

Universal Counter SC-7200H Series

A new lineup of high-performance counters that transcend their class!



GPIB CE

3GHz x 1ch &
230MHz x 2ch
Universal Counter
SC-7207H



GPIB CE

2GHz x 1ch &
230MHz x 1ch
Universal Counter
SC-7206H



GPIB CE
[Option]

230MHz x 2ch
Universal Counter
SC-7205H

Useful functions based on the need for a maximum of 3GHz and easy use.

- Enables frequency measurements for two independent channels (SC-7207H, SC-7205H.)
- Pulse width measurements and time interval measurements greatly broaden the scope of single-gate measurement.
- Easy operations with single key strokes for each action.
- Easy-to-see fluorescent display area. Detailed information displayed with 5 x 7 dot resolution.
- * A full-spelling guide provides powerful support for operations.
- Auto-trigger function that eradicates the need for setting the trigger level. Manual setup is, of course, also possible.
- Making line inspection tasks more efficient is a simple chore with the comparison and statistic calculation functions.
- The scaling calculation function enables single unit conversion (revolutions, speed, etc.)
- Input signal peak voltage measurements make it easy to confirm the waveform amplitude.
- The save/recall function for panel setup makes predetermined inspection tasks more efficient.
- The GPIB (optional for the SC-7205H: SC-701) and RS-232 interfaces provide full remote control.

* Transmission is performed in the real-time at a high speed of a maximum 200 items of data/second, which contributes to improved line throughput.

- Full lineup of options to provide greater expandability
- Comparator output (open collector) with digital I/O (SC-702.) External trigger input.
- * 150mA can be used for line monitoring equipment without modification to provide a margin of 50V.
- The high-stability standard oscilloscope (SC-703A) provides highly accurate measurements.

Specifications and Performance

Output Interfaces	RS-232: Fitted as standard. GPIB Fitted as standard (optional for the SC-7205H: SC-701) Digital I/O: Optional (SC-702)
Size and Weight	Approximately 210W x 99H x 353L mm (excluding options and protrusions) 4.0kg or less (when mounted with the SC-701, 702 and 703 options)
High-stability Standard Oscillator (manufactured on request)	Two types of options available (only one type may be mounted) Temperature Characteristics: +/-0.05ppm, Oscillation Frequency: 10MHz

Universal Counter Option

GPIB Interface

SC-701

For use with the SC-7205H

- Mounting the SC-701 onto the SC-7207H, 7206H and 7205H Universal Counters (fitted as standard to the SC-7207H and 7206H) enables measurements taken with external GPIB controllers to be reset, the remote setup of measurement functions, time base functions and calculations, etc., and the results of measurements to be transmitted as data to external sources.

* This is a factory option and needs to be ordered at the same time as the main unit. Ordering factory installation at a later date will be chargeable.

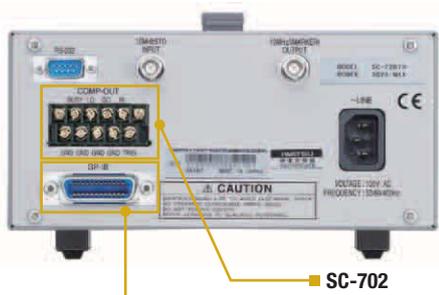
Digital I/O

SC-702

For use with the SC-7207H, SC-7206H and SC-7205H

- Installing the SC-702 onto the SC-7207H, SC-7206H and SC-7205H Universal Counters will enable control over the start of measurement and the output of comparison calculation results. (open collector) Connecting an external lamp also allows parts to be selected and inspection results to be easily browsed.

* This is a factory option and needs to be ordered at the same time as the main unit. Ordering factory installation at a later date will be chargeable.



SC-701 GPIB Interface (Equipped as standard on SC-7207H and SC-7205H. Factory option only for SC-7206H)
SC-702 Digital I/O (Factory option)

Main Performance

Maximum Output Terminal Rating	Withstand voltage	DC50V
	Withstand current	DC150mA
Maximum Input Terminal Rating	Frequency response	DC to 1kHz
	Withstand voltage	DC5V
Maximum Input Terminal Rating	Frequency response	DC to 1kHz

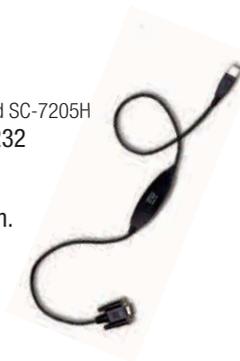
RS-USB Converter

SC-525

For use with the SC-7207H, SC-7206H and SC-7205H

- The cable for connecting the RS-232 measurement unit to a personal computer's USB port.
- Overall length approximately 85cm.

* Can also be used with the VQAC 7500H series, the SG-4115 and the SG-4105.



High-stability Standard Oscilloscope

SC-703A

Custom Order

New Crystal (SC-703A)	
Oscillation Frequency	10MHz
Temperature Characteristics	+/-0.05ppm Range of 0 °C to 40 °C with +25 °C as the standard.
Rising Time	+/-0.05ppm 10 minutes for power switch-on with the frequency 1 hour after power switch-on as the standard
Time Fluctuations (per day)	+/-0.02ppm Value at 72 hours after power switch-on with 48 hours after power switch-on as the standard
Time Fluctuations (per year)	+/-0.02ppm Value at one year after power switch-on with 10 days after power switch-on as the standard

Universal Counters SC-7207H / SC-7206H / SC-7205H Specifications

Frequency A (FREQ-A)					
*Measuring range and resolution * SC-7206H is not equipped with EXT-B gate					
		SC-7207H		SC-7206H, SC-7205H	
Reference time (reference frequency)		10ns (100MHz)		100ns (10MHz)	
Range		6mHz to 230MHz		0.6mHz to 230MHz	
Resolution and count method	DC	10Hz to 230MHz			
	AC	10Hz to 230MHz			
	Frequency	Below 100MHz	100MHz or more	Below 10MHz	10MHz or more
	Count method	Reciprocal count	Direct count	Reciprocal count	Direct count
	1ms gate	5 digits	1kHz	4 digits	1kHz
	10ms gate	6 digits	100Hz	5 digits	100Hz
	0.1s gate	7 digits	10Hz	6 digits	10Hz
	1s gate	8 digits	1Hz	7 digits	1Hz
	10s gate	9 digits	0.1Hz	8 digits	0.1Hz
	EXT-B gate *	Reciprocal count method: The number of digits is determined by external gate time			
SGL gate	Reciprocal count method: The number of digits is determined by measured signal				

AC Line Frequency (FREQ-LINE) (for SC-7207H and SC-7205H only)			
*Measuring range and resolution			
		SC-7207H	SC-7205H
Reference time		10ns	100ns
Range		45Hz to 440Hz	
Resolution	0.1s gate	7 digits	6 digits
	1s gate	8 digits	7 digits
	10s gate	9 digits	8 digits

Frequency C (FREQ-C) (for SC-7207H and SC-7206H only)					
*Measuring range and resolution					
		SC-7207H		SC-7206H	
Reference time (reference frequency)		10ns (100MHz)		100ns (10MHz)	
Range (for AC coupling only)		100MHz to 3GHz 1/16 prescaler		100MHz to 2GHz 1/16 prescaler	
Resolution and count method	Measured signal	Below 1.6GHz	1.6GHz or more	Below 160MHz	160MHz or more
	Count method	Reciprocal count	Direct count	Reciprocal count	Direct count
	1ms gate	5 digits	10kHz	4 digits	10kHz
	10ms gate	6 digits	1kHz	5 digits	1kHz
	0.1s gate	7 digits	100Hz	6 digits	100Hz
	1s gate	8 digits	10Hz	7 digits	10Hz
	10s gate	9 digits	1Hz	8 digits	1Hz
	EXT-B gate *	Reciprocal count method: The number of digits is determined by external gate time			
	SGL gate	Not equipped with EXT-B			

Period A (PERI-A)			
*Measuring range and resolution *SC-7206H is not equipped with EXT-B gate			
		SC-7207H	SC-7206H, SC-7205H
Reference time		10ns	100ns
Range		5ns to 171s	5ns to 1,717s
Resolution	DC couple	5ns to 0.1s	
	AC couple	5ns to 0.1s	
	1ms gate	5 digits	4 digits
	10ms gate	6 digits	5 digits
	0.1s gate	7 digits	6 digits
	1s gate	8 digits	7 digits
	10s gate	9 digits	8 digits
	EXT-B gate *	The number of digits is determined by external gate time	
	SGL gate	The number of digits is determined by measured signal	

Duty ratio A (DUTY-A)			
*Measuring range and resolution			
		SC-7207H	SC-7206H, SC-7205H
Input signal frequency range		Same as FREQ-A	
Measuring range	SGL gate	0.01 μ to 99,999,999 [%]	
	Internal gate	2 μ to 99,999,998 [%]	
Measuring resolution	Average count of internal gate	100ns/input period x 100 [%]	
	SGL gate	100ns/average input period x 100 [%]	
	1 to 24	10ns/average input period x 100 [%]	
	25 to 2,499	1ns/average input period x 100 [%]	
	2,500 to 249,999	100ps/average input period x 100 [%]	
	250,000 to 24,999,999	10ps/average input period x 100 [%]	
	25,000,000 or more	1ps/average input period x 100 [%]	

Pulse width A (P.W-A)			
*Minimum pulse width: 6ns *Maximum repetitive frequency: 80MHz *Measuring range and resolution			
		SC-7207H	SC-7206H, SC-7205H
Reference time		10ns	100ns
Measuring range		SGL gate: 10ns to 171s Internal gate (1ms to 10s): 10ns to approx. 1/2 gate time	SGL gate: 100ns to 1,717s Internal gate: 100ns to approx. 1/2 gate time
Measuring resolution	Average count of internal gate	100ns to 1ms	
	SGL gate	100ns to 1ms	
	1 to 24	10ns	
	25 to 2,499	1ns	
	2,500 to 249,999	100ps	
	250,000 to 24,999,999	10ps	
	25,000,000 or more	1ps	

Time interval A --> B (T.INT A --> B) (for SC-7207H and SC-7205H only)			
*Minimum time interval: 6ns *Maximum repetitive frequency: 80MHz *Measuring range and resolution			
		SC-7207H	SC-7205H
Reference time		10ns	100ns
Measuring range		SGL gate: 10ns to 10,955s Internal gate (1ms to 10s): 10ns to approx. 1/2 gate time	SGL gate: 100ns to 109,951s Internal gate: 100ns to approx. 1/2 gate time
Measuring resolution	Average count of internal gate	100ns to 100μs	
	SGL gate	100ns to 100μs	
	1 to 24	10ns	
	25 to 2,499	1ns	
	2,500 to 249,999	100ps	
	250,000 to 24,999,999	10ps	
	25,000,000 or more	1ps	

Frequency ratio A/B (FREQ A/B) (for SC-7207H and SC-7205H only)			
•Measuring range and resolution			
		SC-7207H	SC-7205H
Input signal frequency range Both CH-A and CH-B are the same as that for FREQ-A			
Measuring range		Internal gate (1ms to 10s)	1E-9 to 1E+9
Measuring resolution		Internal gate (1ms to 10s)	1+LOG (CH-A input frequency x gate time) digits
Phase measuring A → B (PHAS A → B) (for SC-7207H and SC-7205H only)			
•Minimum time interval: 6ns •Maximum repetitive frequency: 80MHz •Measuring range and resolution			
		SC-7207H	SC-7205H
Reference time		10ns	100ns
Measuring range		SGL gate Internal gate	0.1μ to 359,999,999.9 [] 10μ to 359,999.99 []
Measuring resolution	Average count of internal gate	SGL gate	0ns/input period x 360 [] 100ns/average input period x 360 []
		1 to 24	10ns/average input period x 360 [] 100ns/average input period x 360 []
		25 to 2,499	1ns/average input period x 360 [] 10ns/average input period x 360 []
		2,500 to 249,999	100ps/average input period x 360 [] 10ps/average input period x 360 []
		250,000 to 24,999,999	10ps/average input period x 360 [] 1ps/average input period x 360 []
25,000,000 or more		1ps/average input period x 360 []	10ps/average input period x 360 []
Peak voltage measuring (SC-7206H is not equipped with CH-B)			
Measures and displays in real-time the voltage amplitude of the measured signal at CH-A or CH-B.			
Frequency range		150Hz ≤ input frequency ≤ 50MHz	
Response time		2 seconds or less	
Voltage range		± 2.50V (ATT off, resolution: 10mV), ± 50.0V (ATT on, resolution: 100mV)	
Measuring error		ATT off: 10% of indication ± 50mV ATT on: not specified	
CH-A, CH-B input terminal (SC-7206H is not equipped with CH-B)			
Input RC		Approx. 1MΩ/20pF or less	
Coupling		AC or DC	
Low pass filter		Off, 10kHz	
Attenuator		Off, 26dB (1/20)	
Trigger level	Measuring Range	ATT off	-2.50V to +2.50V (resolution: 10mV)
		ATT on	-50.0V to +50.0V (resolution: 100mV)
	accuracy (0°C to +40°C)	ATT off	10% ± 30mV of the set value (± 3% when +2V to -2V)
		ATT on	10% ± 300mV of the set value (± 3% when +40V to -40V)
Operating input voltage range		ATT off	± 2.5V
		ATT on	± 50V
Input sensitivity	Manual trigger	ATT off	30mVrms (DC to 230MHz)
		ATT on	0.6Vrms (DC to 230MHz)
	Auto trigger	ATT off	200mVrms (10kHz to 230MHz, sine wave)
		ATT on	4Vrms (10kHz to 230MHz, sine wave)
CH-C input terminal (for SC-7207H and SC-7206H only)			
Maximum input power		+30dBm (approx. 7Vrms when 1mΩ/50Ω = 0dBm as a reference)	
Impedance		Approx. 50Ω	
Coupling		AC	
VSWR		2.0 or less (SC-7207H: 100MHz to 3GHz, SC-7206H: 100MHz to 2GHz)	
Input sensitivity		(Sine wave: up to 2GHz for SC-7206H) (100MHz ≤ input frequency ≤ 300MHz)	
AGC off/on	-20dBm	(300MHz < input frequency ≤ 1.5GHz)	
	-25dBm	(1.5GHz < input frequency ≤ 3.0GHz)	
	-20dBm		
Burst detection	Detection frequency range		SC-7207H 100MHz to 3GHz
	Input sensitivity		(Sine wave: up to 2GHz for SC-7206H) (100MHz ≤ input frequency ≤ 1.2GHz)
	AGC off	-20dBm	(1.2GHz < input frequency ≤ 3.0GHz)
		-10dBm	
Detection delay time		500μs (Burst period ≥ set gate + 500μs)	
10MHz STD IN			
BNC terminal for more stable input of the external reference frequency			
Frequency		10MHz ± 50Hz (± 5ppm)	
Amplitude		1Vrms to 5Vrms, threshold = 0V	
Input resistance		Approx. 6.4kΩ	
Input coupling		AC	
10MHz STD OUT/(MARKER OUT)			
BNC terminal for output of internal reference oscillator or marker signal.			
Marker signal is a signal that presupposes the brightness modulation (Z axis) of the analog oscilloscope for example. It is enabled at the SGL gate when the function is in between the time interval (T.INT A → B) and phase (PHAS A → B). Output is "Lo level" from the start of CH-A measuring to the start of CH-B measuring.			
Output		CMOS level	
Reference frequency output		10MHz: Stability is the same as that for the internal reference oscillator.	
Marker output		In the 5MHz band, L-state is output during actual measuring. (for SC-7207H and SC-7205H only.)	
Output interface		Environmental conditions	
•RS-232 is equipped as standard •GPIB is equipped as standard (option SC-701 for SC-7205H) •Digital I/O option can be installed (SC-702)		•Warm-up time: 60 minutes or more •Operating temperature/humidity: 0°C to +40°C/85%R.H or less (no condensation) •Storage temperature/humidity: -20°C to +60°C/90%R.H or less (no condensation)	
Reference oscillator			
Equipped with SC-7207H, SC-7206H and SC-7205H as standard			
Output is possible to the 10MHz OUT BNC terminal on the rear panel of the main unit.			
•Oscillation frequency: 10MHz •Temperature characteristics: ± 2.5ppm/unit environmental temperature: 0°C to +40°C •Aging rate: ± 1.0ppm/year			
Power supply conditions and power supply voltage changes (factory option)			
•Voltage: AC100V / 110V to 120V / 220V to 240V •Frequency: 50Hz, 60Hz, 400Hz •Power consumption: At AC100V with optional SC-701 and SC-702 are installed.			
Power Consumption		SC-7207H 36VA MAX	SC-7206H 33VA MAX
			SC-7205H 31VA MAX
Size		(210 ± 2)W x (99 ± 2)H x (353 ± 2)L mm (excluding options and protruded parts)	
Weight		4.0kg or less (including optional SC-701 and SC-702)	
Accessory		Power cable (1), operation manual CD-ROM (1)	

Universal Counter
SC-7217



A Maximum of 3GHz, and the Digit Display Greatly Increased to Accommodate a Maximum of 12Digits/sec

- USB, LAN, RS-232 (option) and full remote control with GPIB (option)
- Compare output with digital I/O
- Full lineup of options to provide greater expandability
 - Data stored on USB storage memories.
 - High-stability clock oscillator option.

SC-7217 Interim Specifications

CH-A, CH-B	Input impedance		50 Ω ± 1.5% / 1MΩ ± 1.5% // 16pF ± 3pF		
	Input withstand pressure		50 Ω / 1MΩ		
	Frequency band		DC / AC		
	Input voltage range		ATT OFF / ON		
	Trigger level accuracy		ATT OFF / ON		
	Slope switching		+ / -		
	Band limiter		10kHz		
	Noise rejection		OFF/ON		
EXT-B	Input signal range		Pulse width / frequency		
CH-C	Input impedance / SWR / Maximum input electrical power		50 Ω, AC coupling / 2.0 or less / +30dBm		
	Frequency band		100MHz to 3GHz		
	AGC		ON/OFF		
	Burst detection		ON/OFF		
Measurement Functions	FREQ A, FREQ B		Max. 13-digit, 12-digit/sec (at 1second gate)		
	Measurement range		Single: 6mHz to 250MHz, time / EXT-B gate: 12mHz to 450MHz		
	Gate selection		Single / EXT-B / Time (set at 10μs to 10s 10 ⁿ) (n: integer)		
	FREQ C		Max. 13-digit, 12-digit/sec (at 1second gate)		
	Measurement range		100MHz to 3GHz, 1/16 pre-scaler		
	Gate selection		EXT-B / Time (set at 10μs to 10s 10 ⁿ) (n: integer)		
	FREQ LINE		Measurement range / Gate selection		
	Measurement range		45Hz to 440Hz / 0.1s/1s/10s		
	PERIOD A		Measurement range		
	Gate selection		Single / EXT-B / Time (set at 10μs to 10s 10 ⁿ) (n: integer)		
	DUTY A		Input signal range	Pulse width / Frequency	
	Measurement range		Single / Time	0.01μ to 99.999,999,99% / 0.2μ to 99.999,999,8%	
	Gate selection		Single / Time (set at 10μs to 10s 10 ⁿ) (n: integer)		
	PULSE WIDTH A		Input signal range	Pulse width / Frequency	
	Measurement range		Single / Time	6ns to 171s / 6ns to approximately 1/2 gate time	
	Gate selection		Single / Time (set at 10μs to 10s 10 ⁿ) (n: integer)		
	TIME INTERVAL A → B		Input signal range	Pulse width / Frequency	
	Measurement range		Single / Time	6ns to 10,995s / 6ns to approximately 1/2 gate time	
	Gate selection		Single / Time (set at 10μs to 10s 10 ⁿ) (n: integer)		
	FREQ A/B		Input signal range, Frequency	250MHz max	
	Measurement range / Gate Selection		1 E-9 to 1 E+9 / Time (set at 10μs to 10s 10 ⁿ) (n: integer)		
	PHAS A → B		Input signal range	Pulse width / Frequency	
	Measurement range		Single / Time	0.1μ to 359.999,999,99 / 1μ to 359.999,999* (However, it is necessary or this to be less than half of the gate for non-measurable signal cycles)	
	Gate selection		Single / Time (set at 10μs to 10s 10 ⁿ) (n: integer)		
	TOT A		Input signal range	Pulse width / Frequency	
	Gate selection		MANUAL / EXT-B / Time (set at 10μs to 10s 10 ⁿ) (n: integer)		
	Measurement range		0 to 4,294,967,295 count		
	Peak voltage measurement		Measurement frequency / Measurement speed	150Hz to 150MHz / 2 seconds or less	
Measurement voltage range		ATT OFF / ATT ON	± 2.5V / ± 50V		
Measurement operations			Repeat / Single / HOLD		
Calculation			Smoothing (moving average), scaling, compare, statistics (MAX, MIN, σ, average)		
Pulse setup			Internal memory (10) or USB memory		
DATA save memory			MAX. 500,000kinds (volatile memory)		
Internal standard clock			Temperature characteristics		
Temporal change / Short-term stability			+/- 1 ppm (range of 0 to +40°C with +25°C as the standard)		
Interface			USB / LAN / DIO		
10MHz STD IN			Input impedance / Input frequency / Input sensitivity		
Marker / STD output			Output impedance / Marker output / STD output		
Options (OP when shipped)	OCXO	Medium stability	Temperature characteristics	+/- 20ppb (range of 0 to +40°C with +25°C as the standard)	
			Temporal change	+/- 10ppb/day (fluctuations in one day's frequencies with the standard frequency being that measured after 48 hours. At +25°C) +/- 100ppb/year (fluctuations in one year's frequencies with the standard frequency being that measured 10 days after the power has been switched on. At +25°C)	
		High stability	Temperature characteristics	+/- 5ppb (range of 0 to +40°C with +25°C as the standard)	
			Temporal change	+/- 0.5ppb/day (fluctuations in one day's frequencies with the standard frequency being that measured 30 days after the power has been switched on. At +25°C) +/- 50ppb/year (fluctuations in one year's frequencies with the standard frequency being that measured 30 days after the power has been switched on. At +25°C)	
		Interface		GPIB (conforming to IEEE488-1 with full remote functions,) RS-232C, host for connecting the USB memory (for storage only)	
		Electric power		Voltage / Frequency	
Power consumption		AC 100V to AC 240V ± 10% / 50 to 60Hz ± 5%(100V to 240V) / 400Hz ± 10%(100V to 120V)			
External dimensions (W x H x D)		70VA(35W) max			
Accessories		(210 ± 2) × (99 ± 2) × (353 ± 2) mm			
Environment		Product users' guide x 1, instructions (CD) x 1, power cable x 1.			
		0°C to +40°C with 80%RH or less and no condensation			