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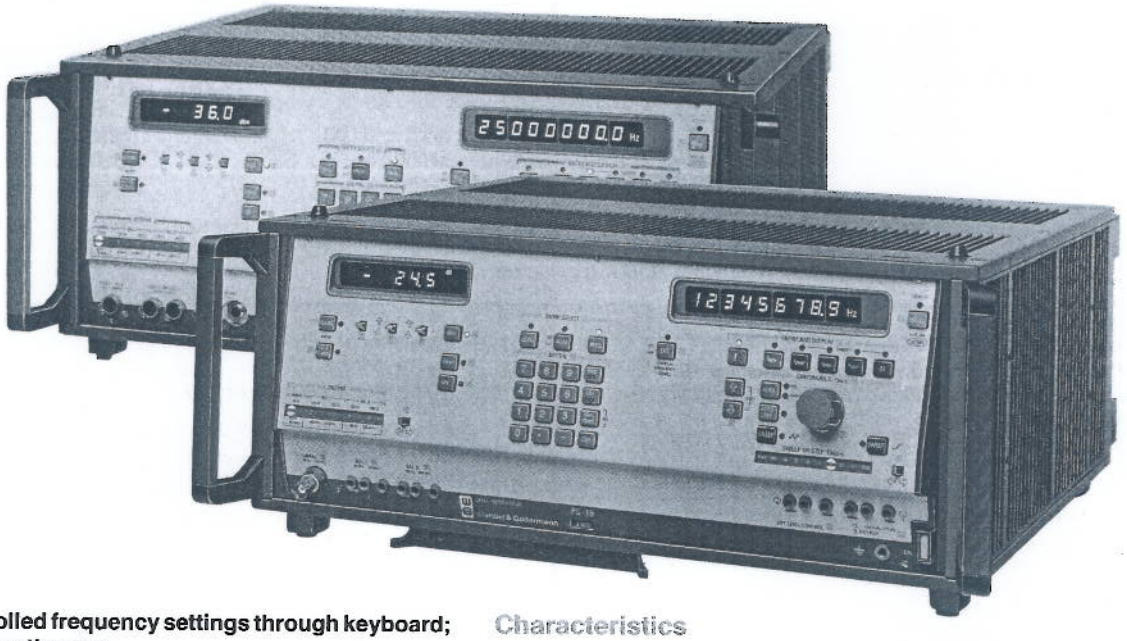
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Find the *VIAVI Solutions / JDSU / Wandel and Goltermann PSS-19* at our website: ***Click HERE***

PS-19/PSS-19
Level Generator

for the frequency range 80 Hz to 25 MHz

IEEE 488
IEC 625



- **Crystal controlled frequency settings through keyboard; stepwise or continuous**
- **High accuracy of frequency, max. resolution 0.1 Hz**
- **Send level adjustable in 0.1 dB steps**
- **Level displayed in dB/dB0 or in dBm/dBm0**
- **Coaxial (75 Ω or 50 Ω) and balanced outputs**
- **Slave tuning by SPM-19 Level Meter**
- **Sweepable send frequency, if requested**
- **Storage and call-up of any fixed frequencies, and a menu of complete instrument settings**
- **Economical Measuring Setup design with PSS-19 Send Section and SPM-19 Level Meter**
- **Point-by-point and sweep measurements with frequency offset (PS-19/SPM-19)**
- **Extendable for use as level standard**

Applications

The PS-19 Level Generator provides a signal source for use in the development, manufacture, installation and maintenance of balanced and coaxial FDM systems with up to 3600 voice-grade channels. It can also be used for measurements in the lower multiplexer range of single sideband radio-link systems and in individual telephone channels.
Because of its remote control facility, the PS-19 can be used in automatic test systems. When used in conjunction with the SPM-19 Level Meter a complete measuring setup for level, gain and loss measurements is created.
The setup can be provided with a sweep facility on request. Measurements using frequency offsets, e.g. on translators, are possible. The instrument is particularly suitable for selective end-to-end measurements on VFT systems.

Characteristics

The PS-19's send frequency is derived from a synthesizer, which has a remarkably high spectral purity, accuracy, stability and freedom from phase-hits at frequency changeovers (this applies particularly to sweep measurements).
The send frequency on the PS-19 can be entered digitally via a keyboard, a continuous adjustment control or an increment key. The resolution is 0.1 Hz for all three methods.
To all intents and purposes, any number of fixed frequencies and PS-19 settings can be stored to facilitate repetitive measurements.
The built-in data retention capability ensures that the memory contents are not lost if there is a power failure. The send level, which may be "soft" blanked, can be set very precisely in 0.1 dB steps. After the microprocessor controlled, fully programmable Level Generator has been switched on, a self-check is carried out to ensure the PS-19 will function correctly. The PS-19 has female connectors for WECO male connectors.

Frequency range, coaxial	80 Hz to 25 MHz
balanced	80 Hz to 14 MHz
Frequency setting	via keyboard, quasi-continuous, by increments manual or automatic, frequency sweep (on request)
Frequency error limits	$\pm 3 \times 10^{-7}$ or $\pm 1 \times 10^{-7}$
Level range, coaxial (75 Ω)	−83.9 to +1 dB (−74.9 to +10 dBm)
Send level error at 20 kHz and $Z_o = 75\ \Omega$	±0.1 dB
Output impedances	0, 75*), 124, 150 (135), 600 Ω
Storable fixed frequencies (100/200) and PS-19 settings (10/50)	

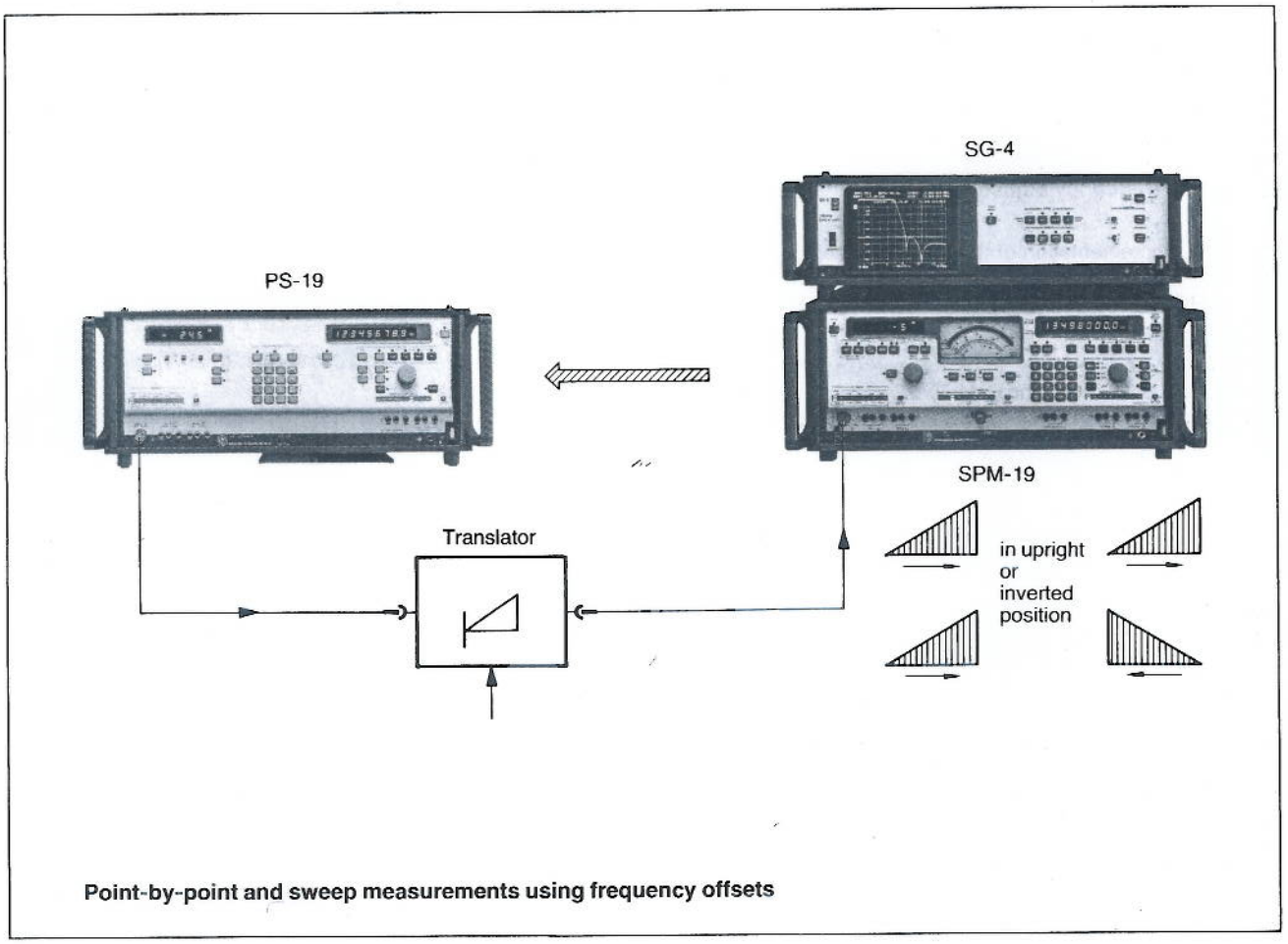
*) 50 Ω on request

PS-19

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Further Characteristics and Applications

- High frequency accuracy: The very small uncertainty of 3×10^{-7} on the set frequency (1×10^{-7} as option), means that frequencies can be set very accurately – even at the high frequencies required for making in-service measurements in the channel gaps of FDM systems, for example. The error stated is valid in the rated range of use for temperature and includes ageing of the reference crystal.
- Sweep capability: The send frequency can be swept over the whole of the PS-19's frequency range (BN 870/02 and /22). The rapid and easy-to-set sweep limits are particularly useful for wideband end-to-end measurements. The centre frequency and sweep width are also adjustable.
- Storage of fixed frequencies and PS-19 settings: The possibility of calling up 100 (with User-specific Memory 200) fixed frequencies and 10 or 50 PS-19 settings takes the tedium out of repetitive measurements. The fixed frequencies can be stepped through in sequence automatically or manually.
  If the SPM-19 (or SPM-16) is connected at the remote site, selective end-to-end measurements can be carried out in this operating mode without additional synchronisation. When a frequency is changed it is possible to "soft" blank the send level.
- Measurement with frequency shift: Point-by-point and sweep measurements using frequency offsets, e.g. on translators, are possible with the PS-19/SPM-19 setup. The send and receive frequencies can be detuned in the same or opposite direction by an amount equal to the frequency offset.
- Digital level display: This means that the send level can be set quickly and precisely with high resolution. The absolute level referred to a point of zero relative level (dBm0 or dB0) and the relative level of the measurement point (dBr) can also be set for measurements on FDM systems.
- Use as a level standard: The PS-19 can be used as a precise a.c. signal source producing a level of 0 dBm. This is achieved by forming a control loop in which the *EPM-1 Milliwatt Power Meter* acts as an ALC amplifier and feeds a control voltage to the control voltage input of the PS-19. This arrangement eliminates the loss and matching errors introduced by long leads.
- Economical design: Only one tuning oscillator is required for frequency setting when measurements with the same send and receive frequency are carried out. The *PSS-19 Send Section/SPM-19 Level Meter* combination is ideal for measurements of this kind.
- All instrument functions can be remotely controlled using the *BCI-1 Barcode Interface* (accessory) without needing an external computer. A pen-like scanner reads the barcode and the BCI-1 translates this into IEC bus commands. The BCI-1 is supplied with a barcode generator program suitable for DOS computers used with a matrix or laser printer.
- SNZ-1 Standard Frequency Adaptor Option is used for external synchronisation using frequencies between 0.3 and 9.9 MHz (100 kHz steps). Power supply from separate mains unit (e.g. BN 964/00.0X; 12 V/50 mA).
- For precision measurements a compensated test cable KMK-100 with an almost flat frequency response (±0.05 dB) is available.



Point-by-point and sweep measurements using frequency offsets

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Unless otherwise noted, the specifications are valid for the rated range of use of the a.c. line voltage, a.c. line frequency and the ambient temperature 15 min after the set is switched on. The level ranges for dBm calibration are shown in brackets.

Outputs

Coaxial output* . . . . . Versacon® 9 Universal Connector System adaptable to all commercially used connectors
BN 870/22: Fem. conn. for WECO 358 A male conn.
Output impedance . . . . . 75 Ω or 50 Ω
Frequency range . . . . . 80 Hz to 25 MHz

Balanced outputs[1] . . . . . 3 pole CF jacks

Output impedance, switchable . . . . . 124 Ω, 150 Ω
Frequency range . . . . . 60 kHz to 14 MHz
Signal balance ratio according to CCITT Rec. O.121 . . . . . ≧40 dB

Output impedance, switchable . . . 150 Ω, 600 Ω, approx. 0 Ω
Frequency range . . . . . 80 Hz to 620 kHz
Signal balance ratio according to CCITT Rec. O.121 . . . . . ≧40 dB

Frequency

Frequency setting at PS-19,
digital keyboard, resolution . . . . . 0.1 Hz
quasi-continuous manual tuning over the whole range without band switching smallest step . . . . . 1 Hz
in steps by increment keys, smallest increment . . . . . 1 Hz
Error limits of frequency
including ageing over 1 year . . . . . $\pm 3 \times 10^{-7}$
with Option Device BN 865/00.03 . . . . . $\pm 1 \times 10^{-7}$
Slave tuning . . . . . through Level Meter SPM-19

Frequency setting at PSS-19
through . . . . . Level Meter SPM-19

Automatic frequency adjustments

Auto-step
Automatic incrementation of the frequency between two limits entered on the PS-19.
Entry of increment, limits and speed of incrementation via keyboard.

Sweep mode
with PS-19, BN 870/02 and BN 870/22
with PSS-19 through SPM-19, BN 829/02, /03 or /22

Setting of upper and lower sweep limits or setting of centre frequency and sweep width
Sweep . . . . . periodic (triangular), single shot, and manual
Sweep duration
for one half period . . . . . 0.03, 0.1, 0.3, ..., 300 s

Send level

Calibration switchable from voltage level (0 dB ≅ 0.775 V) to power level (0 dBm ≅ 1 mW in Z_o)

Setting
of absolute level, display in . . . . . dBm, dB
or absolute power (voltage) level referred to a point of zero relative level, display in dBm0, dB0
and the relative level, display in . . . . . dBr
digital through keyboard, resolution . . . . . 0.1 dB
in steps through increment keys with automatic overflow into the next decade, smallest level step . . . . . 0.1 dB
Level display . . . . . 3 digits and sign

Level ranges
coaxial output (50 Ω on request)
$Z_{out} = Z_L = 75\ \Omega$ . . . −83.9 to +1 dB (−74.9 to +10 dBm)
$Z_{out} = Z_L = 50\ \Omega$ . . −91.4 to −6.5 dB (−80.6 to +4.3 dBm)
balanced output I
$Z_{out} = Z_L = 124\ \Omega$ . . . . . −82.2 to +2.7 dB (−75.3 to +9.6 dBm)
$Z_{out} = Z_L = 150\ \Omega$ . . . . . −82.2 to +2.7 dB (−76.2 to +8.7 dBm)
balanced output II
$Z_{out} = Z_L = 150\ \Omega$ . . . . . −83.9 to +11 dB (−77.9 to +17 dBm)
$Z_{out} = 0, Z_L = 150\ \Omega$ . . . . . −78 to +16.9 dB (−72 to +22.9 dBm)
$Z_{out} = Z_L = 600\ \Omega$ . . . . . −83.9 to +11 dB/dBm
$Z_{out} = 0, Z_L = 600\ \Omega$ . . . . . −77.9 to +17 dB/dBm
Max. send level for f <200 Hz . . . . . 0 dB/dBm

Total error[1]

Limits of total error for $Z_{out} = Z_L = Z_o$ or $Z_{out} = 0, Z_L = Z_o$
Output $Z_o = 75\ \Omega$, f ≧ 200 Hz
Level > −20.0 dB/dBm . . . . . ±0.20 dB
Level ≦ −20.0 dB/dBm . . . . . ±0.25 dB
Output $Z_o = 124\ \Omega, 150\ \Omega$, f = 60 kHz to 14 MHz
Level > −20.0 dB/dBm . . . . . ±0.30 dB
Level ≦ −20.0 dB/dBm . . . . . ±0.35 dB
Output $Z_o = 150\ \Omega, 600\ \Omega$, f = 200 Hz to 100 kHz . . ±0.35 dB

Individual errors (contained in total error)[1]

Error limits of send level
for $Z_{out} = Z_L = Z_o$ or $Z_{out} = 0, Z_L = Z_o$ at f = 20 kHz or 200 kHz
(Tabulated values in dB)

Output	at f =	p_{min} dB	−29.9	−19,9	p_{max} dBm
$Z_o = 75\ \Omega$	20 kHz	±0.15	±0.10		
$Z_o = 124, 150\ \Omega$	200 kHz	±0.15		±0.10	
$Z_o = 150, 600\ \Omega$	20 kHz	±0.18	±0.15		

Error limits of the frequency response
for $Z_{out} = Z_L = Z_o$ or $Z_{out} = 0, Z_L = Z_o$
(Tabulated values in dB)

Output	referred to f at	80 Hz	200 Hz	1	60	100	620 kHz	5	14	25 MHz
$Z_o = 75\ \Omega$	20 kHz	±0.25	±0.10	±0.08				±0.10		
$Z_o = 124, 150\ \Omega$	200 kHz	—		±0.15				±0.20	—	
$Z_o = 150, 600\ \Omega$	20 kHz	±0.25[2]	±0.15	±0.13			±0.25	—		

1) If $Z_o = 50\ \Omega$, all level values given as reference are shifted by −7.5 dB or −5.7 dBm
2) for send level ≦0 dB/dBm

1) BN 870/22: 135 Ω instead of 150 Ω
Fem. conn. (124 Ω) for WECO 372 A/379 A male conn.
Fem. conn. (135 Ω) for WECO 241 A male conn.
Fem. conn. (600 Ω) for WECO 310 A male conn.

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Spurious voltages

Harmonic ratio a_{k_2}, a_{k_3}
for $Z_{out} = Z_L = Z_o$ or $Z_{out} = 0$, $Z_L = Z_o$
Coaxial output, $Z_o = 75\ \Omega$, 800 Hz to 25 MHz . . . . . ≧50 dB
Balanced outputs
$Z_o = 124\ \Omega$, $150\ \Omega$; 60 kHz to 14 MHz . . . . . ≧50 dB
$Z_o = 150\ \Omega$, $600\ \Omega$; 800 Hz to 100 kHz . . . . . ≧50 dB

Suppression of discrete, nonharmonic spurious signals,
in range 200 Hz to 25 MHz,
signal-to-spurious signal ratio . . . . . ≧60 dB
or spurious level . . . . . ≦−120 dB (−110 dBm)

Auxiliary inputs and outputs

External automatic level control from EPM-1,
controlled range . . . . . approx. ±1 dB

Slave control input * . . . . . for external tuning from Level Meter SPM-19

Input * for external standard frequency . . . . 1, 2, 5, 10 MHz

Output * for internal standard frequency . . . . . 10 MHz

Memory
100 fixed frequencies (only PS-19) and 10 complete menus of instrument settings (PS-19, PSS-19) user programmable, entry and call-up via keyboard, erasure by writing over stored information.

General specifications

Power supply
Rated ranges of use for a.c. line voltage, selectable
PS-19 . . . . . 96 to 140 V/193 to 261 V
PSS-19 . . . 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 PS-19 . . . . . approx. 50 W
PSS-19 . . . . . approx. 45 VA

Safety class as per IEC 348 and VDE 0411 . . . . . Class I

Tolerable ambient temperature
Rated range of use . . . . . +5 to +40°C
Limits range for storage and transport . . . . . −40 to +70°C

Dimensions (in mm) and weight

Bench model	PS-19	PSS-19
Width with handles	477	477
Height overall	199	155
Depths with handles	432	432
Weight	approx. 18 kg	approx. 14 kg

German Post Office Certificate of Approval
for PSS-19 . . . . . No. 279 094 190
for PS-19, BN 870/02 . . . . . No. 279 094 195

Options

Higher Frequency Accuracy, BN 865/00.03
for PS-19, frequency error limits . . . . . $\pm 1 \times 10^{-7}$

Interface <IEC 625> Board, BN 853/05
for external control of all PS-19 instrument functions through an external computer.
Connection to the IEEE-Bus by adaptor plug S 834.

User-specific Memory, BN 870/00.01
for PS-19; storage of 100 fixed frequencies and 40 instrument settings, according to user's choice.

User-specific Memory, BN 871/00.01
for PSS-19; storage of 40 instrument settings according to user's choice.

Ordering information

Level Generator PS-19		**BN 870/..**
Standard version *	No sweep	BN 870/01
	With sweep	BN 870/02
WECO connectors [1]	With sweep	BN 870/22

Send Section PSS-19 (for SPM-19	**BN 871/..**
Standard version *	BN 871/01
WECO connectors [1]	BN 871/21

Option (no extra charge)
Generator output 50 Ω (instead of 75 Ω) [2] — BN 870/00.15

Options (at extra cost)
Higher Frequency Accuracy for PS-19 [2] — BN 865/00.03

Interface <IEC 625> Board for PS-19 — BN 853/05
with adaptor plug IEC 625/IEEE 488 (S 834) and connecting cable for IEEE 488 (K 420)

User-specific Memory for PS-19 [3] — BN 870/00.01
User-specific Memory for PSS-19 [3] — BN 871/00.01

Accessories (at extra cost)
BCI-1 Barcode Interface [4] — BN 3005/10
for PS-19 with Interface <IEC 625> Board
Standard Frequency Adaptor SNZ-1 [4] — BN 956/00.07
Connecting cable 24 pin, 50 cm long [5] — K 366
Compensated test cable KMK-100 [4] — BN 862/00.01
Z = 75 Ω, dc to 100 MHz

Front and back panel covers (1 set)
SD-4 for PS-19 — BN 700/00.24
SD-3 for PSS-19 — BN 700/00.23
19" conversion kit — BN 700/00.04 (PS-19)
BN 700/00.03 (PSS-19)

1) Impedances Z_o = 0, 75, 124, 135, 600 Ω
2) Factory fitted only. Please order with instrument.
3) State chosen fixed frequencies (PS-19) and instrument settings when placing order (ask for Order Form No. 5/785 a, b; or 5/785 a for the PSS-19).
4) For specifications and extra ordering information see "Accessory" specification sheet.
5) Cable is required for sweep and offset frequency measurements with PS-19/SPM-19.
* Equipped with the 75 Ω basic connector Versacon® 9 and BNC adapter. For other adapter types, see "Specification Sheet Versacon® 9", and order chosen type when ordering instrument.

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