

GSM-20H10

Precision DC Source Meter



FEATURES

- * Maximum Output $\pm 210V/\pm 1.05A/22W$
- * 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 6½-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 6½-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 $\pm 210V/\pm 1.05A/22W$. 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 $1\mu V/10pA/10\mu\Omega$.

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 μ A to 100mA range.
3. Overshoot into a fully resistive 100k Ω load, 10Hz to 1MHz BW, adjacent ranges : 10mV typical, except 20V/200V.
4. Maximum time required for the output to begin to change following the receipt of : SOURCE : VOLTage|CURRent <nrf> 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 μ A and 10 μ A ranges <65ms.
7. 1000 point sweep was characterized with the source on a fixed rang.
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 <nrf> Command not included.



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SPECIFICATIONS

MAXIMUM RANGE	Voltage	±210V										
	Current	±1.05A										
	Power	22W										
	Voltage Resolution	1µV										
	Current Resolution	10pA										
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	±10.0000mA	±100.000mA	±1.00000A		
Resolution			10pA	100pA	1nA	10nA	100nA	1µA	10µA			
Accuracy			±(0.035%+600pA)	±(0.033%+2nA)	±(0.031%+20nA)	±(0.034%+200nA)	±(0.045%+2µA)	±(0.066%+20µA)	±(0.27%+900µA)			
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; 150µs, 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										
	Voltage	Input Resistance	>10 GΩ									
		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	±10.0000mA	±100.000mA	±1.00000A		
			Resolution	10pA	100pA	1nA	10nA	100nA	1µA	10µA		
			Accuracy	±(0.029%+300pA)	±(0.027%+700pA)	±(0.025%+6nA)	±(0.027%+60nA)	±(0.035%+600nA)	±(0.055%+6µA)	±(0.22%+570µA)		
Temperature Coefficient		±(0.1 × accuracy specification) / °C (0°-18°C & 28°-50°C)										
Resistance		Range	Resolution	<2.00000Ω	2.00000Ω	20.0000Ω	200.000Ω	2.00000kΩ	20.000kΩ			
			Test current	---	---	100µA	1mΩ	10mΩ	100mΩ			
			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	±(0.07%+0.3Ω), Normal ±(0.05%+0.1Ω), Enhanced	±(0.06%+3Ω), Normal ±(0.04%+1Ω), Enhanced			
			Accuracy	±(0.07%+300), Normal ±(0.05%+100), Enhanced	±(0.11%+3000), Normal ±(0.05%+1000), Enhanced	±(0.11%+1kΩ), Normal ±(0.05%+500Ω), Enhanced	±(0.66%+10kΩ), Normal ±(0.35%+5kΩ), Enhanced	Source IACC+Meas.VACC				
	Temperature Coefficient	Resolution	1Ω	10Ω	100Ω	1kΩ	---	---				
		Test current	10µA	5µA	0.5µA	100nA	---	---				
		Accuracy	±(0.07%+300), Normal ±(0.05%+100), Enhanced	±(0.11%+3000), Normal ±(0.05%+1000), Enhanced	±(0.11%+1kΩ), Normal ±(0.05%+500Ω), Enhanced	±(0.66%+10kΩ), Normal ±(0.35%+5kΩ), Enhanced	Source IACC+Meas.VACC					
		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		
				TO MEMORY	TO GPIB	TO MEMORY	TO GPIB	TO MEMORY	TO GPIB	TO MEMORY	TO GPIB	
		Fast	0.01 / internal	2081 (2030)	1198 (1210)	1551 (1515)	1000 (900)	902 (900)	809 (840)	165 (162)	164 (162)	
		488.2	0.01 / external	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)	
		488.2	0.1 / external	438 (380)	438 (380)	409 (360)	409 (365)	374 (333)	374 (333)	131 (125)	131 (125)	
		Normal	1 / internal	59 (49)	59 (49)	58 (48)	58 (48)	56 (47)	56 (47)	44 (38)	44 (38)	
		488.2	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	
					TO GPIB	TO GPIB	TO GPIB	TO GPIB	TO GPIB	TO GPIB		
Fast(488.2)			0.01 / internal	256 (256)	79 (83)	79 (83)	79 (83)	79 (83)	79 (83)			
Medium(488.2)			0.1 / internal	167 (166)	72 (70)	72 (70)	72 (70)	72 (70)	72 (70)			
Normal(488.2)	1 / internal	49 (42)	34 (31)	34 (31)	34 (31)	34 (31)	34 (31)					
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			
			TO GPIB	TO GPIB	TO GPIB	TO GPIB	TO GPIB	TO GPIB				
	Fast	0.01 / internal	1.04 ms (1.08 ms)	0.5 ms (0.5 ms)	0.5 ms (0.5 ms)	4.82 ms (5.3 ms)						
	Medium	0.1 / internal	2.55 ms (2.9 ms)	0.5 ms (0.5 ms)	0.5 ms (0.5 ms)	6.27 ms (7.1 ms)						
Normal	1 / internal	17.53 ms (20.9 ms)	0.5 ms (0.5 ms)	0.5 ms (0.5 ms)	21.31 ms (25.0 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 DC Source Meter
 GSM-20H10 Precision DC 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 GTL-258 GPIB Cable (25 pin)
 SM-02 Digital I/O Adapter, Convert DB15 to DB37 + 8-pin micro-DIN Micro-D Connector)
 GTL-246 USB Cable (USB 2.0 A-B Type, approx.. 1200mm)

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