9. SPECIFICATIONS

(1) Electrical Performance

Table 9 - 1 Specifications of R5372/5373/5372P/5373P

Input / Item	INPUT A		INPUT B
Frequency measurement range	10 mHz to 10 MHz (DC coupling) 10 Hz to 10 MHz (AC coupling)	10 MHz to 550 MHz	500 MHz to 18 GHz (R5372/P) 500 MHz to 27 GHz (R5373/P)
Input impedance	Approx. 1 MΩ/60 pF or less	Approx. 50Ω	Approx. 50Ω
Input sensitivity	25 mVrms	25 mVrms	-20 dBm (500 MHz to 18 GHz) -15 dBm (18 GHz to 27 GHz)
Input attenuation	0 dB, 20 dB selectable 0 dB or 20 dB	ANS (ON, OFF)	AUTO on approx. 20dB
Maximum input level	500 mVrms/ATT. 0 dB 5 Vrms/ATT. 20 dB	500 mVrms/ANS OFF 5 Vrms/ANS ON	0 dBm (ATT: AUTO) +10 dBm (ATT: 20dB)
Damaging input	5 Vrms (1 MHz to 10 MHz) 10 Vrms (400 Hz to 1 MHz) 100 Vrms (DC to 400 Hz)	6 Vrms	+10 dBm (ATT: AUTO) +20dBm (ATT: 20dB)
Input coupling mode	DC/AC	AC	AC
Trigger level	Approx. -1 V to +1 V continuously variable (-10 V to +10 V/ATT. 20 dB)		
Resolution/ gate time	See Figure 9-1	Decade switching from 10 MHz/0.1 µs to 0.1 Hz/ 10 s	Decade switching from 10 MHz/ 0.1 µs to 0.1 Hz/ 10 s

Table 9 - 1 Specifications of R5372/5373/5372P/5373P (Cont'd)

Item \ Input	INPUT A		INPUT B
Measurement accuracy	±(trigger error/number of periods) ±1 count ±time base accuracy (See Figure 9-1 for frequency.)	±1 count ±time base accuracy	±1 count ±time base accuracy; Residual stability:±1/10x frequency[GHz] count rms
Measuring method	Reciprocal scheme	Direct count method	Direct counting made after heterodyne conversion by digital TRAHET system
Input connector	BNC type		N type (R5372/P) SMA type convertible into N type (R5373/P)

(Note) Trigger error: Within ±0.3% of sine wave input at signal-to-noise ratio of 40 dB or more

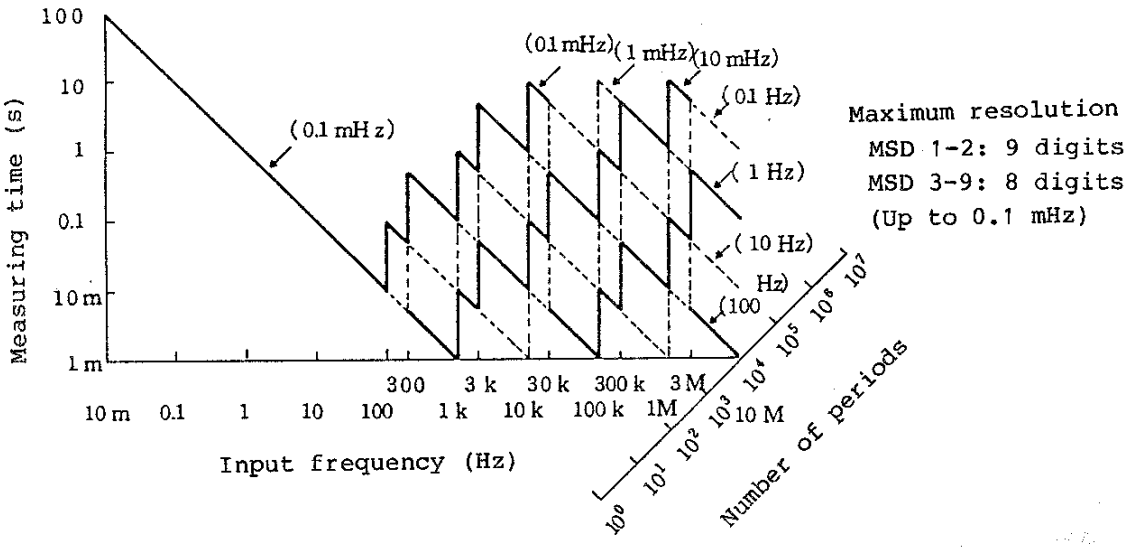

Figure 9 - 1 Measuring Time, Resolution, and Number of Periods Versus Input Frequency

Totalize [INPUT A (up to 10 MHz)]

Counting range : DC to 10 MHz

Counting capacity: 0 to $10^{10}-1$

Pulse width measurement [INPUT A (up to 10 MHz)] (R5372P/5373P only)

Measuring range : 50 ns to 1 s

Resolution for 10-pulse average measurement: 10 ns

Unit of display : µs (fixed decimal point)

Measurement accuracy: (±trigger error/$\sqrt{10}$) ±1 count ±time base accuracy

(Note) Trigger error: $\pm \frac{0.0025}{\text{Signal slope (V/µs)}}$

$\pm \frac{2 \times \text{(peak voltage of noise)}}{\text{Signal slope (V/µs)}}$ [µs]

Measurement mode [INPUT B]

AUTO : Acquisition time: Approx. 300 ms (From resetting to starting of counting)
FM tolerance: Max. 10 MHz p-p

MANUAL : Fixed band determined by frequency key setting.
No acquisition operation is made.
Bandwidth (FM tolerance):
±125 MHz or more(At 1.4 GHz to 18/27 GHz)
±25 MHz or more (At 0.5 GHz to 1.4 GHz)

Pulse-modulated carrier frequency measurement [MANUAL mode]

Measuring range : 100 MHz to 550 MHz [INPUT A]
500 MHz to 18 GHz [INPUT B] (R5372/P)
500 MHz to 27 GHz [INPUT B] (R5373/P)

Pulse width : 0.5 µs (min.) (R5372/5373)
100 ns to 0.1 s (internally synchronized) (R5372P/5373P)
50 ns to 0.1 s (externally synchronized) (R5372P/5373P)

Pulse repetition frequency (f_R): 10 Hz to 5 MHz

Resolution : 1/gate time (Hz) (R5372/5373)

Note : Gate time is the decade step time of 0.1 μs to 10 s which is shorter than the pulse width minus 0.4 μs of pulse modulation wave.

Maximum resolution: See Figure 9-2.

Accuracy : ±1 count ±time base accuracy (R5372/5373)

±1 count ±time base accuracy ± $\frac{0.04}{GW}$ (Hz rms)
±5 kHz (R5372P/5373P)

Calibration time : $(50\ \mu s + \frac{1}{f_R}) \times (\frac{1}{\text{resolution}} \times \frac{1}{GW}) \times (1 + \frac{1}{\text{resolution}} \times \frac{1}{GW}) + 20$ ms (R5372P/5373P)

(Note) GW: Gate width (In case of internal synchronization, GW is the modulated pulse width minus approximately 50 ns.)

Measuring time : $(50\ \mu s + \frac{1}{f_R}) \times (\frac{1}{\text{resolution}} \times \frac{1}{GW})^2$

Unit of display : Hz, kHz, MHz and GHz (fixed display)

Modulated pulse width measurement (R5372P/5373P only)

Resolution : 10 ns

Accuracy : 30 ns ± time base accuracy

Unit of display : μs fixed

Note: Pulse width at the input sensitivity level is displayed.

Synchronized trigger mode

INT : Gate is opened and closed in synchronism with internal detector output.

EXT START : Gate is opened by external signal, but triggering is possible only when internal detector output is produced.

Input signal level (including sine-wave input)

2 Vp-p or more, 10 Vp-p or less with center voltage of +1.5 V; or 2 Vp-p or more, 10 Vp-p or less for sine-wave input signal with no DC component.

Pulse width

1 µs or more for sine-wave input signal of 100 kHz or less

EXT GATE : Gate is opened and closed by external signals.

Input signal level

TTL active low

Pulse width

50 ns to 0.1 s

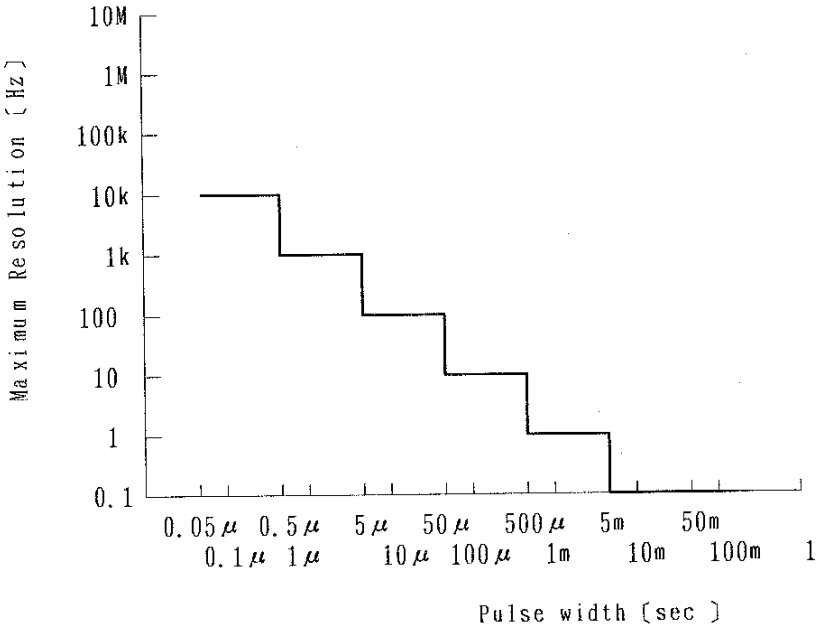

Figure 9 - 2 Relationship Between Pulse Width and Maximum Resolution for the Carrier Frequency Measurement (R5372P/5373P)

LINE : Gate is opened in synchronism with line frequency, but triggering is possible only when internal detector output is produced.

Sample rate : Continuously variable from 50 ms to 5 s and HOLD

Delay time : Continuously variable from 26 µs to 30 ms and OFF (time from INT/EXT/LINE triggering to starting of counting)

Time base

Time base stability: See Table 9-2.

Time base output : 10 MHz, 1 Vp-p or more

Output impedance: Approx. 50 Ω

External time-base frequency

: 1, 2, 2.5, 5, or 10 MHz; 1 to 10 Vp-p

Input impedance:Approx. 500 Ω

Table 9 - 2 Time Base Stability

	Standard specification	Option 21	Option 22	Option 23
Aging rate (long-term stability)	2×10^{-8}/day 8×10^{-8}/month (1×10^{-7}/year) (After operating 24 hours)	5×10^{-9}/day 5×10^{-8}/month (8×10^{-8}/year) (After operating 24 hours)	2×10^{-9}/day 2×10^{-8}/month (5×10^{-8}/year) (After operating 48 hours)	5×10^{-10}/day 1×10^{-8}/month (2×10^{-8}/year) (After operating 48 hours)
Temperature coefficient (251C±251C)	$\pm5\times10^{-8}$	$\pm5\times10^{-8}$	$\pm1\times10^{-8}$	$\pm5\times10^{-9}$
Warmup *1 (Specified time)	$\pm5\times10^{-8}$ (30 minutes)	$\pm2\times10^{-8}$ (1 hour)	$\pm1\times10^{-8}$ (1 hour) ($\pm4\times10^{-9}$)*3	$\pm1\times10^{-8}$ (1 hour) ($\pm1\times10^{-9}$)*3
Reproducibility *2 (Specified time)	$\pm5\times10^{-8}$ (30 minutes)	$\pm3\times10^{-8}$ (1 hour)	$\pm2\times10^{-8}$ (1 hour) ($\pm1\times10^{-8}$)*4	$\pm1.5\times10^{-8}$ (1 hour) ($\pm5\times10^{-9}$)*4

*1 Difference between the frequency measured when the specified time (30 minutes or one hour) has lapsed after powering on and that measured when 24 hours have lapsed after that specified time.

Table 9 - 2 Time Base Stability (Cont'd)

*2 Difference between the frequency measured when the specified time has lapsed after powering on within 24 hours after last powering the instrument off and that measured immediately before last powering the instrument off.

*3 Difference between the frequency measured when 24 hours have lapsed after powering on within 24 hours after last powering off and that measured when 48 hours have lapsed.

*4 Difference between the frequency measured immediately before powering off and that measured when 24 hours have lapsed after subsequently powering the instrument on.

STD IN/OUT connector: BNC type

Backup power supply for memory: The memory is backed up as long as AC power is supplied. If the power supply cable is unplugged with the internal Ni-Cd battery charged, the memory is backed up for up to about 2 weeks. Charging the Ni-Cd battery takes 2 to 3 days.

AUX INPUT/OUTPUT

Input/output signals: Gate signal output, detector output, external reset signal input, measurement end signal output (TTL level)

Computation capabilities: Maximum value holding, minimum value holding,deviation [(maximum deviation) - (minimum deviation)], standard deviation, averaging, digital comparison GO/NO GO decision, display of marker frequency of TR4110 series Spectrum Analyzer, ppm, addition, subtraction, multiplication, division

(2) General specifications

Display	: Green 7-segment LEDs (approx. 11 mm high) storage display
Operating temperature range	: 0 to +40°C
Operating humidity	: 85% rh or less
Storage temperature range	: -20 to +70°C
Power requirements	: 100 VAC (120 V, 220 V) ±10% or 240 VAC $^{+4}_{-10}$%, 50/60 Hz
Power consumption	: 90 VA or less (R5372/5373) 120 VA or less (R5372P/5373P)
Dimensions	: (W) 255 x (H) 132 x (D) 420 mm (approx.)
Weight	: 10 kg or less

(3) Options

① GPIB interface (Option 01. This interface is equipped as standard feature)
Complies with IEEE standard 488-1978.
The output of display data and all key settings on the front panel can be externally controlled.

② BCD parallel data output (Option 02 only. Note that either option 01 or 02 can be equipped.)
TTL positive logic
The nine low-order display digits are output in BCD parallel format for connection to the TR6198 Digital Recorder.