Signal Input and Trigger

Item	Specifications
Number of input channels	2 (CH A and CH B)
Input coupling	DC/AC
Input connector	BNC connector
Input impedance	50Ω/1 MΩ, 23pF (typical value[*1])

Frequency characteristics	• When the input coupling is DC: DC to 250 MHz (typical value[*1])
	• When the input coupling is AC and
	  • Input impedance is 50 Ω: 680 kHz to 250 MHz (typical value[*1])
	  • Input impedance is 1 MΩ: 35 Hz to 250 MHz (typical value[*1])

Internal jitter	100 ps rms
Minimum input pulse width	3 ns (2.2 ns for CH B when measuring A-to-B time interval)
Operating voltage range	–5 to 5 V

Maximum input voltage	• When the input impedance is 50 Ω: 5 V_{rms}
	• When the input impedance is 1 MΩ and
	  • DC ≤ input frequency ≤ 100 kHz: 40 V (DC+AC_{peak})
	  • 100 kHz ≤ input frequency ≤ 100 MHz: {3.5/f+5} V (DC+AC_{peak}), where f is the frequency in MHz
	• Overvoltage category: I and II

Input sensitivity[*2]	100 mV_{p-p}
Input amplifier noise	400μV_{rms} (typical value[*1])
Cross talk when using the dual measurement function[*3]	–40 dB (typical value[*1])

Trigger	• Trigger mode: Select from single auto trigger, repeat auto trigger, and manual trigger.
	• Trigger level (when using manual trigger)
	  • Selectable range: –5 to 5 V
	  • Accuracy[*4]: ±(10 mV + 1% of the specified value)
	  • Resolution: 1 mV
	• Trigger level (when using single auto trigger or repeat auto trigger)
	  • Selectable range: 0% to 100%
	  • Resolution: 1%
	• Input condition when using single auto trigger or repeat auto trigger: Continuous signal between 1 kHz and 50 MHz
	• Setup time of single auto trigger and repeat auto trigger: 0.7 s (typical value[*1])

Phase Adjustment	Function used to adjust the phase difference of CH B with respect to CH A when measuring A-to-B time interval, period A & A-to-B time interval, or pulse width A & A-to-B time interval Selectable range: 0 to 10.0 ns (resolution: 0.1 ns)

Sampling	• Sampling mode: Select from time stamp mode, hardware histogram mode, and inter-symbol interference analysis mode
	• Maximum sample rate
	When using the single measurement function[*5]: 80 MS/s continuous (12.5 ns interval)
	When using the dual measurement function[*3]: 50 MS/s continuous (20 ns interval)
	• Maximum sample size (maximum number of data points)
	  • When in time stamp mode or inter-symbol interference analysis mode: 1,024,000 (512,000 when using the dual measurement function[*3])
	  • When in hardware histogram mode: 10^9
	• Sampling interval (setting only when using the single measurement function[*5] in time stamp mode)
	0μs to 1 s (resolution: 1 μs)
	Maximum sample rate when 0 μs is selected
	• Longest sampling time
	When in time stamp mode or inter-symbol interference analysis mode: 320 s (time from when arming is activated)
	When in hardware histogram mode: 3200 s (time from when arming is activated)

Update rate[*1]	400 ms (hardware histogram mode) Update rate when the sampling size (event size) is 1000 and period of a 1-MHz sine wave is measured.

*1 Typical value represents a typical or average value. It is not strictly warranted.

*2 Measured value under standard operating conditions with input coupling set to DC and input impedance set to 50 Ω after the warm-up time has elapsed.

*3 Period A & period B, period A & A-to-B time interval, pulse width A & A-to-B time interval, pulse width A & pulse width B, pulse width A→A-to-B time interval, or pulse width A→pulse width B measurement.

*4 Measured value under standard operating conditions with input coupling set to DC and input impedance set to 1 MΩ after the warm-up time has elapsed.

*5 Period, A-to-B time interval, or pulse width measurement.

Measurement Functions (Measurement Items)

Item	Specifications

Measurement function	• When in time stamp mode or hardware histogram mode
	  • Single measurement function
	  Period, A-to-B time interval, and pulse width
	  • Dual measurement function
	  Period A & period B, period A & A-to-B time interval, pulse width A & A-to-B time interval, and pulse width A & pulse width B
	• When in inter-symbol interference analysis mode
	  • Single measurement function
	  Pulse width
	  • Dual measurement function
	  Pulse width A→A-to-B time interval and pulse width A→pulse width B

Display resolution	• When in time stamp mode: 25 ps • When in hardware histogram mode, inter-symbol interference analysis mode, or time stamp mode when using multi window display: 25 ps or (X span of the histogram/600) whichever is greater

Period measurement	• Measurement range
	  • When in time stamp mode: 6 ns to 20 ms
	  • When in hardware histogram mode: 6 ns to 3.2 μs
	• Measurement resolution
	  ±100 ps rms[*1] ±$\sqrt{2}$ × trigger error[*2]
	• Accuracy[*3]
	  Measurement resolution ± (frequency stability of the time base × measured value) ± 300-ps systematic error
	• Slope: Select from ↑ or ↓

A-to-B time interval measurement	• Measurement range
	  • When in time stamp mode: 0 ns to 20 ms
	  • When in hardware histogram mode: 0 ns to 3.2 μs
	• Measurement resolution
	  • When the slope is set to A↑B↑, A↓B↑, A↑B↓, or A↓B↓:
	  ±100 ps rms[*1] ± A input trigger error[*2] ± B input trigger error[*2]
	  • When the slope is set to **A↕B**↑ or **A↕B**↓:
	  ±100 ps rms[*1] ± A input trigger error[*2] ± B input trigger error[*2] ± trigger level timing error[*4]
	• Accuracy[*3]
	  • When the slope is set to A↑B↑, A↓B↑, A↑B↓, or A↓B↓:
	  Measurement resolution ± trigger level timing error ± (frequency stability of the time base × measured value) ± 1-ns systematic error
	  • When the slope is set to **A↕B**↑ or **A↕B**↓:
	  Measurement resolution ± (frequency stability of the time base × measured value) ± 1-ns systematic error
	• Slope: Select from A↑B↑/A↓B↑, **A↕B**↑, A↑B↓, A↓B↓, and **A↕B**↓
	• Continuous measurement condition: The time to the next A signal edge after the A-to-B time interval measurement is greater than equal to 0 ns and the time from the previous A signal edge is greater than or equal to 12.5 ns

*1 100 ps rms or the display resolution whichever is greater when in hardware histogram mode, inter-symbol interference analysis mode, or time stamp mode using multi window display.

*2 The trigger error, A input trigger error, B input trigger error, rising edge trigger error, and falling edge trigger error defined by the following equation.

$$\frac{\sqrt{X^2 + W^2 + E_n^2}}{SR}$$

X: Input amplifier noise, W: Cross talk noise (0.01 × the signal amplitude of the other channel [Vrms])
En: Noise in the signal being measured [Vrms], SR: Slew rate of the input signal [V/s]

*3 Measured value under standard operating conditions as described in General Specifications after the warm-up time has elapsed.

*4 The trigger level timing error is defined by the following equation.

$$\pm\left(\frac{8\text{mV}}{\text{Slew rate of the start signal}} - \frac{8\text{mV}}{\text{Slew rate of the stop signal}}\right) \pm \frac{\text{Trigger level setting accuracy}}{\text{Slew rate of the start signal}} \pm \frac{\text{Trigger level setting accuracy}}{\text{Slew rate of the stop signal}}$$

Item	Specifications

Pulse width measurement	• Measurement range
	  • When in time stamp mode: 6 ns to 20 ms
	  • When in hardware histogram mode: 6 ns to 3.2 μs
	  • When in inter-symbol interference analysis mode: 10 ns to 3.2 μs
	• Measurement resolution
	  • When the polarity is set to ↔⌋ or ⌈↔: ±100 ps rms[*1] rising edge trigger error[*2] ± falling edge trigger error[*2]
	  • When the polarity is ↔↔: ±100 ps rms[*1] rising edge trigger error[*2] ± falling edge trigger error[*2] ± trigger level timing error[*3]
	• Accuracy[*4]
	  • When the polarity is set to ↔⌋ or ⌈↔: Measurement resolution ± trigger level timing error ± (frequency stability of the time base × measured value) ± 1-ns systematic error
	  • When the polarity is ↔↔: Measurement resolution ± (frequency stability of the time base × measured value) ± 1-ns systematic error
	• Polarity: Select from ↔⌋, ⌈↔, and ↔↔ (↔↔ only when in inter-symbol interference analysis mode)

Period A & period B measurement	• Measurement range
	  • When in time stamp mode: 6 ns to 20 ms
	  • When in hardware histogram mode: 6 ns to 3.2 μs
	• Measurement resolution
	  ±100 ps rms[*1] $\pm\sqrt{2}$ × trigger error[*2]
	• Accuracy[*4]
	  Measurement resolution ± (frequency stability of the time base × measured value) ± 300-ps systematic error
	• Slope: Select from **A↑&B↑ or A↓&B↓**

Period A & A-to-B time interval measurement	• Measurement range
	  • When in time stamp mode
	  • Period measurement: 6 ns to 20 ms
	  • A-to-B time interval measurement: 0 ns to 20 ms
	  • When in hardware histogram mode
	  • Period measurement: 6 ns to 3.2 μs
	  • A-to-B time interval measurement: 0 ns to 3.2 μs
	• Measurement resolution
	  • Period measurement: ±100 ps rms[*1] $\pm\sqrt{2}$ × trigger error[*2]
	  • A-to-B time interval measurement: ±100 ps rms[*1] ± A input trigger error[*2] ± B input trigger error[*2]
	• Accuracy[*4]
	  Period measurement: Measurement resolution ± (frequency stability of the time base × measured value) ± 300-ps systematic error
	  A-to-B time interval measurement:
	  Measurement resolution ± trigger level timing error ± (frequency stability of the time base × measured value) ± 1-ns systematic error
	• Slope: Select from **A↑&A↑B↑ or A↓&A↓B↑**
	• Continuous A-to-B time interval measurement condition: The time to the next A signal edge after the A-to-B time interval measurement is greater than equal to 13 ns and the time from the previous A signal edge is greater than or equal to 20 ns

*1 100 ps rms or the display resolution whichever is greater when in hardware histogram mode, inter-symbol interference analysis mode, or time stamp mode using multi window display.

*2 The trigger error, A input trigger error, B input trigger error, rising edge trigger error, and falling edge trigger error defined by the following equation.

$$\frac{\sqrt{X^2 + W^2 + E_n^2}}{SR}$$

X: Input amplifier noise, W: Cross talk noise (0.01 × the signal amplitude of the other channel [Vrms])
En: Noise in the signal being measured [Vrms], SR: Slew rate of the input signal [V/s]

*3 The trigger level timing error is defined by the following equation.

$$\pm\left(\frac{8\text{mV}}{\text{Slew rate of the start signal}} - \frac{8\text{mV}}{\text{Slew rate of the stop signal}}\right) \pm \frac{\text{Trigger level setting accuracy}}{\text{Slew rate of the start signal}} \pm \frac{\text{Trigger level setting accuracy}}{\text{Slew rate of the stop signal}}$$

*4 Measured value under standard operating conditions as described in General Specifications after the warm-up time has elapsed.

Item	Specifications

Pulse A & A-to-B time interval measurement and pulse A→A-to-B time interval measurement	• Measurement range
	  • Time stamp mode or inter-symbol interference analysis mode
	  Pulse width measurement: 6 ns to 20 ms, A-to-B time interval measurement: 0 ns to 20 ms
	  • Hardware histogram mode
	  Pulse width measurement: 6 ns to 3.2 μs, A-to-B time interval measurement: 0 ns to 3.2 μs
	  • Inter-symbol interference analysis mode
	  Pulse width measurement: 10 ns to 3.2 μs, A-to-B time interval measurement: 0 ns to 3.2 μs
	• Measurement resolution
	  • Pulse width measurement
	  • When the polarity is set to ↔⌋ or ⌈↔:
	  ±100 ps rms[*1] rising edge trigger error[*2] ± falling edge trigger error[*2]
	  • When the polarity is ↔↔:
	  ±100 ps rms[*1] rising edge trigger error[*2] ± falling edge trigger error[*2] ± trigger level timing error[*3]
	  • A-to-B time interval measurement
	  • When the slope is set to A↑B↑, A↓B↑, A↑B↓, or A↓B↓:
	  ±100 ps rms[*1] ± A input trigger error[*2] ± B input trigger error[*2]
	  • When the slope is set to **A↕B↑** or **A↕B↓**:
	  ±100 ps rms[*1] ± A input trigger error[*2] ± B input trigger error[*2] ± trigger level timing error[*3]
	• Accuracy[*4]
	  • Pulse width measurement
	  • When the polarity is set to ↔⌋ or ⌈↔:
	  Measurement resolution ± (frequency stability of the time base × measured value) ± trigger level timing error[*3] ± 1-ns systematic error
	  • When the polarity is ↔↔:
	  Measurement resolution ± (frequency stability of the time base × measured value) ± 1-ns systematic error
	  • A-to-B time interval measurement
	  • When the slope is set to A↑B↑, A↓B↑, A↑B↓, or A↓B↓:
	  Measurement resolution ± (frequency stability of the time base × measured value) ± trigger level timing error[*3] ± 1-ns systematic error
	  • When the slope is set to **A↕B↑** or **A↕B↓**:
	  Measurement resolution ± (frequency stability of the time base × measured value) ± 1-ns systematic error
	• Polarity/Slope
	  • When in time stamp mode or hardware histogram mode:
	  Select from **A**↔↔**&A↕B↑** and A**A**↔↔**&A↕B↓**
	  • When in inter-symbol interference analysis mode:
	  Select from **A**↔↔**&A↑B↑, A**↔↔**&A↓B↑, A**↔↔**&A↕B↑**, A↔↔**&A↑B↓, A**↔↔**&A↓B↓, and A**↔↔**&A↕B↓**
	• Continuous A-to-B time interval measurement condition: The time to the next A signal edge after the A-to-B time interval measurement is greater than equal to 13 ns and the time from the previous A signal edge is greater than or equal to 20 ns

Pulse width A & pulse width B measurement and pulse width A→pulse width B measurement	• Measurement range
	  • When in time stamp mode: 6 ns to 20 ms
	  • When in hardware histogram mode: 6 ns to 3.2 ms
	  • When in inter-symbol interference analysis mode: 10 ns to 3.2 μs (20 ns to 3.2 μs for pulse width B)
	• Measurement resolution
	  • When the polarity is set to ↔⌋ or ⌈↔:
	  ±100 ps rms[*1] rising edge trigger error[*2] ± falling edge trigger error[*2]
	  • When the polarity is ↔↔:
	  ±100 ps rms[*1] rising edge trigger error[*2] ± falling edge trigger error[*2] ± trigger level timing error[*3]
	• Accuracy[*4]
	  • When the polarity is set to ↔⌋ or ⌈↔:
	  Measurement resolution ± (frequency stability of the time base × measured value) ± trigger level timing error[*3] ± 1-ns systematic error
	  • When the polarity is ↔↔:
	  Measurement resolution ± (frequency stability of the time base × measured value) ± 1-ns systematic error
	• Polarity: Select from ↔⌋, ⌈↔, and ↔↔ (↔↔ only when in inter-symbol interference analysis mode)

*1 100 ps rms or the display resolution whichever is greater when in hardware histogram mode, inter-symbol interference analysis mode, or time stamp mode using multi window display.

*2 The trigger error, A input trigger error, B input trigger error, rising edge trigger error, and falling edge trigger error defined by the following equation.

$$\frac{\sqrt{X^2 + W^2 + E_n^2}}{SR}$$

X: Input amplifier noise, W: Cross talk noise (0.01 × the signal amplitude of the other channel [Vrms])
En: Noise in the signal being measured [Vrms], SR: Slew rate of the input signal [V/s]

*3 The trigger level timing error is defined by the following equation.

$$\pm\left(\frac{8\text{mV}}{\text{Slew rate of the start signal}} - \frac{8\text{mV}}{\text{Slew rate of the stop signal}}\right) \pm \frac{\text{Trigger level setting accuracy}}{\text{Slew rate of the start signal}} \pm \frac{\text{Trigger level setting accuracy}}{\text{Slew rate of the stop signal}}$$

*4 Measured value under standard operating conditions as described in General Specifications after the warm-up time has elapsed.

Gate, Arming, and Inhibit

The specifications for inter-symbol interference analysis mode conform to the specifications for time stamp mode.

Item	Specifications
Gate	• Gate types: Select from EVENT, TIME, and EXTERNAL When using the dual measurement function[*2], the measurement terminates when the gate of each measurement closes. • Selectable range of the event size when using event gate (within the longest sampling time) • Time stamp mode or inter-symbol interference analysis mode • Single measurement function[*3]: 2 to 1024000 • Dual measurement function[*2]: 1 to 51200 (for each measurement) • Hardware histogram mode • Single measurement function[*5]: 2 to 10^9 • Dual measurement function[*2]: 1 to 10^9 (for each measurement) • Selectable range of gate time when set to time gate (within the maximum event size of each sampling mode) 1 μs ≤ gate time ≤ 10 s (resolution is 100 ns) • Allowable time and polarity when set to external gate Allowable time: 1 μs to 320 s (except within the maximum event size of the sampling mode) Polarity: Select from ⌊↔⌋ and ⌈↔⌉ • External gate input (shared with external arming) • Connector type: BNC • Input coupling: DC • input impedance: 1 MΩ (typical value[*1]) • Trigger level: TTL (1.4 V), TTL/10 (0.14 V), or 0 V • Maximum input voltage: 40 V (DC + AC_{peak}) • Minimum input pulse width: 30 ns • Setup time: 60 ns (must precede the measurement signal by at least 60 ns for the gate to be valid).
Arming	• Arming source: Select from AUTO and EXT (external) • External arming (EXT) setting • Selectable range of delay time when set to time delay (set the time for each measurement when using the dual measurement function[*2]) 1 μs ≤ delay time ≤ 1 s (resolution is 100 ns) • Selectable range of the event size when set to event delay (Set the value for each measurement when using period A & period B or pulse width A & pulse width B measurement. Event delay is possible when the frequency of event occurrence is less than or equal to 50 MHz.) 1 to 10^6 (resolution: 1) • Slope: Select from ↑ and ↓ • External arming input (shared with external gate) • Connector type: BNC • Input coupling: DC • input impedance: 1 MΩ (typical value[*1]) • Trigger level: TTL (1.4 V), TTL/10 (0.14 V), or 0 V • Maximum input voltage: 40 V (DC + AC_{peak}) • Minimum input pulse width: 30 ns • Setup time: 60 ns (must precede the measurement signal by at least 60 ns for the arming to be valid).
Inhibit	• Active time • When in time stamp mode: 1 μs to 320 s • When in hardware histogram mode: 1 μs to 3200 s • Polarity: Select from ⌊↔⌋ and ⌈↔⌉ • Inhibit input • Connector type: BNC • Input coupling: DC • input impedance: 1 MΩ (typical value[*1]) • Trigger level: TTL (1.4 V), TTL/10 (0.14 V), or 0 V • Maximum input voltage: 40 V (DC + AC_{peak}) • Minimum input pulse width: 30 ns • Setup time: 30 ns (must precede the measurement signal by at least 30 ns for the inhibit to be valid).

*1 Typical value represents a typical or average value. It is not strictly warranted.

*2 Period A & period B, period A & A-to-B time interval, pulse width A & A-to-B time interval, pulse width A & pulse width B, pulse width A→A-to-B time interval, or pulse width A→pulse width B measurement.

*3 Period, A-to-B time interval, or pulse width measurement.

Block Sampling

Item	Specifications

Selectable range of the number of blocks	• Time stamp mode
	  • When the arming source is EXT and the rest mode is OFF or when the arming source is AUTO and the rest mode is event or time: 2 to 250
	  • When the arming source is AUTO and the rest mode is OFF: 2 to 1000
	• When in hardware histogram mode: 2 to 1000
	The total sample size of all blocks is within the maximum sampling size (see page 15-1).

Block rest mode	Select from OFF, Time, and Event
Selectable range of the block rest time	1 μs to 1 s (resolution: 100 ns, accuracy: ±200 ns)
Selectable range of the block rest event size	1 to 10^6 (resolution: 1, rest time: 500 ns or more, frequency of event occurrence: 50 MHz or less, accuracy:±1 event)
Restriction on use	Cannot be specified when using the dual measurement function*2, external gate, or when in inter-symbol interference analysis mode. When the rest mode is set to event or time, external arming (EXT) cannot be used.

*1 Period, A-to-B time interval, or pulse width measurement.
*2 Period A & period B, period A & A-to-B time interval, pulse width A & A-to-B time interval, or pulse width A & pulse width B measurement.

Inter-symbol Interference Analysis Function

Item	Specifications
Function	Function used to extract the data around the spaces and marks of the specified condition, display the histogram, and calculate statistics.
Measurement Function	Pulse width, pulse width A→A-to-B time interval, pulse width A→pulse width B (Inhibit function cannot be used when using the dual measurement function*1)
Minimum input pulse width	10 ns (pulse width B is 20 ns)
Data extraction mode	Select from Single, Combination and Between
Data extraction condition	Select from nT, nT to maxT, and minT to nT (n: arbitrary value between 1 and 16)
Trigger	Select mark or space
Target	Select the analysis data with respect to the trigger from Prev., Middle, Next, or Both
Missed sampling fill	Function used to fill the dropouts in sampling when using the dual measurement function*1 Maximum number of dropout samples that can be filled: 256 Conditions for filling the samples: When the dropout sampling interval is 100 ns or more
Sync function	Turn ON/OFF the function which starts the analysis from where the symbol search function found the desired symbol

*1 Pulse width A→A-to-B time interval or pulse width A→pulse width B measurement

Display

Item	Specifications
Display	• Display size: 6.4 inches • Display resolution: 640 (H) × 480 (V) dots • Display defect: 0.01% or less with respect to all the display dots
Display format	• When in time stamp mode: Select from histogram, list, time variation, and statistics displays • When in hardware histogram mode Select from histogram, list, and statistics displays • When in inter-symbol interference analysis mode Select histogram or list
Selection of the item to be analyzed when using the dual measurement function*1	• MEAS1: Displays the measurement result of measurement function 1 • MEAS2: Displays the measurement result of measurement function 2

*1 Period A & period B, period A & A-to-B time interval, pulse width A & A-to-B time interval, pulse width A & pulse width B, pulse width A→A-to-B time interval, or pulse width A→pulse width B measurement.

Item	Specifications
Histogram display	• Scale: Sets the X-axis and Y-axis of the histogram • Selectable range of X center (X-axis center) When in time stamp mode: –50 ns to 20.000000000 ms (resolution: 25 ps) When in hardware histogram mode: –50 ns to 3.2000000 µs (resolution: 25 ps) • X Span When in time stamp mode: Select from 1.5, 3, 7.5, 15, 30, 60, 150, 300, 600ns, 1.5, 3, 6, 15, 30, 60, 150, 300, 600 ms, 1.5, 3, 6, 15, and 30 ms When in hardware histogram mode: Select from 1.5, 3, 7.5, 15, 30, 60, 150, 300, 600 ns, 1.5, 3, 6 µs • Y axis (scale type): Select Lin (linear) or Log (logarithmic) • Y High (Y-axis maximum) • When the Y-axis scale is linear: Select from 10, 20, 40, 100, 200, 400, 1000, 2000, 4000, 10000, 20000, 40000, 100000, 200000, 400000, $1e^6$, $1e^7$, $1e^8$, and $1e^9$ • When the Y-axis scale is logarithmic: Select from $1e^1$, $1e^2$, $1e^3$, $1e^4$$1e^5$, $1e^6$, $1e^7$, $1e^8$, and $1e^9$ • Readout: Read out the value by positioning the X marker (marker display can be turned ON/OFF) Specify the statistical calculation area by specifying a frequency for the Y marker (marker display can be turned ON/OFF) • Statistics display (can be turned ON/OFF) • Area: Select the area for performing statistical calculation from Window or Marker • A-to-B time interval measurement **A↕B↑**: Select the slope from **A↑B↑**, **A↓B↑**, **A↕B↑**, and **A↑B↑&A↓B↑** • A-to-B time interval measurement **A↕B↓**: Select the slope from **A↑B↓**, **A↓B↓**, **A↕B↓**, **A↑B↓&A↓B↓** • Pulse width measurement ↔↔: Select the polarity from ↔_, _↔, ↔↔, and ↔_ & _↔. • Pulse width A & A-to-B time interval measurement A↔↔&**A↕B↑**: Select from **A**↔_**&A↑B↑**, **A**_↔**&A↓B↑**, **A**↔↔**&A↕B↑**, **A**↔_**&A↑B↑**, **A**_↔**&A↓B↑** • Pulse width A & A-to-B time interval measurement A↔↔&**A↕B↓**: Select from A↔_**&A↑B↓**, **A**_↔**&A↓B↓**, **A**↔↔**&A↕B↓**, **A**↔_**&A↑B↓&A**_↔**&A↓B↓** • Pulse width A & pulse width B measurement: Select from **A**↔_**&B**↔_, **A**_↔**&B**_↔, **A**↔↔**&B**↔↔, **A**↔_**&B**↔_**&A**_↔**&B**_↔ • Selectable range of T Value (T value of statistical calculation: 1 ns to 250 ns (resolution: 25 ps) • Multi window: Data analysis of multiple histograms Selectable range of window size: 1 to 14 • Auto window: Automatic data analysis of multiple histograms • Histogram sum (only when using the multi window or auto window) Sums the frequencies of all specified windows for each bin around the X-axis center of each window • Display style Switch the graph size between half and full, turn ON/OFF the statistics display, turn ON/OFF the panorama display, turn ON/OFF the both polarities/both edges graph (Both Graph), and turn ON/OFF the overlap of each polarity graph Select Stat, Dev, or σ when in hardware histogram mode or time stamp mode using the all display of the multi window or auto window
Time variation display (only when in time stamp mode)	• Scale: Sets the X-axis and Y-axis of the time variation. • Selectable range of X Min (X-axis minimum): 0 to 320.0000000 s (resolution: 100 ns) • Selectable range of X Span: Select from 6, 12, 30, 60, 120, 300, 600 µs, 1.2, 3, 6, 12, 30, 60, 120, 300, 600 ms, 6, 12, 30, 60, 120, 300, and 600 s • Selectable range of Y Center (Y-axis center): –50 ns to 20.000000000 ms (resolution: 25 ps) • Y Span: Select from 500 p, 1, 2.5, 5, 10, 20, 50, 100, 200, 500 ns, 1, 2, 5, 10, 20, 50, 100, 200, 500 µs, 1, 2, 5, 10, and 20 ms • Readout: Read the value by positioning the X and Y markers • Statistics display (can be turned ON/OFF) Area: Select the area for performing statistical calculation from Window, Marker, and Block • Display style Switch the graph size between half and full, turn ON/OFF the statistics display, turn ON/OFF the panorama display, turn ON/OFF the overlap of measured waveforms (when using the dual measurement function[*1]), select the display waveform (MEAS1, MEAS2, or MEAS1 & MEAS2) • Display parameters: Turn ON/OFF the grid and interpolation, switch the plot mark between Pixel and Mark • Time resolution of the X-axis (time stamp): 100 ns
List display	• When in time stamp mode or inter-symbol interference analysis mode • Lists the time stamps, corresponding measured values, and symbols • Can be displayed for each block when block sampling is used • Display data scrolling • Symbol search function available (forward and backward search) Number of symbols to be searched: Select from 1 to 4 • When in hardware histogram mode • Lists the measured values (median values) and corresponding frequencies • Display data scrolling

*1 Period A & period B, period A & A-to-B time interval, pulse width A & A-to-B time interval, or pulse width A & pulse width B

Item	Specifications
Statistics display	• When in time stamp mode When the calculated item is histogram Statistical calculation parameters: Average, Maximum, Minimum, Peak-Peak, σ, σ/Average, σ/T, Deviation, Deviation/T, Median, Mode, Number When calculation item is time variation Statistical calculation parameters: T.Average, T.Maximum, T.Minimum, T.Peak-Peak, T.σ, T.(σ/Average), T.(P-P/Average), T.RF, and T.Number • When in hardware histogram mode Statistical calculation parameters: Average, Maximum, Minimum, Peak-Peak, σ, σ/Average, σ/T, Deviation, Deviation/T, Median, Mode, Number

Auto Window Function

Item	Specifications
Function	Measures T. Value and automatically sets the size, scale, and area of each window according to the modulation type
Modulation type	EFM, EFM+, and 1-7
T. Value calculation method	Measured T: Automatically sets the constant T value from the average value of the CH B clock input signal (T resolution: 25 ps) Estimated T: Estimates the constant T value from the input signal and modulation type.
Operation Condition	Measured T: CH B input 1025 cycles or more Estimated T: Data rate 80 MS/s or less, sampling time 1.6 s or less (when measuring pulse width or A-to-B time interval) Data rate 50 MS/s or less, sampling time 1.6 s or less (when measuring pulse width A & A-to-B time interval, pulse width A & pulse width B)
T measurement range	7 ns to 250 ns

Rear Panel Input/Output

Item	Specifications
Reference input	Connector type: BNC Input coupling: AC Input impedance: 1 kΩ or more Input frequency range: 10 MHz ± 10 Hz Input level: 1 V_{p-p} or higher Maximum input voltage: ±10 V
10-MHz output	Connector type: BNC Output coupling: AC Output impedance: 50 Ω (typical value*1) Output frequency: 10 MHz (typical value*1) Output level*2: 1 V_{p-p} or higher
Monitor output (CH A/CH B)	Connector type: BNC Output impedance: 50 Ω (typical value*1) Output level*2: Approx. 1/4 the input signal (±5 V or less)
Probe power terminal	Number of output terminals: 2 (Usable probe: FET probe (700939)) Output voltage: ±12 V
Gate output	Connector type: BNC Output level: TTL

*1 Typical value represents a typical or average value. It is not strictly warranted.
*2 Level when the input impedance on the receiving side is 50 Ω.

GP-IB Interface

Item	Specifications
Interface	GP-IB
Electrical and mechanical specifications	Conforms to IEEE St'd 488-1978 (JIS C 1901-1987).
Mechanical specifications	SH1, AH1, T6, L4, SR1, RL1 PP0, DC1, DT1, C0
Protocol	Conforms to IEEE St'd 488.2-1992
Code	ISO (ASCII) code
Mode	Addressable mode
Address	0 to 30
Clear remote mode	Remote mode can be cleared using the LOCAL (SHIFT+AUTO SCALE) key (except during Local Lockout).

Time Base

Item	Specifications
Internal reference frequency	Temperature-compensated crystal oscillator, 10 MHz
Frequency stability	Aging rate: ±1.5 ppm/year Temperature characteristics: 2.5 ppm in the range of 5 to 40°C with 25°C as the reference. Frequency accuracy at factory shipment: ±0.5 ppm
External adjustment	Possible

Internal Memory Function

Item	Specifications
	32 sets of setup parameters can be stored/recalled to/from the non-volatile memory

Built-in Printer

Item	Specifications
Printing system	Thermal line dot system
Dot density	8 dots/mm
Paper width	112 mm
Printing width	104 mm

Built-in Floppy Disk Drive

Item	Specifications
Drive type	3.5-inch floppy disk type
Number of drives	1
Format type	720 KB or 1.44 MB (MS-DOS compatible)

PC Card Drive (Optional)

Item	Specifications
Number of slots	1
Supported cards	Flash ATA memory card (PC card TYPE II)

Ethernet Communications (Optional)

Item	Specifications
Communication port	1
Electrical and mechanical specifications	Conforms to IEEE802.3
Transmission system	Ethernet (10BASE-T)
Transmission rate	10 M bps
Communication protocol	TCP/IP
Supported services	FTP server, FTP client (network drive), DHCP, DNS
Connector type	RJ-45 connector

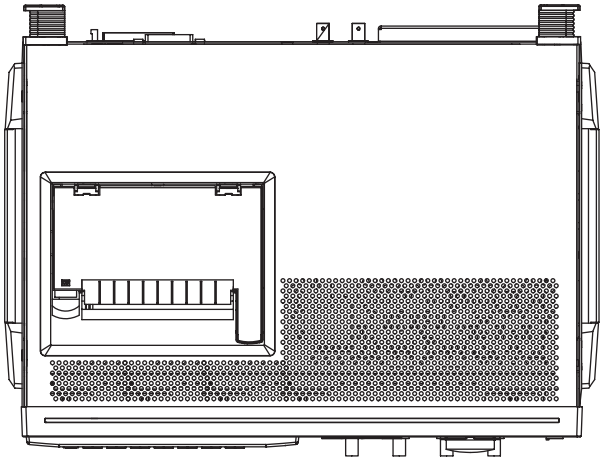
General Specifications

Item	Specifications
Electrical and mechanical specifications	• Ambient temperature: 23 ± 5°C • Ambient humidity: 50 ± 10% RH • Supply voltage/frequency error: Within 1% of rating
Operating altitude	2,000 m or less
Warming up	Approx. 30 minutes
Storage conditions	• Temperature: –20 to 60°C • Humidity: 20 to 80%RH (no condensation)
Operating conditions	• Temperature: 5 to 40°C • Humidity: 20 to 80%RH (no condensation)
Rated supply voltage	100 to 120 VAC, 200 to 240 VAC
Permitted supply voltage range	90 to 132 VAC, 180 to 264 VAC
Rated supply voltage frequency	50/60 Hz
Permitted supply voltage frequency range	48 to 63Hz
Maximum power consumption	250 VA
Withstanding voltage	1.5 kVAC, 10 mA or less for one minute (between power supply and case)
Insulation resistance	500 VDC, 10 MΩ or more (between power supply and case)
Signal ground	The ground of all input and output connectors is connected to the case ground.
External dimensions	Approx. 426 (W) × 177 (H) × 300 (D) mm (projections excluded)
Weight	Approx. 12 kg (main unit only)
Cooling method	Forced air cooling
Installation position	Horizontal (stacking prohibited)
Battery backup	Setup parameters and time are backed up using the internal lithium battery.
Fuse*1	Maximum rated voltage: 250 V, maximum rated current: 3.15 A, type: time lag, standard: UL/VDE certified Part number: A1351EF
Standard accessories	Power cord (1), rubber feet (4), printer roll paper, user's manual (this manual) (1), communication interface user's manual (1)

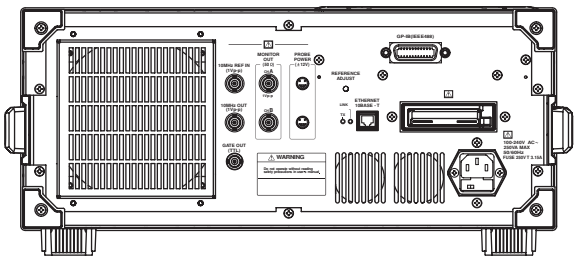
*1 There is also another fuse inside the unit, but the user cannot replace it. If you believe the fuse inside the unit is blown, contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.

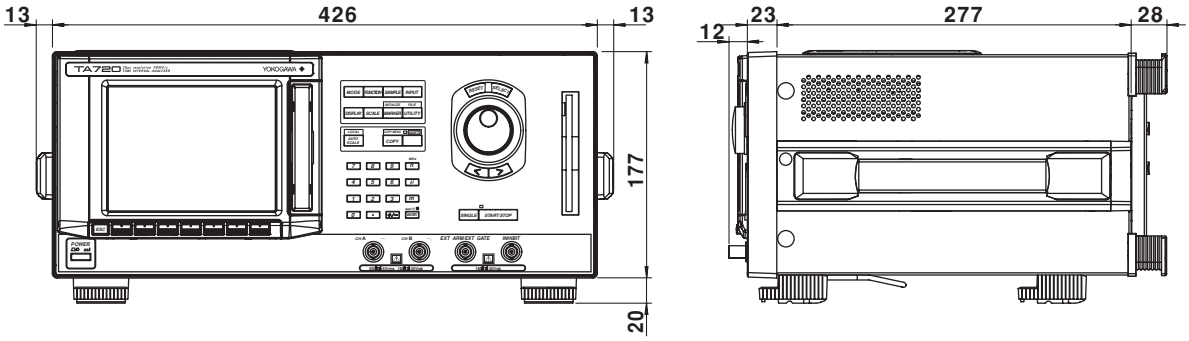
External Dimensions

Unit: mm



Rear View





If not specified, the tolerance is ±3%. However, in cases of less than 10 mm, the tolerance is ±0.3 mm.