

Electronic Counters

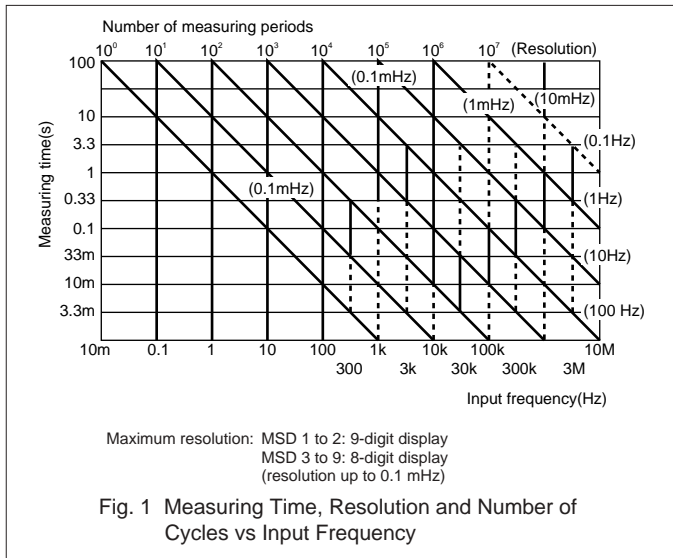
10 MHz to 18 GHz

R5372P (Continued From Previous Page)

Specifications

Input	Input A	Input B
Frequency measurement range	10 mHz to 10 MHz (DC coupled), 10 Hz to 10 MHz (AC coupled)	10 MHz to 550 MHz 500 MHz to 18 GHz
Input impedance	Approx. 1 M Ω /60 pF max.	Approx. 50 Ω Approx. 50 Ω
Input sensitivity	25 mVrms	25 mVrms -20 dBm (500 MHz to 18 GHz)
Input attenuator	0 dB, 20 dB	ANS AUTO, 20 dB
Maximum measurement input	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. 20 dB)
Damage level input	6 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 +20 dBm/ATT.20 dB
Coupling	DC and AC	AC AC
Trigger level	Approx. -1 V to 1V continuously variable (when -10 V to +10 V/ATT. 20 dB)	- -
Resolution / counting time	See Fig. 1	10 MHz/0.1 μ s to 0.1 Hz/10 s decade switched 10 MHz/0.1 μ s to 0.1 Hz/10 s decade switched
Measurement accuracy	\pm Trigger error*/no. of measurement cycles \pm 1 count \pm time base accuracy (See Fig. 1 for measurement cycles)	\pm 1 count \pm time base accuracy \pm 1 count \pm time base accuracy \pm residual stability Residual stability: 1/10 Y Measured frequency (GHz) (counts rms)
Measurement method	Reciprocal	Direct counting Digital TRAHET Heterodyne converted direct counting
Input connector	BNC	N-type

* Trigger error: \pm 0.3% with respect to sinewave input of 40 dB or higher S/N



Totalize: (Input A 10 mHz to 10 MHz)

Counting range: DC to 10 MHz

Counting capacity: 0 to 9,999,999,999

Pulse width measurement: (Input A 10 mHz to 10 MHz band)

Range: 50 ns to 1 s (resolution 10 ns, average of 10 pulses)

Units: μ s (fixed display)

Accuracy: \pm trigger error $\sqrt{10} \pm 1$ count \pm time base accuracy

$$\text{Trigger error;} \quad \frac{0.0025}{\text{Signal slope (V}/\mu\text{s)}} \quad (\mu\text{s})$$

$$\pm \frac{2 \times \text{Peak noise voltage}}{\text{Signal slope}} \quad (\mu\text{s})$$

Pulse Modulation Measurement (MANUAL mode)

Measurement ranges:

10 MHz to 550 MHz (INPUT A)

500 MHz to 18 GHz (INPUT B)

Pulse width: 100 ns to 0.1 s (internal syncing)

50 ns to 0.1 s (external syncing)

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

Syncing trigger modes:

INT. Internal syncing. Gate is opened and closed in sync with a pulse modulation of the input.

EXT. START Gate is opened when an external start signal is received.

Triggering is only possible when an internal detector output is on.

Trigger input signal (sinewave also usable):

1.5V \pm (2 to 10) Vp-p

Pulse width; 1 μ s min.

EXT. GATE Gate opens and closes when an external gate signal is received.

Gate input signal level: TTL, negative logic

Pulse width: 50 ns to 0.1 s

LINE Gate opens in sync with power-line frequency. Triggering is only possible when an internal detector output is on.

Carrier frequency measurement:

Maximum resolution See Fig. 2.

Accuracy $GW < 200 \mu\text{s};$

± 1 count \pm time base accuracy $\pm \frac{0.04}{GW}$ (Hz rms) ± 5 kHz

$GW \geq 200 \mu\text{s};$

± 1 count \pm time base accuracy $\pm \frac{1}{GW}$ (Hz rms)

Measurement time $(50 \mu\text{s} + \frac{1}{f_r}) \times (\frac{1}{\text{RESOLUTION}} \times \frac{1}{GW})^2$

GW; Gate width (for internal syncing, this is the modulation pulse width minus approx. 50 ns)

f_r ; Pulse repetition frequency

Units display GHz, MHz, kHz, Hz, fixed display

Modulation pulse width measurement:

Pulse width display at the counter input sensitivity level

Resolution: 10 ns

Accuracy: ± 30 ns \pm time base accuracy

Units: μ s fixed display

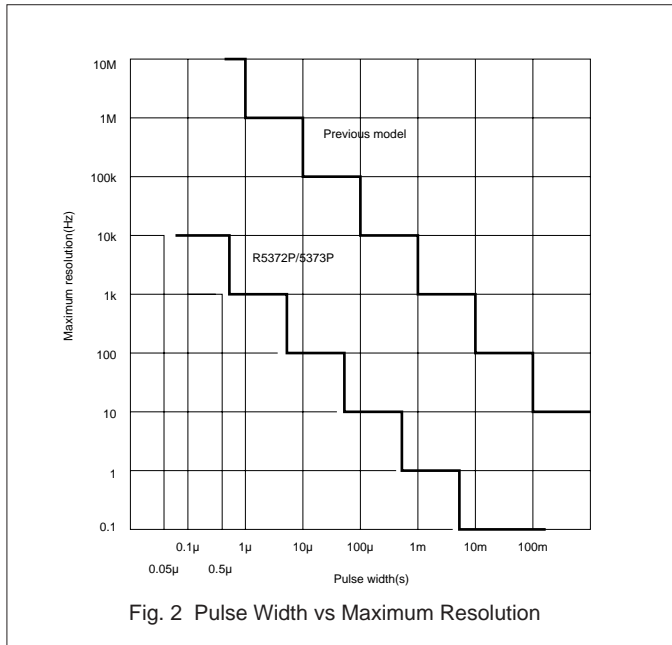


Fig. 2 Pulse Width vs Maximum Resolution

Time Bases

Time base stability:

	Standard	Option 21	Option 22	Option 23
Aging rate	$2 \times 10^{-9}/\text{day}$	$5 \times 10^{-9}/\text{day}$	$2 \times 10^{-9}/\text{day}$	$5 \times 10^{-10}/\text{day}$
	$8 \times 10^{-9}/\text{mo.}$	$5 \times 10^{-9}/\text{mo.}$	$2 \times 10^{-9}/\text{mo.}$	$1 \times 10^{-9}/\text{mo.}$
Long-term stability	$1 \times 10^{-7}/\text{yr}$	$8 \times 10^{-8}/\text{yr}$	$5 \times 10^{-8}/\text{yr}$	$2 \times 10^{-8}/\text{yr}$
Temperature characteristic ($+25 \pm 25^\circ\text{C}$)	$\pm 5 \times 10^{-8}$	$\pm 5 \times 10^{-8}$	$\pm 1 \times 10^{-8}$	$\pm 5 \times 10^{-9}$

Time base output: Frequency 10 MHz

Voltage 1 Vp-p (minimum)

Output impedance Approx. 50 Ω, BNC connector

External frequency standard input: 1, 2, 2.5, 5 or 10 MHz

Voltage 1 to 10 Vp-p

Input impedance Approx. 500 Ω, BNC connector

Calculation Functions

- Digital comparator function (limits set using keyboard)
- Maximum & minimum value hold
- Deviation measurement (deviation, maximum, minimum)
- Standard deviation
- Averaging
- PPM
- Offset display, drift display
- Scaling display
- Sum and difference display by automatic measurement of Inputs A and B
- Harmonic frequency display
- Arithmetic functions

General Specifications

Measuring modes (Input B):

AUTO: Automatic mode with capture time of approx. 300 ms (from reset until count begins)

FM tolerance 10 MHzp-p (minimum)

MANUAL: Manual key settings of fixed frequency band; no capture action

Bandwidth (FM tolerance)

± 125 MHz or more (1.4 GHz to 18 GHz)

± 25 MHz or more (0.5 GHz to 1.4 GHz)

Sample rate: 50 ms to 5 s continuously variable or HOLD

Delay time: 25 μs to 30 ms continuously variable or OFF (from INT/EXT/LINE trigger until count begins)

Memory backup: Backup is provided when power is supplied from AC line. When power cable is disconnected, approximately two weeks' backup is available from built-in Ni-Cd batteries. Full charging of batteries requires 2 to 3 days.

Auxiliary input/output: Supports gate signal output, wave detection output, external reset signal input and measurement completed signal output; input/output level, 14-pin TTL connector equivalent to Amphenol 57-40140.

Display: 12-digit fixed-point, 7-segment green LED decimal display with memory; character height approx. 11 mm

Operating conditions: 0 to 40°C, 85% relative humidity (maximum)

Storage temperature range: -20 to +60°C

Power requirement: Specified at time of ordering

Option No.	Standard	Option 32	Option 42	Option 44
Power supply voltage	90 to 110 V	108 to 132 V	198 to 242 V	216 to 250 V

48 to 66 Hz

Power consumption: 120 VA (maximum)

External dimensions: Approx. 255 (W) × 132 (H) × 420 (D) mm

Mass: 10 kg (maximum)

Accessories

Item	Model	Product code	Remarks
Power cable	A01402		
Input cable	A01036-1500		BNC-BNC
Input cable	MI-04		N-N

Options

(These options may be added after delivery of the unit by factory retrofitting.)

(Either Option 01 or option 02 (not both) can be selected.)

Option 01: GPIB interface (IEEE 488-1978)

Function Output of displayed data and remote control of front panel key settings

Option 02: BCD data output

Function Parallel output of the nine least significant digits in binary-coded-decimal form; can be connected to Digital Recorder with 50-pin connector equivalent to Amphenol 57-40500

Specifications common to Options 01 and 02:

D/A converter analog output: (From AUX IN/OUT connector)

Digits converted: 3 least significant digits

Output voltage: -4.995 V to +4.995 V ± 20 mV ($+23^\circ \pm 5^\circ\text{C}$)

Output impedance: 100 Ω (maximum)

Digital comparator output: (From AUX INPUT/OUTPUT connector) TTL negative logic, open collector

Option 21, 22 and 23: Time base oscillator

(See Time Base Stability chart above left)

Accessories (Sold separately)

R16058 Transit Case

A02448 EIA Rack Mount Set

A02248 JIS Rack Mount Set