

TEST & MEASUREMENT

Product Catalog



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Selection Guide of Generators

	TFG6700 Series	TFG6800 Series	TFG2900A Series	TFG3900A Series	TFG1900A Series	TFG1900B Series
Max Frequency	60MHz	100MHz	400MHz	160MHz	20MHz	20MHz
Channel	2	2	2 or 4	2	2	1
Frequency Resolution	1μHz	1μHz	1μHz	1μHz	1μHz	10μHz
Best Accuracy	±(25 ppm+34p Hz)	20ppm	1ppm	2ppm	20ppm	50ppm
Sampling Rate	625 MSa/s	250MSa/s	1.2GSa/s	500MSa/s	100MSa/s	100MSa/s
Vertical Resolution	16 bits	16bits	14bits	14 bits	10bits	8bits
Output level	Max 24 Vpp	Max 20Vpp	Max 10Vpp	Max 20Vpp	Max 20Vpp	Max 20Vpp
Waveform	166 kinds include: Sine, Square, Ramp, Pulse, Noise, DC, PRBS, user-defined arbitrary waveform, user-defined harmonic, etc.	165 kinds including Sine, square, ramp, pulse, noise, DC, PRBS, user-defined arbitrary waveform, user-defined harmonic, etc	165 kinds including: Sine, square, ramp, pulse, noise, DC, PRBS, built-in arbitrary waveforms, user-defined harmonic, etc	150 kinds including: Sine, square, ramp, pulse, noise, PRBS, Exponential, Logarithm, Tangent, Gaussian, Cardiac, Quake, etc	11 built-in waveforms(sine, square, ramp, pulse, etc) + 5 user-defined arbitrary waveforms	16 waveforms, sine, square, ramp, Exp, Log, Noise, etc.
DC Offset	●	●	●	●	●	●
TTL	●	●	●	●	●	●
Sweep	●	●	●	●	●	●
Modulation	FM, AM, PM, PWM, SUM, FSK, 4FSK, NPSK, PSK, 4PSK, NPSK, ASK, OSK	FM, AM, PM, PWM, Sum, FSK, 4FSK, NPSK, PSK, 4PSK, NPSK, ASK, OSK	FM, AM, PM, PWM, Sum, FSK, 4FSK, NPSK, PSK, 4PSK, NPSK, ASK, OSK	FM, AM, PM, PWM, Sum, FSK, 4FSK, QFSK, PSK, 4PSK, QPSK, ASK, OSK	FM, AM, PM, PWM, FSK	FM, AM, PM, PWM, FSK
Burst	●	●	●	●	●	●
Frequency Counter	1mHz to 300MHz DC couple 10Hz to 300MHz AC couple	0.01Hz to 350MHz DC couple 10Hz to 350MHz AC couple	○	0.1Hz ~ 350MHz	1Hz ~ 100MHz	○
Display	4.3" TFT LCD	7" TFT LCD touch screen	7" TFT LCD touch screen	4.3" TFT LCD	VFD	LCD
Interface	USB Host & Device and LAN	USB Host & Device and LAN	USB Host & Device, LAN, WIFI	USB Host & Device and LAN	USB Host & Device	USB Device
Options	Power Amplifier, TCXO	TCXO, Power Amplifier, IOT interface	Frequency Counter, OCXO	Power Amplifier	Power Amplifier	Power Amplifier

*Notice: ● means the indicated function is available while ○ means not available

TFG6700 Series Function/Arbitrary Waveform Generator



Features

- 625 MSa/s sample rate, 16bits vertical resolution and 32 Mpts arbitrary length
- Amplitude is upto 24 Vpp with 0.1 mVpp resolution
- Economic type with improved performance



Specification

		TFG6702	TFG6703	TFG6704	TFG6706
Frequency					
Sine		1 μ Hz~20 MHz	1 μ Hz~30 MHz	1 μ Hz~40 MHz	1 μ Hz~60 MHz
Square					1 μ Hz~40 MHz
Pulse		1 μ Hz~10 MHz	1 μ Hz~10 MHz	1 μ Hz~10 MHz	1 μ Hz~25 MHz
Others					1 μ Hz~20 MHz
Resolution		1 μ Hz			
Accuracy		$\pm(25 \text{ ppm} + 34 \text{ p Hz})$			
Waveform					
Type		166 kinds include: Sine, Square, Ramp, Pulse, Noise, DC, PRBS, user-defined arbitrary waveform, user-defined harmonic, etc.			
Sample Rate		625 MSa/s			
Vertical Resolution		16 bits			
Arbitrary	Sample Rate	625 MSa/s (jump-point sample); 1 μ Sa/s~312.5 MSa/s (poing-to-point sample)			
	Length	2-32 Mpts			
	Resolution	16 bits			
Square	Rise/Fall Time	$\leq 3 \text{ ns (typ.)}$			
	Duty Cycle	0.0001 %~99.9999 %			
Pulse	Rise/Fall Time	$\geq 3 \text{ ns}$			
	Pulse Width	8 ns ~(period-8ns)			

Amplitude		
Range		2 mVpp~24 Vpp, frequency≤10 MHz
		2 mVpp~12 Vpp, frequency>10 MHz
Resolution		0.1 mVpp or 4 digits
Accuracy		±(1% of setting+1mV), Sine 1kHz,0V offset,≥10mVpp
DC Offset (High-Z)		
Range		±12 Vpk (ac+dc)
Resolution		0.1 mVdc or 4 digits
Accuracy		±(setting value ×1 % +amplitude value×0.5 %+2 mV)
Sweep		
Range		1 μHz ~ upper frequency limits
Type		Linear, logarithmic, step
Time		1ms to 500s
Burst		
Mode		Triggered, Gated
Period		1μs ~ 999.9s
Count		1~2 ³¹ -1
Modulation		
FM, AM,PM,PWM,SUM	Carrier Waveform	Sine, Square, Ramp (only pulse for PWM), etc.
	Modulation Waveform	Sine, Square, Ramp, etc.
	Modulation Frequency	1 mHz to 100 kHz
FSK,4FSK,NFSK,PSK,4PSK,NPSK,ASK,OSK	Carrier Waveform	Sine, Square, Ramp, etc.
	Hop Frequency	1 μHz to upper limits
	Hop Rate	1 mHz to 1 MHz
Counter		
Frequency Range		1 mHz to 300 MHz (DC Couple)
		10 Hz to 300 MHz (AC Couple)
Resolution		8 digits/s
Period and Pulse Width Measurement		100 ns to 20 s
Duty Cycle Measurement		0.1 % to 99.9 %
General Characteristic		
Power		100 V~240 V,50/60 Hz(1±10 %); 100V~120V,400Hz(1±10%)
		<45 VA; <80 VA (with optional P/A)
Dimension & Weight		256×105×321 mm, approx. 2.4 kg/2.6 kg (with optional P/A)

Standard Accessories

Power Cord	1
BNC cable	1
CD(software+manual)	1



Options

TCXO	±1ppm accuracy, ±1ppm/year aging rate
Power Amplifier	2 times power amplifier, Max output power 8W (8Ω)

TFG6800 Series Function/Arbitrary Waveform Generator



* without option PA

Features

- 250MSa/s sample rate, 16bit vertical resolution and 16Mpts waveform length
- Rise/fall time of Square: $\leq 4.2\text{ns}$
- Removable PA (option)
- Optional IOT interface
- High precision frequency counter
- 7"touch screen display

Specification

		TFG6803	TFG6806	TFG6810
Frequency				
Sine/Square		1μHz~35MHz	1μHz~65MHz	1μHz~100MHz
Pulse		1μHz-25MHz		
Ramp		1μHz-3MHz		
PRBS		1kbps~60Mbps		
Noise (-3dB)		100MHz bandwidth		
Other		1μHz~20MHz		
Resolution		1μHz or 12 digits		
Accuracy		±(20ppm + 14pHz)		
Waveform				
Type		166 kinds include: Sine, Square, Ramp, Pulse, Noise, DC, PRBS, user-defined Arbitrary waveform, user-defined harmonic, etc		
Sample Rate		250MSa/s		
Vertical Resolution		16 bits		
Arbitrary	Sample Rate	1μSa/s~125MSa/s		
	Length	2-16Mpts		
	Resolution	16 bits		
Square	Rise/Fall Time	≤4.2ns		
	Duty Cycle	0.0001%~99.9999%		
Pulse	Rise/Fall Time	≥8ns		
	Width	13ns ~ (period - 13ns)		
DC Offset (High-Z)				
Range		±10Vpk(ac+dc)		
Resolution		1mVdc		
Accuracy		±(setting value ×1%+amplitude value ×0.5%+ 2mV)		
Sweep				
Range		1μHz ~ upper frequency limit		
Type		Linear, logarithmic		
Time		1ms to 500s		
Burst				
Mode		Triggered, Gated		
Period		1μs to 600s		
Count		1 to 100000000 cycles		
Counter				
Frequency Range		1mHz to 350MHz (DC Couple) 10Hz to 350MHz (AC Couple)		
Resolution		8 digits/s		
Period and Pulse Width Measurement		100ns to 20s		
Duty Cycle Measurement		0.1% to 99.9%		
Amplitude (High-Z)				
Range		2mVpp~20Vpp, frequency≤10MHz 2mVpp~10Vpp, frequency>10MHz		
Resolution		1mVpp or 4digits		
Accuracy		±(of settings value×1%+1mV), Sine 1kHz, ≥10mVpp, offset 0V		
Modulation				
FM,AM,PM, PWM,Sum	Carrier Waveform	Sine, Square, Ramp (only pulse for PWM), etc.		
	Modulating Waveform	Sine, Square, Ramp, etc.		
	Modulating Frequency	1mHz to 100kHz		
FSK,4FSK,NFSK, PSK,4PSK,NPSK, ASK,OSK	Carrier Waveform	Sine, Square, Ramp, ect		
	Hop Frequency	1μHz -upper limits		
	Hop Rate	1mHz to 1MHz		
General Characteristic				
Power		AC 100~240V, 50/60Hz ±10% , AC 100~120V, 400Hz ±10%		
Dimension & Weight		226×200×125mm, Approx. 2.9kg		
		226×200×166mm, Approx. 3.3kg (if amplifier power is selected)		

Standard Accessories

Power Cord	1
BNC cable	1
CD(software+manual)	1

Options

TCXO	$\pm 1\text{ppm}$ accuracy, $\pm 1\text{ppm/year}$ aging rate
Power Amplifier	2 times power amplifier, Max output power 8W (8 Ω)
IOT interface	Based on LoRa

TFG2900A Series Arbitrary Waveform Generators



Features

- 1.2GSa/s sample rate, 14 bits vertical resolution
- Maximum 4 output channels can be configured
- Generating arbitrary waveform points by points to ensure output high-quality waveform accurately
- Unique Harmonic Synthesis
- Standard Interface include: USB Host, USB Device, LAN and WIFI
- 7" touch screen display for easier operation(pixel 800*400)

Specification

	TFG2922A	TFG2924A	TFG2932A	TFG2934A	TFG2942A	TFG2944A
Output Channel	2	4	2	4	2	4
Frequency						
Sine	1μHz~200MHz		1μHz~300MHz		1μHz~400MHz	
Square	1μHz~120MHz					
Pulse	1μHz~80MHz					
Ramp	1μHz~6MHz					
Others	1μHz~50MHz					
Resolution	1μHz					
Accuracy	±1ppm					
Waveform						
Type	165 kinds include : Sine, Square, Ramp, Pulse, Noise, DC, PRBS, buid-in arbitrary waveforms ,user-defined harmonic, etc.					
Sample Rate	1.2GSa/s					
Vertical Resolution	14 bits					
Arbitrary	Sample Rate	1uSa/s~200MSa/s				
	Length	2 ~ 32M points				
	Resolution	14 bits				
Square	Rise/Fall Time	≤2.5ns				
	Duty Cycle	0.01%~99.99%				
Pulse	Rise/Fall Time	2.5ns ~1.2s				
	Width	4ns~(period-4ns)				
Sine Spectral Purity						
Total Distortion	≤0.2% (20Hz~20kHz,20Vpp)					
Phase Noise	≤-140dBc/Hz@10MHz (0dBm, 10kHz offset)					
Amplitude (into 50Ω)						
≤40MHz	1mVpp~10Vpp					
≤100MHz	1mVpp~5Vpp					
≤200MHz	1mVpp~2Vpp					
≤300MHz	1mVpp~1.5Vpp					
>300MHz	1mVpp~1Vpp					
Accuracy	±(1% of setting + 1mVpp), (Sine 1kHz, High-Z, ≥10mVpp)					
Offset						
Range	±5Vpk ac+dc (50Ω load)					
Accuracy	±(setting value ×1%+2mV+ amplitude×0.5%) (High-Z)					
Modulation						
Type	FM, AM, PM, PWM, Sum, FSK, 4FSK, NFSK, PSK, 4PSK, NPSK, ASK, OSK					
Burst						
Burst Count	1 to 100 000 000 cycles					
General Characteristic						
Power	AC 100~240V, 45~65Hz , <70VA (TFG29X2A) ,<80VA (TFG29X4A)					
Dimension & Weight	364×155×329 mm, 7.0Kgs , (TFG29X2A)					
	364×155×468 mm, 10.0Kgs (TFG29X4A)					

Standard Accessories

Power Cord	1
BNC cable	1
CD(Software+ User's Guide)	1
Wifi Antenna	1

Options

Frequency Counter (upper limits to 3GHz)
OCXO (accuracy:±0.01ppm±1μHz)

TFG3900A Series Function/Arbitrary Waveform Generators



Features

- Dual channel outputs with identical performance
- 500MSa/s sample rate, 14 bits vertical resolution
- 2ppm high accuracy to ensure the high quality waveform
- 150 built-in waveforms
- Full and complete modulation functions
- 7digits/s, 350MHz built-in counter
- Standard interface: USB Host & Device, LAN



Standard Accessories

Power Cord	1
BNC cable	1
CD(Software+ User's Guide)	1

Options

Power Amplifier

Specification

		TFG3908A	TFG3912A	TFG3916A
Frequency				
Range	Sine	1μHz ~ 80MHz	1μHz ~ 120MHz	1μHz ~ 160MHz
	Square, Pulse	1μHz ~ 30MHz	1μHz ~ 40MHz	1μHz ~ 50MHz
	Arbitrary	1μHz ~ 30MHz		
	Ramp	1μHz ~ 5MHz		
Resolution		1μHz		
Accuracy		±(2ppm+1μHz)		
Waveform				
Type		150 kinds, including Sine, Square, Ramp, Pulse, Noise, PRBS, Exponential, Logarithm, Tangent, Gaussian, Cardiac, Quake, etc.		
Length		16384 points		
Sample Rate		500MSa/s		
Vertical Resolution		14bits		
Amplitude				
Range	Frequency≤40MHz	1mVpp~10Vpp (50Ω load)		
	Frequency≤80MHz	1mVpp~5Vpp (50Ω load)		
	Frequency≤120MHz	1mVpp~2.5Vpp (50Ω load)		
	Frequency>120MHz	1mVpp~2Vpp (50Ω load)		
Accuracy		±(1% of setting + 2mVpp)		
Flatness		±0.2dBm, frequency<80MHz		
(relative to 1MHz Sine)		±0.3dBm,frequency≥80MHz		
Offset				
Range		±10Vpk (ac+dc, open circuit) ±5Vpk (50Ω load)		
Accuracy		±(1% of setting + 2mV + 0.5% of amplitude)		
Modulation				
FM, AM, PM, PWM, Sum Modulation	Modulating Frequency	1mHz ~ 100kHz (FM, AM, PM,PWM) 1mHz~1MHz(Sum)		
	AM Modulating Depth	0% ~ 120%		
	Phase Deviation	0° ~ 360°		
	Pulse Width Deviation	0% ~ 99%		
	Sum Amplitude	0% ~ 100%		
	Source	Internal/External		
FSK,4FSK,QFSK, PSK,4PSK,QPSK, ASK,OSK	Hop Frequency	1μHz ~ maximum frequency		
	Rate	1mHz ~ 1MHz		
	Source	Internal/External		
Sweep				
Waveform		Sine, Square, Ramp, etc.		
Type		Linear, Log, List		
Sweep Time		1ms to 500s		
Return/Hold/Interval Time		0s to 500s		
Trigger Source		Internal, External or Manual		
Burst				
Waveform		Sine, Square, Ramp, etc.		
Period		1μs ~ 500s		
Burst Count		1 ~ 100000000		
Start/Stop Phase		0° ~ 360°		
Trigger Source		Internal, External or Manual		
Channel Coupling				
Frequency Coupling		Frequency Ratio, Frequency Difference		
Amplitude Offset Coupling		Amplitude Difference, Offset Difference		
Waveform Coupling		Combination Amplitude, 0% ~ 100%		
Sync Output				
Level		TTL compatible, rise/fall time≤10ns		
Impedance		50Ω (typical)		
Counter				
Frequency Range		0.01Hz ~ 350MHz	Resolution: 7 digits/s	
Period and Pulse Width Measurement		100ns ~ 20s		
Duty Cycle Measurement		0.1% ~ 99.9%		
General Characteristics				
Power		AC 100 ~ 240V, 45 ~ 65Hz, <30VA		
Dimension & Weight		256×106×386mm, Approx.3.7 kg		

TFG1900A Series Function/Arbitrary Waveform Generators



Features

- Dual channel outputs
- Frequency accuracy 20ppm and 1μHz resolution
- Abundant modulation function AM, FM, PM, PWM and FSK
- Provide sweep and burst
- 100MHz built-in counter
- Standard interface : USB Device & Host



Standard Accessories

Power Cord	1
CD(Software+ User's Guide)	1

Options

Power Amplifier: 10W, load 8Ω

Specification

		TFG1905A	TFG1910A	TFG1920A
Frequency				
Range	Sine	1μHz ~ 5MHz	1μHz ~ 10MHz	1μHz ~ 20MHz
	Square, Pulse	1μHz ~ 5MHz		
	others	1μHz ~ 1MHz		
Resolution		1μHz, 6digits		
Accuracy		±20ppm		
Waveform				
Type		11 build-in waveform (Sine, Square, Ramp, Pulse, etc.) + 5 user-defined arbitrary waveforms		
Length		4096 points		
Sample Rate		100 MSa/s		
Vertical Resolution		10 bits		
Amplitude Characteristics				
Range	Frequency≤8MHz	0 ~ 10Vpp(50Ω), 0 ~ 20Vpp(Open circuit)		
	Frequency>8MHz	0 ~ 9Vpp (50Ω), 0 ~ 18Vpp(Open circuit)		
Resolution		2mVpp(Amplitude>2Vpp) 0.2mVpp(Amplitude≤2Vpp)		
Offset Characteristics (Ampl. 0Vpp)				
Range		±5Vdc (50Ω), ±10Vdc (Open circuit)		
Resolution		2mVdc		
Modulation Characteristics (CHA)				
FM,AM,PM, PWM	Carrier Waveform	16 waveforms, Sine, Square, Ramp, etc. (PWM is only for Pulse)		
	Modulating Waveform	16 waveforms, Sine, Square, Ramp, etc.		
	Modulating Frequency	2mHz ~ 20kHz		
FSK	Carrier Waveform	16 waveforms, Sine, Square, Ramp, etc.		
	Hop Frequency	1μHz ~ 5MHz	1μHz ~ 10MHz	1μHz ~ 20MHz
	Rate	1mHz ~ 100kHz		
Sweep Characteristics (CHA)				
Carrier Waveform		16 waveforms, Sine, Square, Ramp, etc.		
Type		Linear or Log		
Sweep Time		50ms ~ 500s		
Burst Characteristics (CHA)				
Carrier Waveform		16 waveforms, Sine, Square, Ramp, etc.		
Burst Count		1 ~ 1000000		
Internal Period		1μs ~ 500s		
Start/Stop Phase		0° ~ 360°		
Sync Output				
Waveform Characteristic		Square, rise/fall time ≤ 20ns		
Output Level		TTL compatible		
Counter				
Frequency Range		1Hz ~ 100MHz		
Input Amplitude		100mVrms ~ 7Vrms		
Gate Time		50ms ~ 5s		
General Characteristics				
Power		AC 100 ~ 240V, 45 ~ 65Hz, < 30VA		
Display		VFD display		
Dimension & Weight		322×256×102 mm, Approx.1.5 kg		

TFG1900B Series Function Generators



Features

- Simple structure and highly cost-effective
- Output 16 waveforms
- FM, AM, PM, PWM and FSK modulation
- Provide frequency sweep and burst
- Standard configuration interface: USB device



Standard Accessories

Power Cord	1
CD(Software+ User's Guide)	1

Options

Power Amplifier (output power: 10W)

Specification

		TFG1903B	TFG1905B	TFG1910B	TFG1920B
Frequency					
Range	Sine	10μHz ~ 3MHz	10μHz ~ 5MHz	10μHz ~ 10MHz	10μHz ~ 20MHz
	Square	10μHz ~ 5MHz			
	others	10μHz ~ 1MHz			
Resolution		10μHz			
Accuracy		±50ppm			
Waveform					
Type		16 waveform, Sine, Square, Ramp, Exp, Log, Noise, etc.			
Length		1024 points			
Sampling Rate		100 MSa/s			
Vertical Resolution		8 bits			
Sine	Harmonic Distortion	≤-40dBc(≤5MHz); ≤-35dBc(>5MHz)			
	Total Distortion	≤0.5% (20Hz ~ 20kHz, 20Vpp)			
Square	Rise/Fall Time	≤35ns Overshoot: ≤10 %			
	Duty Cycle	0.1% ~ 99.9%			
Ramp	Symmetry	0.0% ~ 100.0%			
Amplitude					
Range	Frequency≤8MHz	0 ~ 10Vpp(50Ω), 0 ~ 20Vpp(Open circuit)			
	Frequency>8MHz	0 ~ 9Vpp (50Ω), 0 ~ 18Vpp(Open circuit)			
Resolution		5mVpp(Amplitude>2Vpp) 0.5mVpp(Amplitude≤2Vpp)			
DC Offset (Ampl. 0Vpp)					
Range		±5Vdc (50Ω), ±10Vdc (Open circuit)			
Resolution		5mVdc			
Modulation					
FM,AM,	Carrier Waveform	16 waveforms, Sine, Square, Ramp, etc. (only Pulse for PWM)			
PM,PWM	Modulating Waveform	16 waveforms, Sine, Square, Ramp, etc.			
	Modulating Frequency	40mHz ~ 20kHz			
FSK	Carrier Waveform	16 waveforms, Sine, Square, Ramp, etc.			
	Modulating Waveform	Square			
	FSK Rate	40mHz ~ 100kHz			
Sweep					
Type		Linear or Logarithmic			
Sweep Time		50ms ~ 500s			
Trigger Source		Internal/External/Manual			
Burst					
Waveform		16 waveforms, Sine, Square, Ramp, etc.			
Burst Count		1 ~ 1000000			
Internal Period		1μs ~ 20s			
Start Phase		0° ~ 360°			
Trigger Source		Internal/External/Manual			
Sync Output					
Electrical Level		TTL compatible			
Waveform Characteristic		Square, edge time ≤ 20ns			
Output Level		low level<0.3V, high level>4V			
General Characteristics					
Power		AC 100 ~ 240V, 45 ~ 65Hz, <20VA			
Display		LCD display			
Dimension & Weight		322×256×102mm, Approx.1.5 kg			

SU3812 Signal Generator



Features

- Frequency range: 9kHz~13.6GHz
- Level range: -10dBm ~ +13dBm
- Ultra-low phase noise: -110dBc/Hz@100kHz (typ.)
- Wide application in radar, communication, satellite navigation, etc.



Specification

Frequency	
Frequency Range	9KHz~13.6GHz
Resolution	1Hz
Accuracy	±50ppm, 18°C~28°C
Level	
Setting Range	-20dBm~+13dBm
Specified Range	-20dBm~+10dBm, (200MHz~13.6GHz)
Resolution	0.1dB
Accuracy	setting ±1.5dBm (output level:-20dBm~+10dBm, 12GHz≥output frequency≥10MHz)
Output Impedance	50Ω
Spectrum Purity	
Harmonic	<-30dBc(13.6GHz≥output frequency ≥ 200MHz)
Non-harmonic	<-50dBc
Phase Noise	-110dBc/Hz@100kHz(Typ.) Output frequency10 GHz
Pulse Modulation	
Internal Pulse Width	0.1us-10ms
Internal Pulse Period	0.5us-10ms
External Pulse Modulation	Pulse Width≥1.0us
External Pulse Input Level	0V/3.3V(low/high)
Sweep	
Sweep Mode	Step, List
Sweep Type	Single, Continuous
Sweep Range	Full frequency range
Sweep Points	2~65535(Step), 1~6001(List)
Dwell Time	20ms~100s
General Characteristics	
Power	AC100V~240V, 50(1±10%)Hz
Dimension & Weight	256*106*322mm, Approx.4.0 kg

Standard Accessories

Power Cord	1
N-BNC Connector	1
CD(Software+User's Guide)	1



TFG3860 RF Signal Generator



Features

- Frequency range: 9 kHz~6.5 GHz
- 0.01 Hz frequency resolution
- Maximum output level from -130 dBm to +20 dBm
- Level accuracy: ≤ 0.5 dB(typ.)
- Phase noise: < -110 dBc/Hz @20 kHz(typ.)
- Provides AM, FM, Φ M and Pulse modulation function (on/off ratio up to 70 dBc)
- 7 inch TFT capacitive touch screen
- Standard interfaces including USB Host, USB Device, LAN



Specification

Frequency		
Range		9 kHz ~ 6.5 GHz
Resolution		0.01Hz
Spectral Purity		
SSB Phase Noise (CW mode, carrier offset=20 kHz, 1 Hz bandwidth)	100 kHz≤f≤1.6 GHz	<-110 dBc/Hz (typ.)
	1.6 GHz≤f≤3.6 GHz	<-107 dBc/Hz
	3.6 GHz<f≤6.5 GHz	<-105 dBc/Hz(typ.)
Harmonic		<-30 dBc
Spurious		<-55 dBc
Level		
Output level range		-120 dBm~+13 dBm
Resolution		0.01 dB
Accuracy		≤0.5 dB(typ.)
Internal Modulation Generator (LF)		
Waveform		Sine/Square
Frequency Range	Sine	DC~200kHz
	Square	DC~20kHz
Frequency Resolution		0.01Hz
Voltage Range	AC	0~3 V
	DC	-3 V~3 V
Voltage Resolution		2 mV
Sweep		
Function		Frequency Sweep, Level Sweep
Sweep type	Step sweep(equally spaced level steps)	
	List sweep(list with arbitrary level steps)	
Sweep mode		Single, continuous
Sweep range		Full frequency range, Full level range
Modulation		
Type		AM, FM, ΦM, Pulse Mod
General Characteristics		
Power		AC 100 V~240 V, 50/60 Hz(1±10%), 60 VA
Dimension & Weight		364*154*388mm, 8kg

Standard Accessories

Power Cord	1
N-BNC Connector	1
CD (Software+User's Guide)	1



Options

OCXO: $< 5 \times 10^{-7}$

TFG3836 RF Signal Generator



Features

- Frequency up to 3.6GHz
- 0.01Hz frequency resolution
- Level output from -110dBm to +13dBm, maximum level up to +20dBm
- Phase noise: < -105dBc/Hz@20 kHz (typ.)
- Level accuracy: ≤ 0.5 dB (typ.)
- Provides standard AM, FM, ϕ M and Pulse modulation (on/off ratio up to 70dBc)
- 7 inch TFT capacitive touch screen
- Standard interface include USB Host, USB Device and LAN



Specification

Frequency		
Range		9kHz ~ 3.6GHz
Resolution		0.01Hz
Spectral Purity		
Harmonic (CW mod, 1MHz $\leq$ f $\leq$ 3.6GHz, levels+13 dBm)		<-30 dBc
Non-harmonic (CW mod, level>-10 dBm, carrier offset>10kHz)	100kHz $\leq$ f $\leq$ 2.4GHz	<-60dBc, <-70 dBc (typ.)
	2.4GHz $\leq$ f $\leq$ 3.6GHz	<-54dBc, <-64 dBc (typ.)
SSB Phase Noise (CW mod, carrier offset=20kHz, 1Hz bandwidth)	100kHz $\leq$ f $\leq$ 2.4GHz	<-105dBc/Hz, <-110 dBc/Hz (typ.)
	2.4GHz $\leq$ f $\leq$ 3GHz	<-100 dBc/Hz, <-107 dBc/Hz (typ.)
	3GHz $\leq$ f $\leq$ 3.6GHz	<-100dBc/Hz, <-105 dBc/Hz (typ.)
Level		
Setting Range		-110dBm to +20dBm
Specified Range		-110dBm to +13dBm
Resolution		0.01dB
Accuracy	100kHz $\leq$ f $\leq$ 3.6GHz	≤ 1 dB, ≤ 0.5 (typ.) (output level:+13dBm ~ -60dBm)
		≤ 2 dB, ≤ 0.7 (typ.) (output level:-60dBm ~ -110dBm)
VSWR	1MHz $\leq$ f $\leq$ 3.6GHz	<1.8 (typ.)
Internal Modulation Generator (LF)		
Waveform		Sine Square
Frequency Range	Sine	DC~200kHz
	Square	DC~20kHz
Resolution		0.01Hz
Voltage Range		AC: 0 ~ 3V, DC: -3V ~ 3V
Sweep		
Function		Frequency Sweep, Level Sweep
Modulation		
Type		AM, FM, ϕ M, Pulse modulation
General Characteristics		
Power		AC 100~240V, 50/60Hz(1 $\pm$ 10%), 60VA
Dimension & Weight		364 $\times$ 154 $\times$ 388 mm, 6kg

Standard Accessories

Power Cord	1
N-BNC Connector	1
CD (Software+User's Guide)	1



Options

OCXO: <5 $\times$ 10⁻⁷

TFG3600 Series Synthesized Signal Generators



Features

- Perfect combination of DDS and PLL techniques
- Frequency upper limits to 1.5GHz
- Higher level of frequency accuracy, up to 1ppm
- Complete AM/FM/FSK/PSK modulation function
- Standard communication interface: USB Device and RS-232



Standard Accessories

Power Cord	1
BNC cable	1
CD(Software+ User's Guide)	1

Options

Frequency Counter
(upper limits to 2.5GHz, only for TFG3605)

GPIB

Specification

CHA		TFG3605	TFG3610	TFG3615
Frequency				
Range	Sine	1μHz ~ 500MHz	1μHz ~ 1000MHz	1μHz ~ 1500MHz
	Square	1μHz ~ 80MHz		
Resolution		1μHz (carrier frequency≤80MHz) 1Hz (carrier frequency>80MHz)		
Accuracy		±1ppm, Frequency≥1.0kHz, 18°C to 28°C ±50ppm, Frequency<1.0kHz, Min. output 1μHz		
Sine Output Level				
Range	Freq≤500MHz	-127dBm ~ +13dBm(-127dBm ~ -117dBm typ.)		
	Freq≤1000MHz	-110dBm ~ +13dBm(-100dBm ~ -110dBm typ.)		
	Freq≤1500MHz	-105dBm ~ +10dBm(-100dBm ~ -105dBm typ.)		
Resolution		0.1dB		
Accuracy	Freq≤300MHz	setting value ±1dBm (output level +13dBm~-100dBm)		
	Freq≤1500MHz	setting value±2.2dBm (output level +13dBm~-80dBm, setting value ±1.5dBm typ.) setting value ±2.7dBm (output level -80dBm~-100dBm, setting value ±2.0dBm typ.)		
Stationary Wave Ratio (SWR)		<1.8 (output level≤0dBm)		
Spectral Purity				
Harmonic		< -33dBc (output level≤4dBm, typ.)		
Non-Harmonic		<-40dBc (output level≤4dBm, deviation CF≥5kHz)		
Sub-Harmonic		<-40dBc (output level≤4dBm)		
Residual FM		< 100Hz (BW: 0.3 ~ 3kHz, RMS < 120MHz)		
Square				
Rise/Fall Time		≤15ns		
Overshoot		≤5%		
Modulation				
Type		AM, FM, FSK, PSK		
External Modulation Input		Voltage Range: 5V full scale, Input impedance:10kΩ, Frequency: DC to 10kHz		
Frequency Sweep				
Sweep Rate		1ms ~ 800s Linear (carrier ≤80MHz) 100ms ~ 800s Logrithm(carrier ≤80MHz)		
Step Time		50ms ~ 10s Linear (carrier>80MHz)		
Burst(Carrier Frequency ≤80MHz)				
Burst Count		1 ~ 10000 cycles		
Interval		0.1ms ~ 800s		
CHB				
Frequency				
Range		1μHz ~ 10MHz		
Resolution		1μHz		
Accuracy		±1ppm, Frequency≥1.0kHz, 18°C to 28°C ±50ppm, Frequency<1.0kHz, Min. output 1μHz		
Waveform				
Type		Sine, Square, Ramp, Pulse, Sinc, Exp, Noise, DC		
Square	Rise/Fall Time	≤50ns		
	Duty Cycle	0.01% ~ 99.99%		
Pulse	Rise/Fall Time	≤50ns		
	Pulse Width	20ns ~ 20s		
Ramp	Symmetry	0.0% ~ 100.0%		
Output				
Amplitude		1mVpp ~ 10Vpp(50Ω), 2mVpp ~ 20Vpp(High Z)		
Offset		±5Vpk ac+dc(50Ω), ±10Vpk ac+dc(High Z)		
Resolution		5mVpp		
Accuracy		±(1% of setting + 10mVpp) (1kHz Sine)		
Flatness		± 0.5dB(1MHz Sine, 1Vpp)		
General Characteristics				
Power		AC 100V~240V, 50/60Hz, 30VA Max		
Dimension & Weight		256×106×386 mm, Approx.4.2 kg		

SU5600 Series Pulse Function Arbitrary Waveform Generator



Features

- 1 or 2 channel is selectable, differential outputs
- Pulse, sine, square, ramp, noise, arbitrary and pattern (optional) could be generated
- Noise, with selectable crest factor, and signal repetition time of 26 days
- 14-bit, 2GSa/s arbitrary waveform, 512k samples deep arbitrary waveform memory per channel
- FM, AM, PM, PWM, FSK modulation capabilities up to 10MHz
- Trigger, sweep and burst modes are supported
- Pattern generator with 16Mbit memory is optional
- Communication interfaces USB Device, USB Host, LAN and GPIB are provided



Specification

	SU5601	SU5602	SU5603	SU5604
Output	1	2	1	2
Patter Generator	Yes	Yes	No	No
Pulse				
Frequency	1μHz~120MHz			
Resolution	1μHz			
Pulse Width	4.1ns to (period-4.1ns) (limited by edge time and frequency)			
Accuracy	± 500ps ±50ppm (edge time 2.5ns)			
Transition Time	2.5ns~1000s (10%~90%)			
Accuracy	± 500ps (< 50ns,1Vpp)			
Sine				
Frequency	1μHz~240MHz			
Resolution	1μHz			
Square				
Frequency	1μHz~120MHz			
Duty cycle	(Frequency/240MHz)~1-(Frequency/240MHz)			
Ramp				
Frequency	1μHz~5MHz			
Symmetry	0.0%~100%			
Noise				
Bandwidth	120MHz typ.			
Amplitude Distribution	Selectable Gaussian, user defined			
Crest factor (peak/RMS) selectable	3.1, 4.8, 6.0, 7.0 typ. (Gaussian distribution)			
Repetition Time	26 days			

Arbitrary		
DAC Sample Rate	2GSa/s,Fixed	
Length	2~512k points	
DAC Resolution	14 bits	
Frequency	1μHz~120MHz	
Resolution	1μHz	
PP Jitter	1ns typ.	
Modulation		
AM, FM, PM	Carrier waveform: Sine, square, ramp, arbitrary	
	Internal modulation: Sine, square, ramp, noise, arbitrary	
	modulation frequency: 1MHz~10MHz	
FSK	Carrier waveform: Sine, square, ramp, arbitrary	
	Internal modulation:50% square	
	FSK rate: Internal: 1mHz~50MHz, External: DC~10MHz, Frequency Range: 1mHz~240MHz	
PWM	Carrier waveform: Pulse	
	Internal modulation: Sine, square, ramp, noise, arbitrary	
	Offset: 0%~100% pulse width	
Sweep		
Waveform	Pulse, sine, square, ramp, arbitrary	
Sweep time	100μs~500s	
Start/Stop frequency	1μHz~240MHz (Max frequency depends on selected waveform)	
Burst		
Waveform	Pulse, sine, square, ramp, arbitrary	
Frequency	1μHz~120MHz	
# of waveforms in a burst	2~2 ³¹ -1	
Output		
Max frequency	120MHz pulse/240MHz sine	
Type	Single-end or differential	
Amplitude(50Ω~50Ω)	50mVpp~10Vpp (<50MHz)	
	50mVpp~5Vpp (≤120MHz)	
	50mVpp~3Vpp (>120MHz)	
DC offset range	Voltage (50Ω~50Ω) -10V~+10V typ.	
Pattern Generator (only for SU5601/5602)		
Data rate	1μbit/s~120Mbit/s	
Pattern memory	16Mbit	
Number of levels	2,3 or 4 (user selectable)	
Trigger modes	Continuous, gated, one bit per trigger event, one sequence per trigger event	
Pattern sources	Internal: PRBS -7, 9, 11, 15, 23 and 31	
	User Defined	
	External: pass through pattern mode	
Modulation	AM, FM, PM	
Arbitrary bit shape	User-defined and predefined bit transitions with up to 64 arbitrary waveform points per bit transition	
General Characteristic		
Power	100~240 V, 50/60 Hz(1±5%), 80 W nominal	
Dimension & Weight	≤452 mm×100 mm×463 mm, Benchtop; ≤427 mm×89 mm×437 mm, Racked, Appx. 6 kg	

Standard Accessories

Power Cord	1
BNC Cable	2
CD	1



SU5000 Series Pulse/Pattern Generators



Features

- Direct Digital Synthesis Technology
- Crystal Oscillation Reference
- High Accurate Time and Frequency
- Count burst or single burst both can be selected
- Multiple output channels and EXT
- Trigger/Frequency Standard Input channels
- Data Storage And Recall
- Optional GPIB and USB interface

Specification

	SU5101/5102	SU5202G	SU5302	SU5303
Channel	1/2	2	2	1
Waveform				
Pulse	Single/Dobule, Logic Positive /Negative, Positive/Negative Polary	Single/Dobule, Logic Positive /Negative		Logic Positive /Negative
Edge Time	≤ 10ns	≤ 10ns	8ns ~ 1ms	5ns ~ 1ms
Overshoot	≤ 10%	≤ 10%	≤ 10%	≤ 10%
Time				
Pulse Period	20ns ~ 10000s (frequency range: 0.1mHz ~ 50MHz)			20ns ~ 10000s
Time Interval	5ns ~ 10000s			8ns ~ 9999.5s
Resolution	5ns (Low range), 10μs (High range)			0.1ns (typical)
Interval Error	± (T×5×10 ⁻⁵ + 5ns)(Low range), ±(T×5×10 ⁻⁵ + 10μs) (High range)			±(T×5×10 ⁻⁵ +5ns)
Pattern	○		Length:4095bits Format:NRZ	Length range: 2~16383bits Format:NRZ, RZ
Rate:100mHz ~ 50MHz				
Amplitude Offset				
Amplitude Range	50mV ~ 10V(High Z)	50mV ~ 5V (50Ω)		
Offset Range	50mV ~ 10V(High Z)	±(50mV~5V) (50Ω)		
Output Impedance	50Ω			
TTL				
TTL/CMOS Level	Low Level≤ 0.3V, High Level≥3.0V (high impedance load)			
Output Impedance	50Ω			
Burst				
Burst Count	2 ~ 65000 cycles			
Burst Mode	Continuous, Single			
EXT. STD Input				
Frequency	10M mutiple			
Amplitude	0.5-5Vpp, AC coupling			
Trigger				
Trigger Mode	Internal, External, Manual			
Ext. Trigger Input	Frequency: 1Hz ~ 10MHz (Square), Amplitude: 1Vp-p~20Vp-p			Ampl: TTL, Pulse width: >100ns, Input Impedance: ≥1kΩ
Input Impedance	≥100kΩ			
General Characteristics				
Power	AC110~240V, 50/60Hz,<80VA			
Display	VFD	5.7' TFT LCD	5.7' TFT LCD	4.3' TFT LCD
Optional Interface	USB, GPIB	RS232(Standard),GPIB	RS-232(Standard)	RS232(Standard),GPIB
Dimension & Weight	256×106×385mm, Approx.3 kg	340×162×293mm,Approx.4.2kg		450×102×475mm, Approx.6.0 kg

Standard Accessories

Power Cord	1
BNC cable	1
CD (User's Guide)	1

Options

Power Amplifier

SU432X Series Noise Generator



Features

- Gauss white noise with broadband standard could be generated
- Uniform and controlled Spectral density, no DC and excess noise
- Simulate line noise in the UAV, navigation and satellite communication
- Widely application in electronic countermeasures and electromagnetic compaction, BER test and CATV test

Specification

	SU4323	SU4326
Output		
Noise Bandwidth	10.0MHz~3.0GHz	10.0MHz~6.0GHz
Attenuation Range	0.0~60.0dB	
Attenuation Step	0.1 dB	
Max. Output Noise	≥3.0dBm (10MHz~3.0GHz)	≥3.0dBm (10MHz~6.0GHz)
Flatness (attenuation 0.0dB)	±2.0dB (10MHz~50MHz)	±2.0dB (10MHz~50MHz)
	±2.0 dB (50MHz~2.4GHz)	±2.0 dB (50MHz~2GHz)
	±2.0 dB (2.4GHz~3GHz)	±2.0 dB (2GHz~5.4GHz)
		±2.5 dB (5.4GHz~6.0GHz)
Output Impedance	50Ω	
General Characteristics		
Interface	RS-232, USB (standard), GPIB (optional)	
Power	AC 100V-240V, 50Hz~60Hz (1±10%), <15VA	
Environment	Temperature 5℃ ~ 40℃, RH<80%	
Dimension	254 × 103 × 374 mm	
Weight	4.0kg	4.2kg

Standard Accessories

Power Cord	1
CD(Software+ User's Guide)	1



SA2110 Power Quality Analyzer



Features

- Fully compliant with stringent international IEC61000-4-30 Class S standard
- 5.6 inch color LCD touch screen with refreshing User Interface
- Add new function: Dataflaging , Inverter Efficiency, Mains Signaling, Harmonic Power, Waveform Recording
- IP53 protection grade
- High safety rating in the industry: CAT III 1000V/CAT IV 600V



Specification

	Measurement Range	Resolution	Accuracy
Voltage/Current/Frequency			
Vrms(AC+DC)	1 V~ 120 V	0.001V	U _{din} <100 V: ±0.2 V
	120 V ~ 400 V	0.01V	U _{din} >100 V: ±U _{din} ×0.2%
	400 V~1000 V	0.1V	
Vpk	1~ 1400 V	0.01V	±5% of nominal voltage
V(Crest Factor)	1.0 ~ >2.8	0.01	±5%
Arms (AC, CT's error is not inclusive)			
10mV/A	0~150A	clamp's range×current proportion, 5 effective digits display	±(0.1% reading+0.05% range)
1mV/A	1A~2000A		±(0.1% reading+0.05% range)
Flexible coils	10A~6000A		±(0.1% reading+0.1% range)
A(Crest Factor)	1 ~ 10	0.01	±5%
Frequency	42.5Hz~57.5Hz (50Hz nominal)	0.01Hz	±0.01Hz
	51Hz~69Hz (60Hz nominal)	0.01Hz	±0.01Hz
	320Hz~480Hz (400Hz nominal)	0.01Hz	±0.01Hz

Measurement Range		Resolution	Accuracy
Dips & Swells			
Vrms1/2	0 ~ 200% of nominal voltage	refer to Vrms	±0.5% nominal voltage
Arms1/2	depends on current clamps	refer to Arms	±(0.2% reading+0.2% range+CT)
Harmonic (IEC61000-4-7)			
Harmonic Number	1 ~ 100 (50/60Hz)		
	1~12 (400Hz)		
Absolute Voltage	0-1000V	refer to Vrms	±5% reading (harmonica≥1% nominal value)
			±0.05% nominal voltage (harmonica<1% nominal value)
Absolute Current	depends on current clamps	refer to Arms	±5% reading (harmonica≥3% nominal value)
			±0.05% nominal current (harmonica<3% nominal value)
THD	0.0 ~ 100.0%	0.01%	±2.5%
Phase	-180° ~180 0°	0.1°	± nx0.5° (n=harmonic number)
Harmonic Power (50/60Hz)	1-50	Min 0.01kW	± (5%+ nx2% +CT)
Harmonic Power (400Hz)	1-12		
K factor	1-50	0.01	±10% (Irms≥1% current range)
Power and Energy (IEEE1459)			
P, S, Q1	depends on nominal voltage and current clamps	mini 0.01kW	±(1%+10 digits+CT)
PF & cosΦ	0 ~ 1	0.01	±0.01
kWh, kVAh, kvarh	depends on nominal voltage and current clamps		±(1%+10 digits+CT)
Flicker (IEC61000-4-15)			
Pst(10min)	0.00 ~ 20.00	0.01	±5%
Plt (2 hrs)			
Unbalance			
Voltage	0.0 ~ 30.0%	0.01%	±0.1%
Current	0.0 ~ 30.0%	0.01%	±1%
Voltage Phase	-360° ~ 0°	0.1°	±0.1°
Current Phase	-360° ~ 0°	0.1°	±0.5°
Voltage Transient			
Vpk	±6000Vpk	0.01V	±15%
Vrms	10 ~ 1000Vrms	0.01V	±2.5%
Min. Test Time	5us		
Sample rate	200kS/s		
Inrush Current			
Arms	depends on current clamps	refer to Arms	±(1%+CT)
Inrush Duration	1 ~ 32min selectable	10ms	±20ms
Mains Signaling			
Signaling Frequency	60 ~ 3000Hz	0.1Hz	
Relative V%	0% ~100%	0.1%	±0.4%
Absolute V3s (average 3s)	0.0 ~ 1000V	0.1V	±5% of nominal voltage
Logger			
Memory	built-in Micro SD card, 32GB		
Duration Time	2 hrs to 1 year, depends on the recording items and time interval		
Interval	1s to 60 minutes		
Monitor			
Suport EN50160 in default or user-defined standard			
General Characteristics			
Communication	USB Host, LAN, WIFI		
Language	Multi language including Chinese, English, etc.		
Power	Li-ion, 38.48Wh (7.4 V,5200 mAh) / 12 V/2 A DC adaptor		
Screen	640×480 pixels, 5.6 inch color LCD touch screen		
Dimension/Weight	270(H)×200(W)×68(D) mm / approx. 2KGs		

SA2200 Power Quality Analyzer

Features

- Fully Class-A compliant
- 1 to 100th harmonic display
- Available time synchronization function (option)
- Mains signaling and wave record support



Specification

		Measurement Range	Resolution	Accuracy
Voltage/Current/Frequency				
Vrms(AC+DC)		1 ~ 120Vrms	0.001Vrms	Vnom>100V: ±(Vnom×0.1%) Vnom<100V: ±0.1V
		120Vrms~400Vrms	0.01Vrms	
		400~1000Vrms	0.1Vrms	
Vpk		1 ~ 1400Vpk	0.01Vpk	±0.5% of nominal voltage
V(Crest Factor)		1.0 ~ >2.8	0.01	±5%
Arms (AC)	10mV/A	0~150A	0. 1A	±0.1%±0.5A
	1mV/A	1~2000A	1A	±0.1%±5A
	65mV/1000A	10~6000A	0.01kA	±0.1%±50A
A(Crest Factor)		1 ~ 10	0.01	±5%
Frequency		42.5~57.5 (50Hz nominal)	0.01Hz	±0.01Hz
		51~69 (60Hz nominal)	0.01Hz	±0.01Hz
		320~480 (400Hz nominal)	0.01Hz	±0.01Hz
Dips & Swells				
Vrms1/2		0 ~ 200% of nominal voltage	0.01Vrms	±0.2%
Arms1/2		depends on current clamps	Ref to Arms	±1%±5counts
Harmonic (IEC61000-4-7)				
Harmonic Number		1 ~ 100(50/60Hz) (IEC61000-4-7) 1~12(400Hz)		
Harmonic Voltage %f		0.0 ~ 100.0%	0.01%	±0.1% ± nx0.1%
Harmonic Current %f		0.0 ~ 100.0%	0.01%	±0.1% ± nx0.1%
THD		0.0 ~ 100.0%	0.01%	±2.5%
Phase		-180° ~180°	0.1°	± nx0.1°
Power and Energy				
P, S, Q1		Max. 6000MW	0.1kW	±1%±10 digits
PF & cosΦ		0 ~ 1	0.01	±0.01
kWh, kVAh, kvarh		depends on nominal voltage and current clamps		±1%±10 digits
Flicker (IEC61000-4-15)				
Pst(10min)/Plt (2 hrs)		0.00 ~ 20.00	0.01	±5%
Unbalance				
Voltage		0.0 ~ 20.0%	0.1%	±0.1%
Current		0.0 ~ 20.0%	0.1%	±1%
Voltage Phase		-360° ~ 0°	0.1°	±0.1°
Current Phase		-360° ~ 0°	0.1°	±0.5°
Voltage Transient				
Vpk		±6000Vpk	0.01V	±15%
Vrms		10 ~ 1000Vrms	0.01V	±2.5%
Min. Test Time		5us		
Inrush Current				
Arms		depends on current clamps	Ref to Arms	±1%±10counts
Inrush Duration		1 ~ 32min selectable	10ms	±20ms
Mains Signaling				
Signaling Frequency		60-3000Hz	0.1Hz	
Relative V%		0%~100%	0.10%	±0.4%
Absolute V3s (3s average)		0.0 ~ 1000V	0.1V	±5% of Nominal voltage
Logger				
Recording		user-defined parameters for 4 phases at the same time		
Memory		Data stored in Micro SD card, 32GB		
Duration Time		2 hrs to 1 year, depends on the recording items and time interval		
Interval		1s to 60 minutes		
Monitor				
Suport EN50160 in default or user-defined standard				

SA2300 Power Quality Analyzer



Features

- Economical, compact and simple to use
- Provide all necessary measurement function
- 4.3-inch color LCD touch screen
- 32GB Micro SD card is used for storage
- LAN and USB Host communication

Specification

Input

4 current input channels+4 voltage input channels

3 Phase Hase Multi-Power System

1P/2W(1P+NEUTRAL, 1P IT NO NEUTRAL)

1P/3W(1P Split Phase)

P/3W(3P DELTA)

3P/4W (3P WYE)

Data Refresh Rate

1s

Measurement

Voltage/ACV (Urms, Upk)	Accuracy(L1/A,L2/B,L3/C)	$\pm 0.2\% \pm 2$ counts
	Range	5~600Vrms
	PT ratio	1 to 10000, variable
Current/ACA (Irms, Ipik)	Range	1500A, with C06-1500A current probe
	Accuracy	$\pm 0.2\% \pm 5$ counts
	Optional current probe	C01-5A, C02-100A,C03-200A,C06-1500A, C07-3000A, C08-6000A
Frequency	Range	42.5-57.5Hz (50Hz nominal)
		51-69Hz (60Hz nominal)
Harmonic	Number	1-51 th
	Accuracy(%f)	$\pm 0.1\% \pm n \times 0.1\%$
	THD	$\pm 2.5\%$
Power	Active power (P), Reactive power(Q), Apparent power(S), Power Factor (PF),cosΦ (DPF)	
Energy	Active energy (EP), Reactive entergy(EQ), Apparent energy(ES)	
Transient Event	Dips/swells	
Logger	Interval	1s to 60 minutes
	Memory	32GB Micro SD card

General

Display	4.3 inch color touch screen/480x272
Language	Multi language including Chinese, English, etc.
Communication Port	USB Host, LAN
Dimension/Weight	158x200x47 mm / 1kg
Power	18650 lithium ion 3.6V x 2, 5100mAh / 6h or DC 5V/3A adapter
Safety standard	IEC61010-1, CATIII 600V

Standard Accessories

Voltage Test Leads + Alligator Clips		(2m) × 5 pcs
Measurement Guide (SA2110)		1 pcs
Colorful identification clips (SA2110)		20 pcs
Power Cord Power Adapter		1 pcs

Soft Carry Bag		1 pcs
Hang Strap		1 pcs
USB Flash Drive (SA2110)		1 pcs
CD		1 pcs
Sticker of input port		1 pcs

Options

★ Clamp Mode	C01-5A	C02-100A	C03-200A	C04-1000A	C05-1000AD
Apperance					
Measurement Range	0-5A	0-100A	1~200A	1~1000A	0.0-1000A (AC/DC)
Output Voltage Ratio	10mV/A	10mV/A	1mV/A	1mV/A	1mV/A
Accuracy	0.2%	0.2%	0.2%	1%	±3%
Frequency Characteristic	45Hz~55Hz	50Hz~400Hz	50Hz~400Hz	40Hz~100kHz	AC: 45Hz~400Hz
Clamp Radius (mm)	8	8	13	52	30×35
Dimension (mm)	158×43×24	171×46×27	174×52×27	111×216×45	122×70×33
Cable Length (cm)	200	300	300	300	150
Power	○	○	○	○	9V Dry cell 6LR61

★ Flexible Probes Mode	C06-1500A	C07-3000A	C08-6000A
Apperance			
Measurement Range	10~1500A	15~3000A	20~6000A
Output Voltage Ratio	100mV/1000A @ 50Hz	65mV/1000A @ 50Hz	65mV/1000A @ 50Hz
Accuracy	±0.5% + Position Error	±1% + Position Error	±1% + Position Error
Maximum Allowable Input	100KA	100KA	100KA
Phase Error	<±1°	<±1°	<±1°
Noise	<2mVrms (10Hz~10KHz)	<2mVrms (10Hz~10KHz)	<2mVrms (10Hz~10KHz)
Frequency Characteristic	10Hz~10KHz (-3dB)	10Hz~10KHz (-3dB)	10Hz~10KHz (-3dB)
Weight	110g	130g	150g
Length	200cm	200cm	200cm
CT Perimeter	35cm	50cm	80cm
Measurement Position Error	±1%	±2%	±2%

★ Voltage Magnetic Connector	Beidou/GPS receiver	Hard Protection Case
		

SE2000 Ground Tester



Purpose

It is used to test the ground resistance of various telecommunication, electric power, meteorology, computer room, oil field, electric power distribution line, tower transmission line, gas station, factory grounding network, lightning rod and so on.

Features

- Resistance range: 0-1200Ω
- Current range: 0-20A
- Display Ω and current at the same time
- 300 groups of memory

Specification

	Range	Resolution	Accuracy
Resistance	0.010Ω-0.099Ω	0.001Ω	± (1%+0.01Ω)
	0.10Ω-0.99Ω	0.01Ω	± (1%+0.01Ω)
	1.0Ω-49.9Ω	0.1Ω	± (1%+0.1Ω)
	50.0Ω-99.5Ω	0.5Ω	± (1.5%+0.5Ω)
	100Ω-199Ω	1Ω	± (2%+1Ω)
	200Ω-395Ω	5Ω	± (5%+5Ω)
	400-590Ω	10Ω	± (10%+10Ω)
	600Ω-880Ω	20Ω	± (20%+20Ω)
	900Ω-1200Ω	30Ω	± (25%+30Ω)
Current	0.00mA -9.95mA	0.01mA	± (2.5%+1mA)
	10.0mA -99.0mA	0.1mA	± (2.5%+5mA)
	100mA -300mA	1mA	± (2.5%+10mA)
	0.30A-2.99A	0.01A	± (2.5%+0.1A)
	3.0A-9.9A	0.1A	± (2.5%+0.3A)
	10.0A-20.0A	0.1 A	± (2.5%+0.5A)

SE3015/3018 Multi-function Clamp Earth Resistance Tester



Features

- Integrate the functions of clamp method, ground pile method, selection method, soil resistivity, ground voltage, etc.
- Clamp Resistance: 2000 Ω
- Ground Pile Resistance: 30 k Ω
- Current: 50 A, resolution 1 μ A
- Soil Resistivity: 9999 k Ω m
- Voltage: 600 V
- Supporting USB data upload
- 2.4-inch color LCD screen



Specification

SE3015		SE3018
Measurement		
Clamp Resistance Range	0.00 Ω-1500 Ω	0.00 Ω-1800 Ω
Leakage Current Range	0.000 mA-40 A	0.000 mA-50 A
Ground Voltage Range	600 V	
Resistance Resolution	0.01 Ω	
Current Resolution	1 uA	
Voltage Resolution	0.01 V	
Three-Four-Wire method range	0.00 Ω-3000 Ω	0.00 Ω-30 kΩ
Soil Resistivity Range	∞	0.00 Ω-9999 kΩm
Function	Ground resistance test, loop resistance test, AC current test, AC voltage test	
Accuracy guaranteed temperature and humidity	23 ℃±5 ℃ , below 75%rh	
Measure Time	1 time/s	
Data Storage	Maximum 500 groups of data	
Overflow Display	“OL” symbol indication when over-range overflow	
Automatic Shut-down	Turn off automatically after 15 minutes	
USB Data upload function	●	
General Characteristics		
Communication	USB	
Power	DC 3.7 V 750 mA Lithium battery	
Screen	2.4 inch color LCD screen	
Dimension/Weight	273mm×106mm×53mm/975g(including battery)	

Standard Accessories

Test Line	4
Auxiliary grounding rod	4
Simple test line	2
Check Ring	1
USB Cable	1
Charger	1
CD (Monitoring software)	1



Test Line



Auxiliary grounding rod



Simple test line



Check Ring



USB Cable



Charger



CD

SA9200 Series Spectrum Analyzers



Features

- Frequency range from 9kHz to 7.5GHz
- -160dBm Display Average Noise Level (Min.)
- < -100 dBc/Hz @10 kHz Offset Phase Noise (Typ.)
- Total Amplitude Accuracy < 0.8 dB
- Pre-amplifier and EMI filter are standardly configured



Standard Accessories

Power Cord	1
N-BNC Adapter	1
CD(Software+ User's Guide)	1

Options

Tracking Generator
N-SMA Adapter, N-SMA Cable, BNC-BNC Cable,
USB cable, RS-232 cable
Attenu 1(900MHz/1.8GHz), Attenu2 (2.4GHz)
Near Filed Probe Set SY5030

Specification

SA9232		SA9275
Frequency		
Range	9kHz ~ 3.2GHz	9kHz ~ 7.5GHz
Resolution	1Hz	
Aging Rate	<1×10 ⁻⁶ /year	
Frequency Span		
Frequency Span Range	0Hz, 100Hz ~ 3.2GHz	0Hz, 100Hz ~ 7.5GHz
Uncertainty	±span/(sweep points-1)	
SSB Phase Noise (fc=1.0GHz)	-96dBc/Hz @10 kHz offset	
Bandwidth		
Resolution Bandwidth (-3dB)	10Hz ~ 1MHz, step 1-3-10,	
RBW Uncertainty	10%, nominal (RBW>1kHz) 20%, nominal(RBW≥10Hz, sweep time≥5s)	
Video Bandwidth (-3dB)	1Hz to 1MHz, step 1-3-10	
Amplitude		
Range	DANL to +20dBm DC Voltage: 50V	
Maximum Input Level	CW RF Power: +20dBm (0.1W) Max.Damage Level: +30dBm (1W)	
Displayed Average Noise Level (DANL)		
DANL (Preamplifier Off)	typ. -135 dBm	
DANL (Preamplifier On)	typ. -152 dBm	
Reference Level Range	-100 dBm to +20 dBm, step 1 dB	
Sweep		
Sweep Time Range	1ms to 3200s (100Hz ≤ Span ≤ 3.2GHz) 20μs to 3200s (Span = 0Hz)	1ms to 7500s (100Hz ≤ Span ≤ 7.5GHz) 20μs to 7500s (Span = 0Hz)
Sweep Time Uncertainty	5%, nominal (100Hz ≤ Span ≤ 3.2GHz) 0.5%,nominal (Span=0Hz)	5%,nominal (100Hz ≤ Span ≤ 7.5GHz)
Sweep Mode	Continuous, Single	
Trigger		
Trigger Source	Free, Video, External	
External Trigger Level	5 V TTL level	
Advanced Measurement		
Channel Power, Adjacent Channel Power, N-dB bandwidth, Occupied Bandwidth		
EMI	200Hz, 9kHz, 120kHz	
Input/Output		
RF Input Impedance	50 Ω	
Standard frequency	Frequency: 10MHz Amplitude: 0dBm~10dBm (input)-3dBm to +3dBm (output)	
Tracking Generator (-TG Model)		
TG Frequency range	100kHz to 3.2GHz	100kHz to 7.5GHz
TG Output level range	-40dBm to 0dBm	
TG Output level resolution	1 dB	
Interface		
Type	USB Host & Device, LAN, VGA	
General Characteristic		
Power Supply	Input Voltage: AC100V to 240V Frequency: 50/60Hz (1±10%) Power Consumption: 65VA Max	
Dimension & Weight	364×155×328mm, Approx. 6.5kg	



SS7406 Universal Frequency Counter/Timer/Analyzer



Features

- Minimum measuring resolution 11 digits/s
- Time resolution 100ps
- 4.3' TFT-LCD display to show abundant information also trendgram and histogram of statistical calculation visually
- Firm and sophisticated standard 2U design
- Standard interface of RS-232, USB Host, GPIB and LAN

Specification

Measuring Functions

Frequency Range	Channel 1: 1mHz ~ 200MHz Channel 2: 1mHz ~ 200MHz Channel 3: 3GHz/6.5GHz/12.4GHz/16GHz/20GHz/26.5GHz/40GHz (option)
Measurement Resolution	11 digits/s
Period	5ns ~ 1000s
Time Interval Range	1ns ~ 100000s
Time Resolution	100 ps
Pulse Width	1ns ~ 100000s
Duty Cycle	1% ~ 99%
Totalize	0 ~ 1×10^{13}
Phase Difference	1° ~ 359°

Input

Dynamic Range	50mVrms ~ 1.0Vrms (Sine), 150mVPP ~ 4.5VPP (Pulse)
Input Impedance	1M Ω //35pF or 50 Ω
Coupling Mode	AC or DC
Input Attenuation	$\times 1$ or $\times 10$
Trigger Level	-5.000V ~ +5.000V, min. step 1mV or auto trigger level

Other Functions

Frequency Ratio	ratio value range : 0.00001~999999
Up/Low Limit	"Limit" light on shows the result out of range, off shows within range
Statistics Calculation	Multi-average, Max., Min., PPM, SD, Allan Variance

Standard Time Base

Daily Aging	1×10^{-8} /day
Yearly Aging	5×10^{-7} /year

Optional Time Base

Daily Aging	5×10^{-10} /day
Yearly Aging	5×10^{-8} /year

Channel Options

	Frequency Range	Dynamic Range
3.0GHz	100MHz ~ 3GHz	-27dBm ~ +19dBm (100MHz ~ 2.6GHz) -15dBm ~ +19dBm (2.6GHz ~ 3.0GHz)
6.5GHz	200MHz ~ 6.5GHz	-15dBm ~ +13dBm
12.4GHz	6GHz ~ 12.4GHz	-30dBm ~ +20dBm
16.0GHz	6GHz ~ 16GHz	-30dBm ~ +20dBm
20.0GHz	200MHz ~ 20GHz	-10dBm ~ +10dBm (200MHz ~ 350MHz) -15dBm ~ +10dBm (350MHz ~ 18GHz) -10dBm ~ +10dBm (18GHz ~ 20GHz) -20dBm ~ +10dBm (10GHz ~ 20GHz)
26.5GHz	10GHz ~ 26.5GHz	-15dBm ~ +10dBm (20GHz ~ 24GHz) -10dBm ~ +10dBm (24GHz ~ 26.5GHz) -29dBm ~ +15dBm (18GHz ~ 20GHz)
40GHz	18GHz ~ 40GHz	-20dBm ~ +15dBm (20GHz ~ 28GHz) -29dBm ~ +10dBm (28GHz ~ 37GHz) -20dBm ~ +13dBm (37GHz ~ 40GHz)

General Characteristics

Interface	RS-232, GPIB, LAN, USB Host
Power	Standard: AC220V (1 $\pm$ 10%), 50Hz (1 $\pm$ 5%), <70VA Optional: AC110V (1 $\pm$ 10%), 60Hz (1 $\pm$ 5%), <70VA
Dimension & Weight	454 $\times$ 98 $\times$ 486mm, 4.3Kg



Standard Accessories

Power Cord	1
BNC Cable	1
CD (Software+ User's Guide)	1



SS7000 Series Universal Frequency Counter/Timer/Analyzer



Features

- Minimum measuring resolution 11 digits/s
- Time resolution 25ps (typical)
- Maximum frequency's measurement can reach to 40GHz (options)
- Measures Frequency, Period, Duty Cycle, Frequency Ratio, Totalize, Phase Difference, Pulse Width, Time Interval and DCV.
- Utility statistics functions of multi-average, maximum, minimum, PPM, standard deviation and Allan Variance for frequency measurement
- Stores 15 group status
- High-stability crystal oscillator is optional



Standard Accessories

Power Cord	1
BNC Cable	1
CD(Software+ User's Guide)	1

Specification

		SS7200A	SS7300	SS7400	SS7402
Measuring Functions					
Frequency Range	CH1	0.001Hz ~ 200MHz			
	CH2	0.001Hz ~ 200MHz			
	CH3	CH 3:3GHz/6.5GHz/12.4GHz/16GHz/20GHz/26.5GHz/40GHz (option)			
Display Resolution		8 digits/s	10 digits/s	11 digits/s	11 digits/s
Period		5ns ~ 1000s			
Time Interval Range		10ns ~ 10000s		1ns ~ 10000s	
Time Resolution		2.5ns	500 ps	150ps	25ps
Pulse Width		30ns ~ 5000s		1ns ~ 10000s	
Duty Cycle		1% ~ 99%			
Totalize		0 ~ 1×10 ¹³			
Phase Difference		1° ~ 359°			
Input					
Dynamic Range		50mVrms ~ 1.0Vrms (Sine), 150mVpp ~ 4.5Vpp(Pulse)			
Input Impedance		1MΩ//35pF or 50Ω			
Input Attenuation		×1 or ×10			
Trigger Level		-5.000V ~ +5.000V			
Other Functions					
Frequency Ratio		●			
Up/Low Limit		“Limit” light on shows the result out of range, off shows within range			
Statistics Calculation		Multi-average, Max.,Min., PPM, SD, Allan Variance			
Standard Time Base					
Accuracy		5×10 ⁻⁸			
Daily Aging		1×10 ⁻⁸ /day			
Yearly Aging		5×10 ⁻⁷ /year			
Optional Time Base					
Accuracy		5×10 ⁻⁸			
Daily Aging		5×10 ⁻¹⁰ /day			
Yearly Aging		5×10 ⁻⁸ /year			
Channel Options					
		Frequency Range	Dynamic Range		
3.0GHz		100MHz ~ 3GHz	-27dBm~+19dBm (100MHz~2.6GHz) -15dBm~+19dBm (2.6GHz~3.0GHz)		
6.5GHz		200MHz ~ 6.5GHz	-15dBm ~+13dBm		
12.4GHz		6GHz ~ 12.4GHz	-30dBm ~ +20dBm		
16.0GHz		6GHz ~ 16GHz	-30dBm ~ +20dBm		
20.0GHz		200MHz~20GHz	-10dBm ~ +10dBm (200MHz~350MHz) -15dBm ~ +10dBm (350MHz~18GHz) -10dBm ~ +10dBm (18GHz~20GHz)		
26.5GHz		10GHz~26.5GHz	-20dBm ~ +10dBm (10GHz~20GHz) -15dBm ~ +10dBm (20GHz~24GHz) -10dBm ~ +10dBm (24GHz~26.5GHz)		
40GHz		18GHz~40GHz	-29dBm~+15dBm (18GHz~20GHz) -20dBm~+15dBm (20GHz~28GHz) -29dBm~+10dBm (28GHz~37GHz) -20dBm~+13dBm (37GHz~40GHz)		
General Characteristics					
Interface	Standard	USB, RS-232			RS-232,GPIB
	Optional	GPIB			○
Power		AC220V(10%) or AC110V(10%), 50Hz(5%) or 60Hz(5%) AC220V (1 ±10%), 50Hz (1 ±5%) <70VA (for SS7402)			
Dimension & Weight		256×106×386mm			
		3.7kg	3.7kg	4.2kg	5.2kg

SS7301 Frequency Counter



Features

- High accuracy with minimum measuring resolution 10 digits/s
- 16-bit microcontroller is used and the speed of data processing is fast
- Maximum frequency's measurement can reach to 40 GHz (options)
- Utility statistics functions of multi-average, maximum, minimum, PPM, standard deviation and Allan Variance for frequency measurement
- High-stability crystal oscillator is optional

Specification

Measuring Functions		
Frequency	CH 1	0.001Hz ~ 200MHz
	CH 2	3GHz/6.5GHz/12.4GHz/16GHz/20GHz/26.5GHz/40GHz (options)
	CH 3	3GHz/6.5GHz/12.4GHz/16GHz/20GHz/26.5GHz /40GHz(options)
Display Resolution		10 digits/s
Period		5ns ~ 1000s
Input		
Dynamic Range		50mVrms ~ 1.0Vrms (Sine), 150mVpp ~ 4.5Vpp(Pulse)
Input Impedance		1MΩ//35pF or 50Ω
Coupling Mode		AC or DC
Trigger Mode		Rising edge or Falling edge
Input Attenuation		×1 or ×10
Low-pass Filter		stop frequency approx.100kHz
Trigger Level		-5.000V ~ +5.000V, step 5mV
Other Functions		
Frequency Ratio		●
Frequency Self-test		●
Up/Low Limit		"Limit" light on shows the result out of range, off shows within range
Statistics Calculation		Multi-average, Max., Min., PPM, SD, Allan Variance
Standard Time Base		
Accuracy		5×10^{-8}
Daily Aging		1×10^{-8} /day
Optional Time Base		
Accuracy		5×10^{-8}
Daily Aging		5×10^{-10} /day
Channel Options		
	Frequency Range	Dynamic Range
3.0GHz	100MHz ~ 3GHz	-27dBm~+19dBm (100MHz~2.6GHz)
		-15dBm~+19dBm (2.6GHz~3.0GHz)
6.5GHz	200MHz ~ 6.5GHz	-15dBm ~ +13dBm
12.4GHz	6GHz ~ 12.4GHz	-30dBm ~ +20dBm
16.0GHz	6GHz ~ 16.0GHz	-30dBm ~ +20dBm
20.0GHz	200MHz~20GHz	-10dBm ~ +10dBm (200MHz~350MHz)
		-15dBm ~ +10dBm (350MHz~18GHz)
		-10dBm ~ +10dBm (18GHz~20GHz)
26.5GHz	10GHz~26.5GHz	-20dBm ~ +10dBm (10GHz~20GHz)
		-15dBm ~ +10dBm (20GHz~24GHz)
		-10dBm ~ +10dBm (24GHz~26.5GHz)
40GHz	18GHz~40GHz	-29dBm~+15dBm (18GHz~20GHz)
		-20dBm~+15dBm (20GHz~28GHz)
		-29dBm~+10dBm (28GHz~37GHz)
		-20dBm~+13dBm (37GHz~40GHz)
General Characteristics		
Interface	Standard	USB, RS-232
	Optional	GPIO
Power		AC220V(10 %) or AC110V(10%), 50Hz(5%) or 60Hz(5%)
Dimension & Weight		256×106×386mm, Approx. 3.5kg

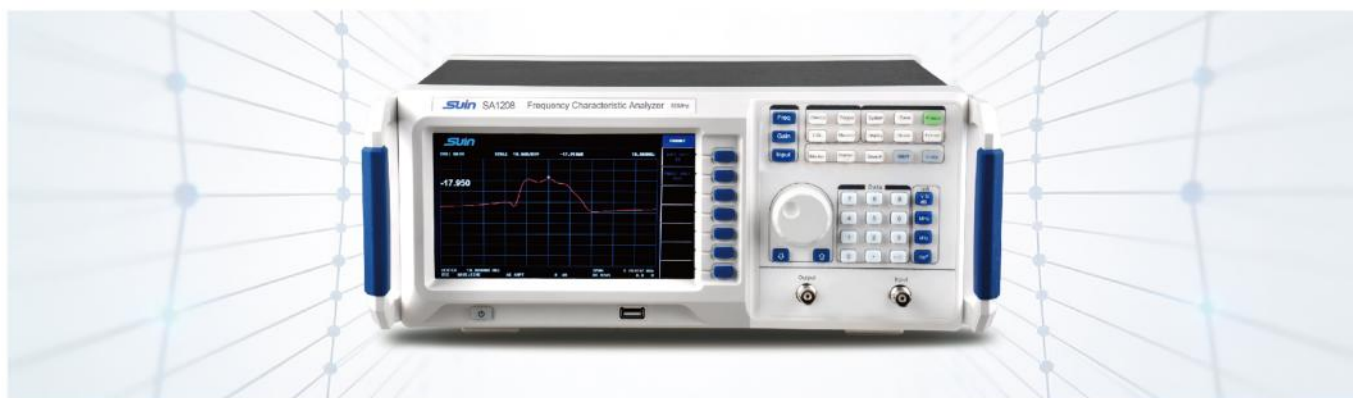


Standard Accessories

Power Cord	1
BNC Cable	1
CD(Software+ User's Guide)	1



SA1200 Series Frequency Characteristic Analyzer



Features

- Maximum frequency sweep range: 20Hz~200MHz
- Built-in detector, dispensing with detection radiometer
- Measure amplitude-frequency, phase-frequency, frequency discrimination and S parameters
- Available to set sweep mode arbitrarily, such as linear, logarithm
- Six cursors could be displayed at same time within the sweep range
- 7" TFT color LCD with clear graph interface and convenient operation
- USB Device and RS-232 interface



Specification

		SA1208	SA1216	SA1220
Measurement				
Frequency	Frequency Range	20Hz ~ 80MHz	20Hz ~ 160MHz	20Hz ~ 200MHz
	Frequency resolution	1mHz		
	Frequency accuracy	≤(set value×5×10 ⁻⁶ +1 mHz)		
Measurement Function		amplitude-frequency, phase-frequency, frequency discrimination, S Parameters		
Sweep Mode		Linear, Logarithm		
Output	Output Level range	-80dBm~+10dBm		
	Output Level accuracy	≤±1dB		
	Output Impedance	50Ω/75Ω		
	Output attenuation	0~90 dB, 0.1dB step		
Input	Input Level range	-80dBm~+20dBm		
	Input Level accuracy	±0.1dB		
	Input Impedance	50Ω/75Ω/1MΩ		
	Input gain	-6~12 dB, 6 dB step		
Phase	Phase Range	-180°~+180°		
	Phase Accuracy	better than ±0.5°		
(frequency discrimination) Input signal amplitude range		-5V≤A≤+5V		
General Characteristics				
Display	7" TFT LCD, 800×480			
Interface	RS-232, USB Device			
Power	AC 100V~240V, 50/60Hz(1±10%)			
Dimension & Weight	364×155×328mm, 5.3kg			

Standard Accessories

Power Cord	1
BNC cable	2
Test clip leads	2
CD(User's Guide)	1



SM2100 Series Digital AC Millivolt Meter



Features

- LED Display, Dual Independent Channels
- Auto/Manual Ranging can be selected
- Multiple display result with different units
- High Frequency Range from 5Hz to 6MHz
- Standard Interface USB Device



Specification

SM2130		SM2160
Frequency Range	5Hz ~ 3MHz	5Hz ~ 6MHz
Measurement Range		
AC Voltage	50μV ~ 400V	50μV ~ 300V
Range	3mV, 30mV, 300mV, 3V, 30V, 300V	
dBV	-86dBV ~ 52dBV	-86dBV ~ 50dBV
dBm	-73dbm~65.05dbm (50Ω) -84dbm~54.26dbm (600Ω)	-73dbm~62.55dbm (50Ω) -84dbm~51.76dbm (600Ω)
Vpp	141μVpp ~ 1131Vpp	141μVpp ~ 848Vpp
W	0.05nW~3200W (50Ω) 0.00417nW~267W (600Ω)	0.05nW~1800W (50Ω) 0.00417nW~150W (600Ω)
Voltage Measurement Error		
≥5Hz ~ 100Hz	±2.5% reading ± 0.8% range	
>100Hz ~ 500kHz	±1.5% reading ± 0.5% range	
>500kHz ~ 2MHz	±2.0% reading ± 1.0% range	
>2MHz ~ 3MHz	±3.0% reading ± 1.0% range	
>3MHz ~ 5MHz	±4.0% reading ± 2.0% range	
>5MHz ~ 6MHz	±5.0% reading ± 4.0% range	
Resolution		
Range	3 1/2 digits Display	4 1/2 digits Display
3mV	0.001mV	0.0001mV
30mV	0.01mV	0.001mV
300mV	0.1mV	0.01mV
3V	0.001V	0.0001V
30V	0.01V	0.001V
300V	0.1V	0.01V
Maximum Undamaged Input Voltage		
Range:300V	400Vrms	350Vrms
General Characteristics		
Power	AC220(1±10%)V, 50 (1±5%)Hz, 15VA	
Interface	USB Device	
Display	LED display	
Dimension & Weight	256×106×386mm , Approx.3.9 kg	

Standard Accessories

Power Cord	1
Test clip leads	2
CD(Software+ User's Guide)	1



SA5053 Digital Multimeter



Features

- Real 5½ digits readings resolution (119999 counts)
- 1 μ V resolution
- True-RMS AC Voltage and AC Current measuring
- 4.3-inch color LCD touch screen with double display for easy viewing
- Two sets of input interfaces front and rear, which provides convenience to arrange wires
- In addition to numerical data display, it also features histograms, trend charts, bar charts, and statistics functions



Specification

Basic Function		Range	Best Accuracy ± (% reading + % range)
DC Voltage	100mV/1V/10V/100V/1000V		±(0.012+0.006)
AC Voltage	100mV/1V/10V/100V/750V		± (0.2 + 0.1)
DC Current	100μA/1mA/10mA/100mA/1A/10A		± (0.05+0.007)
AC Current	100μA/1mA/10mA/100mA/1A/10A		± (0.5+0.1)
Resistance	100Ω/1KΩ/10KΩ/100KΩ/		±(0.05+0.005)
	1MΩ/10MΩ/100MΩ		
Capacitance	1nF/ 10nF/ 100nF/1μF/10μF/100μF		±(1+0.5)
Frequency	5Hz~1MHz		± 0.1
Temperature	- 200℃ ~ 800℃		± 0.2 ℃ (without accuracy of probe)
Features			
Reading Rate	130 reading/s		
Auto Range	●		
Diode	●		
Continuity	●		
Trigger	●		
Save/Read	●		
Math	MAX/MIN,Rel,dB, dBm,Limit,Statistic		
General Characteristics			
Safety	IEC61010-1: 2001, CAT I 1000V/CAT II 600V, Class of pollution: 2		
Interface	USB Host, USB Device,RS-232,LAN, GBIP (optional)		
Power	115V/230V, 50Hz/60Hz, 15VA		
Dimension & Weight	256x106x322 mm, 3.2 kg		

Standard Accessories

Power Cord	1
Test Lead Kit	1
Temperature Probe	1
CD (User's Guide+PC software)	1



SA5062 Digital Multimeter



Features

- Real $6\frac{1}{2}$ digits reading resolution (1199999 counts)
- True-RMS AC Voltage and AC Current measuring
- 4.3-inch color LCD touch screen with double display for easy viewing
- Multi display - Number, Bar, Trend Chart, Histogram



Specification

Basic Function	Range	Best Accuracy ± (% reading + % range)
DC Voltage	100 mV/1 V/10 V/100 V/1000 V	± (0.0035 % + 0.0005 %)
AC Voltage	100 mV/1 V/10 V/100 V/1000 V	± (0.06 % + 0.04 %)
DC Current	100 μA/1 mA/10 mA/100 mA/1 A/10 A	± (0.05 % + 0.006 %)
AC Current	100 μA/1 mA/10 mA/100 mA/1 A/10 A	± (0.1 % + 0.04 %)
Resistance	100 Ω/1 KΩ/10 KΩ/100 KΩ/1 MΩ/10 MΩ/100 MΩ	± (0.01 % + 0.001 %)
Capacitance	1 nF/10 nF/100 nF/1 μF/10 μF/100 μF	± (0.9 % + 1 %)
Frequency	3 Hz ~ 1 MHz	± 0.02 %
Temp	PT100/PT385/PT3916	N/A
Tcouple	K/J/R	N/A
Diode	10 V	N/A
Continuity	1 KΩ	N/A
Features		
Reading Rate	10K reading/s	
Auto Range	•	
Null	•	
Trigger	•	
Store/Recall	• 4GB	
Math	MAX/MIN, Rel, dB, dBm, Limit, Statistic	
General Characteristics		
Safety	IEC61010-1: 2001, CAT I 1000V/CAT II 600V, Class of pollution: 2	
Interface	USB Host, USB Device, RS-232, LAN, GBIP (optional)	
Power	110 V/220 V (1±10%), 50 Hz/60 Hz, 15 VA	
Dimension & Weight	256x106x322 mm, 3.2 kg	

Standard Accessories

Power Cord	1
Test Lead Kit	1
Temperature Probe	1
CD (User's Guide+PC software)	1



Power Cord



CD



Test Lead Kit



Temperature Probe

SK3323/3325/3503 Programmable DC Power Supply



Features

- Three outputs, the maximum power is up to 342W
- Standard Timing Output
- Comprehensive over-voltage protection
- 4 digit LED display can show voltage, current and power simultaneously

Specification

		SK3323	SK3325	SK3503
Channel				
	CH1	0~32V/0~3.2A	0~32V/0~5.1A	0~50V/0~3.2A
	CH2	0~32V/0~3.2A	0~32V/0~5.1A	0~50V/0~3.2A
	CH3	1.8V/2.5V/3.3V/5.0V switchable, 3.2A (Max. output)		
Line Regulation				
Voltage	CH1, CH2	$\leq 1 \times 10^{-4} + 2\text{mV}$		
	CH3	$\leq 1 \times 10^{-4} + 3\text{mV}$		
Current	CH1, CH2	$\leq 1 \times 10^{-4} + 2\text{mA}$		
Load Regulation				
Voltage	CH1	$\leq 1 \times 10^{-4} + 3\text{mV}$	$\leq 1 \times 10^{-4} + 8\text{mV}$	$\leq 1 \times 10^{-4} + 3\text{mV}$
	CH2			
	CH3		$\leq 1 \times 10^{-4} + 3\text{mV}$	
Current	CH1, CH2	$\leq 1 \times 10^{-4} + 2\text{mA}$		
Programming/Readback Accuracy				
Voltage	CH1	$\leq \pm(0.5\% + 30\text{mV})$		$\leq \pm(0.5\% + 60\text{mV})$
	CH2			
	CH3 (no readback)			
Current	CH1	$\leq \pm(0.5\% + 30\text{mA})$	$\leq \pm(1\% + 60\text{mA})$	$\leq \pm(0.5\% + 30\text{mA})$
	CH2			
	CH3 (no readback)	$\geq 3.2\text{A}$		
Ripple and Noise				
Voltage	CH1, CH2	$\leq 1\text{mVrms}$		$\leq 1.5\text{mVrms}$
	CH3			$\leq 1\text{mVrms}$
Current	CH1, CH2	$\leq 3\text{mA}_{\text{rms}}$	$\leq 5\text{mA}_{\text{rms}}$	$\leq 3\text{mA}_{\text{rms}}$
Display resolution				
Voltage	CH1, CH2	10mV		
Current	CH1, CH2	1mA		
Display Digits				
Voltage		4 digits		
Current		4 digits		
Other function				
Auto switch of serial and parallel		●		
General Characteristics				
Rated Voltage		AC220(1±10%)V		
Rated Power		500W 670VA		600W 800VA
Rated Frequency		50/60(1±5%) Hz		
USB charging Interface		5V 1A		
Remote Interface		USB(TMC Protocol), LAN (option)		
Dimension		226×140×303mm		226×140×333mm
Weight		8KGs		9KGs

Standard Accessories

Power Cord	1
CD(User's Guide)	1



Power Cord



CD

SK3323J/3325J Programmable DC Power Supply



Features

- Three outputs, the maximum power is up to 338W
- Low Ripple and Noise: $\leq 1\text{mV}/\leq 3\text{mA}$
- Standard Timing Output
- Comprehensive over-voltage and over-temperature protection
- Fully remote control interface: LAN, USB Device and RS-232
- 5 digit LED display can show voltage, current and power simultaneously

Specification

		SK3323J	SK3325J
Channel			
	CH1	0~32V/0~3A	0~32V/0~5A
	CH2	0~32V/0~3A	0~32V/0~5A
	CH3	0~6V/0~3A	
Line Regulation			
Voltage	CH1, CH2,CH3	≤1×10 ⁻⁴ +3mV	
Current	CH1, CH2,CH3	≤1×10 ⁻⁴ +500μA	
Load Regulation			
Voltage	CH1	≤1×10 ⁻⁴ +3mV	≤1×10 ⁻⁴ +5mV
	CH2		
	CH3		≤1×10 ⁻⁴ +3mV
Current	CH1,CH2,CH3	≤1×10 ⁻⁴ +500μA	
Programming/Readback Accuracy			
Voltage	CH1	≤±(0.05%+20mV)	
	CH2		
	CH3		
Current	CH1	≤±(0.3%+5mA)	≤±(0.3%+10mA)
	CH2		
	CH3	≤±(2%+20mA)	
Ripple and Noise			
Voltage		≤1mV	
Current		≤3mA	
Display resolution			
Voltage		1mV	
Current		1mA	
Display Digits			
Voltage		5 digits	
Current		4 digits	
Other function			
Auto switch of serial and parallel		○	
Timing Output		●	
OTP		●	
OVP		●	
General Characteristics			
Rated Voltage		220/230 (198-242)V	
Rated Power		0.5kW 0.7kVA	0.6kW 0.8kVA
Rated Frequency		50/60(47-63) Hz	
USB charging Interface		5V 2A	
Remote Interface		LAN, USB Device, RS-232	
Dimension		254×157×442mm	
Weight		9KGs	10KGs

Standard Accessories

Power Cord	1
CD(User's Guide)	1



Power Cord



CD

SK135XX Series Programmable DC Power Supply



Features

- All digital controlled, output 1mV/1mA step
- High stability, Low drift
- LED display the voltage/current and working status visually
- Intelligent temperature controlled fan with low noise
- Storage and recall function
- OVP (Over Voltage Protection) function
- Keypad locked function to avoid the misoperation
- Standard RS-232 interface, optional USB Device



Specification

	SK13515	SK13530	SK13530K
Output Range	35V/15A	35V/30A	35V/30A
Output Power	500W	1000W	1000W
Resolution	1mV/1mA		
Source Effect			
CV	$\leq 1 \times 10^{-5} + 1\text{mV}$		
CC	$\leq 1 \times 10^{-5} + 3\text{mA}$		
Load Effect			
CV	$\leq 1 \times 10^{-4} + 3\text{mV}$		
CC	$\leq 1 \times 10^{-4} + 3\text{mA}$		
Period and Random Deviation (PARD)			
CV	$\leq 1\text{mV}$		
CC	$\leq 6\text{mA}$		$\leq 20\text{mA}$
Accuracy			
Voltage	$\leq \pm (0.1\% + 10\text{mV})$		
Current	$\leq \pm (0.2\% + 25\text{mA})$	$\leq \pm (0.2\% + 50\text{mA})$	
OVP	$\leq \pm (0.5\% + 0.5\text{V})$		$\leq \pm (0.5\% + 0.8\text{V})$
General Characteristics			
Power	AC220V(1 $\pm$ 10%)V,50(1 $\pm$ 5%)Hz		AC220~230(198~242)V,50(47~63)Hz
Interface	RS-232 (standard) USB Device (option)		
Dimension & Weight	445 $\times$ 148 $\times$ 475 mm, Approx 25kg	445 $\times$ 148 $\times$ 675 mm, Approx 35kg	345 $\times$ 148 $\times$ 475 mm, Approx 13kg

Standard Accessories

Power Cord	1
RS-232 cable	1
CD(Software+User's Guide)	1



SE28000 Series Programmable DC Power Supply



Features

- 4 channels output, total power up to 2000 W with 0.05% accuracy
- 1/2 3U rack cabinet size, suitable for installation in standard 19-inch racks
- 10 mV/1 mA setting and readback resolution
- CV/CC priority setting
- Built-in bleed circuit to ensure no residual high voltage at shutdown
- 4.3-inch TFT LCD color screen display with curve output and online 1-minute data logging
- Fully digital control integrated with OVP, OCP, OPP, over-temperature, and input undervoltage protection
- Supports LAN, RS485, RS232 interfaces



Specification

		SE28020	SE28010	SE28005
Channel			4	
Output Range		80 V/20 A	80 V/10 A	80 V /5A
Output Power		4*500 W	4*150 W	4*250 W
Setting Resolution		10 mV/1 mA		
Readback Resolution		10 mV/1 mA		
Line Regulation (%of output+offset)	CV	$\leq 0.05\% + 20 \text{ mV}$	$\leq 0.03\% + 20 \text{ mV}$	$\leq 0.05\% + 20 \text{ mV}$
	CC	$\leq 0.1\% + 30 \text{ mA}$	$\leq 0.05\% + 30 \text{ mA}$	$\leq 0.05\% + 30 \text{ mA}$
Load Regulation (%of output+offset)	CV	$\leq 0.05\% + 20 \text{ mV}$	$\leq 0.03\% + 20 \text{ mV}$	$\leq 0.03\% + 20 \text{ mV}$
	CC	$\leq 0.1\% + 30 \text{ mA}$	$\leq 0.05\% + 30 \text{ mA}$	$\leq 0.05\% + 30 \text{ mA}$
Setting Accuracy	Voltage	$\leq 0.05\% \pm 20 \text{ mV}$	$\leq 0.05\% \pm 40 \text{ mV}$	$\leq 0.05\% \pm 40 \text{ mV}$
	Current	$\leq 0.1\% \pm 30 \text{ mA}$	$\leq 0.1\% \pm 0.1\% \text{FS}$	$\leq 0.1\% \pm 0.1\% \text{FS}$
Readback Accuracy	Voltage	$\leq 0.05\% \pm 20 \text{ mV}$	$\leq 0.05\% \pm 40 \text{ mV}$	$\leq 0.05\% \pm 40 \text{ mV}$
	Current	$\leq 0.1\% \pm 30 \text{ mA}$	$\leq 0.1\% \pm 0.1\% \text{FS}$	$\leq 0.1\% \pm 0.1\% \text{FS}$
Ripple & Noise	Voltage	$\leq 50 \text{ mVp-p}$	$\leq 100 \text{ mVp-p}$	$\leq 100 \text{ mVp-p}$
	Current	$\leq 30 \text{ mArms}$	$\leq 100 \text{ mArms}$	$\leq 120 \text{ mArms}$
Output Temp Drift Coefficient (0°C~40°C)	Voltage	100 ppm/°C		
	Current	200 ppm/°C		
Readback Temp Drift Coefficient	Voltage	100 ppm/°C		
	Current	200 ppm/°C		
Transient Response (10%~90% rated load)		$\leq 5.0 \text{ ms}$		
General Characteristics				
Input Power		198 V~240 V AC, 45~65 Hz	100 v~240 V AC, 45~65 Hz	
Working Temperature		0~40 °C		
Display		4.3-inch TFT LCD screen		
Interface		USB, LAN, RS485, RS232		
Dimension/Weight		215.0×133.0×446.2 mm, appx 7 kg		

*Input Voltage: 100~120 VAC, output Power reduced by half.

Standard Accessories

Power Cord	1
USB Cable	1
User's Guide	1

Options

Banana-Crocodile Test Leads

PO7H Frequency Standard Comparator



Features

- National first-class frequency standard metrology and testing instrument
- Supporting to measure stability, frequency deviation, aging rate, booting characteristic, daily fluctuation, repeation
- Up to 16 channels configured with SS2901E Programmable RF Switch
- Data auto storing during powering interruption
- Incorporation of frequency difference multiplication, data acquisition, data storage, data processing
- Standard interface of USB, GPIB. Configured with Frequency Standard, Programmable RF Switch and PC to make an auto measuring system, supporting to print calibration certificate by connecting with printer

Specification

Input Signal	
Frequency Standard under test	1 MHz, 2 MHz, 2.5 MHz, 5 MHz, 10 MHz
Reference Frequency Standard	5 MHz, 10 MHz
Waveform	Sine
Amplitude	0.5 Vrms~1.5 Vrms
Measurement	
Measuring Bandwidth	10 kHz
Uncertainty of Comparison	$5 \times 10^{-10}/0.01 \text{ s}$,
	$1 \times 10^{-11}/0.1 \text{ s}$,
	$1 \times 10^{-12}/1 \text{ s}$,
	$2 \times 10^{-13}/10 \text{ s}$,
	$3 \times 10^{-14}/100 \text{ s}$,
	$2 \times 10^{-14}/\geq 1000 \text{ s}$
Sample Time	10 ms, 100 ms, 1 s, 10 s, 100 s, 1000 s, 10000 s, 86400 s
General Characteristics	
Power	220(1±10%) V, 50(1±5%) Hz, ≤40 VA
Work Environment	Temperature: 10℃~30℃ (temperature change <±2℃/h)
	Storage Temperature: -30℃~70℃
	RH: 20%~80%
	Atmospheric Pressure: 86 kpa~106 kpa
Pre-warm up	$1 \times 10^{-12}/\text{s}$ after pre-warming 60 min
Dimension & Weight	364 ×155×328 mm, approx. 10 kg

Standard Accessories

Power Cord	1	50Ω Terminal Load	1
BNC cable	3	BNC-J Connector	2
T Type Connector	1	CD(User's Guide)	1
USB Cable	1		

SF2002 Stopwatch Calibrator



Features

- High resolution of crystal oscillator with accuracy up to 5×10^{-8}
- Quick response
- Easy operation suitable for metrological service, factory, academy and scientific research institution to calibrate all kinds of timer instruments



Specification

Mechanical stopwatch and electronic stopwatch	
Input Range	T_0 : 1s-99999s
Accuracy	$< \pm (5 \times 10^{-8} \times T_0 + 3\text{ms})$
Pointer electrical stopwatch	
Input Range	T_0 : 0.1s-99999s (Continuous, Trigger and Pause)
Accuracy	$< \pm (\text{Mains frequency accuracy} \times T_0 + 0.6\text{ms})$
Digital electrical stopwatch	
Input Range	T_0 : 0.1ms-9999.9s
Accuracy	$< \pm (5 \times 10^{-8} \times T_0 + 3\mu\text{s})$
Crystal Oscillator	
Nominal Frequency	10MHz
Daily Aging Rate	$\leq 5 \times 10^{-9}/\text{day}$
Second Stability	$\leq 5 \times 10^{-11}/\text{s}$
Accuracy	$\leq 5 \times 10^{-8}$
Warm Up Time	> 2 hours
General Characteristics	
Power	220(1 $\pm$ 10%)V, 50(1 $\pm$ 5%)Hz, <20VA
Display	LCD
Dimension	256 $\times$ 106 $\times$ 393 mm
Weight	3.7kg

Standard Accessories

Power Cord	1
CD (User's Guide)	1
Dual banana plug test lead	2
BNC-banana test lead	1



Options

SF2001 stopwatch fixture
 SF2601 timer fixture
 Certificate issued by third part

SF2003 Time Calibrators



Features

- Auto measure, Single measure, Cycle measure and Batch measure are available for mechanical/electronic stopwatches calibration.
- Supporting most stopwatches calibration including 401, 405, 407, 408, 415, 417 and 411 Millisecond Meter, etc.
- 7-inch touch screen for easy operation
- More remote interfaces including LAN, USB Device, RS232



Specification

Mechanical stopwatch and electronic stopwatch	
Input Range	0.3 s~10 000 000 000 s
Accuracy	$\pm (A_1 \times t + 3 \text{ ms})$
Pointer electric stopwatch	
Input Range	0.02 s~10 000 000 000 s
Accuracy	$\pm (A_2 \times t + 0.1 \text{ ms})$
Digital electric stopwatch	
Input Range	0.1 μ s~10 000 000 000 s
Accuracy	$\pm (A_1 \times t + 0.1 \mu\text{s})$
Empty Contact Millisecond Meter	
Input Range	0.1 ms~10 000 000 000 s
Accuracy	$\pm (A_1 \times t + 10 \mu\text{s})$
Crystal Oscillator	
Nominal Frequency	10MHz
Relative Frequency Deviation	$\leq 5 \times 10^{-8}$
Boot Characteristics	$\leq 10^{-8}$
General Characteristics	
Power	220(1 $\pm$ 10%) V, 50(1 $\pm$ 5%) Hz, <30 VA
Display	7-inch LCD touch screen
Dimension	364 $\times$ 155 $\times$ 388 mm
Weight	6 kg

Note: A_1 is the max allowed frequency deviation for oscillator, A_2 is the Mains relative frequency deviation, t is the measured time interval.

Standard Accessories

Power Cord	1
Dual banana plug test lead	2
BNC-banana test lead	2
BNC-BNC test lead	1
USB2.0 Cable	1
CD(User's manual+ PC Software)	1

Options

SF2001 Stopwatch Fixture
SF2601 Timer Fixture
SF2602 Intelligent Fixture
Certificate issued by third party

SF2004 Daily Difference Calibrator



Features

- High precision OCXO are built in
- Support instantaneous measurement of daily difference, monthly difference and yearly difference
- Non-contact or contact measurement way could be selected
- Frequency and time interval measurement function are also supported
- 7" touch screen display, voice broadcast PPM measurement result



Specification

Instantaneous Daily Difference Measurement

Frequency	32.768KHz, 1Hz
Object	Electric Stopwatch, Electric Energy Meter, Crystal, Quartz Clock, etc.
Method	Non-contact or contact
Items	PPM, s/d, s/m, s/y
Range	Daily difference: -10.000 ~ +10.000 (s) Monthly difference: -300.000 ~ +300.000 (s)
Resolution	0.0001s
Allowed Error Range	Daily difference: $\pm 0.01s$ Monthly difference: $\pm 0.3s$

Time/Frequency Measurement

Resolution	Frequency: 8 digits/s Time Interval: 5ns
Signal Level	Pulse, TTL Level

Time Base Input

Frequency	5MHz or 10MHz
Wave	Sine
Amplitude	$\geq 1.5V_{p-p}$

Built-in OCXO

Frequency	10MHz
Daily Aging	$1 \times 10^{-8}/\text{day}$
Power on	Pre-warm 1h, $1 \times 10^{-8}/4\text{hs}$
Relative Frequency Deviation	Better than 5×10^{-8}
Second Stability	Better than 1×10^{-9}

General Characteristic

Power	AC220 (1 $\pm$ 10%)V, 50(1 $\pm$ 5%)Hz, <50VA
Work Environment	Temperature: 0 $\sim$ +40 $^{\circ}\text{C}$, RH:20 $\sim$ 80%
Interface	USB Host, USB Device, RS-232
Dimension & Weight	364 $\times$ 155 $\times$ 328 mm, approx. 2KGs

Standard Accessories

BNC cable	1
Power Cord	1
CD (User's Guide)	1
Sensor + Connection wire	1



SF2101 Photoelectric Converter



Design Reference

Verification regulation of time calibrator

Purpose

- To verify actuation time of machinery such as stroke time of stopwatch fixture, bullet flying speed, object's rotating speed, etc.
- To count by pieces in production line.

Features

- High precision photoelectric detector is introduced to ensure the accuracy and reliability
- Easy to use, high cost performance

Application

- Metrological Service, factory, institutions, scientific research units.

Specification

Basic information	
Converting accuracy	≤0.1ms
Interface	BNC
Detected distance	≤1m
Detected object	Untransparent objects with ≥Φ2mm
Output	+12V Square
Adapter	Input AC100-220V, 50/60Hz, output DC+12V
Power	Total current consumption ≤50mA for transmitting and receiving terminals
Required Test Device	Frequency Counter or Oscilloscope
General Characteristic	
Working Environment	Temperature: 0~+40℃, RH:20~80%
Dimension & Weight	185×120×90mm, approx. 3KGs

Standard Accessories

Power Cord	2
THX-120200KD power adapter	2
BNC Cable	1
CD (User's Guide)	1



Test Leads/Probes/Connector



01



02



03



04



05



06



07



08



09



10



11



12



13



14



15



16

Power Adapter/Data Cable



17



18



19



20

Antenna



21



22



23



24

Soft Carry Bag/Battery



25



26



27



28



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