

Level Generators and Digital Level Meters



while the PS-20 has 28 frequencies between 20 Hz and 20 kHz. The generator frequency of the PS-10 can also be swept. The output level can be adjusted in steps as small as 0.1 dB in the range from -59.9 to 0 dBm (PS-20: +16.0 dBm). The error limits of only ± 0.15 dB in the mid-frequency range and the harmonic ratio of 60 dB provided by the PS-20 facilitate highly accurate measurements. These instruments have enough precision even for laboratory applications.

These Level Generators can be turned into complete AF measuring setups through the addition of a PM-20 or PMP-20 Digital Level Meter. The PS-10 also includes a built-in d.c. loop holding circuit to maintain the d.c. exchange loop when measuring on voice circuits. A plug-in adapter providing the same function is available for the PS-20.

The PM-10, PM-20 and PMP-20 Digital Level Meters greatly simplify the job of testing telephone and audio channels in the field. Potential users of these devices include telecommunications authorities, railways, oil companies, broadcasting companies and utilities. When combined with the PS-10 or PS-20 Level Generator, each of these devices forms a complete, battery-powered AF level measuring setup. The auto-ranging capability and large digital display with 0.1 dB resolution make measurements quick and easy. For out-of-service or loop-back measurements, the PM-10 offers two fixed levels (switch-selectable) of -10 and -27 dBm at 820 Hz.

The PS-10 and PS-20 Level Generators are designed as signal sources for AF measurements on telephone and audio transmission equipment. Their low weight, compact design and battery powering options make them ideal for field applications such as troubleshooting and maintenance. The instruments are particularly popular among telecommunications authorities, railways, oil companies, system manufacturers and utility companies.

- Handheld signal sources for measurements on telephone and audio equipment
- Fixed frequencies from 200 Hz to 4 kHz or 20 Hz to 20 kHz

- Frequency range from 80/15/30 Hz to 20 kHz
- Broadband level measurements on telephone and audio channels
- ITU-T noise measurements (PMP-20)
- Built-in generator (PM-10)

An automatic cutoff circuit ensures that no battery power is wasted. For carrying or storing the instruments, leather pouches and full-sized cases are available with room for power supplies and accessories.

The PMP-20 can measure either weighted or unweighted noise in accordance with ITU-T Recommendation O.41. A true rms detector is used.

For use in investigating the frequency dependency of AF equipment, the PS-10 includes 10 fixed frequencies in the range from 200 Hz to 4 kHz,

Output port

Balanced, floating, short-circuit-proof 3-way CF jack
PS-10 includes built-in holding circuitry for maintaining exchange loops.

Output impedance, switchable

PS-10 600 Ω in series with C = 4.7 μF and 0 Ω (≤ 3 Ω)
PS-20 600 Ω and 0 Ω (≤ 3 Ω)

Allowable holding current (for Z_o = 600 Ω)

PS-10 ≤ 60 mA (no d.c. current allowed for Z_o = 0 Ω)
PS-20 d.c. voltage and d.c. current loading not allowed¹⁾

Allowable brief calling voltage, 25 or 50 Hz, max. duration

10 s, source impedance ≥ 500 Ω, RMS value ≤ 100 V

Output signal balance conforming to ITU-T O.121

for output level ≥ -40 dB ≥ 40 dB

Allowable d.c. voltage with respect to ground (⊥) ≤ 100 V

Frequency

Version	PS-10	PS-20
Frequency range	0.2 to 4 kHz	20 Hz to 20 kHz
Fixed frequencies	0.2; 0.3; 0.4; 0.6; 0.8; 1; 1.6; 2.4; 3.4; 4 kHz	20, 30, 40, 50, 75*), 100, 125, 150, 160, 200 Hz Multiplier × 1, × 10, × 100
Error limits of output frequency	at 800 Hz: ±2% otherwise: ±3%	f ≤ 10 kHz: ±2% otherwise: ±3%

^{*)} 85 Hz for version BN 902/02

Sweep (PS-10, only)

Sweep range 0.2 to 3.5 kHz

Timing exponential

Sweep time forward: 2 s, reverse: 2 s

Output level

Signal shape sinusoidal

Level range	PS-10	PS-20
Z _o = Z _i = 600 Ω	-59.9 to 0.0 dBm	-59.9 to +10.0 dBm
Z _o = 0, Z _i ≥ 600 Ω	-59.9 to 0.0 dBm	-59.9 to +16.0 dBm
Level setting	with thumbwheel smallest stepsize 0.1 dB	

Error limits of output level

for Z_o = Z_i = 600 Ω or Z_o = 0, Z_i ≥ 600 Ω,
f = 700 to 1100 Hz ±0.15 dB

Frequency dependency referred to 1 kHz

	0.02	0.2	0.3	4	20 kHz
PS-10	—	±0.15 dB	±0.1 dB	—	—
PS-20	±0.1 dB				

Overall error ±0.25 dB

Spectral purity of output voltage

for Z_o = Z_i = 600 Ω or Z_o = 0 Ω, Z_i ≥ 600 Ω,

Intrinsic harmonic distortion a _{k2} and a _{k3}	PS-10	PS-20
f = 0.2 to 4 kHz	≥ 40 dB	≥ 60 dB
f = 40 Hz to 15 kHz	—	≥ 60 dB
f = 20 Hz to 20 kHz	—	≥ 55 dB

Attenuation of non-harmonic spurious signals over entire frequency range for output level ≥ -40 dBm ≥ 70 dB
≥ -59.9 dBm ≥ 50 dB

General specifications

Power supply

Battery operation

Dry batteries (built-in) 2 × 9 V IEC 6 F 22
NiMH cells upon request (2 cells)

Operating life for intermittent battery operation,

at 23 °C and for Z_i ≥ 600 Ω, U_i ≤ 0 dBm | ≤ +16 dB (PS-20)

Mallory MN 1604 dry batteries	approx. 80 h	approx. 40 h
VARTA	approx. 35 h	approx. 18 h
NiMH cells VARTA V 7/8H	approx. 15 h	approx. 7 h

Charging time with device switched off approx. 40 h

Automatic switch-off

of battery power supply after approx. 20 min

Spurious emissions conforms to EN 50081-1

Interference immunity conforms to EN 50082-1

Allowable ambient temperature

Nominal range of use 0 to +50 °C

Storage and transport -40 to +70 °C

Dimensions (w × h × d) in mm 98 × 54 × 164

Weight with batteries approx. 0.5 kg

1) Allowable with plug-in adapter BN 902/00.01

Ordering information

PS-10 Level Generator	BN 904/01	NiMH cells, 2 required	BN 820/00.50
PS-20 Level Generator	BN 902/01, BN 902/02²⁾	Carrying strap	BN 820/00.52
		Plug-in adapter with holding circuitry (usable only with PS-20)	BN 902/00.01
Accessories (extra charge)		Leather case for PS-10 or PS-20	BN 926/09
LNT-1 adapter/charger for charging NiMH cells	BN 2068/10	MK-1 carrying case for PS-10 or PS-20, LNT-1, batteries, test cables and operating manual	BN 2090/01
Please specify desired a.c. line cable:			
European a.c. line connector	K 490		
US a.c. line connector	K 491		
UK a.c. line connector	K 492		
A.C. line connector for Australia	K 493		

2) Fixed frequency of 85 Hz (instead of 75 Hz)

Level measurements

	Frequency range	Level measurement range
PM-10	80 Hz to 20 kHz	-50 to +10 dBm
PM-20	15 Hz to 20 kHz	-50 to +30 dBm ¹⁾
PMP-20	30 Hz to 20 kHz	-70 to +10 dBm ²⁾

Level display, with correct sign, resolution 0.1 dB

Error limits of level display including frequency response error, digital error, error due to intrinsic noise and error due to reflection for adaptation $Z_s = Z_l = 600 \Omega$

PM-10

Frequency range	Level range	Ambient temperature	Error limits
200 Hz to 4 kHz	-40 to +10 dBm -50 to -40 dBm	+5 to +40 °C	±0.25 dB ±0.4 dB
80 Hz to 20 kHz	-40 to +10 dBm -50 to -40 dBm	+5 to +40 °C	±0.75 dB ±0.9 dB

PM-20

Frequency range	Level range	Ambient temperature	Error limits
700 Hz to 1100 Hz	-11 to +5 dBm -50 to +30 dBm	(23 ± 10) °C +0 to +50 °C	±0.15 dB ±0.2 dB
200 Hz to 4 kHz	-50 to +30 dBm	+0 to +50 °C	±0.25 dB
40 Hz to 16 kHz			±0.35 dB
15 Hz to 20 kHz			±0.5 dB

PMP-20

Frequency range	Level range	Ambient temperature	Error limits
700 Hz to 1100 Hz	-11 to +5 dBm -70 to +10 dBm	(23 ± 10) °C +0 to +50 °C	±0.15 dB ±0.2 dB
200 Hz to 4 kHz	-70 to +10 dBm	+0 to +50 °C	±0.25 dB
40 Hz to 16 kHz			±0.35 dB
30 Hz to 20 kHz			±0.5 dB

D.C. voltage measurement (PM-20, PMP-20)

Measurement range 0 to ±100 V
 Error limits of display, (23 ± 10) °C ... ±0.5% of value ±0.1 V
 0 to +50 °C. ±1% of value ±0.1 V

Noise measurement (PMP-20, only)

Frequency dependency conforms to ITU-T O.41
 Rectification true RMS rectification
 Level meas. range (input level) -85 to +10 dBm
 Error limits of level display at 800 Hz ±0.5 dB

Input ports

For level balanced, floating, 3-way CF jack
 Input impedance, switchable 600 Ω ±0.5% and 100 kΩ
 For d.c. voltage (PM-20, PMP-20) floating
 Input resistance 1 MΩ

Built-in generator unit (PM-10 only)

Output frequency 820 Hz³⁾ ±1%
 Output level, switchable -10 or -27 dBm³⁾
 Error limits ±0.1 dB
 Output balanced, floating, 3-way CF jack
 Output impedance (in series with 3.3 μF) 600 Ω ±0.5%

General specifications

Power supply
 Built-in dry battery 9 V IEC 6 F 22
 or upon request NiMH cell
 Separate "521" charger unit (198 to 242 V/45 to 60 Hz)
 Separate LNT-1 adapter/charger for PMP-20, BN 876/04
 Spurious emissions conforms to EN 50081-1
 Interference immunity conforms to EN 50082-1

Allowable ambient temperature

Nominal range of use, PM-10 +5 to +40 °C
 PM-20, PMP-20 0 to +50 °C
 Limits range of use, PM-10 0 to +50 °C
 Storage and transport -20 to +60 °C

Dimensions (w × h × d) in mm, PM-10 90 × 42 × 160
 PM-20, PMP-20 98 × 54 × 164

Weight with battery approx. 0.5 kg

1) In frequency range 200 Hz to 4 kHz: -65 to +30 dBm
 2) For PMP-20, BN 876/04, with LNT-1: -60 to +10 dBm
 3) Values apply in accordance with device version.

Ordering information

PM-10 Digital Level Meter

BN 820/..

Output frequency	Output level	Order number
820 Hz	-27 and -10 dBm	BN 820/01 ^{*)}
820 Hz	-27 and 0 dBm	BN 820/09
820 Hz	-10 and 0 dBm	BN 820/11
800 Hz	-27 and -10 dBm	BN 820/30
800 Hz	-27 and 0 dBm	BN 820/44
1010 Hz	-16 and 0 dBm	BN 820/55

PM-20 Digital Level Meter

BN 881/01

PMP-20 Digital Level and Noise Meter

BN 876/01, BN 876/04^{)}**

Accessories (extra charge)

NiMH cell	BN 820/00.50
"521" charger	BN 820/00.51
LNT-1 adapter/charger	BN 2068/10
(for charging cells in PMP-20, BN 876/04)	
Please specify desired a.c. line cable:	
European a.c. line connector	K 490
US a.c. line connector	K 491
UK a.c. line connector	K 492
A.C. line connector for Australia	K 493
Carrying strap	BN 820/00.52
150/300 Ω plug-in adapter (for PM-20, PMP-20)	BN 902/00.01
Leather case	BN 926/09
MK-1 carrying case	BN 2090/01
for PM-20/PMP-20, LNT-1, batteries and accessories	
MK-4 carrying case	BN 2092/..
for 4 handheld devices and accessories	

^{*)} Standard version

^{**)} Like version BN 876/01, but with connection for LNT-1