

The tuning frequency is produced by a synthesizer, so ensuring high frequency accuracy and stability. The frequency can be entered by means of a numeric keypad, in steps (e.g. channel spacing) or in the quasianalog mode.

The result is either displayed as an absolute value (level or voltage) or as a level difference, i.e. the difference between a measured value and a reference value. Results are shown on a digital display which has a max. resolution of 0.01 dB.

Autoranging has been provided to make operation even easier. A fast bar graph indicates level trends (resolution 0.1 dB). One

hundred setups/fixed frequencies can be stored to reduce the work involved in routine measurements.

The SPM-34 can be run on its own internal batteries which are monitored to prevent incorrect results when the battery goes low. The SPM-34 can be powered from an a.c. adapter/charger when measurements of some duration are being made.

When the SPM-34 is switched on a selftest is run; this is followed by a calibration routine. Display symbols indicate if a fault is present, and the fault type. A variety of test programs simplifies troubleshooting during servicing.

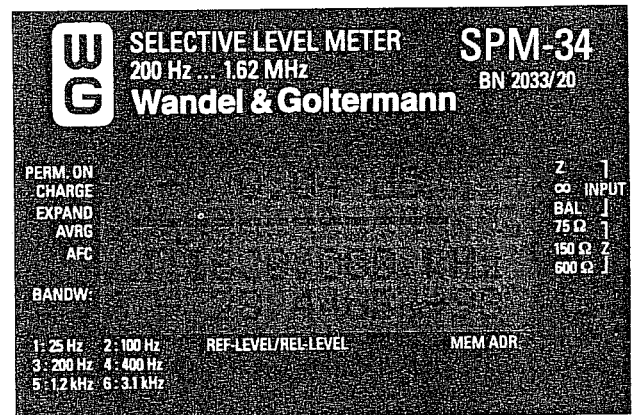
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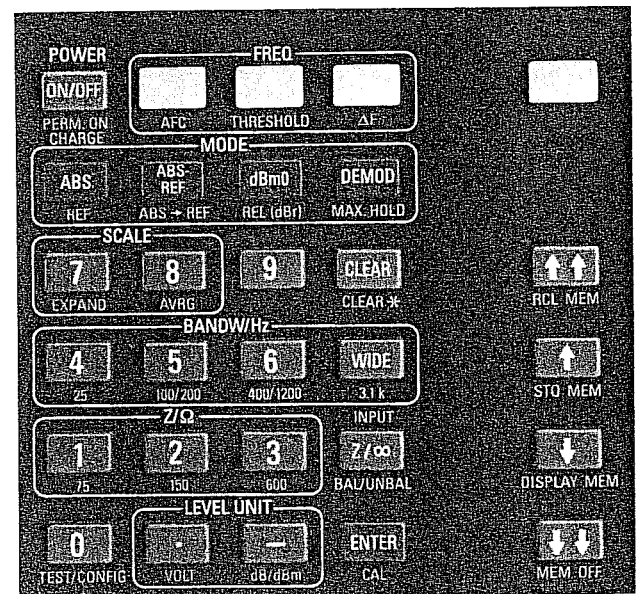
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Other characteristics and applications

- **Range of bandwidths:** Special bandwidths for keyed signals make the SPM-34 optimal for in-service measurements on FM-VFT and remote control systems up to 600 Baud or on the ED 1000 Single Channel Data Communications System. The 25 Hz bandwidth has many uses, including measuring pilots, carrier leaks and spurious sidebands in and outside of the FM-VFT channel, and determining frequency deviation. The 3.1 kHz signal is suitable for measuring channel power, unweighted noise in voice channels and line noise levels (power line carrier systems).
- **Exact frequency measurements:** The SPM-34's high selectivity means the frequency of individual signal components can be measured. A selectable AFC tunes the synthesizer exactly to the signal to be measured (selective freq. counter).
- **Frequency search:** Finds hot tones and spurious discrete frequencies that exceed a certain threshold (adjustable). The speed of the search depends on the bandwidth.
- **Noise averaging (AVRG) and (MAX. HOLD):** Noise averaging is used to reduce display jitter so making it possible to read off results more accurately, e.g. noisy signals and noise measurements. MAX. HOLD is used to freeze and display the greatest level that has been measured. This measurement mode would be useful when measuring strongly fluctuating levels.
- **Voltage display:** Precise voltage measurements are possible in the range from approx. 8 μ V to 3.8 V. The result is displayed to four digits in μ V, mV and V.
- **Result memory:** Up to 100 results and the appropriate measurement parameters can be stored and recalled when required.
- **Demodulator:** Demodulates single sideband signals (upper or lower sideband); the integral loudspeaker is used for qualitative signal assessment at any of the available bandwidths.
- **Power line carrier measurements:** PLC systems may use levels up to +50 dBm. High impedance measurements on levels of this magnitude can be made using the SDG-40 Balanced Attenuator (for version BN 2033/20).



Display showing results and selected parameters



SPM-34 keypad

Unless otherwise stated, the data are valid for the nominal range of use immediately after switch-on.

Inputs

Coaxial input* Versacon® 9 Universal Connector is compatible with all common connector systems
 Input impedance, selectable 75 Ω, high impedance
 Frequency range 200 Hz to 1.62 MHz
 Return loss ≥40 dB
 Balanced input¹⁾ 3-pole CF connector (BN 2033/20)
 Input impedance, selectable 75 Ω, 150 Ω, 600 Ω, high impedance
 Frequency range 200 Hz to 1.62 MHz
 Return loss at f = 10 kHz ≥40 dB
 Signal balance ratio to CCITT O.121, f ≤ 620 kHz ≥40 dB
 f > 620 kHz ≥30 dB
 Maximum load for both inputs (as input signal and common mode signal)
 Input level +30 dBm
 D.C. input voltage 60 V from Z_{out} ≥ 600 Ω

Frequency

Frequency setting
 numeric via keypad, resolution 1 Hz
 In steps by means of increment key, smallest step 1 Hz
 Quasi-analog with up/down keys, resolution (depends on bandwidth) 200 Hz to 1 Hz
 Automatic frequency settings
 Automatic search (single shot), adjustable level threshold AFC
 Accuracy < ±1 Hz ± 1 % of selected bandwidth
 Frequency display LCD, 7 digits
 Error limits for tuning frequency including one year's aging ±3 × 10⁻⁶ ± 1 Hz

Voltage and level measurements

Measured quantities
 Power Level (dBm) referred to 1 mW
 Voltage level (dB) referred to 0.775 V
 Level difference in dB
 Level in dBm0, dB0
 Relative level dBr or noise in dBm
 Voltage in μV, mV, V
 MAX. HOLD displays the max. rms value aid for use with keyed signals

Level and voltage display

Digital display, max. resolution 0.01 dB
 Quasi-analog bar graph as trend display
 Scale, selectable 140 dB/10 dB ± 2 dB
 Resolution, expanded display 0.1 dB
 Voltage display 4 digits

Display range

Intrinsic spurious noise up to max. test level (dBm)

Input	Selective	Wideband
Coaxial 75 Ω	< -90 to +20 dBm	< -50 to +20 dBm
Bal- anced 75 to 150 Ω	< -90 to +20 dBm	< -50 to +20 dBm
	600 Ω	< -100 to +10 dBm
Voltage	< 8 μV to 3.8 V	1 mV to 3.8 V

Error limits of the level display^{*)}

for Z_{in} = Z_{out} = Z_o, after calibration, with noise averaging, MAX HOLD off, battery mode, includes rounding errors and the signal balance ratio of test item ≥ 20 dB

^{*)} For voltage measurements the error limits can be converted linearly to %: 0.1 dB = 1.2 % (of the test value)

Intrinsic error and variation with level at 10 kHz and (23 ± 3) °C (table values in dB)

	±0.4					±0.9
	±0.3	±0.1	±0.3	±0.4	±0.9	
Level range/dBm (75, 135, 150 Ω)	+20	0	0	-60	-70	-80
Level range/dBm, dB (600 Ω)	+10			-70	-80	-90

Variation of level display with frequency referred to 10 kHz, the input level being ≥ 40 dB above the intrinsic noise level

Coaxial	Z _o = 75 Ω	±0.3 dB	±0.5 dB
Balanced	Z _o = 75 to 150 Ω	±0.3 dB	±0.5 dB
	Z _o = 600 Ω	±0.4 dB	±0.6 dB
Frequency range	200 Hz	620 kHz	1.62 MHz

Total error

(the total of all previously listed errors)

Error limits (selective) ¹⁾	f = 200 Hz to 620 kHz	±0.7 dB	
	f = 200 Hz to 1.62 MHz	±0.9 dB	
Error limits (wideband) ²⁾	f = 200 Hz to 620 kHz	±0.8 dB	—
	f = 200 Hz to 1.62 MHz	±1 dB	—

Level range/dBm (75, 135, 150 Ω) +20 -35 -75
 Level range/dBm, dBm (600 Ω) +10 -45 -85

1) rms measurements
 2) For sinusoidal voltage average measurement, rms display

Selectivity, selectable bandwidth

3 dB BW, nominal value	VFT system	Attenuation at ±Δf from center frequency			
		≤ 0.5 dB	≤ 3 dB	≥ 17 dB	≥ 50 dB
25 Hz		—	±12 Hz	—	±100 Hz
100 Hz	FM 120	±25 Hz	±50 Hz	±100 Hz	±350 Hz
200 Hz	FM 240	±60 Hz	±100 Hz	±200 Hz	±700 Hz
400 Hz	FM 480	±120 Hz	±200 Hz	±400 Hz	±1 kHz
1200 Hz	FM 600 Bd	±360 Hz	±600 Hz	±1200 Hz	±2 kHz ^{**)}
3100 Hz ^{*)}		—	±1.35 kHz	—	±2 kHz ^{**)}

^{*)} Effective noise BW 3.1 kHz ± 15 %

^{**)} Attenuation ≥ 55 dB

1) BN 2033/23: Connector compatible with I-214 APS

Image frequency and IF attenuation >60 dB

Harmonic ratio a_{k2}, a_{k3}
for fundamentals ≥ 2 kHz >55 dB

Demodulator

Single sideband demodulation, .
selectable upper or lower sideband
Integral loudspeaker, volume adjustable

Memory

100 user-programmable setups.
Entry and recall by means of keypad. Setups are cleared
by being overwritten.

General specifications

Power supply
Battery or a.c. operation
Dry batteries (fitted) two 9 V IEC 6LF22
Option NiCd batteries (two) 9 V IEC 6F 22
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
with dry batteries approx. 8 h
with NiCd batteries approx. 2 h
EMI/RFI to Bundespost 1046/1984
Ambient temperature
Nominal range of use 0 to +50°C
Limits operating range -10 to +55°C
Storage and transport -40 to +70°C
Dimensions (w×h×d in mm) 110×200×60
Weight with batteries approx. 1 kg

Ordering information

Selective Level Meter SPM-34 * (CF connector) **BN 2033/20**
Selective Level Meter SPM-34 * **BN 2033/23**
with socket for I-214 connector ¹⁾
Supplied accessories: two dry batteries, carrying strap
Options (no extra charge)
124 Ω ²⁾ instead of 150 Ω **BN 2033/00.60**
135 Ω ²⁾ instead of 150 Ω **BN 2033/00.61**
140 Ω ²⁾ instead of 150 Ω **BN 2033/00.62**
Accessories (charged extra)
Nicads (two required) **BN 820/00.50**
with charger contact
A.C. adapter/charger LNT-1 **BN 2068/01**
Please specify type of power cord required ³⁾:
Power cord with
European type plug **K 490**
US type plug **K 491**
UK type plug **K 492**
Australian type plug **K 493**
Balanced Attenuator SDG-40 **BN 608/00.01**
for SPM-34, BN 2033/20
Equipment case MK-1 **BN 2090/04**
for SPM-34, LNT-1, SDG-40, batteries, test cable
and operating manual.
Etui 9 **BN 926/22**
Leather case for SPM-34 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 SPM-34.
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 together with the SPM-34 (can only be factory fitted)
3) BN 2033/23 on request

