Standard Signal Generators SG-7000 SERIES

1.3GHz FM/AM Standard signal generator SG-7130 2GHz FM/AM Standard signal generator SG-7200

OUTLINE

Liberalized communication's market has led to rapid expansion for cordless communication's market including pocket pagers and cellular phones for car and portable use, thus causing a flood of portable street terminals. The SG-7000 Series are standard signal generators optimized for development, assembly, quality control, maintenance and servicing in the mobile communications field, and include cellular phones, cordless phones and pagers. Developed in order to achieve reduction both in power consumption and price based on excellent basic performance and operability, it is a standard signal generator featuring multiple and high functionality with high cost efficiency.



SG-7000 SERIES

FEATURES

Enriched Basic Performance

The SG-7200 covers a wide band from 100 kHz to 2 GHz (100 kHz to 1.3 GHz with the SG-7130) and its output level can be varied between -133 and +13 dBm with a high resolution in 0.1 dB steps. The available modulation includes FM, AM, AM/FM, and FM/FM simultaneous modulation as well as DC-FM modulation, which can provide frequency accuracy with an even higher stability. In addition, up to 100 front panel setting conditions including frequencies, output levels and modulation methods can be stored and recalled.

These features make the SG-7000 series a production measuring tool for the communications field, providing enriched basic performance together with high cost efficiency.

Excellent Operability

Features for eliminating operation mistakes and improving the ease of use include; 1) independent control of the frequency output levels using two rotary knobs; 2) key layout for minimizing operation mistakes adopted for frequently-used keys such as the RF ON/OFF, FM/AM modulation ON/OFF, memory and UP/DOWN keys; 3) direct selection of FM, AM, DC-FM, FM-FM (FM 2-tone) modulation, and so on.

Continuously Variable Output Level

The output level can be varied continuously and uninterruptedly from a desired point without the need for switching an internal attenuator.

This is specially convenient in squelch sensitivity testing, etc.

Highly Stable DC-FM Modulation

The DC-FM modulation featuring a high carrier frequency stability of

 \pm (Reference oscillation \pm 250 Hz) at <10 kHz deviation is of optimum performance for the pager (because the DC-FM modulation used with the pager should have a high carrier stability).

100-Step Sequence Memory

The sequence memory can be divided into 10 groups and copied to an instrument of the same model. As the GP-IB and remote control connectors are provided as standard, the SG-7000 series can be accommodated in an automated measuring system for use in production automation.

PROGRAMMABLE FM/AM STANDARD SIGNAL GENERATORS

Non-harmonic - 60dBc maximum when the 0dBm

output level is at least \pm 5kHz from

the carrier in CW mode

SPECIFICATIONS

Figures inside [] are the values for the SG-7130; all other values are common.

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F			(Band: 500MHz 100kHz fc 130MHz)
Frequency			- 40dBc max.
Range			(Band: > 500MHz 100kHz fc 130MHz)
Resolution			- 60dBc max. (130MHz < fc 1.02GHz)
	20Hz (fc > 1.02GHz fc: carrier frequency)		- 54dBcmax, (fc > 1.02GHz)
	Same as reference oscillator	SSB phase noise	
Display			- 120dBc/Hz max. (100kHz fc 130MHz)
•••	50ms (standard), Maximum :150ms		- 130dBc/Hz max. (130MHz < fc 255MHz)
Reference oscillator			- 125dBc/Hz max. (255MHz < fc 510MHz)
Frequency			- 120dBc/Hz max. (510MHz < fc 1.02GHz)
Stability	Temperature stability : $\pm 5 \times 10^{-5}$ (5		- 115dBc/Hz max.
	to 35)		(1.02GHz < fc 2GHz [1.3GHz])
	Aging rate : $\pm 2 \times 10^{-6}$ /Week	Vestigial modulation	
External reference input		Vestigial FM	At demodulation band : 0.3 to 3kHz,
Frequency			deviation : 3.5kHz
Level	0.15 Vrms or more (50 Ω load)		12Hz(49dB) max. (100kHz fc 130MHz)
Maximum input voltage	5V (DC + ACpeak)		3Hz(61dB) max. (130MHz < fc 255MHz)
External reference output			6Hz(55dB) max. (255MHz < fc 510MHz)
Frequency			12Hz(40dB) max. (510MHz < fc 1.02GHz)
Level	0.15 Vrms or more (50Ω load)		24Hz(43dB) max. (1.02GHz < fc 2MHz)
Output level			unit ; rms (vestigial FM)
Setting range	- 133dBm to +13dBm		dB : relative value for 3.5kHz deviation
	- 26dBµ to +120dBµ		At demodulation band :50Hz to 15kHz
	- 20EMF dBµ to +126EMF dBµ		deviation : 75kHz
	(The maximum output level range		16Hz(73dB) max. (100kHz fc 130MHz)
	during AM modulation is up to -6dB		50µs de-emphasis : ON
	of the above range)		dB : relative value for 3.5kHz deviation
Units	$dBm (0dB = 1mW, 50\Omega load)$	Vestigial AM	0.03% (60dB) max. (dB : relative
	dBμ (0dB = 1μV)		value for 30% modulation)
	EMF dBµ (0dB = 1µV, open-circuit)		CW mode, demodulation band 50Hz
Resolution	0.1dB		to 15kHz (at 30% modulation)
Display	4 digits digital display	Modulation	
Frequency response		Internal modulation frequency	1kHz ± 3%
	± 1.5dB (fc > 1.02GHz)		400Hz ± 3% (Dependent on 1kHz
	(output level :0dBm)		and 400Hz changeover)
Output level accuracy	-	External modulation input	-
At 100kHz fc 130MHz	± 1dB (- 10dBm)	Input impedance	Approx. 10k Ω (unbalanced)
	± 1.5dB (- 120dBm)	Input voltage	
	± 2dB (- 127dBm)	Maximum voltage	
At 130MHz < fc 1.02GHz	± 1dB (- 10dBm)	FM modulation (AC-FM)	
	± 1.5dB (- 120dBm)	Display	3 digits, digital display
	± 2dB (- 123dBm)	Frequency deviation setti	0 0 1 9
At fc > 1.02GHz		fc	range
	$\pm 2dB$ (- 103dBm)	100kHz fc 127.5MHz	0
	± 3dB (- 110dBm)	Frequency deviation	0 to 9.99kHz 10 ~ 99.9kHz 100 ~ 250kHz
Output impedance		Resolution	10Hz 100Hz 1kHz
VSWR		127.5MHz fc 260MHz	
	1.8 max.(fc > 1GHz)	Frequency deviation	0 to 9.99kHz 10 to 60kHz
	(at output level : - 13dBm or less)	Resolution	10Hz 100Hz
Reverse power protection	•	260MHz fc 520MHz	
Signal purity		Frequency deviation	0 to 9.99kHz 10 to 99.9kHz 100 to 125kHz
Spurious output	(at output level :0dB max	Resolution	10Hz 100Hz 1kHz
1	fundamental wave = 0dBc)	520MHz fc 1.04GHz	
Higher harmonic	-	Frequency deviation	0 to 9.99kHz 10 to 99.9kHz 100 to 250kHz
	- 50dBc max. (1.02GHz fc 1.7GHz[1.3GHz])	Resolution	
	- 40dBc max. (fc > 1.7GHz [1.3GHz])	1.04GHz fc 2GHz [1.3GHz]	
		Frequency deviation	0 ~ 4.99kHz 5 ~ 49.9kHz 50 ~ 500kHz
		Resolution	
		Resolution	TOTIL TOTIL INIL

SG-7000 SERIES

modulation frequency does not include the residual FM component, and the guaranteed range is fc x 10% of the frequency range when fc 2.5MHz, up to a maximum frequency shift of 400kHz)Hi-Lo mot modulation frequency response ± 1 dB (External modulation frequency 20Hz to 70kHz, 1kHz standard, and 22.5kHz deviation)Hi-Lo mot modulation level funct dowNHz)Modulation distortion0.5% max. (demodulation band : 50Hz to 15kHz, modulation frequency : 1kHz, 75kHz/600kHz) deviation : fc > 500kHz)Special funct deviation 22.5kHz parasitic AM0.5% max. (demodulation band : 50Hz to 15kHz, modulation frequency : to 15kHz, modulation frequency : to 200kHz)DC-FM(at FM deviation : less than 10kHz) ± (reference oscillator + 250Hz) (100kHz < fc 1030HHz) ± (reference oscillator + 250Hz) (100kHz < fc 1030Hz) to 100Hz (510MHz < fc 1030Hz) ± (reference oscillator + 125Hz)Memory fl (100KHz fc 1030Hz) to 100Hz (510MHz < fc 1030Hz) to 100Hz (510MHz < fc 102GHz) to 100Hz (510MHz < fc 102GHz) to 100Hz (510MHz <fc 1030hz)<="" td="">Dump function (102GHz fc 102GHz) to 70kHz, 1kHz standard, and 22.5kHz deviation)Stability0010Lz 60 minute max, (except fre</fc>	
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$\mathbf{D}_{\mathbf{r}} = \frac{1}{2} \left(\mathbf{r} - \mathbf{r} \right) \left(r$	option gh stability o gh stability o riable oscilla z to 6.5KHz
Parasitic FM 200Hz peak max. (fc 1.02GHz) 6.5kH 400Hz peak max. (fc > 1.02GHz) (demodulation band :0.3 ~ 3kHz, modulation Frequency :1kHz, 30% modulation, output level : + 7dBm max.)	Hz to 65kHz

Functions				
Simultaneous modulation FM-AM Simultaneous modulation				
	FM-FM Simultaneous modulation			
Hi-Lo monitor function wi	th a width of $\pm 2\%$ of the external			
modulation input				
Continuously variable output				
level function	Continuously variable output (except			
	during AM modulation) in 0.1dB			
	steps between ± 5dB of any selected			
	point, without main attenuator			
	changeover or short break			
RF•ON/OFF function	RF output ON/OFF switching by			
	RF OFF key			
Special functions	Memory protect, internal modulation			
	frequency changeover, FM-FM			
	modulation preset, frequency offset			
	mode, special function initial settings,			
	etc.			
Set function	Various settings with numeric pad			
	and rotary knob (cursor location)			
	and various settings with step keys			
	and preset keys			
Memory function	100-point memory (frequency,			
	output level, degree of modulation,			
	and other items), which can be used			
	as 10 points x 10 or 100 continuous			
	points, and a backup memory			
	function			
Dump function	Can transfer contents of 100-point			
	memory to the same models			
Remote control function	1			
	panel, except for power ON/OFF			
GP-IB Interface	SH1, AH1, T3, L4, SR0, RL1, PP0,			
Environmental condition	DC1, DT0, C0			
Environmental condition				
Temperature/humidity for operation	0 to 40 90% max.			
Temperature/humidity	0 to 40 90% max.			
for characteristics in spec.	5 to 35 85% max.			
Leakage interference	Maximum signal leakage of 1µV at			
Leakage interference	50Ω terminal voltage, measured with a			
	25mm-diameter, dual-loop attenuator			
	located 25mm from the front panel			
General	located zonan nom the none parer			
Power requirements	AC90 to 250V 50Hz/60Hz			
Power consumption				
	$426(W) \times 99(H) \times 400(D)mm$			
	$431(W) \times 115(H) \times 466(D)mm$			
Weight				
Factory option				
(1) High stability crystal oscillator ($\pm 5 \times 10^{-8}$) OP-18				
(2) High stability crystal oscillator ($\pm 5 \times 10^{-7}$) OP-17				
(3) Variable oscillator OP-16				
20Hz to 6.5KHz : resolut	20Hz to 6.5KHz : resolution 0.1Hz			
6.5kHz to 65kHz : resolution 1Hz				