



GSM-20H10

Precision 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)

Streamline Your Characteristic Analysis

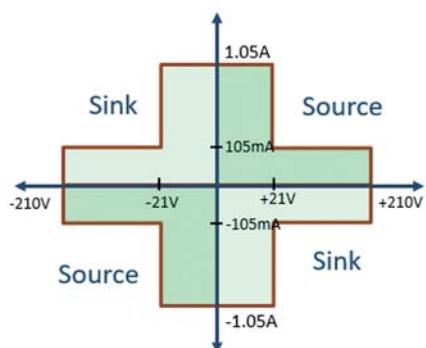
GW Instek GSM-20H10 is a precision source meter that provides highly stable DC power and instrument-grade 6½-digit multimeter measurements. While operating, it can be used as a voltage source, current source, voltmeter, ammeter, and ohmmeter, which is uniquely ideal for the evaluation of component characteristics 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.

A. MAXIMUM OUTPUT: $\pm 210V/\pm 1.05A/22W$



The power source output of the GSM-20H10 has two ranges.

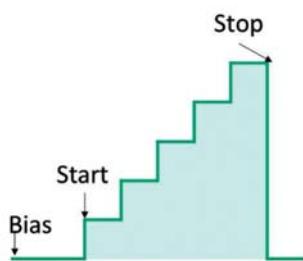
The voltage range is ± 21 volts, and the current is $\pm 1.05A$.

The voltage range is ± 210 volts, and the current range is $\pm 105mA$.

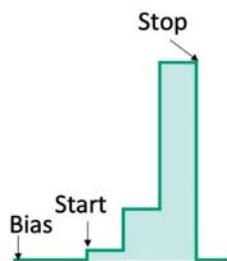
The power capacity is 22W.

Provide a full range of four-quadrant measurement without duty cycle limit.

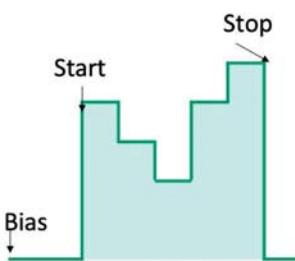
B. BUILT-IN 4 SEQUENCE OUTPUT MODES, UP TO 2500 POINTS



LINEAR STAIRCASE SWEEP



LOG STAIRCASE SWEEP



CUSTOM MODE

GSM-20H10 precision source meter provides four sequence output modes: linear staircase, log staircase, SRC-MEM (source memory) and Custom (self-defined).

With these output modes, users can quickly generate output as needed. The total number of sequence points is 2,500.

C. OVP /OTP PROTECTION FUNCTION



D. 0.012% BASIC MEASURE ACCURACY WITH 6½ DIGIT RESOLUTION



In terms of protection, GSM-20H10 provides OVP/OTP protection modes; in the design of OVP, users can define the range of OVP, and the protection of OTP can effectively prevent errors caused by temperature drift during the test process.

GSM-20H10 provides a measurement accuracy of up to 0.012%, and provides a meter display function of up to 6½ digits, allowing users to have more accurate results when measuring small signals..

E. VARIABLE SAMPLING SPEED

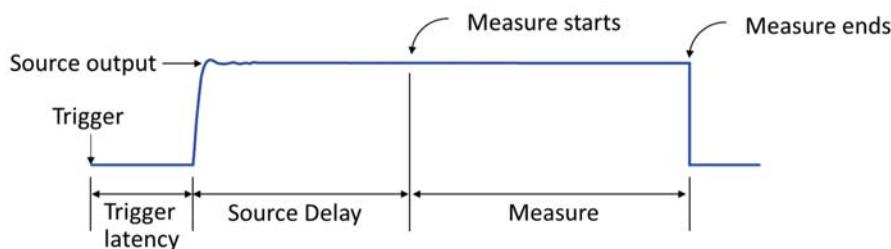


SAMPLING MODE	FAST	MEDIUM	NORMAL	HIGH	OTHER
Speed, NPLC	0.01	0.1	1	10	User defined
Digit	3½	4½	5½	6½	Selectable

The sampling rate of GSM-20H10 is variable. Therefore, users can choose the sampling rate from 0.01 PLC to 10 PLC according to their needs.

Where NPLC represents the number of power line cycles, for example, AC power frequency is 50Hz, 1 PLC means 20ms, 2 PLC means 40ms, and so on.

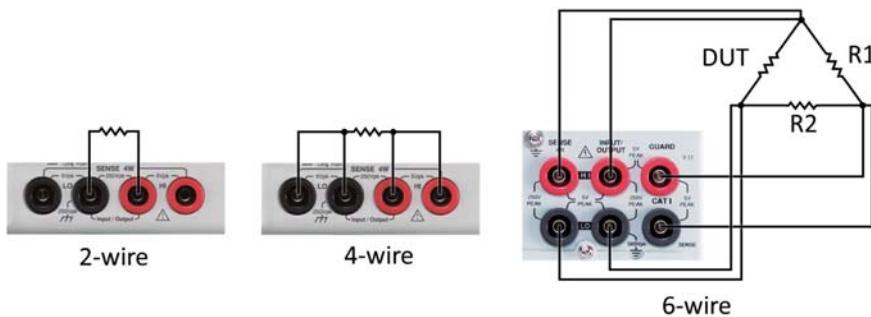
F. SDM (SOURCE DELAY MEASURE) CYCLE



The initial state of the source output may be unstable. If the meter starts measuring after the source is output, users can set the source delay to start the meter measurement after passing the unstable period so as to obtain stable measurement results.

GSM-20H10 precision source meter's delay range is 0 to 9999.999 seconds.

G. 2-, 4-, AND 6-WIRE REMOTE V-SOURCE AND MEASURE SENSING



Other than 2-wire, GSM-20H10 also provides 4-wire and 6-wire resistance measurements.

4-wire measurement eliminates the effect of lead resistance, realizing accurate measurement of small resistances below 100ohm at high currents.

6-wire combining 4-wire connection and the protection of ohm characteristics eliminate the effects of internal parallel resistance, realizing the resistance measurement of a tiny wire.

H. VARIABLE DISPLAY DIGITS



I. BUILT-IN LIMIT FUNCTION

Digout	Mode	Pass pattern	Source	Location	Limit	41°C
Digout 1	Grading	T	None	None	None	None
Digout 2	Grading	Low	None	None	None	None
Digout 3	Grading	High	None	None	None	None
Digout 4	Grading	Low	None	None	None	None
Digout 5	Grading	High	None	None	None	None
Digout 6	Grading	Low	None	None	None	None
Digout 7	Grading	High	None	None	None	None
Digout 8	Grading	Low	None	None	None	None
Digout 9	Grading	High	None	None	None	None
Digout 10	Grading	Low	None	None	None	None
Digout 11	Grading	High	None	None	None	None
Digout 12	Grading	Low	None	None	None	None

The display bits of GSM-20H10 are variable. Therefore, users can choose the number of display bits among 3.5, 4.5, 5.5, and 6.5 bits according to their needs.

GSM-20H10 has three built-in Pass/Fail limit line tests with a total of 11 sets.

J. BUILT-IN 5 CALCULATION FUNCTIONS

- Power = $V \cdot I$
- CompOhms = $\frac{(V_2 - V_1)}{(I_2 - I_1)}$
- $V_{ceoff}(\%) = \left[\frac{\Delta R}{(R_2 + \Delta V)} \right] * 100\%$
- $\text{VarAlpha}, \alpha = \frac{\log(I_2/I_1)}{\log(V_2/V_1)}$
- $\text{Dev} = \left[\frac{(X - Y)}{Y} \right] * 100\%$



GSM-20H10 provides five built-in calculation functions: Power, Offset Compensation Ohms, Voltage Coefficient, Varistor Alpha, and Percent Deviation.

PANEL INTRODUCTION



1. LCD Display
 2. USB Host
 3. Number Pad/
Secondary Function Key
 4. Power On/Off Button
 5. Direction Keys And Enter Key
 6. Function Key
 7. Front Panel Input/Output
Terminals
 8. Auxiliary Function Key
 9. AC Power Switch
 10. GPIB Port (Option)
 11. Heat Sink Fan
 12. LAN
 13. USB Device
 14. Real Panel Inputs/Outputs
 15. RS-232
 16. Digital I/O
 17. AC Power Socket and Fuse

SPECIFICATIONS

MAXIMUM RANGE	Voltage	$\pm 210V$					
	Current	$\pm 1.05A$					
	Power	22W					
	Voltage Resolution	1μV					
	Current Resolution	10pA					
	Output Voltage	$\pm 21V / \pm 1.05A, \pm 210V / \pm 105 mA$					
DC Voltage	Current Limit	Min. 0.1% of range					
	Programming Resolution & Accuracy *1	Range	$\pm 200,000\text{nV}$	$\pm 2,000,000\text{V}$	$\pm 20,000\text{V}$	$\pm 200,000\text{V}$	$\pm 200,000\text{V}$
		Resolution	1μV	10μV	100μV	1mV	
		Accuracy	$\pm(0.02\%+600\mu\text{V})$	$\pm(0.02\%+600\mu\text{V})$	$\pm(0.02\%+2.4\text{mV})$	$\pm(0.02\%+24\text{mV})$	
	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	$\pm(0.15 \times \text{accuracy specification})/\text{^{\circ}C}$ ($0^{\circ}\text{-}18^{\circ}\text{C} \& 28^{\circ}\text{-}50^{\circ}\text{C}$)					
SOURCE	Output Current	$\pm 1.05A / \pm 21V, \pm 105 mA / \pm 210V$					
	Voltage Limit	Min. 0.1% of range					
	Programmed Source Resolution & Accuracy *1	Range	$\pm 1,000,000\mu\text{A}$	$\pm 10,000\mu\text{A}$	$\pm 100,000\mu\text{A}$	$\pm 1,000,000\text{mA}$	$\pm 10,000,000\text{mA}$
		Resolution	10pA	100pA	1nA	10nA	100nA
		Accuracy	$\pm(0.035\%+600\mu\text{A})$	$\pm(0.033\%+2n\text{A})$	$\pm(0.031\%+20n\text{A})$	$\pm(0.034\%+200n\text{A})$	$\pm(0.045\%+2\mu\text{A})$
	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	$\pm(0.15 \times \text{accuracy specification})/\text{^{\circ}C}$ ($0^{\circ}\text{-}18^{\circ}\text{C} \& 28^{\circ}\text{-}50^{\circ}\text{C}$)					
	Output Settling Time *2	100μs typical time					
General	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	Command Processing Time *4	Autorange On:10ms. Autorange Off: 7ms					

SPECIFICATIONS

MEASUREMENT	Voltage	Input Resistance	>10 GΩ						
		Range	±200.000mV	±2.00000V	±20.0000V	±200.000V	±2.00000V	±200.000V	
		Resolution	1µV	10µV	100µV	1mV	1mV	1mV	
	Current	Accuracy	±(0.0129%+300µV)	±(0.012%+300µV)	±(0.015%+1.5mV)	±(0.015%+10mV)	±(0.015%+6µA)	±(0.015%+10mV)	
		Voltage Coefficient	±(0.15 x accuracy specification) / °C (0°~18°C & 28°~50°C)						
	Programmed Source Resolution & Accuracy *1	Voltage Burden (4-wire mode)	<1mV						
		Range	±1.00000µA	±10.0000µA	±100.000µA	±1.00000mA	±10.0000mA	±100.000mA	
		Resolution	10µA	100µA	1nA	10nA	100nA	1µA	
		Accuracy	±(0.029%+300pA)	±(0.027%+700pA)	±(0.025%+6nA)	±(0.027%+60nA)	±(0.035%+600nA)	±(0.055%+6µA)	
	Temperature Coefficient	±(0.1 x accuracy specification) / °C (0°~18°C & 28°~50°C)							
		Range	<2.00000Ω	2.00000Ω	20.0000Ω	200.000Ω	2.00000kΩ	20.0000kΩ	
	Resistance	Resolution	... 10µΩ	100µΩ	1mΩ	10mΩ	100mΩ	100µA	
		Test current	... 100nA	100nA	10nA	100nA	1nA	100µA	
		Accuracy	Source IACC+Meas.VACC	Source IACC+Meas.VACC	±(0.1%+0.003%), Normal ±(0.07%+0.001%), Enhanced	±(0.08%+0.03%), Normal ±(0.05%+0.01%), Enhanced	±(0.07%+0.3%), Normal ±(0.05%+0.1%), Enhanced	±(0.06%+3%), Normal ±(0.04%+1%), Enhanced	
		200.000kΩ	2.00000MΩ	20.0000MΩ	200.000MΩ	>200.000MΩ			
		Resolution	1Ω	1Ω	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%+5000), Enhanced	±(0.66%+10kΩ), Normal ±(0.35%+5kΩ), Enhanced	Source IACC+Meas.VACC		
	Temperature Coefficient	±(0.15 x accuracy specification) / °C (0°~18°C & 28°~50°C)							
		Source I mode, Manual OHMS	Total uncertainty = V 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	Guard Output Impedance	<0.1Ω in ohms mode						
		Maximum Range Change Rate	75/second						
	SYSTEM SPEED*	Maximum Measure Auto Range Time	40ms (fixed source)*6						
		Sequence Reading Rates*7 (rdg./second) for 60Hz (50Hz)	NPLC / Trig Origin	Measure	Source-Measure *9	Source-Measure Pass/Fail test *8,*9	Measure Memory *9		
	Single Reading Operation Rates (rdg./second) for 60Hz (50Hz)	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)	
	Component Interface Handler Time for 60Hz (50Hz)*8,*10	488.2	1 / external	57 (48)	57 (48)	57 (48)	57 (47) 56 (47) 56 (47) 44 (38)	44 (38)	
		Speed	NPLC / Trig Origin	Measure	Source-Measure *9	Source-Measure Pass/Fail test *8,*9	Source-Measure Memory *9		
		Fast (488.2)	0.01 / internal	256 (256)	79 (83)	79 (83)	TO GPIB		
	Single Reading Operation Rates (rdg./second) for 60Hz (50Hz)	Medium (488.2)	0.1 / internal	167 (166)	72 (70)	72 (70)	TO GPIB	69 (70)	
		Normal (488.2)	1 / internal	49 (42)	34 (31)	34 (31)	TO GPIB	35 (30)	
	Component Interface Handler Time for 60Hz (50Hz)*8,*10	Speed	NPLC / Trig Origin	Measure	Source Pass/Fail test	Source-Measure Pass/Fail test *8,*11	Source-Measure Memory *9		
		Fast	0.01 / internal	1.04 ms (1.08 ms)	0.5 ms (0.5 ms)	0.5 ms (0.5 ms)	TO GPIB	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)	TO GPIB	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)	TO GPIB	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 84 (H) x 356.5 (D) mm, Approx. 4.8kg						

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. 10µA to 100mA range.

3. Overshoot into a fully resistive 100kΩ load, 10Hz to 1MHz BW, adjacent ranges: 100mV 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 lead. 1µA and 10µA 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 <nrf> Command not included.

Specifications subject to change without notice. GSM-20H10_E_D1BH_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	GTL-258 GPIB Cable (25 pin Micro-D Connector)
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)	

Global Headquarters
GOOD WILL INSTRUMENT CO., LTD.
T +886-2-2268-0389 F +886-2-2268-0639
China Subsidiary
GOOD WILL INSTRUMENT (SUZHOU) CO., LTD.
T +86-512-6661-7177 F +86-512-6661-7277
Malaysia Subsidiary
GOOD WILL INSTRUMENT (SEA) SDN. BHD.
T +604-6111122 F +604-61115225
Europe Subsidiary
GOOD WILL INSTRUMENT EURO B.V.
T +31(0)40-2557790 F +31(0)40-2541194

U.S.A. Subsidiary
INSTEK AMERICA CORP.
T +1-909-399-3535 F +1-909-399-0819
Japan Subsidiary
TEXIO TECHNOLOGY CORPORATION.
T +81-45-620-2305 F +81-45-534-7181
Korea Subsidiary
GOOD WILL INSTRUMENT KOREA CO., LTD.
T +82-2-3439-2205 F +82-2-3439-2207
India Subsidiary
GW INSTEK INDIA LLP.
T +91-80-6811-0600 F +91-80-6811-0626

