

## **MULTIFUNCTION GENERATOR**

## **WF1947/WF1948** 0.01 µHz to 30 MHz



## This is a standard Function Generator.

## WAVE FACTORY

**NF Corporation** 

## MULTIFUNCTION GENERATOR

## "The Function Generator" that NF offers

Ever since NF developed the first function generator in Japan, we've been addressing the true needs of our customers. Our function generators have been evolving along with our customers' desires and our determination to satisfy them.

These new products are new additions to our WAVE FACTORY product lineup. WAVE FACTORY products have accurate and stable output, an abundance of output waveforms, various oscillation modes for various purposes, outstanding user-friendliness and the flexible generation of waveforms that engineers need. NF considers oscillators that offer the flexible generation of waveforms as the standard, and we continue to offer function generators with ever more advanced functions.



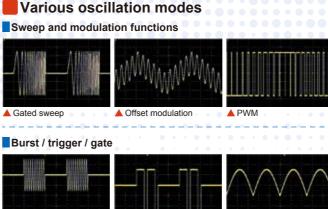
# 0.01 µHz to 30 MHz



OThe photo shows the WF1948 (two channels) The display here shows all the items



that can be displayed on the panel.



## ▲ 3-value pulse(burst/trigger) ▲ Full-wave rectification Triggered gate

As pulse generator

▲ Rising/falling time variable ▲ Rising time (50 ns)

The dual-channel WF1948 offers channel modes of two phases. constant frequency difference, constant frequency ratio and differential outputs. Various types of sweeps are possible withthe two channels in ganged operation mode.

Each channel has a floating output terminal.

- Independent output (Indep) Two channels programmed separately.
- Two phase (2-Phase) Same frequency.
- Constant frequency difference (2-Tone) Difference in frequencies is constant
- Constant frequency ratio (Ratio) Ratio of frequencies is constant.
- Differential output (Diff) Reverse phase waveform with identical frequency amplitude, and DC offset



## Low noise

The noise level is reduced to roughly one-tenth of those of previous models<sup>\*</sup> at comparatively high voltage output (about 2 Vp-p/50  $\Omega$ , without DC superposition) and within frequencies of up to 300 kHz. By employing an attenuator, the noise level at the low voltage output of about 1 Vp-p or lower has been reduced to between a half and one-third those of previous models. In all of the output ranges, dramatic noise reduction has been realized, which makes this product perfect for a wide range of uses.

## Low distortion

A complete revision of the circuitry has realized the generation of low-distortion sine waves with total harmonic distortion of 0.4% or less. In addition to the 16-bit resolution of waveform amplitude, high-quality sine waves are produced. (Frequency setting range : 20 Hz-20 kHz, amplitude: 0.25 Vp-p/50 Ω or greater)

## Waveform amplitude resolution: 16 bits

The circuit structure we developed has realized a 16-bit resolution of waveform amplitude, which is the highest of any oscillator designed for a maximum frequency of 30 MHz. High-quality 16-bit resolution of waveform amplitude is provided for all the waveforms you might need, including sine, square and arbitrary waveforms.

## High amplitude setting accuracy

The auto range function facilitates the optimum selection of output voltage range. Further, by reducing the deterioration of the amplitude setting accuracy due to the setting level, it is possible to obtain a very high amplitude setting accracy. The "fixed output range" mode can be selected when discontinuous oscillation caused by changing the range is undesirable.

## Floating

Each output terminal is insulated from the housing, which makes it possible to connect the terminal to equipment with dissimilar electric potentials. The inclusion of floating output terminals reduces noise caused by ground loops.

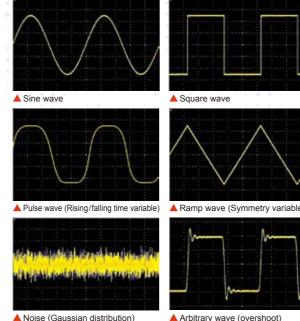
### Low fan noise

The rotational frequency (Or revolution per minute) of the fan is controlled according to the detected ambient temperature. At normal room temperature, excluding start-up and abnormal operation, the noise is one-tenth of that of previous models\*

## Wide array of output waveforms Output waveforms Sine, square, pulse, ramp

and arbitrary waveforms, noise, and DC

In addition to generating standard waveforms such as sine and square waveforms, it is possible to generate arbitrary waveforms of up to 512k words. Up to 128 waveforms can be stored in the 4M-word memory. All the generated waveforms have 16-bit high resolution. High-quality waveforms are indispensable for improvement in the repeatability (Or reproductivity) of tests. Arbitrary waveforms can be set on the main unit, and the provided arbitrary waveform creation software "Arbitrary Wave Editor" makes waveform editing smooth.



### Software for generating arbitrary waveforms "Arbitrary Wave Editor'

Software for easily generating complex arbitrary waveforms This software allows waveforms to be generated and math operations to be conducted by the import of mathematical expressions and external data.

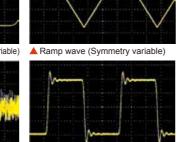
### Major functions

Generation using standard waverofrm and mathematical equations Straight line, spline and continuous spline interpolation Math operation (addition, subtraction, multiplication,

and division of waveform

Contraction and extension (vertical and horizontal directions)

## 2-channel Ganged Operation



## WF1947/WF1948

## W/VE FACTORY

## WF1947 (1ch) / WF1948 (2ch)



It's possible to perform sweeps not only of frequencies, but also of amplitudes, phases, offsets and duties (0% to 100%). In sweeping, it is possible to combine one-way or shuttle, linear or logarithmic slope\*, and continuous, single-shot or gated single-shot modes.

FM, FSK, PM, PSK, AM and DC offset modulations and PWM are supported. Internal and external modulations are possible. Logarithmic mode is supported only for frequency sweeping.

In the burst oscillation mode, oscillation can be started or stopped at any wave count. WF1947 and WF1948 support four modes ;

Auto burst : No trigger is needed

Trigger burst : Oscillation in sync with the trigger

Gate: Oscillation in sync with the gate signal

Triggered gate : Gate oscillation switched on/off by gate upon trigger The phase where oscillation starts/stops and the level at which oscillation starts/stops can be set

You can use this waveform generator as a signal source for digital circuits or a pulse generator. The duty/time and the rising time/falling time of pulse waves can be individually set. The generator is suited to the operation testing of a wide variety of digital equipment and devices, data transmission equipment and more.

### **Other functions**

- External 10MHz frequency reference input, frequency reference output, synchronous operation of multiple generators A high-accuracy frequency can be output when an external 10 MHz standard signal is input into the external 10 MHz frequency reference input (REF IN). Synchronous operation of up to six units is possible in the form of master/slave connections, using the frequency reference output (REF OUT) and frequency reference input (REF IN) External addition input This adds external signals to the waveform output signal User-defined unit The value in any unit can be set using a specified conversion expression (Frequency, period, amplitude, DC offset, phase, and duty)
- Waveform monitor This displays the set waveform
- Memory to save setting Ten settings can be saved



Waveform mor

## **SPECIFICATIONS**

### ▼Frequency and Phase

г	requercy setting ranges					
	Oscillation mode Waveform	Continuous,	modulation, and sweep (continuous, single)	Sweep (gated) and burst		
	Sine	0.01 µHz to 3	30 MHz	0.01 µHz to 10 MHz		
	Square	0.01 µHz to 2	20 MHz	0.01 µHz to 10 MHz		
	Pulse	0.01 µHz to 2	20 MHz	0.01 µHz to 10 MHz		
	Ramp	0.01 µHz to 5 MHz				
	Noise	The equivalent bandwidth is fixed to 26 MHz				
	DC	Frequency s	etting invalid			
	Arbitrary	0.01 µHz to \$				
	Frequency setting resolution		0.01 µHz			
	Frequency accuracy *		± (3 ppm of setting + 2 pHz), aging rate* : ±1 ppm/year			
Phase setting range		ande	-1800.000° to +1800.000°			

### Output Characteristics

Output Characteristics		
Setting range	0 Vp-p to 20 Vp-p/open, 0 Vp-p to 10 Vp-p/50 $\Omega$ AC + DC ≤ ± 10 V/open	
Setting resolution	999.9 mVp-p or less : 4-digit/0.1 mVp-p 1 Vp-p or greater : 5-digit/1 mVp-p	
Accuracy *	± (0.8% of amplitude setting [Vp-p] + 2 mVp-p)/open (1 kHz sine wave, amplitude setting : 20 mVp-p/open or greater)	
Setting unit	Vp-p, Vpk, Vrms, dBV, and dBm	
Resolution of waveform	16 bit (8 mVp-p/open or greater)	
Setting range	±10 V/open, ±5 V/50 Ω	
Setting resolution	±499.9 mV or less : 4-digit/0.1 mV, ±0.5 V or greater : 5-digit/1 mV	
Accuracy *	± (  1% of DC offset setting [V]   + 5 mV + 0.5% of amplitude	
	setting [Vp-p])/open (when outputting sine waves of 10 MHz or less)	
tput impedance	50 Ω unbalanced	
tput voltage of	Sync signals TTL level, internal modulation signal -3 V to +3 V/open,	
nchronous/sub output	sweep X drive 0 V to +3 V/open	
	Setting range Setting resolution Accuracy * Setting unit Resolution of waveform Setting range Setting resolution	

▼Signal Characteristics

_		*		
	Amplitude frequency characteristics*	100 kHz to 5 MHz : = 5 MHz to 20 MHz : = 20 MHz to 30 MHz : =	±0.3 dB	.8 Vp-p/50 Ω or higher) ncv 1 kHz )
	Total harmonic distortion* 20 Hz to 20 kHz : 0.04% or less (0.25 Vp-p to 10 Vp-p/50 $\Omega$ )			
Sine	Harmonic spurious*			2 Vp-p to 10 Vp-p/50 Ω
Si	namone spanous		-60 dBc or less	-55 dBc or less
			-50 dBc or less	-43 dBc or less
		10 MHz to 30 MHz -		-30 dBc or less
	Non-harmonic spurious*	Up to 1 MHz :	-65 dBc or less*, -7	
		1 MHz to 3 MHz : 3 MHz to 30 MHz :	-65 dBc or less*	(0.5 Vp-p to less* 10 Vp-p/50 Ω)
	Duty variable			
Square	Duty variable	Variable range : Normal or extended (selectable) Setting range : Normal range 0.0100% to 99.9900% Upper limit (%) : 100 - frequency (Hz)/400,000 Lower limit (%) : frequency (Hz)/400,000		
due		Extended range 0.0000% to 100.0000%		
S	Rising/falling time*	15.5 ns or less (typ.),	, 17 ns or less *	
	Overshoot	5% or less typ.		
	Jitter	Normal variable range : 300 ps rms or less typ. Extended variable range : 2.5 ns rms or less typ.		
				s typ.
	Pulse width	Duty setting range : 0		
			24.00 ns to 99.9830 Ms	
	Rising/falling time	(resolution 0.01% of ftequency/0.01 ns) Setting range : 15.0 ns to 62.5 Ms (resolution 3-digit/0.1 ns)		
Pulse	Rising/ialling une	Rising/falling time independently set,		
Pu		The minimum setting value is 0.01% of period or 15 ns, whichever is larger.		
	Overshoot	5% or less typ.		ro no, unionovor io largor.
	Jitter 500 ps rms or less typ. (10 kHz or more)			
		2.5 ns rms or less typ. (less than 10 kHz)		
Ra	mp	Symmetry setting range : 0.00% to 100.00%		
Arbitrary waveform	Waveform length	4 K to 512 K words (2 <sup>n</sup> , n=12 to 19) or the number of control points is 2 to 10,000 (Control points are linearly interpolated.)		
vav	Total of waveform	Up to 128 waves or 4	M words (combined tot	al for channels 1 and 2)
IL V	saving capacity	Saved in the nonvolatile memory		
Ditra	Amplitude resolution	16 bit		
Art	Sampling rate	120 MS/s		

### Modulation

Modu	lation type	FM, FSK, PM, PSK, AM, DC offset modulation, PWM
	Modulation waveform	Other than FSK, PSK :
U.		Sine, square (duty of 50%), triangle (symmetry 50%), rising ramp,
llati		falling ramp, noise, arbitrary waveforms
odt		FSK, PSK: Square (duty of 50%)
Internal modulation	Modulation frequency	Other than FSK, PSK, DC offset modulation :
Brne		0.1 mHz to 1 MHz (8-digit/0.1 mHz resolution)
Inte		FSK, PSK : 0.1 mHz to 3 MHz (8-digit/0.1 mHz resolution)
		DC offset modulation : 0.1 mHz to 100 kHz (8-digit/0.1 mHz resolution)
o, a-	Input voltage range	±1 V full scale (other than FSK and PSK)
External modulation	Input impedance	10 kΩ unbalanced (other than FSK and PSK)
μÊ	Input frequency	DC to 40 kHz/-3 dB (other than FSK and PSK). DC to 3 MHz (FSK. PSK)

## **NF** Corporation

Head Office 6-3-20 Tsunashima Higashi, Kohoku-ku, Yokohama 223-8508, Japan Phone: +81-45-545-8128 Fax: +81-45-545-8187 http://www.nfcorp.co.jp/english/

## **MULTIFUNCTION GENERATOR WF1947/WF1948**

Sweep type         Frequency, phase, amplitude, DC offset, and duty           Sweep function         One-way (ramp waveform shape)/shuffle (finangle waveform shape) selectable           Sweep range setting         Start and stop values or the center and span values are specified.           Sweep mode         Continuous/single-shot values or the center and span values are specified.           Sweep mode         Continuous/single-shot values or the center and span values are specified.           Sweep mode         Continuous/single-shot values or the center and span values are specified.           Sweep input/set on the center and span values are specified.         Sweep shot seep           Stringer source         Internal/valuestable           Internal/valuestable         Secting range: 100.00% to 100.00% of amplitude full scale or off           Sweep input/sourput         Sweep sync/marker output, sweep X drive output, sweep x drive output, sweep x drive output, sweep x drive output.           Sweep input/sourput         Auto burst, trigger burst, gate, and triggered gate modes (The gate is turned on off at each triggered gate mode).           Number of mark/space waves         0.5 cycles to 999.999.5 cycles, in 0.5-cycle unit           Oscillation stop unit         1 cycle or 0.5 cycles selectable           In the gate stured on off at each trigger data mode.           Phase setting range         -1800.000° to -1800.000°           Specifying signal level while oscillation is stoppe	▼Sweep	
Sweep function         One-way (ramp waveform shape) shuttle (tringle waveform shape) selectable Linear/log (frequency sweep only selectable           Sweep mide         Start and stop values or the center and span values are specified.           Sweep mide         Continuous Single-shot galed single-shot selectable Oscillation only occurs during sweep execution in the gated single-shot mode.           Tigger source         Internal /verternal selectable           Sweep index setting range: 100.00% to +100.00% of amplitude full scale or off Sweep input/output         Sweep oncome setting range: 100.00% to +100.00% of amplitude full scale or off Sweep input/output           Sweep input/output         Sweep oncome setting range: 100.00% to +100.00% of amplitude full scale or off Sweep input/output           Sweep input/output         Sweep oncome setting range: 100.00% to +100.00%         Sweep input/output           Sweep input/output         Sweep oncome setting range: 100.00%         Sweep input/output           Sweep input/output         Sweep oncome setting range: 100.00%         Sweep input/output           Tigger date mode         Auto burst, trigger burst, gale, and triggered gate modes (The gale is turned on /off at each trigger input           Tigger date mode         1 cycle or 0.5 cycles selectable         Internal inger oscillation is stopped           Setting range: -100.00% to +100.00%         Setting range: -100.00% to +100.00%           Solation stop at the set oscillation is stopped         Setting range: -100.00% to		Frequency, phase, amplitude. DC offset, and duty
Linear/bg (freguery sweep only) selectable           Sweep time setting range         0.1 ms to 10.000 s (4-dig/t.0.1 ms resolution)           Sweep time setting range         0.1 ms to 10.000 s (4-dig/t.0.1 ms resolution)           Sweep time setting range: 10.00 ps to 10.000 s (5-dig/t.0.1 ps resolution)           Stop level setting         Specifying signal level while oscillation is stopped during gated single shot sweep psecting range: 10.00 ps to 10.000 s (5-dig/t.0.1 ps resolution)           Stop level setting         Specifying signal level while oscillation is stopped during gated single shot sweep psecting range: 1-00.00% to +100.00% of amplitude full scale or off           Sweep input/output         Sweep sync/marker output, sweep x drive output		
Sweep range setting         Start and stop values or the center and span values are specified.           Sweep mode         Octimitoous/single-shot/gated single-shot selectable           Occiliation only occurs during sweep execution in the gated single-shot mode.           Trigger source         Period setting range: 100.0 µs to 100.00 s (5-digit/0.1 µs resolution)           Stop level setting         Specifying signal level While oscillation is stopped during gated single shot sweep.           Stop level setting         Sweep nosci marker output. sweep xeternal trigger input           Planst Infiger OEAE         Operation Stop level setting range:100.00% to +100.00% of ampitude full scale or off           Sweep input/output         Sweep sync marker output. sweep xeternal trigger input           Planst mode         Auto burst, trigger Durst, gate, and triggered gate modes.           Number of mark space wave.         D.5 cycles to 999.999.5 cycles, in 0.5-cycle unit           Oscillation stop unit         1 cycle or 0.5 cycles selectable           Phase setting range         -1800.000° to +1800.00°           Stop level         Specifying signal level while oscillation is stopped           Socialiation stop at the set oscillation startstop phase when the stop level is set to off.           Trigger calary         0.000 us to 100.00% (c-digit/0.01 us resolution)           Trigger oscillator         1 Us us to 100.00 s (c-digit/0.01 us resolution) <t< td=""><td></td><td></td></t<>		
Sweep mode         0.1 ms to 10:00 = (4-dig/10.1 ms resolution)           Sweep mode         Continuous/ingle-shot/gated single-shot selectable           Oscillation only occurs during sweep execution in the gated single-shot mode.           Internal ringer socillator         Period setting range: 10:00 µs to 10:000 s (5-digi10.1 µs resolution)           Stop level setting         Specifying signal level while oscillation is stopped during gated single-shot weep           Sweep input/output         Sweep sync/marker output, sweep X drive output	Sween range setting	
Sweep mode         Continuous/single-shot/gated single-shot selectable           Trigger source         Internal / external selectable           Internal fittigger oscillator         Period setting range : 100.0 µs to 10,000 s (5-digit/0.1 µs resolution)           Stop level setting         Specifying signal level while oscillation is stopped during gated single shot sweep           Sweep input/output         Sweep sync/marker output, sweep X drive output, sweep x drive output, sweep external control input, sweep external control is stopped during atrex insut system material e		
Oscillation only occurs during sweep execution in the gated single-shot mode.           Trigger source         Internal regre oscillator           Period setting range: 100.0 µs to 10.000 s (5-digit/0.1 µs resolution)           Stop level setting         Specifying signal level while oscillation is stopped during gated single shot sweep           Sweep input/output         Sweep sync/marker output, sweep X while output and thiggered gate modes.           Yburst Mode         Auto burst, trigger burst, gate, and triggered gate modes.           Numed mark/space waves         0.5 cycles to 999.999.5 cycles, in 0.5 cycle unit           Oscillation stop at the set oscillation is stopped         Specifying signal level while oscillation is stopped           Stop level         Specifying signal level while oscillation is stopped           Stop level         Specifying signal level while oscillation is stopped           Stop level         Specifying signal level while oscillation is stopped           Stop level         Specifying signal level while oscillation is stopped           Trigger source         Internal trigger oscillator           10 µs to 10.00 s (6-digit/0.1 µs resolution)         Evel while oscillation stops the only.           Trigger source         Internal trigger oscillator           10 µs to 10.00 s (6-digit/0.1 µs resolution)         External		
Trigger source         Internal ingen cociliator           Stop level setting         Specifying signal level while oscillation is stopped during gated single shot sweep           Stop level setting         Specifying signal level while oscillation is stopped during gated single shot sweep sync/marker output, sweep x drive x driv	Sweep mode	
Informal trigger oscillator         Period setting range : 100.0 µs to 10,000 s (5-digit/0.1 µs resolution)           Stop level setting         Specifying signal level while oscillation is stopped during gated single shot sweep           Sweep input/output         Sweep sync/marker output, sweep X Arive output, S Arive X Arive Or 0.5 cycles selectable           Number of mark/space waves         0.5 cycles to 999.999.5 cycles, in 0.5-cycle unit           Oscillation stop at the set oscillation is stopped         Specifying signal level while oscillation is stopped           Stop level         Specifying signal level while oscillation is stopped           Stop level is set to off.         Trigger source           Trigger source         Internal trigger coscillator           1.0 µs to 10.00 s (6-digit/0.1 µs resolution)         External trigger oscillator           Trigger source         Panel key operation, rigger delay allowed           Vachannel Ganged Operation (WF1948 only)         Channel Ganged Operation (WF1948 only)           Channel Mode         Two channels in the same time.           Same operation         Set two channels at the same time.	<b>T</b> :	
Stop level setting         Specifying signal level while oscillation is stopped during gated single shot sweep Setting range : -100.00% to +100.00% of amplitude full scale or off           Sweep input/output         Sweep sync/marker output, sweep x drive output, sweep external control input, sweep x drive output, sweep external control input, sweep x drive output, sweep are stermal control input, sweep x drive output, sweep sync/marker output, sweep x drive output, sweep x stermal control input, sweep are instruction off at each trigger in the triggered gate modes (The gate is turned on off at each triggered gate mode).           Number of mark/space waves         0.5 cycles to 999.999.5 cycles, in 0.5-cycle unit Oscillation stop unit in the gate mode           Phase setting range         -1800.000° to +1800.000°           Stop level         Specifying signal level while oscillation is stopped Setting range : -100.00% to +100.00% Oscillation stops at the set oscillation start/stop phase when the stop level is set to off.           Internal trigger oscillator         10 by to 10.00 s (6-digit/0.1 µs resolution)           Trigger source         Internal or external selectable, manual trigger allowed           Internal trigger of the they, input impedment 10 kg/level up to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed           V=channel Ganged Operation(VF1946 any)           Channel Indeger Operation(VF1946 any)           Channel Indeger Operation (VF1946 any)           Same value setting, and trigger in the tringereory, anditude, DC offset, reversed waveform) <td></td> <td></td>		
single shot sweep           Setting range : - 100.00% to + 100.00% of amplitude full scale or off           Sweep input/output         Sweep sync/marker output, sweep X drive output, sweep xternal control input, sweep external torger input           * Burst mode         Auto burst, trigger burst, gale, and triggered gale modes (The gale is turned on/off at each triggered gale modes)           Number of mark/space waves         0.5 cycles selectable           Deciliation stop unti         1 cycle or 0.5 cycles selectable           Phase setting range         -1800.000° to +1800.00°           Stop level         Specifying signal level while esciliation is stopped           Setting range : -100.00% to +100.00%         Ob cycles selectable           Trigger source         Internal external selectable, manual trigger allowed           Internal or external selectable, manual trigger allowed         Internal trigger for latent delay allowed           V2-channel Ganged Operation/WF1948 only)         Channel Manual trigger rigut           Channel Manual trigger rigut         The level, sing trigger delay allowed           V2-channel Ganged Operation/WF1948 only)         Channel Mol           Channel Mode         Two channels at the same time.           Frequency difference         Set two channels at the same time.           Set wave setting range         Output voltage: 1.02-p5 to 5.Vp-p. Sine or square           Frequency relin </td <td></td> <td></td>		
Setting range := 100.00% to +100.00% of amplitude full scale or off           Sweep input/output         Sweep sync/marker output, sweep X drive output, sweep external control input, sweep X drive output, sweep external control input, sweep external trigger input           VEX.pst 2012         Auto burst, trigger burst, gale, and triggered gale modes (The gale is turned on/off at each triggered gale modes)           Number of mark/space waves         0.5 cycles to 999.999.5 cycles, in 0.5-cycle unit           Oscillation stop unit in the gate mode         1 cycle or 0.5 cycles selectable           Phase setting range         -100.00% to +100.00%           Stop level         Specifying signal level while oscillation is stopped Setting range: :-100.00% to +100.00%           Oscillation stops at the set oscillation is stopped Setting range: :-100.00% to +100.00%           Oscillation stops at the set oscillation starti/stop phase when the stop level is set to off.           Trigger delay         0.00 is to 10.00 s (6-digit/0.01 is resolution)           Except for latent delay. Valid in the trigger burst mode only.           External trigger input         TL level, input impedance 10 kD (pulled up to +3.3 V), unbalanced           Manual trigger         Panek key operation, trigger delay allowed           Z-channel Ganged Operation/WF1948 only)           Channel mode         The chance same time.           Same value setting, same operation         Set two channels at the same time.	Stop level setting	
Sweep input/output         Sweep sync/marker output, sweep X drive output, sweep Xermal control input, sweep external trigger input           Purst/Trigger/Gate Operation         Burst mode         Auto burst, trigger burst, gale, and trigger and trigger and trigger dgate modes. (The gate is turned on/off at each trigger in the triggered gate mode.)           Number of mark/space waves         0.5 cycles selectable         0.5 cycles selectable           Phase setting range         -1800.000° to +1800.000°           Stop level         Specifying signal level while oscillation is stopped           Stop level         Specifying signal level while oscillation startistop phase when the stop level is set to off.           Trigger source         Internal trigger oscillator         1.0 us to 1.000 (S c-ligit/0.1 us resolution)           Trigger four         The level is set to off.         Setting range: trigger burst mode only.           External trigger oscillator         1.0 us to 1.000 (S c-ligit/0.1 us resolution)         External trigger oscillator           Trigger source         Panel key operation. trigger delay allowed         Vachannels independent, two phases (same frequency), constant frequency difference, constant frequency, raversed waveform)           Same value setting, same value setting, same operation         Set two channels independent, two phases (same frequency), constant frequency ratific and the same time.           Setting range         CH-2 frequency : CH-1 frequency           Vorther Funcctions		single shot sweep
sweep external control input, sweep external trigger input           Surst mode           Auto burst, trigger burst, gate, and triggered gate modes (The gate is turned on/off at each trigger in the triggered gate mode.)           Number of mark/space waves (Scillation stops at the set oscillation is stopped Scillation stops at the set oscillation is stopped Setting range: -100.00% to -100.00% Oscillation stops at the set oscillation is stopped Setting range; -100.00% to -100.00% Oscillation stops at the set oscillation is start/stop phase when the stop level is set to off.           Trigger source         Internal or external selectable, manual trigger allowed           Internal ringger oscillator         10 yes to 1000 S (3-digit/0.1 yer resolution)           External trigger input         TL'level, input impedance 10 K0 (Dulled up to -3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed           V2-channel Ganged Operation/WF1948 onty)         Two channels independent, two phases (same frequency), constant frequency amplitude, DC offset, reversed waveform)           Same value setting, same operation         Set two channels at the same time.           Frequency ratio         10 by 99.999 (for each of N and M)           N : M setting range         CH-2 frequency: CH-1 frequency           Frequency reference         Output voltage : 0 S Vp-p for 0 Xp-p, Sine or square           Frequency reference         Output voltage : 1 Vp-f50 Q, square, 10 MHz (for Synchronization of multiple units ) </td <td></td> <td>Setting range : -100.00% to +100.00% of amplitude full scale or off</td>		Setting range : -100.00% to +100.00% of amplitude full scale or off
Burst / Trigger / Gate Operation           Burst mode         Auto burst, trigger burst, gate, and triggered gate modes (The gate is turned on / off at each trigger in the triggered gate mode).           Number of mark/space waves:         0.5 cycles to 599,999.5 cycles, in 0.5-cycle unit           Oscillation stop unit in the gate mode         1 cycle or 0.5 cycles selectable           Phase setting range         -1800.000° to +1800.000°           Stop level         Specifying signal level while oscillation is stopped           Setting range:         -100.003 (b - 010.00%)           Trigger source         Internal or external selectable, manual trigger allowed           Internal row returnal selectable, manual trigger allowed         Internal or external selectable, manual trigger allowed           Trigger source         1.0 µs to 1.000.0 (s 6-digit/0.01 µs resolution)           Except for latent delay, Valid in the trigger burst mode only.           External trigger input         TTL level, input impedance 10 kΩ (pulled up to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed           *2-channel Ganged Operation(VFF1948 only)           Channel mode         Two channels independent, two phases (same frequency), constant frequency difference           Set wo channels in dependent, two phases (same frequency) and differential output (same requency difference, constant frequency return)           Same value setting, same operation<	Sweep input/output	Sweep sync/marker output, sweep X drive output,
Burst mode         Auto burst, trigger burst, gate, and triggered gate modes (The gate is turned on/off at each trigger in the triggered gate mode.)           Number of mark/space waves:         0.5 cycles to 599,999.5 cycles; in 0.5-cycle unit           Oscillation stop unit in the gate mode         1 cycle or 0.5 cycles selectable           In the gate mode         -1800.000° to +1800.000°           Specifying signal level while oscillation is stopped         Setting range: -100.00% to -100.00%, Oscillation stops at the set oscillation start/stop phase when the stop level is set to off.           Trigger source         Internal or external selectable, manual trigger allowed           Internal roger oscillator         1.0 µs to 1.000 s (5-digit/0.1 µs resolution)           Trigger delay         0.00 µs to 1000.00 s (6-digit/0.01 µs resolution)           Except for latent delay. Valid in the trigger burst mode only.         Except for latent delay. Valid in the trigger burst mode only.           Y=channel Ganged Operation.(VFF1944 only)         Channel mode         Two channels independent, two phases (same frequency), constant frequency difference. constant frequency difference           Same value setting, same operation         Set two channels at the same time.           Same value setting, same operation         Set two channels of N and M)           N : M setting range         1.0 9,999,999 (for each of N and M)           Frequency reference ouput         1.0 welthy oreference ouput and external 10 MHz frequency refere		sweep external control input, sweep external trigger input
Burst mode         Auto burst, trigger burst, gate, and triggered gate modes (The gate is turned on/off at each trigger in the triggered gate mode.)           Number of mark/space waves:         0.5 cycles to 599,999.5 cycles; in 0.5-cycle unit           Oscillation stop unit in the gate mode         1 cycle or 0.5 cycles selectable           In the gate mode         -1800.000° to +1800.000°           Specifying signal level while oscillation is stopped         Setting range: -100.00% to -100.00%, Oscillation stops at the set oscillation start/stop phase when the stop level is set to off.           Trigger source         Internal or external selectable, manual trigger allowed           Internal roger oscillator         1.0 µs to 1.000 s (5-digit/0.1 µs resolution)           Trigger delay         0.00 µs to 1000.00 s (6-digit/0.01 µs resolution)           Except for latent delay. Valid in the trigger burst mode only.         Except for latent delay. Valid in the trigger burst mode only.           Y=channel Ganged Operation.(VFF1944 only)         Channel mode         Two channels independent, two phases (same frequency), constant frequency difference. constant frequency difference           Same value setting, same operation         Set two channels at the same time.           Same value setting, same operation         Set two channels of N and M)           N : M setting range         1.0 9,999,999 (for each of N and M)           Frequency reference ouput         1.0 welthy oreference ouput and external 10 MHz frequency refere		
Internet         The gate is turned on/off at each trigger in the triggered gate mode.)           Number of mark/space aware         0.5 cycles to 599,999.5 cycles, in 0.5-cycle unit           Oscillation stop unit         1 cycle or 0.5 cycles selectable           In the gate mode         -1800.000° to +1800.000°           Phase setting range         -1800.000° to +1800.000°           Stop level         Specifying signal level while oscillation is stopped           Setting range;100.00% to +100.00%         Oscillation stops at the set oscillation is storypase when the stop level is set to off.           Trigger source         Internal or external selectable, manual trigger allowed           Internal trigger input         10 us to 1,000 s (6-digit/0.01 us resolution)           Trigger delay         0.00 us to 100.00 s (6-digit/0.01 us resolution)           External trigger input         Th: Level, input impedance 10 k0 (Pulled up to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed <b>*2-channel Ganged Operation</b> (WF1948 only)         Channel mode           Trequency difference         0.00 µLz to less than 30 MHz (0.01 µLz resolution)           Same value setting, same operation         Set two channels at the same time.           same operation         CH= 2 frequency (If rencue, C)           Frequency ration         N = CH-2 frequency = CH-1 frequency <t< td=""><td></td><td></td></t<>		
Number of mark/space waves         0.5 cycles to 999,999.5 cycles, in 0.5-cycle unit           Oscillation stop unit in the gate mode         1 cycle or 0.5 cycles selectable           Phase setting range         -1800.000° to +1800.000°           Stop level         Specifying signal level while oscillation is stopped Setting range : -100.00% to +100.00%, Oscillation stops at the set oscillation start/stop phase when the stop level is set to off.           Trigger source         Internal or external selectable, manual trigger allowed           Internal trigger oscillator         1.0 µs to 1.000 (5 6-digit/0.1 µs resolution)           Except for latent delay, Valid in the trigger burst mode only.         Except for latent delay, Valid in the trigger burst mode only.           External trigger input         TTL level, input impedance 10 kΩ (pulled up to +3.3 V), unbalanced Panel key operation, trigger delay allowed           V=channel Ganged Operation(WF1948 only)         Channel mode           Two channels independent, two phases (same frequency), constant frequency difference.         Constant frequency ratio, and differential output (same peration           Set two channels at the same time.         Set two channels at the same time.           Set two channels at the same time.         Set two channels at the same time.           Set two channels at the same time.         Set two channels at the same time.           Set two channels at the same time.         Set two channels in de same time.           Set t	Burst mode	
Oscillation stop unit       1 cycle or 0.5 cycles selectable         in the gate mode       -1800.000° to +1800.000°         Phase setting range       -1800.000° to +100.00% to +100.00%         Stop level       Specifying signal level while oscillation is stopped         Setting range : -100.00% to +100.00%       Oscillation stops at the set oscillation start/stop phase when the stop         Internal frigger source       Internal or external selectable, manual trigger allowed         Internal frigger oscillator       1.0 us to 1.000 s (5-digit/0.1 us resolution)         Trigger delay       0.00 us to 100.00 s (6-digit/0.1 us resolution)         External trigger input       TTL level, input impedance 10 kΩ (pulled up to +3.3 V), unbalanced         Manual trigger       Panel key operation, trigger delay allowed <b>V2-channel Ganged Operation(WF1948 only)</b> Channel mode         Two channels independent, two phases (same frequency, constant frequency difference, constant frequency ratio, and differential output (same frequency, amplitude, DC offset, reversed waveform)         Same value setting, same value setting, same operation       Set two channels and 30 MHz (0.01 µHz resolution)         Frequency difference       0.00 µHz to less than 30 MHz (0.01 µHz resolution)         Frequency ference input       Inv voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         Frequency reference input       IN M= Ch-2 frequency: cH-1 frequency		
in the gate mode       -1800.000° to +1800.000°         Phase setting range       -1800.000° to +100.00%         Stop level       Specifying signal level while oscillation is stopped         Stop level       Specifying signal level while oscillation star/stop phase when the stop level is set to off.         Trigger source       Internal or external selectable, manual trigger allowed         Internal trigger oscillator       1.0 µs to 1.000 s (6-digi/10.1 µs resolution)         External trigger input       TTL level, input impedance 10 kQ (pulled up to +3.3 V), unbalanced         Manual trigger       Panel key operation, trigger delay allowed <b>2-channel Ganged Operation</b> (WF 1948 only)         Channel mode       Two channels independent, two phases (same frequency, constant frequency ratio, and differential output (same frequency, amplitude, DC offset, reversed waveform)         Same value setting,       Set two channels at the same time.         Serfequency difference       0.00 µHz to less than 30 MHz (0.01 µHz resolution)         setting range       CH-2 frequency : CH-1 frequency         V Other Functions       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         External addition input       Input voltage : 1.5 Vp-p 50 Ω, square,         output       10 MHz (for Synchronization of multiple units )         External addition input voltage : 1.5 Vp-p 10 for selectable         Input voltage / Encypere	Number of mark/space waves	s 0.5 cycles to 999,999.5 cycles, in 0.5-cycle unit
in the gate mode       -1800.000° to +1800.000°         Phase setting range       -1800.000° to +100.00%         Stop level       Specifying signal level while oscillation is stopped         Stop level       Specifying signal level while oscillation star/stop phase when the stop level is set to off.         Trigger source       Internal or external selectable, manual trigger allowed         Internal trigger oscillator       1.0 µs to 1.000 s (6-digi/10.1 µs resolution)         External trigger input       TTL level, input impedance 10 kQ (pulled up to +3.3 V), unbalanced         Manual trigger       Panel key operation, trigger delay allowed <b>2-channel Ganged Operation</b> (WF 1948 only)         Channel mode       Two channels independent, two phases (same frequency, constant frequency ratio, and differential output (same frequency, amplitude, DC offset, reversed waveform)         Same value setting,       Set two channels at the same time.         Serfequency difference       0.00 µHz to less than 30 MHz (0.01 µHz resolution)         setting range       CH-2 frequency : CH-1 frequency         V Other Functions       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         External addition input       Input voltage : 1.5 Vp-p 50 Ω, square,         output       10 MHz (for Synchronization of multiple units )         External addition input voltage : 1.5 Vp-p 10 for selectable         Input voltage / Encypere	Oscillation stop unit	
Phase setting range         -1800.000° to +1800.000°           Stop level         Specifying signal level while oscillation is stopped           Stetting range: -100.00% to +100.00%         Oscillation stops at the set oscillation start/stop phase when the stop level is set to off.           Trigger source         Internal or external selectable, manual trigger allowed           Internal or external selectable, manual trigger allowed         Internal or external selectable, manual trigger allowed           Trigger delay         0.00 µs to 100.00 s (8-digit/0.1 µs resolution)           Except for latent delay. Valid in the trigger burst mode only.           External trigger input         TTL level, input impedance 10 kΩ (pulled up to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed <b>2-channel Ganged Operation</b> (WF 1948 only)         Channel mode           Two channels independent, two phases (same frequency), constant frequency difference, constant frequency fiference (solid), and differential output (same frequency amplitude, DC offset, reversed waveform)           Same value setting, same operation         Set two channels at the same time.           same operation         CH-1 frequency - CH-1 frequency           Frequency ratio         1 to 9,999,999 (for each of N and M)           N : M = CH-2 frequency : CH-1 frequency           Frequency reference output voltage : 1 Vp-p/50 Ω, square, output voltage i: 1 Vp-2 /50 Ω, square, 10 MHz (for Sy		
Stop level         Specifying signal level while oscillation is stopped Setting range: -100.00% to +100.00% Oscillation stops at the set oscillation start/stop phase when the stop level is set to off.           Trigger source         Internal or external selectable, manual trigger allowed           Internal figger oscillator         10.00 to (5.6-digit/0.1 µs resolution)           Trigger delay         0.00 µs to 100.00 s (6-digit/0.1 µs resolution)           External trigger input         TTL level, input impedance 10 KQ (pulled µp to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed <b>2-channel Ganged Operation</b> (WF1948 only)         Channels independent, two phases (same frequency), constant frequency difference, constant frequency and differential output (same frequency, amplitude, DC offset, reversed waveform)           Same value setting, same operation         Set two channels at the same time.           Frequency difference         0.00 µHz to less than 30 MHz (0.01 µHz resolution) CH-2 frequency -CH-1frequency           Frequency ratio         1 to 9.999.990 (for each of N and M) N : M setting range           Frequency reference output         Input voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units)           External addition input         Gain : x0.4, x2, x10 or off, selectable Input voltage/frequency : 1 Vto +1 V, DC to 10 MHz (rague, yreference input User defined unit           Setting target: Frequency, period, amplitude, DC offset, phase, and dut Setting target: Frequency, referenc		-1800.000° to +1800.000°
Setting range : -100.00% to +100.00% Oscillation stops at the set oscillation start/stop phase when the stop level is set to off.           Trigger source         Internal or external selectable, manual trigger allowed           Internal rigger oscillator         1.0 us to 1,000 s (6-digit/10.1 µs resolution)           Except for latent delay. Valid in the trigger burst mode only.         External trigger input           External trigger oscillator         1.0 us to 1,000 s (6-digit/10.1 µs resolution)           External trigger input         TTL Level, input impedance 10 kQ (pulled up to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed <b>2-channel Ganged Operation</b> (WF1948 only)           Channel mode         Two channels independent, two phases (same frequency), constant frequency difference, constant frequency ratio, and differential output (same frequency - CH-1frequency           Same value setting, same operation         Set two channels at the same time.           Frequency difference         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           Setting range         CH-2 frequency: CH-1 frequency           Frequency ratio         1 to 9,999,999 (for each of N and M)           N : M = CH-2 frequency : CH-1 frequency         Frequency ference           Output voltage : 1 Vp-p/50 Ω, square,         10 MHz (for Synchronization of multiple units )           External addition input         Gain : ×0.4, ×2, ×10 or off, s		
Oscillation stops at the set oscillation start/stop phase when the stop level is set to off.           Trigger source         Internal or external selectable, manual trigger allowed           Internal trigger oscillator         1.0 µs to 1.000 s (5-digit/0.1 µs resolution)           Trigger delay         0.00 µs to 100.00 s (6-digit/0.01 µs resolution)           External trigger input         TTL level, input impedance 10 KQ (pulled up to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed <b>2-channel Ganged Operation(WF1948</b> only)         Channels independent, two phases (same frequency), constant frequency difference, constant frequency, ratio, and differential output (same frequency, amplitude, DC offset, reversed waveform)           Same value setting,         Set two channels at the same time.           same operation         Set wo channels at the same time.           Frequency difference         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           K-H2 frequency - CH-1 frequency         Frequency           Frequency rating range         N: M = CH-2 frequency - CH-1 frequency           Vother Functions         Input voltage : 1 Vp-p/50 Ω, square,           evalue         0 MHz (for Synchronization of multiple units )           External addition input         Gain : 40.4, x2, x10 or off, selectable           Input voltage/frequency : = 1 V to +1 V, DC to 10 MHz (-3 dB)           Input impedan		
level is set to off.           Trigger source         Internal or external selectable, manual trigger allowed           Internal trigger oscillator         1.0 µs to 1.000 s (5-digit/0.1 µs resolution)           Trigger delay         0.00 µs to 100.00 s (8-digit/0.1 µs resolution)           External trigger input         TTL level, input impedance 10 kQ (pulled up to +3 3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed <b>2-channel Ganged Operation(WF1948</b> only)         Channel mode           Channel work         Two channels independent, two phases (same frequency), constant frequency amplitude, DC offset, reversed waveform)           Same value setting, same operation         Set two channels and the same time.           Same value setting, same operation         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           Setting range         CH-2 frequency - CH-1frequency           Frequency difference         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           setting range         N := CH-2 frequency - CH-1 frequency           Vother Functions         Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square           Frequency reference input         Input voltage : 0.5 Vp-p fo0 Ω, square, output           10 MHz frequency         Input voltage / frequency : -1 V to +1 V, D C to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced           Synchronous operation         Gain : x0.4,		
Trigger source         Internal or external selectable, manual trigger allowed           Internal trigger oscillator         1.0 μs to 1,000 s (5-digit/0.01 μs resolution)           Trigger delay         0.00 μs to 100.00 s (6-digit/0.01 μs resolution)           External trigger input         TTL level, input impedance 10 kΩ (pulled up to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed <b>2-channel Ganged Operation(WF1948 only)</b> Two channels independent, two phases (same frequency), constant frequency, amplitude, DC offset, reversed waveform)           Same value setting, same operation         Set two channels at the same time.           same operation         CH-2 frequency - CH-1frequency           Frequency difference         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           setting range         N = CH-2 frequency - CH-1frequency           Frequency ratio         In b 9.999.999 (for each of N and M)           N : M setting range         N = CH-2 frequency - CH-1 frequency           Frequency reference         Output voltage : 0.5 Vp-p to 5 Vp-p, Sine or square           reference input         They voltage (frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)           Input voltage / frequency : reference output and external 10 MHz frequency inference: on the frequency reference output and external 10 MHz frequency reference input           Upt to funct frequency : requency reference output and external 10 M		
Internal trigger oscillator         1.0 µs to 1,000 s (5-digit/0.1 µs resolution)           Trigger delay         0.00 µs to 100.00 s (6-digit/0.01 µs resolution)           External trigger input         TTL level, input impedance 10 KQ (pulled up to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed <b>2-channel Ganged Operation(WF1948</b> only)         The level, input impedance 10 KQ (pulled up to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed <b>2-channel Ganged Operation(WF1948</b> only)         The only of the operation of the opera	Trigger source	
Trigger delay       0.00 μs to 100.00 s (8-digit/0.01 μs resolution)         External trigger input       TTL level, input impedance 10 kΩ (pulled up to +3.3 V), unbalanced         Manual trigger       Panel key operation, trigger delay allowed <b>V2-channel Ganged Operation(WF1948 only)</b> Channel mode       Two channels independent, two phases (same frequency), constant frequency care, and differential output (same frequency, amplitude, DC offset, reversed waveform)         Same value setting, same frequency, amplitude, DC offset, reversed waveform)         Same value setting, same frequency, amplitude, DC offset, reversed waveform)         Same value setting, same operation         Frequency difference       0.00 µHz to less than 30 MHz (0.01 µHz resolution)         Setting range       CH-2 frequency - CH-1frequency         Frequency ratio       1 to 9,999.999 (for each of N and M)         N : M setting range       N : M= CH-2 frequency : CH-1 frequency         Vother Functions       External 10 MHz frequency         External 10 MHz frequency       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         reference input       Input voltage : 1 Vp-p/50 Ω, square,         Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)       Input voltage/frequency, eriod, amplitude, DC offset, phase, and duty         Synchronous operation       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and e		
Except for latent delay. Valid in the trigger burst mode only.           External trigger input         TTL level, input impedance 10 k0 (pulled up to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed           V2-channel Ganged Operation(WF1948 only)           Channel mode         Two channels independent, two phases (same frequency), constant frequency difference, constant frequency ratio, and differential output (same frequency, amplitude, DC offset, reversed waveform)           Same operation         Set two channels at the same time.           Same operation         CH-2 frequency - CH-1 frequency           Frequency difference         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           Same operation         N : M = CH-2 frequency : CH-1 frequency           Frequency ratio         N : M > CH-2 frequency : CH-1 frequency           Frequency reference input         Input voltage : 1 Vp-p/50 Ω, square,           Output voltage : 1 Vp-p/50 Ω, square,         10 MHz (ros Synchronization of multiple units )           External addition input         Gain : ×0.4, ×2, ×10 or off, selectable           Input woltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)         Input medance input set on square           Setting range         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input           Setting target : Frequency, period, amplitude, DC offset,		
External trigger input         TTL level, input impedance 10 kΩ (pulled up to +3.3 V), unbalanced           Manual trigger         Panel key operation, trigger delay allowed           V2-channel Ganged Operation(WF1948 only)           Channel mode         Two channels independent, two phases (same frequency), constant frequency difference, constant frequency ratio, and differential output (same frequency, amplitude, DC offset, reversed waveform)           Same value setting, same operation         Set two channels at the same time.           Frequency difference         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           CH-2 frequency - CH-1frequency         Frequency ratio           N : Me Setting range         N : Me CH-2 frequency : CH-1 frequency           Vother Functions         Presence           External 10 MHz frequency reference input         Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square           Frequency reference output         Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )           External addition input         Gain : v.0, x 2, x10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced           Synchronous operation of multiple units         Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty frequency fierence (SPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization         Function to	I rigger delay	
Manual trigger         Panel key operation, trigger delay allowed           V2-channel Ganged Operation(WF1948 only)         Two channels independent, two phases (same frequency), constant frequency difference, constant frequency, and differential output (same frequency, amplitude, DC offset, reversed waveform)           Same value setting, same operation         Set two channels at the same time.           Frequency difference         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           Setting range         CH-2 frequency - CH-1frequency           Frequency ratio         1 to 9,999,999 (for each of N and M)           N : M setting range         N : M = CH-2 frequency : CH-1 frequency           Vother Functions         External 10 MHz frequency           Frequency reference         Output voltage : 0.5 Vp-p to 5 Vp-p, Sine or square           output         10 MHz frequency           Frequency reference         Output voltage : 1 Vp-p/50 Ω, square,           output         10 MHz (for Synchronization of multiple units )           External addition input         Gain :: v0.4, v2, ×10 or off, selectable           Input woltage / frequency : = 10 KD unbalanced         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input           User defined unit         Sets and displays the value in any unit, according to the specified conversion expression.           Setting target : Frequen		
<b>V</b> 2-channel Ganged Operation(WF1948 only)         Channel mode       Two channels independent, two phases (same frequency), constant frequency difference, constant frequency ratio, and differential output (same frequency, amplitude, DC offset, reversed waveform)         Same value setting, same operation       Set two channels at the same time.         Same value setting, range       Set two channels at the same time.         Frequency difference       0.00 µHz to less than 30 MHz (0.01 µHz resolution)         Frequency ratio       1 to 9,999,999 (for each of N and M)         N : M setting range       N : M = CH-2 frequency : CH-1 frequency <b>V Other Functions</b> Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         reference input       Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )         External addition input       Gain : x0.4, x2, x10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance: 10 kΩ unbalanced         Synchronous operation of multiple units       frequency reference output and external 10 MHz frequency reference input         User defined unit       Sets and displays the value in any unit, according to the specified conversion expression.         Setting memory       10 settings can be memorized (saved in the nonvolatile memory).         Interface       GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Phase synchronization       Function to restart from the phase where the output waveform	External trigger input	TTL level, input impedance 10 kΩ (pulled up to +3.3 V), unbalanced
Channel mode         Two channels independent, two phases (same frequency), constant frequency difference, constant frequency and differential output (same frequency, amplitude, DC offset, reversed waveform)           Same value setting, same operation         Set two channels at the same time.           Frequency difference setting range         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           Prequency ratio         1 to 9,999,999 (for each of N and M)           N : M setting range         Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square <b>V Other Functions</b> Input voltage : 1.0 Vp-p/50 Ω, square,           External 10 MHz frequency reference input         Output voltage : 1.0 Vp-p/50 Ω, square,           requency reference output voltage / frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance: 10 kD unbalanced           Synchronous operation of multiple units         Gain : ×0.4, ×2, ×10 or off, selectable Input voltage / frequency : efference output and external 10 MHz frequency reference input           User defined unit         Sets and displays the value in any unit, according to the specified conversion expression.           Setting memory         10 settings can be memorized (saved in the nonvolatile memory).           Interface         GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           V Generals         3.5 inch TFT color	Manual trigger	Panel key operation, trigger delay allowed
Channel mode         Two channels independent, two phases (same frequency), constant frequency difference, constant frequency and differential output (same frequency, amplitude, DC offset, reversed waveform)           Same value setting, same operation         Set two channels at the same time.           Frequency difference setting range         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           Prequency ratio         1 to 9,999,999 (for each of N and M)           N : M setting range         Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square <b>V Other Functions</b> Input voltage : 1.0 Vp-p/50 Ω, square,           External 10 MHz frequency reference input         Output voltage : 1.0 Vp-p/50 Ω, square,           requency reference output voltage / frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance: 10 kD unbalanced           Synchronous operation of multiple units         Gain : ×0.4, ×2, ×10 or off, selectable Input voltage / frequency : efference output and external 10 MHz frequency reference input           User defined unit         Sets and displays the value in any unit, according to the specified conversion expression.           Setting memory         10 settings can be memorized (saved in the nonvolatile memory).           Interface         GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           V Generals         3.5 inch TFT color	W2 sharped Conver	
frequency difference, constant frequency ratio, and differential output (same frequency, amplitude, DC offset, reversed waveform)           Same value setting, same operation         Set two channels at the same time.           Frequency difference setting range         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           Frequency ratio         1 to 9,999,999 (for each of N and M)           N : M setting range         N : M = CH-2 frequency : CH-1 frequency <b>V Other Functions</b> External 10 MHz frequency reference input           Frequency reference output         Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square 10 MHz (for Synchronization of multiple units )           External addition input         Gain : x0.4, x2, x10 or off, selectable Input voltage / frequency = 1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kQ unbalanced           Synchronous operation of multiple units         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input           User defined unit         Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty Setting memory           10 settings can be memorized (saved in the nonvolatile memory). Interface         GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching <b>V </b>		
(same frequency, amplitude, DC offset, reversed waveform)           Same value setting, same operation         Set two channels at the same time.           Frequency difference         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           Setting range         CH-2 frequency - CH-1 frequency           Frequency ratio         1 to 9,999,999 (for each of N and M)           N : M setting range         N : M= CH-2 frequency : CH-1 frequency           Vother Functions         Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square           reference input         Output voltage : 1 Vp-p/50 Ω, square,           output         10 MHz (for Synchronization of multiple units )           External addition input         Gain : ×0.4, ×2, ×10 or off, selectable           Input woltage / frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)           Input impedance : 10 kQ unbalanced           Synchronous operation of           Wp to 6 units can be connected in the form of master/slave, using the           multiple units         frequency reference output and external 10 MHz frequency reference input           User defined unit         Sets and displays the value in any unit, according to the specified conversion expression.           Setting memory         10 setting target : Frequency, period, amplitude, DC offset, phase, and duty           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are	Channel mode	
Same value setting, same operation       Set two channels at the same time.         Frequency difference setting range       0.00 µHz to less than 30 MHz (0.01 µHz resolution) CH-2 frequency - CH-1frequency         Frequency ratio       1 to 9,999,999 (for each of N and M) N : M setting range       N : M = CH-2 frequency - CH-1frequency         ✓ Other Functions       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         External 10 MHz frequency reference input       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         Frequency reference output       Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )         External addition input       Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced         Synchronous operation of multiple units       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         User defined unit       Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty         Setting memory       10 settings can be memorized (saved in the nonvolatile memory).         Interface       GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Phase synchronization       Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         VGenerals		
same operation         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           Frequency difference setting range         0.00 µHz to less than 30 MHz (0.01 µHz resolution)           Frequency ratio         1 to 9,999,999 (for each of N and M)           N : M setting range         N : M = CH-2 frequency : CH-1 frequency <b>V Other Functions</b> Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square           reference input         Input voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )           External addition input         Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/ frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input woltage/ frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced           Synchronous operation of multiple units         Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty Setting memory           Inserting target : GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization           Phase synchronization           Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching <b>Cenerals</b> Display         3.5 inch TFT color LCD           Input/output ground         The signal ground for external 10 MHz frequency reference input is insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulat		
Frequency difference setting range       0.00 μHz to less than 30 MHz (0.01 μHz resolution) CH-2 frequency - CH-1frequency         Frequency ratio       1 to 9,999,999 (for each of N and M) N : M setting range         N : M = CH-2 frequency : CH-1 frequency         ✓ Other Functions         External 10 MHz frequency reference input         Frequency reference output         0 MHz (for Synchronization of multiple units )         External addition input         Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced         Synchronous operation of multiple units         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         User defined unit       Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty         Setting memory       10 settings can be memorized (saved in the nonvolatile memory).         Interface       GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Phase synchronization       The signal ground for waterform output, sync/sub output and external modulation / addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.         Phase synchronization       The signal ground for external 10 MHz frequency reference input is insulated from the housing.      <	Same value setting,	Set two channels at the same time.
setting range         CH-2 frequency - CH-1frequency           Frequency ratio         1 to 9,999,999 (for each of N and M)           N : M setting range         N : M = CH-2 frequency : CH-1 frequency <b>V Other Functions</b> Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square           Frequency reference input         Input voltage : 1 Vp-p/50 Ω, square,           Youtput         10 MHz (for Synchronization of multiple units )           External addition input         Gain : ×0.4, ×2, ×10 or off, selectable           Input impedance: 10 KD unbalanced         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input           User defined unit         Sets and displays the value in any unit, according to the specified conversion expression.           Setting memory         10 settings can be memorized (saved in the nonvolatile memory).           Interface         GPIB, USBTMC (SCPI-1999, IEE-488.2)           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching.           Vegenerals         3.5 inch TFT color LCD           Input/output ground         The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.)         50 Hz/60 Hz ±2 Hz           Dimen	same operation	
Frequency ratio       1 to 9,999,999 (for each of N and M)         N : M setting range       N : M = CH-2 frequency : CH-1 frequency         ✓ Other Functions       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         Frequency reference input       Output voltage : 1 Vp-p/50 Ω, square,         Frequency reference       Output voltage : 1 Vp-p/50 Ω, square,         output       10 MHz (for Synchronization of multiple units )         External addition input       Gain : ×0.4, ×2, ×10 or off, selectable         Input impedance : 10 kΩ unbalanced       Input impedance : 10 kΩ unbalanced         Synchronous operation of       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         User defined unit       Sets and displays the value in any unit, according to the specified conversion expression.         Setting memory       10 settings can be memorized (saved in the nonvolatile memory).         Interface       GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Phase synchronization       Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         ✓ Generals       3.5 inch TFT color LCD         Input/output ground       The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing.         Power requirements       AC100 V	Frequency difference	0.00 µHz to less than 30 MHz (0.01 µHz resolution)
Frequency ratio       1 to 9,999,999 (for each of N and M)         N : M setting range       N : M = CH-2 frequency : CH-1 frequency         ✓ Other Functions       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         Frequency reference input       Output voltage : 1 Vp-p/50 Ω, square,         Frequency reference       Output voltage : 1 Vp-p/50 Ω, square,         output       10 MHz (for Synchronization of multiple units )         External addition input       Gain : ×0.4, ×2, ×10 or off, selectable         Input impedance : 10 kΩ unbalanced       Input impedance : 10 kΩ unbalanced         Synchronous operation of       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         User defined unit       Sets and displays the value in any unit, according to the specified conversion expression.         Setting memory       10 settings can be memorized (saved in the nonvolatile memory).         Interface       GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Phase synchronization       Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         ✓ Generals       3.5 inch TFT color LCD         Input/output ground       The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing.         Power requirements       AC100 V	setting range	CH-2 frequency - CH-1frequency
N : M setting range       N : M = CH-2 frequency : CH-1 frequency <b>Conter Functions</b> Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         External 10 MHz frequency reference input       Input voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )         External addition input       Gain : x0.4, x2, x10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced         Synchronous operation of multiple units       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input User defined unit         Set and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty Setting memory         I0 setting target : Frequency, period, amplitude, DC offset, phase, and duty the channels are set, automatic execution at channel mode switching         V Generals         Display       3.5 inch TFT color LCD         Input/output ground       The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.         Power requirements       AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz         Dimensions(mm)       216(W)×132.5(H)×288(D)         Power consumption       WF1947 : 50 VA max. WF1948 : 75 VA max.         Operation temperature/ humid		
Other Functions           External 10 MHz frequency reference input         Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square           Frequency reference output         Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )           External addition input         Gain : x0.4, x2, x10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced           Synchronous operation of multiple units         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty Setting memory           I10 settings can be memorized (saved in the nonvolatile memory). Interface         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           V Generals         3.5 inch TFT color LCD           Input/output ground         The signal ground for external 10 MHz frequency reference input is insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         MC100 V to 2.5% KB H     <		
External 10 MHz frequency reference input       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         Frequency reference output       Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )         External addition input       Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : −1 V to +1 V, DC to 10 MHz (−3 dB) Input impedance : 10 kΩ unbalanced         Synchronous operation of multiple units       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         User defined unit       Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty         Setting memory       10 settings can be memorized (saved in the nonvolatile memory).         Interface       GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Phase synchronization       Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         ✓ Generals       Display       3.5 inch TFT color LCD         Input/output ground       The signal ground for external 10 MHz frequency reference input is insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.         Power requirements       AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz         Dimensions(mm)       216(W)×132.5(H)×288(D)         Power consumption       <	W Solung Idilyc	
reference input         Frequency reference output       Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )         External addition input       Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced         Synchronous operation of multiple units       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         User defined unit       Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty         Setting memory       10 settings can be memorized (saved in the nonvolatile memory).         Interface       GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Phase synchronization       Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         ✓ Generals       J5. inch TFT color LCD         Input/output ground       The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.         Power requirements       AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz         Dimensions(mm)       216(W)×132.5(H)×288(D)         Power consumption       WF1947 : 50 VA max. WF1948 : 75 VA max.         Operat	It. M setting range	
reference input         Frequency reference output       Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )         External addition input       Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced         Synchronous operation of multiple units       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         User defined unit       Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty         Setting memory       10 settings can be memorized (saved in the nonvolatile memory).         Interface       GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Phase synchronization       Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         ✓ Generals       J5. inch TFT color LCD         Input/output ground       The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.         Power requirements       AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz         Dimensions(mm)       216(W)×132.5(H)×288(D)         Power consumption       WF1947 : 50 VA max. WF1948 : 75 VA max.         Operat	Other Functions	
Frequency reference output       Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )         External addition input       Gain : x0.4, x2, x10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced         Synchronous operation of multiple units       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input User defined unit         Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty Setting memory         10 settings can be memorized (saved in the nonvolatile memory).         Interface         GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         V Generals         Display       3.5 inch TFT color LCD         Input/output ground       The signal ground for external 10 MHz frequency reference input is insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.         Power requirements       AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz         Dimensions(mm)       216(W)×132.5(H)×288(D)         Power consumption       WF1947 : 50 VA max. WF1948 : 75 VA max.         Operation temperature/ humidity range </td <td>▼Other Functions</td> <td></td>	▼Other Functions	
output         10 MHz (for Synchronization of multiple units )           External addition input         Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : - 1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kQ unbalanced           Synchronous operation of multiple units         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input User defined unit           User defined unit         Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty Setting memory           10 settings can be memorized (saved in the nonvolatile memory). Interface         GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           V Generals         3.5 inch TFT color LCD           Input/output ground         The signal ground for external 10 MHz frequency reference input is insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Ap	Other Functions     External 10 MHz frequence	
External addition input       Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced         Synchronous operation of multiple units       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         User defined unit       Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty         Setting memory       10 settings can be memorized (saved in the nonvolatile memory). Interface         Phase synchronization       Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         V Generals       3.5 inch TFT color LCD         Display       3.5 inch TFT color LCD         Input/output ground       The signal ground for external 10 MHz frequency reference input is insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.         Power requirements       AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz         Dimensions(mm)       216(W)×132.5(H)×288(D)         Power consumption       WF1947 : 50 VA max. WF1948 : 75 VA max.         Operation temperature/ humidity range       0°C to +4°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)         Weight       Approx. 2.6 kg (main unit excluding accessories)	▼ Other Functions External 10 MHz frequency reference input	y Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square
Input voltage / frequency : −1 V to +1 V, DC to 10 MHz (−3 dB) Input impedance : 10 kΩ unbalanced           Synchronous operation of multiple units         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input           User defined unit         Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty           Setting memory         10 settings can be memorized (saved in the nonvolatile memory).           Interface         GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           ✓ Generals         0           Display         3.5 inch TFT color LCD           Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx 2.6 kg (main unit ex	Other Functions     External 10 MHz frequency     reference input     Frequency reference	y Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square Output voltage : 1 Vp-p/50 Ω, square,
Input impedance : 10 kΩ unbalanced           Synchronous operation of multiple units         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input           User defined unit         Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty           Setting memory         10 settings can be memorized (saved in the nonvolatile memory).           Interface         GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           ✓ Generals         Display         3.5 inch TFT color LCD           Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.)         50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)         Power consumption           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.         0°C to ±40°C, 5% to 85% RH humidity range           Weight         Approx. 2.6 kg (main unit excluding accessories)         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output	y Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )
Synchronous operation of multiple units       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input User defined unit         Set and displays the value in any unit, according to the specified conversion expression.       Setting target : Frequency, period, amplitude, DC offset, phase, and duty Setting target : Frequency, period, amplitude, DC offset, phase, and duty Inserting target : Frequency, period, amplitude, DC offset, phase, and duty Setting target : GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Phase synchronization       Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         ✓ Generals       Display         Display       3.5 inch TFT color LCD         Input/output ground       The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.         Power requirements       AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz         Dimensions(mm)       216(W)×132.5(H)×288(D)         Power consumption       WF1947 : 50 VA max. WF1948 : 75 VA max.         Operation temperature/       (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)         Weight       Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output	y Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units ) Gain : ×0.4, ×2, ×10 or off, selectable
multiple units         frequency reference output and external 10 MHz frequency reference input           User defined unit         Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and dut, Setting memory           10 settings can be memorized (saved in the nonvolatile memory).           Interface         GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           ▼ Generals         Display         3.5 inch TFT color LCD           Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation / addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/         (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output	y Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units ) Gain : x0.4, x2, x10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)
User defined unit         Sets and displays the value in any unit, according to the specified conversion expression. Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory). Interface           GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization           Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           ✓ Generals           Display         3.5 inch TFT color LCD           Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation / addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/         (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input	y Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units ) Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced
conversion expression.           Setting target : Frequency, period, amplitude, DC offset, phase, and duty           Setting target : Trequency, period, amplitude, DC offset, phase, and duty           Interface         GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           ✓ Generals         Display         3.5 inch TFT color LCD           Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 2 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o	y Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units ) Gain : x0.4, x2, x10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced f Up to 6 units can be connected in the form of master/slave, using the
Setting target : Frequency, period, amplitude, DC offset, phase, and duty.           Setting memory         10 settings can be memorized (saved in the nonvolatile memory).           Interface         GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           ✓ Generals         Display         3.5 inch TFT color LCD           Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.)         50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)         Power consumption           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.         0°C to +40°C, 5% to 85% RH           Mumidity range         (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)         Weight	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units	<ul> <li>y Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>f Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input</li> </ul>
Setting memory       10 settings can be memorized (saved in the nonvolatile memory).         Interface       GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Phase synchronization       Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         V Generals       Display       3.5 inch TFT color LCD         Input/output ground       The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.         Power requirements       AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz         Dimensions(mm)       216(W)×132.5(H)×288(D)         Power consumption       WF1947 : 50 VA max. WF1948 : 75 VA max.         Operation temperature/       (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)         Weight       Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable</li> <li>Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)</li> <li>Input impedance : 10 kΩ unbalanced</li> <li>Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input</li> <li>Sets and displays the value in any unit, according to the specified</li> </ul>
Interface         GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           ✓ Generals         Display         3.5 inch TFT color LCD           Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation / addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(VI)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/         (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units	y         Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square           Output voltage : 1 Vp-p/50 Ω, square,           10 MHz (for Synchronization of multiple units )           Gain : ×0.4, ×2, ×10 or off, selectable           Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)           Input impedance : 10 kΩ unbalanced           f         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input           Sets and displays the value in any unit, according to the specified conversion expression.
Phase synchronization         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           ✓ Generals         Solution	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit	y       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         Output voltage : 1 Vp-p/50 Ω, square,         10 MHz (for Synchronization of multiple units )         Gain : ×0.4, ×2, ×10 or off, selectable         Input impedance : 10 kΩ unbalanced         f       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         Sets and displays the value in any unit, according to the specified conversion expression.         Setting target : Frequency, period, amplitude, DC offset, phase, and duty
the channels are set, automatic execution at channel mode switching           ✓ Generals           Display         3.5 inch TFT color LCD           Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation / addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory	y         Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square           Output voltage : 1 Vp-p/50 Ω, square,         10 MHz (for Synchronization of multiple units )           Gain : x0.4, x2, x10 or off, selectable         Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)           Input impedance : 10 kΩ unbalanced         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input           Sets and displays the value in any unit, according to the specified conversion expression.         Setting target : Frequency, period, amplitude, DC offset, phase, and duty           10 settings can be memorized (saved in the nonvolatile memory).         Endets
the channels are set, automatic execution at channel mode switching           ✓ Generals           Display         3.5 inch TFT color LCD           Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation / addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/         0°C to +40°C, 5% to 85% RH humidity range           Meight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory	<ul> <li>y Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>f Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> </ul>
✓ Generals           Display         3.5 inch TFT color LCD           Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation / addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface	<ul> <li>y Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>f Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> </ul>
Display         3.5 inch TFT color LCD           Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.)         50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>If Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input</li> <li>Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> <li>Function to restart from the phase where the output waveforms for all</li> </ul>
Input/output ground         The signal grounds for waveform output, sync/sub output and external modulation / addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>If Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input</li> <li>Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> <li>Function to restart from the phase where the output waveforms for all</li> </ul>
modulation / addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     Generals	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable</li> <li>Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)</li> <li>Input impedance : 10 kΩ unbalanced</li> <li>If Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input</li> <li>Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> <li>Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching</li> </ul>
The signal ground for external 10 MHz frequency reference input is insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     Generals     Display	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>If Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input</li> <li>Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> <li>Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching</li> <li>3.5 inch TFT color LCD</li> </ul>
insulated from the housing.           Power requirements         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/         0°C to ±40°C, 5% to 85% RH           humidity range         (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     Generals     Display	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> <li>Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching</li> <li>3.5 inch TFT color LCD</li> <li>The signal grounds for waveform output, sync/sub output and external</li> </ul>
Power requirements         AC100 V to 230 V ±10% (250 V max.)         50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)         Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     Generals     Display	y         Input voltage : 0.5 V <sub>P</sub> -p to 5 V <sub>P</sub> -p, Sine or square           Output voltage : 1 V <sub>P</sub> -p/50 Ω, square, 10 MHz (for Synchronization of multiple units )           Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced           f         Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input Sets and displays the value in any unit, according to the specified conversion expression.           Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).           GPIB, USBTMC (SCPI-1999, IEEE-488.2)           Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching           3.5 inch TFT color LCD           The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing.
Power requirements         AC100 V to 230 V ±10% (250 V max.)         50 Hz/60 Hz ±2 Hz           Dimensions(mm)         216(W)×132.5(H)×288(D)         Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     Generals     Display	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> <li>Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching</li> <li>3.5 inch TFT color LCD</li> <li>The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is</li> </ul>
Dimensions(mm)         216(W)×132.5(H)×288(D)           Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     Generals     Display	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> <li>Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching</li> <li>3.5 inch TFT color LCD</li> <li>The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is</li> </ul>
Power consumption         WF1947 : 50 VA max. WF1948 : 75 VA max.           Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     Generals     Display     Input/output ground	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>If Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> <li>Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching</li> <li>3.5 inch TFT color LCD</li> <li>The signal ground for waveform output, sync/sub output and external modulation/addition input are insulated from the housing.</li> <li>The signal ground for external 10 MHz frequency reference input is insulated from the housing.</li> </ul>
Operation temperature/ humidity range         0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     Generals     Display     Input/output ground     Power requirements	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>If Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> <li>Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching</li> <li>3.5 inch TFT color LCD</li> <li>The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing. The signal ground for external 10 MHz frequency reference input is insulated from the housing.</li> <li>AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz</li> </ul>
humidity range         (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)           Weight         Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     Generals     Display     Input/output ground     Power requirements     Dimensions(mm)	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : ×0.4, ×2, ×10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>If Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input</li> <li>Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty 10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> <li>Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching</li> <li>3.5 inch TFT color LCD</li> <li>The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing.</li> <li>The signal ground for external 10 MHz frequency reference input is insulated from the housing.</li> <li>AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz 216(W)×132.5(H)×288(D)</li> </ul>
Weight Approx. 2.6 kg (main unit excluding accessories)	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     V Generals     Display     Input/output ground     Power requirements     Dimensions(mm)     Power consumption	y       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         Output voltage : 1 Vp-p/50 Ω, square,       10 MHz (for Synchronization of multiple units )         Gain : ×0.4, ×2, ×10 or off, selectable       Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)         Input impedance : 10 kΩ unbalanced       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         Sets and displays the value in any unit, according to the specified conversion expression.       Setting target : Frequency, period, amplitude, DC offset, phase, and duty         10 settings can be memorized (saved in the nonvolatile memory).       GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         3.5 inch TFT color LCD         The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing.         The signal ground for external 10 MHz frequency reference input is insulated from the housing.         AC100 V to 230 V ±10% (250 V max.)       50 Hz/60 Hz ±2 Hz         216(W)×132.5(H)×288(D)         WF1947 : 50 VA max. WF1948 : 75 VA max.
	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     Venerals     Display     Input/output ground     Power requirements     Dimensions(mm)     Power consumption     Operation temperature/	y       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         Output voltage : 1 Vp-p/50 Ω, square,         10 MHz (for Synchronization of multiple units )         Gain : x0.4, x2, x10 or off, selectable         Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)         Input impedance : 10 kΩ unbalanced         f       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         Sets and displays the value in any unit, according to the specified conversion expression.         Setting target : Frequency, period, amplitude, DC offset, phase, and duty         10 settings can be memorized (saved in the nonvolatile memory).         GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         3.5 inch TFT color LCD         The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing.         The signal ground for external 10 MHz frequency reference input is insulated from the housing.         AC100 V to 230 V ±10% (250 V max.)       50 Hz/60 Hz ±2 Hz         216(W)×132.5(H)×288(D)       WF 1947 : 50 VA max.         0°C to +40°C, 5% to 85% RH       0°C to +40°C, 5% to 85% RH
Safety and EMC EN 61010-1:2010/EN 61326-1:2013	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     ✓ Generals     Display     Input/output ground     Power requirements     Dimensions(mm)     Power consumption     Operation temperature/     humidity range	y       Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square         Output voltage : 1 Vp-p/50 Ω, square,         10 MHz (for Synchronization of multiple units )         Gain : ×0.4, ×2, ×10 or off, selectable         Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB)         Input impedance : 10 kΩ unbalanced         f       Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input         Sets and displays the value in any unit, according to the specified conversion expression.         Setting target : Frequency, period, amplitude, DC offset, phase, and duty         10 settings can be memorized (saved in the nonvolatile memory).         GPIB, USBTMC (SCPI-1999, IEEE-488.2)         Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching         3.5 inch TFT color LCD         The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing.         The signal ground for external 10 MHz frequency reference input is insulated from the housing.         AC100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz         216(W)×132.5(H)×288(D)         WF1947 : 50 VA max. WF1948 : 75 VA max.         0°C to +40°C, 5% to 85% RH         (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)
	Other Functions     External 10 MHz frequency     reference input     Frequency reference     output     External addition input     Synchronous operation o     multiple units     User defined unit     Setting memory     Interface     Phase synchronization     Generals     Display     Input/output ground     Power requirements     Dimensions(mm)     Power consumption     Operation temperature/     humidity range     Weight	<ul> <li>Input voltage : 0.5 Vp-p to 5 Vp-p, Sine or square</li> <li>Output voltage : 1 Vp-p/50 Ω, square, 10 MHz (for Synchronization of multiple units )</li> <li>Gain : x0.4, x2, x10 or off, selectable Input voltage/frequency : -1 V to +1 V, DC to 10 MHz (-3 dB) Input impedance : 10 kΩ unbalanced</li> <li>If Up to 6 units can be connected in the form of master/slave, using the frequency reference output and external 10 MHz frequency reference input Sets and displays the value in any unit, according to the specified conversion expression.</li> <li>Setting target : Frequency, period, amplitude, DC offset, phase, and duty.</li> <li>10 settings can be memorized (saved in the nonvolatile memory).</li> <li>GPIB, USBTMC (SCPI-1999, IEEE-488.2)</li> <li>Function to restart from the phase where the output waveforms for all the channels are set, automatic execution at channel mode switching</li> <li>3.5 inch TFT color LCD</li> <li>The signal grounds for waveform output, sync/sub output and external modulation/addition input are insulated from the housing.</li> <li>Ac100 V to 230 V ±10% (250 V max.) 50 Hz/60 Hz ±2 Hz 216(W)×132.5(H)+288(D)</li> <li>WF1947 : 50 VA max. WF1948 : 75 VA max.</li> <li>0°C to +40°C, 5% to 85% RH (Absolute humidity : 1 g/m³ to 25 g/m³, no condensation)</li> <li>Approx. 2.6 kg (main unit excluding accessories)</li> </ul>

\* Guaranteed numerical value. Other numerical values are nominal or typical (typ.) values

The content of this catalog is current as of October 25st, 2024.External view and specifications are subject to change without prior notice.

Please check the latest specifications, prices, and lead time for purchase.
The company names and product names described here are trademarks

or registered trademarks of respective owners.