

SPECIFICATIONS

Output and Operation Modes

Number of channels	FG110 : 1 channel FG120 : 2 channels
Waveforms output	Sine, Square (fixed duty cycle of 50%), Triangle, Ramp, and Pulse (variable duty cycle from 5% to 95%), and their inverted forms
Operation modes	CONT (continuous oscillation mode) FG120 : phase-continuous and switchable interchannel synchronization, FG110 : phase-continuous; TRIG (trigger mode); GATE (gate mode); DC (DC mode), where a square wave cannot be selected in the TRIG and GATE modes

Frequency

Frequency range	Sine, square: 1 μ Hz to 2 MHz Triangle, ramp, pulse: 1 μ Hz to 100 kHz
Resolution	1 μ Hz or 10 digits
Accuracy	± 20 ppm (± 1 ppm with option code /XTAL)
Stability	± 10 ppm (5 to 40°C) (± 0.5 ppm [5 to 40°C] with option code /XTAL)

Output Characteristics

Voltage range	Switchable between 1-volt and 10-volt ranges
Maximum output voltage*1	1-volt range: ± 1 V(maximum amplitude plus offset) 10-volt range: ± 10 V (maximum amplitude plus offset)
Amplitude setting*1	1-volt range: 2 mVp-p to 2 Vp-p (with 0.01 mVp-p or 4-digit resolution) 10-volt range: 20 mVp-p to 20 Vp-p (with 0.1 mVp-p or 4-digit resolution)
Offset voltage setting*1	1-volt range: ± 0.999 V (with 0.01 mV resolution) 10-volt range: ± 9.99 V(with 0.1 mV resolution)
Output impedance	50 Ω $\pm 1\%$ (open when output is off)
Amplitude accuracy*1	$\pm (0.5\%$ of setpoint plus 0.2% of range): 1kHz sine wave
Amplitude-frequency characteristics	<div> <div> Sine ≤ 10 kHz: ± 0.1 dB ≤ 100 kHz: ± 0.2 dB ≤ 1 MHz: ± 0.5 dB ≤ 2 MHz: ± 1 dB </div> <div> Square ≤ 10 kHz: $\pm 2\%$ Triangle ≤ 10 kHz: $\pm 3\%$ Ramp ≤ 10 kHz: $\pm 3\%$ </div> </div> (RMS values measured at an amplitude of 10 Vp-p, offset voltage of 0 V, 50 Ω load, and scale factor of 0.5, based on a frequency of 1 kHz)
Offset voltage accuracy*1	$\pm (0.3\%$ of setpoint plus 0.2% of range plus 0.2% of amplitude setpoint)
DC mode*1	1-volt range: ± 1 V(with 0.01 mV resolution) 10-volt range: ± 10 V (with 0.1 mV resolution)
DC mode voltage accuracy*1	$\pm (0.3\%$ of setpoint plus 0.1% of range)
Interchannel crosstalk	-70 dB or less (FG120 only)*2

Sine-wave Purity (at an amplitude of 10 Vp-p, offset voltage of 0 V, 50 Ω load and scale factor of 0.5)

Harmonics (maximum value in harmonic components from 2nd to 5th order)	10 kHz : -55 dBc or less (-70 dBc or less with option code /DIST1 or DIST2) 100 kHz : -50 dBc or less (-60 dBc or less with option code /DIST1 or DIST2) 2 MHz: -35 dBc or less (-40 dBc or less with option code /DIST1 or DIST2)
Harmonic distortion*3	10 kHz: 0.3% or less (0.05% or less with option code /DIST1 or DIST2)
Spurious responses*4	100 kHz: -55 dBc or less (-65 dBc or less with option code /DIST1 or DIST2)

Square- and Pulse-wave Characteristics (at an amplitude of 10 Vp-p, offset voltage of 0 V, 50 Ω load and scale factor of 0.5)

Rise time	Square: 100 ns or less (10% to 90%) Pulse: 200 ns or less (10% to 90%)
Overshoot	Within $\pm 5\%$ of peak-to-peak output value
Duty cycle setting	5% to 95 % with 0.1% resolution (applicable only to pulse waves)
Duty-cycle time accuracy	≤ 10 kHz: $\pm 0.2\%$ of 1/frequency setpoint

Phase

Phase setting specifications	Setup of the starting-and-ending point of a phase in TRIG and GATE modes and interchannel phase difference
Phase setting range	-10000 to +10000 degrees
Phase resolution	0.01 degree
Interchannel offset-phase accuracy	≤ 1 kHz: ± 0.02 degree ≤ 10 kHz: ± 0.1 degree (Sine wave at an amplitude of 9.9 Vp-p, offset voltage of 0 V, 50 Ω load and scale factor of 0.5)

TRIG, GATE, and Synchronization Outputs

Trigger sources	External trigger, MAN TRIG key, and GP-IB
External trigger input	TTL level with pulse width equal to or greater than 250 ns Switchable rise/fall time Triggering at an interval of 2 μ s or more after waveform generation
External gate input	TTL level with pulse width equal to or greater than 2ms Switchable high/low levels Shares the terminal for external trigger inputs
Synchronization output	TTL level (output impedance of 50 Ω), synchronized with Channel 1

Other Functions

Setup memory	Capable of storing/recalling up to ten different panel setups using STORE/RECALL key (Non-volatile memory)
Scaling	Displayed by multiplying the voltage setpoint (amplitude, offset voltage, DC mode) by the scaling factor
Preset TTL level *1	Sets the amplitude at 5 V and offset voltage at 2.5 V
Copy function (FG120 only)	Copies setup parameters between the two channels (CH1 \rightarrow CH2; CH2 \rightarrow CH1)
Dual function (FG120 only)	Capable of changing setup parameters on the two channels at the same time
Output on/off	Allows both channels to be turned on or off separately

Communication Functions

Communication function	GP-IB interface (standard)
Electromechanical specifications	Complies with IEEE Standard 488-1978 (JISC1901-1987)
Subsets	SHI, AHI, T6, L4, SRI, RLI, PPO, DCI, DTI, CO

FG120/FG110

General Specifications

Signal grounding	All the grounds of the I/O connectors must be connected to the case grounding.
Operating temperature range	5 to 40°C (41 to 104°F)
Operating humidity range	20 to 80% RH (maximum wet-bulb temperature: 29°C)
Storage temperature range	−20 to 60°C (−4 to 140°F)
Power	90 to 110 VAC or 108 to 132 VAC or 207 to 253 VAC, 48 to 63 Hz
Power consumption	60 VA maximum
Weight	Approx. 3.6 kg
Dimensions	Approx. 213(W) × 100(H) × 330(D)mm

Note: Allow the **FG110** and **FG120** to warm up for more than 30 minutes to obtain the performance specified above.

- *1: with high-impedance load
 - *2: Crosstalk from CH1 to CH2 when 2-MHz sine wave is applied to CH1 and 1.5-MHz sine wave to CH2, respectively, at an amplitude of 10 Vp-p, offset voltage of 0 V, 50Ω load and scaling factor of 0.5.
 - *3: RMS value of harmonic components from 2nd to 5th order
 - *4: At a frequency range of 1 kHz to 20 MHz
- Recommended operating conditions : Temperature: 23 ±2°C, Humidity: 50% ±10% RH, Power supply voltage: 100 V ±1%

AVAILABLE MODELS

Model	Suffix codes	Description
706011		FG110 (1-channel model)
706012		FG120 (2-channel model)
Power requirements	-1	90 to 110 VAC
	-4	108 to 132 VAC
	-7	207 to 253 VAC
Power Cord	-D	UL, CSA Standard
	-F	VDE Standard
	-R	SAA Standard
	-J	BS Standard
Optional features	/XTAL	High Stability Frequency Reference
	/DIST1	Low Distortion Output (for FG110)
	/DIST2	Low Distortion Outputs (for FG120)

Optional Accessories

Name	Code	Description	Order q'ty
BNC cable	366924	BNC-BNC, 1m	1
BNC cable	366925	BNC-BNC, 2m	1
BNC cable	366926	with alligator clip	1
Conversion adaptor	366921	BNC plug and banana jack	1
Conversion adaptor	366927	BNC plug and RCA jack	1
Conversion adaptor	366928	BNC jack and RCA plug	1
Rack mounting kit	751501	EIA single mounting	1
Rack mounting kit	751502	EIA double mounting	1
Rack mounting kit	751503	JIS single mounting	1
Rack mounting kit	751504	JIS double mounting	1

DIMENSIONS

•Common to both the **FG110** and **FG120**. Unit: mm (inch)

