

GSM-20H10

Precision Source Meter



FEATURES

- * Maximum Output $\pm 210\text{V}/\pm 1.05\text{A}/22\text{W}$
- * Built-in 4 Sequence Output Modes (Stair, Log, SRC-MEM, Custom), up to 2500 Points
- * OVP /OTP Protection Function
- * 0.012% Basic Measure Accuracy with $6\frac{1}{2}$ -digit Resolution
- * Variable Sampling Speed
- * SDM (Source Delay Measure) Cycle
- * 2-, 4-, and 6-wire Remote V-source and Measure Sensing
- * Variable Display Digits
- * Built-in Limit Function
- * Built-in 5 Calculation Functions
- * 4.3" TFT LCD, Digital Number Keyboard
- * Built-in RTC Clock
- * Interface: RS-232, USBTMC, LAN, GPIB (Optional)

APPLICATIONS

- * Semiconductor Component Characteristic Testing
- * Energy and Efficiency Characteristic Testing
- * Organic Material Characteristic Testing
- * Nanomaterial Characteristic Testing

GW Instek GSM-20H10 is a precision source meter that provides highly stable DC power and instrument-grade $6\frac{1}{2}$ -digit multimeter measurements. While operating, it can be used as a voltage source, current source, voltmeter, ammeter, and ohmmeter, which is uniquely ideal for the evaluation of component characteristics and the test applications of production, including nanomaterials and components, semiconductor architecture, organic materials, high-efficiency illumination, passive components and material characteristics analysis, etc.

GSM-20H10 provides four-quadrant operation of $\pm 210\text{V}/\pm 1.05\text{A}/22\text{W}$. The first and third quadrants operate as power supplies to supply power to the load. The second and fourth quadrants function as loads to consume power internally. Voltage value, current value and resistance value can be measured while operating the power supply or load function with an accuracy of 0.012% and a resolution of $1\mu\text{V}/10\text{pA}/10\mu\Omega$.

With respect to sampling rate, GSM-20H10 supports a sampling rate of up to 50k points/second, which can accurately analyze the characteristics of the DUT. With the large 4.3-inch screen, all measurement settings, parameters and results can be completely displayed on the screen. The SDM (Source Delay Measure) function is provided to delay sampling when the signal changes so as to prevent the unstable signal from being captured and cause misjudgment. There are four built-in sequence output modes (Stair, Log, SRC-MEM, Custom), which can support up to 2500 points of sequence variation output.

Pertaining to protection, GSM-20H10 provides OVP/OTP modes. The design of OVP allows users to self-define the range of OVP. OTP can effectively prevent errors caused by temperature drift during the test process. For interfaces, this product supports standard SCPI commands and provides RS-232, USBTMC, LAN, GPIB (optional) interfaces to meet users' different interface needs.

SPECIFICATIONS NOTE :

1. Speed = Normal (1 NPLC). For 0.1 PLC, add 0.005% of range to offset specifications, except 200mV, 1A ranges, add 0.05%. For 0.01 PLC, add 0.05% of range to offset specifications, except 200mV, 1A ranges, add 0.5%.
2. Required to reach 0.1% of final value after Command is processed. Resistive load. $10\mu\text{A}$ to 100mA range.
3. Overshoot into a fully resistive $100\text{k}\Omega$ load, 10Hz to 1MHz BW, adjacent ranges : 100mV typical, except $20\text{V}/200\text{V}$.
4. Maximum time required for the output to begin to change following the receipt of : SOURCE : VOLTage|CURRent <nr> Command.
5. Reading rates applicable for voltage or current measurements, autorange off, filter off, display off, trigger delay = 0, and binary reading format.
6. Purely resistive load. $1\mu\text{A}$ and $10\mu\text{A}$ ranges <65ms.
7. 1000 point sweep was characterized with the source on a fixed range.
8. Pass/Fail test performed using one high limit and one low math limit.
9. Includes time to re-program source to a new level before making measurement.
10. Time from falling edge of START OF TEST signal to falling edge of END OF TEST signal.
11. Command processing time of : SOURCE : VOLTage|CURRent : TRIGgered <nr> Command not included.



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SPECIFICATIONS												
MAXIMUM RANGE	Voltage		±210V									
	Current		±1.05A									
	Power		22W									
	Voltage Resolution		1µV									
	Current Resolution		10pA									
SOURCE	DC Voltage	Output Voltage	±21V / ±1.05A, ±210V / ±105 mA									
		Current Limit	Min. 0.1% of range									
		Programming Resolution & Accuracy *1	Range	±200.000mV		±2.00000V		±20.0000V		±200.000V		
			Resolution	1µV		10µV		100µV		1mV		
			Accuracy	±(0.02%+600µV)		±(0.02%+600µV)		±(0.02%+2.4mV)		±(0.02%+24mV)		
		Load Regulation	0.01% of range + 100µV									
		Line Regulation	0.01% of range									
		Overshoot	<0.1% typical (full scale step,resistive load, 10mA range)									
		Recovery Time (1000% Load Change)	<250µs (within 0.1% plus load regulation errors, 1A and 100mA compliance.)									
		Ripple and Noise	4mVrms(20Hz~ 1MHz) / 10mVpp(20Hz~ 1MHz)									
	Temperature Coefficient	±(0.15 × accuracy specification) / °C (0°~18°C & 28°~50°C)										
	DC Current	Output Current	±1.05A / ±21V, ±105 mA / ±210V									
		Voltage Limit	Min. 0.1% of range									
		Programmed Source Resolution & Accuracy *1	Range	±1.00000µA		±10.0000µA		±100.000µA		±1.00000mA		
			Resolution	10pA		100pA		1nA		10nA		
			Accuracy	±(0.035%+600pA)		±(0.033%+2nA)		±(0.031%+20nA)		±(0.034%+200nA)		
		Load Regulation	0.01% of range + 100pA									
		Line Regulation	0.01% of range									
		Overshoot	<0.1% typical (1mA step, RL = 10kΩ, 20V range)									
		Temperature Coefficient	±(0.15 × accuracy specification) / °C (0°~18°C & 28°~50°C)									
		General	Output Settling Time *2	100µs typical time								
	Output Rise Time (±30%)		300µs, 200V range, 100mA compliance ; 150V/µs, 20V range, 100mA compliance									
	DC Floating Voltage		Output can be floated up to ±250VDC									
Remote Sense	Up to 1V drop per load lead											
Compliance Accuracy	Add 0.3% of range and ±0.02% of reading to base specification											
Range Change Overshoot *3	Adjacent range changes between 200mV, 2V and 20V ranges, 100mV typical											
Minimum Compliance Value	0.1% of range											
Command Processing Time *4	Autorange On:10ms. Autorange Off: 7ms											
Input Resistance	>10 GΩ											
MEASUREMENT	Voltage		Measurement Resolution & Accuracy	Range	±200.000mV		±2.00000V		±20.0000V		±200.000V	
		Resolution		1µV		10µV		100µV		1mV		
		Accuracy		±(0.012%+300µV)		±(0.012%+300µV)		±(0.015%+1.5mV)		±(0.015%+10mV)		
		Temperature Coefficient	±(0.15 × accuracy specification) / °C (0°~18°C & 28°~50°C)									
	Current	Voltage Burden (4-wire mode)	< 1mV									
		Programmed Source Resolution & Accuracy *1	Range	±1.00000µA		±10.0000µA		±100.000µA		±1.00000mA		
			Resolution	10pA		100pA		1nA		10nA		
			Accuracy	±(0.029%+300pA)		±(0.027%+700pA)		±(0.025%+6nA)		±(0.027%+60nA)		
	Temperature Coefficient	±(0.1 × accuracy specification) / °C (0°~18°C & 28°~50°C)										
	Resistance	Range	Resolution	<2.00000Ω		2.00000Ω		20.0000Ω		200.000Ω		
			Test current	---		---		---		---		
			Accuracy	Source IACC+Meas.VACC		Source IACC+Meas.VACC		±(0.1%+0.003Ω), Normal ±(0.07%+0.001Ω), Enhanced		±(0.08%+0.03Ω), Normal ±(0.05%+0.01Ω), Enhanced		
			Resolution	200.000kΩ		2.00000MΩ		20.0000MΩ		200.000MΩ		
			Test current	10µA		5µA		0.5µA		100nA		
			Accuracy	±(0.07%+300Ω), Normal ±(0.05%+100Ω), Enhanced		±(0.11%+3000Ω), Normal ±(0.05%+100Ω), Enhanced		±(0.11%+1kΩ), Normal ±(0.05%+500Ω), Enhanced		±(0.66%+10kΩ), Normal ±(0.35%+5kΩ), Enhanced		
			Temperature Coefficient	±(0.15 × accuracy specification) / °C (0°~18°C & 28°~50°C)								
			Source I mode, Manual OHMS	Total uncertainty = I source accuracy + V measure accuracy (4-wire remote sense)								
			Source V mode, Manual OHMS	Total uncertainty = V source accuracy + I measure accuracy (4-wire remote sense)								
			6-wire OHMS Mode	Available using active ohms guard and guard sense. Max. Guard Output Current: 50mA (except 1A range). Accuracy is load dependent								
		Guard Output Impedance	<0.1Ω in ohms mode									
		SYSTEM SPEED *5	Maximum Range Change Rate	75/second								
			Maximum Measure Auto Range Time	40ms (fixed source) *6								
			Sequence Reading Rates *7 (rdg./second) for 60Hz (50Hz)	Speed	NPLC / Trig Origin	Measure		Source-Measure *9		Source-Measure Pass/Fail test *8, *9		Measure Memory *9
Fast				0.01 / internal	TO MEMORY	TO GPIB	TO MEMORY	TO GPIB	TO MEMORY	TO GPIB	TO MEMORY	TO GPIB
	2081 (2030)				1198 (1210)	1551 (1515)	1000 (900)	902 (900)	809 (840)	165 (162)	164 (162)	
	1239 (1200)				1079 (1050)	1018 (990)	916 (835)	830 (830)	756 (780)	163 (160)	162 (160)	
Medium	0.1 / internal			510 (433)	509 (433)	470 (405)	470 (410)	389 (343)	388 (343)	133 (126)	132 (126)	
				438 (380)	438 (380)	409 (360)	409 (365)	374 (333)	374 (333)	131 (125)	131 (125)	
				59 (49)	59 (49)	58 (48)	58 (48)	56 (47)	56 (47)	44 (38)	44 (38)	
Normal	1 / external		57 (48)	57 (48)	57 (48)	57 (47)	56 (47)	56 (47)	44 (38)	44 (38)		
			---	---	---	---	---	---	---	---		
			---	---	---	---	---	---	---	---		
Single Reading Operation Rates (rdg./second) for 60Hz (50Hz)	Speed		NPLC / Trig Origin	Measure		Source-Measure *9		Source-Measure Pass/Fail test *8, *9		Source-Measure Pass/Fail test *8, *9		
	Fast(488.2)		0.01 / internal	TO GPIB	TO GPIB		TO GPIB		TO GPIB		TO GPIB	
				256 (256)	79 (83)		79 (83)		79 (83)			
				167 (166)	72 (70)		69 (70)		69 (70)			
Component Interface Handler Time for 60Hz (50Hz) *8, *10	Speed		NPLC / Trig Origin	Measure		Source Pass/Fail test		Source-Measure Pass/Fail test *9, *11		Source-Measure Pass/Fail test *9, *11		
	Fast		0.01 / internal	TO GPIB	TO GPIB		TO GPIB		TO GPIB		TO GPIB	
		1.04 ms (1.08 ms)		0.5 ms (0.5 ms)		4.82 ms (5.3 ms)		4.82 ms (5.3 ms)				
		2.55 ms (2.9 ms)		0.5 ms (0.5 ms)		6.27 ms (7.1 ms)		6.27 ms (7.1 ms)				
SYSTEM GENERAL	Load Impedance	Stable into 20,000pF typical										
	Differential Mode Voltage	250Vpk										
	Common Mode Voltage	250VDC										
	Common Mode Isolation	>10GΩ, <1000pF										
	Over Range	105% of range, source and measure										
	Max. Voltage Drop	5V										
	Max. Sense lead Resistance	1MΩ										
	Sense Input Impedance	>100GΩ										
	Guard Offset Voltage	<150µV, typical										
	Source Output Modes	Fixed DC level, Memory List (mixed function), Stair (linear and log)										
	Source Memory List	100 points max.										
	Memory Buffer	5,000 readings @ 5 digits (two 2,500 point buffers). Includes selected measured value(s) and time stamp. Lithium battery backup(3 yr + battery life)										
	Programmability	IEEE-488.2 (SCPI), RS-232 ; 5 user-definable power-up states plus factory default and *RST.										
	Digital I/O Connector	Active low input. Start of test, end of test, 3 category bits. ; +5V@ 300mA supply. ; 1 trigger input, 4 TTL/Relay Drive outputs (33V@500mA, diode)										
	Remote Interface	USB/GPIB/LAN/RS-232										
	Insulation	Chassis and terminal : 20MΩ or above (DC 500V) ; Chassis and AC cord : 30MΩ or above (DC 500V)										
	Operation Environment	Indoor use, Altitude: ≤ 2000m Ambient temperature: 0 ~ 40°C Relative humidity: ≤ 80%; Installation category: II, Pollution degree: 2										
	Storage Environment	Temperature: -20°C ~ 70°C; Humidity: < 80%										
	Input Power	100-240VAC, 50-60Hz										
	Power Consumption	80W										
	Dimensions & Weight	214 (W) x 86 (H) x 356.5 (D) mm, Approx. 4.8kg										

Specifications subject to change without notice. GSM-20H10_E_D1DH_202205

ORDERING INFORMATION	
GSM-20H10 with GPIB	Precision Source Meter
GSM-20H10	Precision Source Meter

ACCESSORIES	
CD User manual x 1, Quick Start manual x 1, Test Lead GTL-207A x 1, Alligator Clip x 2	
OPTIONAL ACCESSORIES	
SM-01	Digital I/O Adapter, Convert DB15 to DB9 + 8-pin micro-DIN
SM-02	Digital I/O Adapter, Convert DB15 to DB37 + 8-pin micro-DIN
GTL-246	USB Cable (USB 2.0 A-B Type, approx.. 1200mm)
GTL-258	GPIB Cable (25 pin Micro-D Connector)