signal, which is held constant at the set value, can be "soft" blanked for measurements in channel gaps. The send level can be switched to voltage or power level.

Frequency range	50 Hz to 10 MHz
Error limits of frequency	$\pm 3 \times 10^{-6}$
Send level range (impedance dependent)	-63.9 to +19 dBm or -69.9 to +16 dB
Harmonic ratio, levels ≤ 0 dB/dBm	≥ 50 dB
Output impedance,	
coaxial	75 Ω
balanced	600, 150 (135), 124 Ω ; approx. 5 Ω

Further Characteristics and Applications

- **High frequency stability:** The small error of 3×10^{-6} on the set send frequency means that even high frequencies can be set with high accuracy. The error stated is valid for the rated range of temperature and includes the ageing of the reference crystal.
- **Digital level display:** For setting the send level rapidly and accurately with high resolution. A continuous fine setting is also available.
- **Use as a level standard:** The PS-15 can be used as a precise a.c. voltage source delivering a level of 0 dBm. This is achieved by setting up a control loop in which the setting voltage of the *EPM-1 Milliwatt Power Meter*, acting as an ALC

amplifier, is fed into the control voltage input of the send section. If long leads are used it is possible to eliminate losses and matching errors using the arrangement described above.

- **Battery power facility:** If required the *BAZ-15 Battery Pack* can be purchased. It is mounted on the back panel of the PS-15; the charger is contained in the Main Frame.
- **Remote control capability:** When used in non-mobile applications the PS-15 can be fitted with a IEC 625/IEEE 488 remote control connector instead of the BAZ-15 Battery Pack. This means the PS-15 can be computer controlled in automatic test systems.

Specifications of the Level Generator

PS-15

If nothing to the contrary is stated, the data are valid for the rated ranges of use for ambient temperature, a.c. line voltage and a.c. line frequency immediately after switch-on.

Outputs

Coaxial output* Versacon® 9 universal connector system, can be converted to all commercially available connectors

BN 954/02: Female conn. for WECO 358 A male conn.

Output impedance 75 Ω

Frequency range 50 Hz to 10 MHz

Return loss ≥ 40 dB

Balanced output 3 pole CF connector

Signal balance ratio

complies with CCITT O.121 ≥ 40 dB

Output impedance, switch-selectable 124, 150 Ω

BN 954/02: Only 124 Ω

Female conn. for WECO 372 A/379 A male conn.

Frequency range 6 kHz to 10 MHz

Return loss at 100 kHz ≥ 50 dB

Output impedance, switch-selectable 600 Ω , approx. 5 Ω

BN 954/02: Also 135 Ω

135 Ω female conn. for WECO 241 A male conn.

600 Ω female conn. for WECO 310 male conn.

Frequency range 50 Hz to 620 kHz

Return loss at 10 kHz ≥ 40 dB

Frequency

Frequency setting

digital via keyboard, resolution 1 Hz

in steps via increment key, smallest step 1 Hz

Frequency display 7 digits, LED

Error limits of frequency including 1 year's

ageing $\pm 3 \times 10^{-6}$

External tuning (to 10 MHz) via the SPM-15, SPM-18 and SPM-19 Level Meters.

Send level

Calibration for either voltage levels (0 dB \equiv 0.775 V) or power levels (0 dBm \equiv 1 mW into Z_0)

Level setting

digital via keyboard, resolution 0.1 dB

by steps via increment key, smallest step 0.1 dB

Continuous level setting ± 0.1 dB

Level display LED display, 3 digits and sign

Level ranges¹⁾

Coaxial output

$Z_{out} = Z_L = 75 \Omega$ -60.9 to +19 dBm (-69.9 to +10 dB)

Balanced output

$Z_{out} = Z_L = 124 \Omega$ -63.1 to +16.8 dBm (-69.9 to +10 dB)

BN 954/02:

$Z_{out} = Z_L = 135 \Omega$ -63.4 to +16.4 dBm (-69.9 to +10 dB)

$Z_{out} = Z_L = 150 \Omega$ -63.9 to +16 dBm (-69.9 to +10 dB)

$Z_{out} = Z_L = 600 \Omega$ -69.9 to +10 dBm/dB

$Z_{out} = 0 \Omega, Z_L = 600 \Omega$ -63.9 to +16 dBm/dB

1) See "Outputs" for impedances for BN 954/02

Error limits

Error limits of the send level

for $Z_{out} = Z_L = Z_0$ or $Z_{out} = 0 \Omega, Z_L = Z_0$

at 10 kHz or 100 kHz (124, 150 Ω),

output level 0 dB/dBm, at $(23 \pm 3)^\circ\text{C}$ ± 0.1 dB

additional error at any send level ± 0.1 dB

Error limits of the frequency response at $(23 \pm 3)^\circ\text{C}$

Output ¹⁾	Referred to	50	200 Hz	6	100	620 kHz	10 MHz
$Z_0 = 75 \Omega$	10 kHz	± 0.1 dB					
$Z_0 = 124, 150 \Omega$	100 kHz	—					
$Z_0 = 600 \Omega$ $Z_{out} = Z_L = Z_0$	10 kHz	± 0.2 dB	± 0.15 dB				—
$Z_0 = 600 \Omega$ $Z_{out} = 0 \Omega,$ $Z_L = Z_0$	10 kHz	± 0.2 dB	± 0.15 dB	± 0.5 dB	—		

1) See "Outputs" for the impedance for BN 954/02

Average temperature coefficient of the send level in the range 0 to $+50^\circ\text{C}$, referred to $+23^\circ\text{C}$ ± 0.006 dB/K

Overall error limits

at $Z_{out} = Z_L = Z_o$ or $Z_{out} = 0 \Omega, Z_L = Z_o$

Output ¹⁾	Referred to	Frequency				
		50 Hz	200 Hz	6 Hz	100 Hz	620 kHz
$Z_o = 75 \Omega$	10 kHz	±0.25 dB				
$Z_o = 124, 150 \Omega$	100 kHz	±0.3 dB				
$Z_o = 600 \Omega$ $Z_{out} = Z_L = Z_o$	10 kHz	±0.4 dB	±0.3 dB			—
$Z_o = 600 \Omega$ $Z_{out} = 0 \Omega,$ $Z_L = Z_o$	10 kHz	±0.4 dB	±0.3 dB	±0.6 dB	—	

1) See "Outputs" for the impedance for BN 954/02

Spurious voltages

at $Z_{out} = Z_L = Z_o$ or $Z_{out} = 0 \Omega, Z_L = Z_o$

Harmonic ratio a_{x_2} and a_{x_3}
for output levels ≤ 0 dB/dBm ≥ 50 dB

Attenuation of discrete, nonharmonic,
spurious voltages
in the range 50 Hz to 10 MHz ≥ 70 dB below wanted signal
Noise level ≤ -110 dBm (-120 dB)

Signal-to-noise ratio
referred to 1 Hz bandwidth,
output level 0 dB/dBm, $f \geq 10$ kHz
 ≥ 20 kHz from signal ≥ 120 dB
 ≥ 200 kHz from signal ≥ 130 dB

Level blanking,
manually via key, blanking attenuation ≥ 80 dB

Auxiliary inputs

Control input
for external control by the SPM-15 (SPM-18, SPM-19)
Level Meter

BNC input for standard frequency 10 MHz
Required input level for 75 Ω approx. 0 dBm

BNC input for carrier frequency 40 to 50 MHz
Required input level for 75 Ω approx. -10 dBm

Input for regulating the amplitude of the
send signal with the EPM-1 3 pole, CF connector

Options

Remote control capability via the <IEC 625>/IEEE 488¹⁾
Interface Bus, BN 955/00.03
Interface functions SH1, AH1, T6, L4, SR1, RL1,
PP2, DC1, DT1, C0

Battery Pack BAZ-15¹⁾, BN 955/00.01

Operating time approx. 5 h
Charging time approx. 14 h

General Specifications

Power supply
A.C. line operation
Rated ranges of use for a.c. line voltage,
switch-selectable 110/117/127/220/227/237 V,
-12 to +10 %
Rated range of use for a.c. line frequency 47.5 to 63 Hz
Power consumption (measurements or charging) 35 VA
Safety class as per IEC 348 and VDE 0411 Class I
Battery operation
with BAZ-15 Battery Pack, BN 955/00.01

Permissible ambient temperature
Rated range of use 0 to +50°C
Limits operating range -10 to +55°C
Storage and transportation -40 to +60°C

Dimensions (w x h x d) in mm 317 x 175 x 342

Weight
PS-15 (without option) approx. 11 kg
BAZ-15 approx. 2.8 kg
<IEC 625> Interface Board approx. 1 kg

German Post Office Certificate of Approval No.
for PS-15, BN 954/01 279 111 143-8
for BAZ-15, BN 954/00.01 191 090 156-0

Ordering Information

Level Generator PS-15*	BN 954/01
Level Generator PS-15 with WECO connectors	BN 954/02
Options (at extra cost)	
Battery Pack BAZ-15; rechargeable NiCads ¹⁾	BN 955/00.01
Interface <IEC 625> board ¹⁾	BN 955/00.03
with IEC 625/IEEE 488 (S 834) adaptor and connecting cable for IEEE 488 (K 420)	
135 Ω impedance instead of 150 Ω (for BN 954/01)	BN 954/00.21
Accessories (at extra cost)	
Connecting cable for the <IEC 625> Interface Bus	
120 cm	K 343
200 cm	K 344
Protective Transportation	
Cover SD-940 (1 set)	BN 960/00.02
19" conversion kit	BN 4502/00.16

1) The BAZ-15 and the Interface Bus cannot be used simultaneously
* Equipped with the 75 Ω basic connector Versacon® 9 and BNC adapter.
For other adaptor types, see "Specification Sheet Versacon® 9, and order
chosen type when ordering instrument.