GSM-20H10

Source Measure Unit

CE | RS-232 | USB Host | USB Device | LAN | Digit I/O | GPIB

GW INSTEK
Simply Reliable

GW Instek GSM-20H10 is a Source Measure Unit 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 ±210V/±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 1μV/10pA/10μΩ.

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.

FEATURES

* Maximum Output ±210V/±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

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. 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 forma.
6. Purely resistive lead. 1μA and 10μA 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
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 / ±10.00000mA / ±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
MEASUREMENT	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 / ±10.00000mA / ±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	<2.00000Ω / 2.00000Ω / 20.0000Ω / 200.000Ω / 2.00000kΩ / 20.0000kΩ
		Resolution	--- / 10μΩ / 100μΩ / 1mΩ / 10mΩ / 100mΩ
		Test current	--- / --- / 100mA / 10mA / 1mA / 100μA
		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%+0.01 Ω), Enhanced / ±(0.07%+0.3Ω), Normal; ±(0.05%+0.1Ω), Enhanced / ±(0.06%+3Ω), Normal; ±(0.04%+1Ω), Enhanced
		Range	200.000kΩ / 2.00000MΩ / 20.0000MΩ / 200.000MΩ / >200.000M Ω
		Resolution	1Ω / 10Ω / 100Ω / 1kΩ / ---
		Test current	10μA / 5μA / 0.5μA / 100nA / ---
		Accuracy	±(0.07%+30Ω), Normal; ±(0.05%+10Ω), Enhanced / ±(0.11%+300Ω), Normal; ±(0.05%+100Ω), 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									
	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
Sequence Reading Rates *7 (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)
	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
			TO GPIB	TO GPIB	TO GPIB
	Fast(488.2)	0.01 / internal	256 (256)	79 (83)	79 (83)
	Medium(488.2)	0.1 / internal	167 (166)	72 (70)	69 (70)
	Normal(488.2)	1 / internal	49 (42)	34 (31)	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
			TO GPIB	TO GPIB	TO GPIB
	Fast	0.01 / internal	1.04 ms (1.08 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)	6.27 ms (7.1 ms)
	Normal	1 / internal	17.53 ms (20.9 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 : 30M Ω 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_D2DH

ORDERING INFORMATION

GSM-20H10 with GPIB **Source Measure Unit**
GSM-20H10 **Source Measure Unit**

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-248 GPIB Cable, 2000mm

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