

# IWATSU FUNCTION GENERATORS



## SG-4105 / SG-4115

- Employing high frequency stability and low distortion DDS
- Easy operation
- 10ppm (SG-4115), 50ppm (SG-4105) frequency stability
- 2 channel outputs and arbitrary waveform function
- Chassis and signal ground are isolated up to 42Vp-p.
- AM, FM, PM, FSK, PSK, PWM modulations are available. (SG-4115)
- Both GP-IB and RS-232 come with as standard.
- Output 50mVp-p to 10Vp-p (100mVp-p to 20Vp-p output open), Offset voltage range +10V to -10V (output open)
- Linear / Log SWEEP, BURST, DUTY control function
- Useful CH COPY function (SG-4115)

Function Generators 4115/4105			
Model		SG-4115	SG-4105
Output waveform		Sine wave, Square wave, Pulsewave, Triangle wave, Ramp wave, Gaussian noise, DC output, Arbitrary waveform	Sine wave, Square wave, Pulsewave, Triangle wave, Ramp wave, DC output
Output channels		2	1
Isolation		42Vp-p from GND	-
Output impedance		50 fixed	
Frequency	Range	Sine, Square: 10mHz~15MHz Arbitrary: 10mHz~1.6MHz Others: 10mHz~100kHz (without NOISE, DC)	Sine, Square: 10mHz~15MHz Others: 10mHz~100kHz (without DC)
	SLOW mode (Any wave)	1mHz~100kHz	-
	Accuracy	±10 ppm	±50 ppm
	Resolution SLOW mode (Any wave)	10 mHz or 9 digits 1 mHz or 9 digits	10 mHz or 5 digits —
Amplitude	Range	50 mVp-p to 10 Vp-p 100 mVp-p to 20 Vp-p (Open)	
	Accuracy (Sine 1kHz)	±1 %	
	Resolution	0.1 mV or 3 digits	
	Flatness (Reference to 1kHz sine wave)	Sine ±1% ~100kHz, ±2% Over 100kHz~1MHz, ±3% Over 1MHz~15MHz Square ±3% ~100kHz, ±5% Over 100kHz~15MHz (SWEEP off for SG-4115) Pulse, Triangle ±5%, SLOW mode ±5% (Any waveform)	
Mode		CONT, TRIG, GATE	
Offset	Range	±5V (Waveform + DC offset Less than 5.025V)	
	Resolution	1mV or 3 digits	
	Accuracy	±1% setting value ± 5mV (at DC output)	
Duty	Square wave	20~80% (Less than 5MHz) 40~60% (5MHz or more)	
	Ramp, Pulse	0~100%	
Sine wave spectral purity	Harmonic distortion at 10Vp-p	~100kHz -50dBc, Over 100kHz~1MHz -45dBc, Over 1MHz~15MHz -35dBc	*dBc: Respect to carrier signal
	Spurious at 10Vp-p	100kHz~1MHz -60dBc Over 1MHz~5MHz -50dBc Over 5MHz~15MHz -40dBc	100kHz~1MHz -60dBc
	Total Harmonic Distortion	0.10% at 1Vp-p or more, less than 100kHz 0.30% at less than 1Vp-p, 100kHz	

Step response	Overshoot	Square 2% (less than 1MHz) Pulse 2% (1µs or more FWHM) *Full Width at Half Maximum	
	Rise, Fall time (10%~90%)	Square 20ns	
		Pulse 20ns	Pulse 300ns
SWEEP	Curve	Linear / Log	
	Type	CONTINUOUS: Oscillation continues at STOP frequency	
		STOP: Oscillation stops after STOP frequency	
	Mode	CONT, GATE, TRIG	
	SWEEP TIME	1ms~500s	
Sync out	SWEEP SYNC, SWEEP MARKER		
BURST	Number	65536	
	Mode	CONT, TRIG Selectable ON counts or OFF counts	
PHASE	Range	±359.9	
	Resolution	0.1	
	Function	Start and Stop phase of TRIG,GATE, SWEEP, BURST mode.Phase between 2Channel signals.	Start and Stop phase of TRIG, GATE, SWEEP, BURST mode.
Internal Modulation	Mode	AM, FM, PM, PWM, FSK, PSK	-
	Modulation waveform	Any waveforms except DC	-
	Modulation bandwidth AM	Sine, Square, ARB ~1MHz Triangle, Ramp, Pulse ~100kHz Noise Fixed	-
		FM,PM,PWM, FSK,PSK SLOW mode	~100kHz Any modulation ~100kHz
	Depth or deviation	AM: Depth 0~120% FM: Deviation 10mHz ~7.5MHz (SLOW mode: 1mHz ~100kHz) PM, PSK: Phase ±359.9 PWM,,: Duty 1.0~99.0% FSK: Shift frequency 10mHz ~15MHz (SLOW mode: 1mHz ~100kHz)	-
External modulation	Mode Standard With extended external modulation	AM,FM, PM, PWM, FSK, PSK	-
Pulse Motor Control (Option)	Frequency	10mHz~100kHz	
	Waveform	Pulse	
	Control	CW/CCW or PLS/DIR	CW
	Output	Open collector 2 outputs	Open collector 1 output
	Sensor input	IN1, IN2	

	Mode	LIN-A, ARB-A: After acceleration,	LIN-A,: After acceleration, breaking by sensor input	
		LIN-B, ARB-B: After acceleration, breaking by specified pulse counts	LIN-B: After acceleration, breaking by specified pulse counts	
	Acceleration, breaking curve	Linear, S shape, Arbitrary	Linear	
	Pulse counts	16777216		
	Acceleration, breaking time	1ms~45s		
ARB (Arbitrary signal generator)	Data length	16384 words		
	Waveforms	4		
	Voltage resolution	12 bits		
	Number of Bank	4		
	Bank switch trigger	COUNT, TIME, EXT TRIG		
TRIG	Level,	TTL level (H: 2.1Vmin, L: 0.9Vmax)		
	Inputs	2	1	
	Input impedance	1k or more		
	Minimum pulse width	100ns		
	TRIG delay	Square: 5% of period + 350ns Pulse: Period/16384 + 800ns		
	SLOW	Square: 5% of period + 2.7μs	-	
		Pulse: Period/16384 + 2.7μs		
Setup memory	9			
Remote control	GP-IB, RS-232			
Input / output	Output	CH1, CH2, SYNC_F, SYNC_R/SWEEP SYNC, SWEEP MARKER	OUT, SYNC OUT, SWEEP SYNC, SWEEP MARKER	
	Input	TRIG1/GATE1, TRIG2/GATE2, MODUL TRIG/GATE		
Power	Voltage	AC100V 110V, 220V, 240V Factory option		
	Frequency	50Hz, 60Hz, 400Hz		
	Consumption	Approx. 100VA	Approx. 55VA	
Dimensions	Approx. 210W x 99H x 403L mm	Approx. 210W x 99H x 353L mm		
Weight	Approx. 5.5kg	Approx. 4kg		
Environment conditions	Storage	-20°C ~ +60°C / 90%R.H. or less		
	Operating	0°C ~ +40°C / 85%R.H. or less		
Warm up time	30 min or more			
Accessories	Power cord (1), Operation manual (1)			
Factory option	PMC: SG-507 Extended external modulation: SG-508	PMC: SG-506		