GDM-9060 Specifications

The specifications apply when the GDM-9060 is powered on for at least 60 minutes.

(with optional GPIB)

Note :

- All specifications are ensured only under a single display.
- At least 1 hour of warm-up time is required before applying these specifications.
- Make sure that the Sense LO terminal to Input LO is limited to 2 Vpk, the Sense HI to Sense LO terminals are limited to 200 Vpk and the Input LO to earth is limited to 500 Vpk. CAT II 300 V. MAX DC 1000 V, AC 750 V

Function	Range (2)	Resolution	Input Resistance etc.	24 Hour TCAL ± 1 °C	90 Day TCAL ± 5 °C	1 Year TCAL ± 5 °C	Temperature Coefficient 0 °C to 18 °C / 28 °C to 55 °C
DC Characteristics						Accuracy : ± (% of reading + % of range)	
DC Voltage (1)	100.0000 mV	0.1 µV	10 MΩ or > 10 GΩ	0.0040 + 0.0060	0.0070 + 0.0065	0.0090 + 0.0065	0.0005 + 0.0005
	1.000000 V	1 µV	10 MΩ or > 10 GΩ	0.0030 + 0.0009	0.0060 + 0.0010	0.0080 + 0.0010	0.0005 + 0.0001
	10.00000 V	10 µV	10 MΩ or > 10 GΩ	0.0025 + 0.0004	0.0050 + 0.0005	0.0075 + 0.0005	0.0005 + 0.0001
	100.0000 V	0.1 mV	10 MΩ ± 1%	0.0030 + 0.0006	0.0065 + 0.0006	0.0085 + 0.0006	0.0005 + 0.0001
	1000.000 V	1 mV	10 MΩ ± 1%	0.0030 + 0.0006	0.0065 + 0.0010	0.0085 + 0.0010	0.0005 + 0.0001
Resistance (1)(3)	100.0000 Ω	100 µΩ	1 mA	0.004 + 0.0060	0.011 + 0.007	0.014 + 0.007	0.0006 + 0.0005
	1.000000 kΩ	1 mΩ	1 mA	0.003 + 0.0008	0.011 + 0.001	0.014 + 0.001	0.0006 + 0.0001
	10.00000 kΩ	10 mΩ	100 µA	0.003 + 0.0005	0.011 + 0.001	0.014 + 0.001	0.0006 + 0.0001
	100.0000 kΩ	100 mΩ	10 µA	0.003 + 0.0005	0.011 + 0.001	0.014 + 0.001	0.0006 + 0.0001
	1.000000 MΩ	1 Ω	5 µA	0.003 + 0.0010	0.011 + 0.001	0.014 + 0.001	0.0010 + 0.0002
	10.00000 MΩ	10 Ω	500 nA	0.015 + 0.0010	0.020 + 0.001	0.040 + 0.001	0.0030 + 0.0004
	100.0000 MΩ	100 Ω	500 nA// 10 MΩ	0.300 + 0.0100	0.800 + 0.010	0.800 + 0.010	0.1500 + 0.0002
DC Current (1)(6)	100.0000 µA	100 pA	< 0.011 V	0.010 + 0.020	0.040 + 0.025	0.050 + 0.025	0.0020 + 0.0030
	1.000000 mA	1 nA	< 0.11 V	0.007 + 0.006	0.030 + 0.006	0.050 + 0.006	0.0020 + 0.0005
	10.00000 mA	10 nA	< 0.04 V	0.007 + 0.020	0.030 + 0.020	0.050 + 0.020	0.0020 + 0.0020
	100.0000 m A	100 nA	< 0.4 V	0.010 + 0.004	0.030 + 0.005	0.050 + 0.005	0.0020 + 0.0005
	1.000000 A	1 µA	< 0.7 V	0.050 + 0.006	0.080 + 0.010	0.100 + 0.010	0.0050 + 0.0010
	3.000000 A	1 µA	< 2.0 V	0.180 + 0.020	0.200 + 0.020	0.200 + 0.020	0.0050 + 0.0020
Continuity (1)	1000.000 Ω	0.001 Ω	1 mA	0.003 + 0.030	0.011 + 0.030	0.014 + 0.030	0.0010 + 0.0020
Diode Test (1)(4)	5.00000 V	10 µV	1 mA	0.003 + 0.030	0.011 + 0.030	0.014 + 0.030	0.0010 + 0.0020
DC Ratio (1)(5)	—	—	—	± (DC Input accuracy + DC Reference accuracy)			

AC Characteristics							Accuracy : ± (% of reading + % of range)
True RMS AC Voltage (6)(7)(8)	100.0000 mV	0.1 µV	3 Hz to 5 Hz	1.00 + 0.03	1.00 + 0.04	1.00 + 0.04	0.100 + 0.004
			5 Hz to 10 Hz	0.38 + 0.03	0.38 + 0.04	0.38 + 0.04	0.035 + 0.003
			10 Hz to 20 kHz	0.07 + 0.03	0.08 + 0.04	0.09 + 0.04	0.005 + 0.003
			20 kHz to 50 kHz	0.13 + 0.04	0.14 + 0.05	0.15 + 0.05	0.011 + 0.005
			50 kHz to 100 kHz	0.58 + 0.08	0.63 + 0.08	0.63 + 0.08	0.060 + 0.008
			100 kHz to 300 kHz	4.00 + 0.50	4.00 + 0.50	4.00 + 0.50	0.200 + 0.020
	1.000000 V to 750.000 V	1 µV to 1mV	3 Hz to 5 Hz	1.00 + 0.02	1.00 + 0.03	1.00 + 0.03	0.100 + 0.004
			5 Hz to 10 Hz	0.38 + 0.02	0.38 + 0.03	0.38 + 0.03	0.035 + 0.003
			10 Hz to 20 kHz	0.07 + 0.02	0.08 + 0.03	0.09 + 0.03	0.005 + 0.003
			20 kHz to 50 kHz	0.13 + 0.04	0.14 + 0.05	0.15 + 0.05	0.011 + 0.005
			50 kHz to 100 kHz	0.58 + 0.08	0.63 + 0.08	0.63 + 0.08	0.060 + 0.008
			100 kHz to 300 kHz	4.00 + 0.50	4.00 + 0.50	4.00 + 0.50	0.200 + 0.020
True RMS AC Current (6)(8)(9)	100.0000 µA (Burden Voltage < 0.011 V) 10.00000 mA (Burden Voltage < 0.04 V)	100 pA 10 nA	3 Hz to 5 Hz	1.00 + 0.04	1.00 + 0.04	1.00 + 0.04	0.100 + 0.006
			5 Hz to 10 Hz	0.38+ 0.04	0.38 + 0.04	0.38 + 0.04	0.035 + 0.006
			10 Hz to 5 kHz	0.13 + 0.04	0.13 + 0.04	0.13 + 0.04	0.015 + 0.006
			5 kHz to 10 kHz	0.20 + 0.04	0.20 + 0.04	0.20 + 0.04	0.030 + 0.006
	1.000000 mA (Burden Voltage < 0.11 V) 100.0000 mA (Burden Voltage < 0.4 V)	1 nA 100 nA	3 Hz to 5 Hz	1.00 + 0.04	1.00 + 0.04	1.00 + 0.04	0.100 + 0.006
			5 Hz to 10 Hz	0.33+ 0.04	0.33 + 0.04	0.33 + 0.04	0.035 + 0.006
			10 Hz to 5 kHz	0.13 + 0.04	0.13 + 0.04	0.13 + 0.04	0.015 + 0.006
			5 kHz to 10 kHz	0.18 + 0.04	0.18 + 0.04	0.18 + 0.04	0.030 + 0.006
	1.000000 A (Burden Voltage < 0.7 V)	1 µA	3 Hz to 5 Hz	1.00 + 0.04	1.00 + 0.04	1.00 + 0.04	0.100 + 0.006
			5 Hz to 10 Hz	0.33 + 0.04	0.33 + 0.04	0.33 + 0.04	0.035 + 0.006
			10 Hz to 5 kHz	0.13 + 0.04	0.13 + 0.04	0.13 + 0.04	0.015 + 0.006
			5 kHz to 10 kHz	0.18 + 0.04	0.18 + 0.04	0.18 + 0.04	0.030 + 0.006
	3.000000 A (Burden Voltage < 0.2 V)	1 µA	3 Hz to 5 Hz	1.00 + 0.04	1.00 + 0.04	1.00 + 0.04	0.100 + 0.006
			5 Hz to 10 Hz	0.38 + 0.04	0.38 + 0.04	0.38 + 0.04	0.035 + 0.006
			10 Hz to 5 kHz	0.23 + 0.04	0.23 + 0.04	0.23 + 0.04	0.015 + 0.006
			5 kHz to 10 kHz	0.23 + 0.04	0.23 + 0.04	0.23 + 0.04	0.030 + 0.006
Frequency and Period Characteristics							Accuracy : ± (% of reading)
Frequency / Period (10)(11)(12)(13)	100.0000 mV to 750.000 V	—	3 Hz to 5 Hz	0.100	0.100	0.100	0.100
			5 Hz to 10 Hz	0.050	0.050	0.050	0.035
			10 Hz to 40 Hz	0.030	0.030	0.030	0.015
			40 Hz to 1 MHz	0.006	0.006	0.006	0.015
Temperature Characteristics							
Temperature (RTD) (14)	-200 °C to -100 °C	0.001 °C	—	—	—	0.09 °C	0.004 °C / °C
	-100 °C to -20 °C	0.001 °C	—	—	—	0.08 °C	0.005 °C / °C
	-20 °C to 20 °C	0.001 °C	—	—	—	0.06 °C	0.005 °C / °C
	20 °C to 100 °C	0.001 °C	—	—	—	0.08 °C	0.005 °C / °C
	100 °C to 300 °C	0.001 °C	—	—	—	0.12 °C	0.007 °C / °C
	300 °C to 600 °C	0.001 °C	—	—	—	0.22 °C	0.009 °C / °C

Temperature (Thermocouples) (14)	-200 °C to +1000 °C	0.002 °C	E	—	—	0.2 °C	0.03 °C / °C
	-210 °C to +1200 °C	0.002 °C	J	—	—	0.2 °C	0.03 °C / °C
	-200 °C to +400 °C	0.002 °C	T	—	—	0.3 °C	0.04 °C / °C
	-200 °C to +1372 °C	0.002 °C	K	—	—	0.3 °C	0.04 °C / °C
	-200 °C to +1300 °C	0.003 °C	N	—	—	0.4 °C	0.05 °C / °C
	-50 °C to +1768 °C	0.01 °C	R	—	—	1 °C	0.14 °C / °C
	-50 °C to +1768 °C	0.01 °C	S	—	—	1 °C	0.14 °C / °C
	+350 °C to +1820 °C	0.01 °C	B	—	—	1 °C	0.14 °C / °C
Temperature (Thermistor) (14)	–80 °C to 150 °C	0.01 °C	—	—	—	0.01 °C	0.003 °C / °C
Capacitance Characteristics						Accuracy : ± (% of reading + % of range)	
Capacitance (15)	1.000 nF	—	2.00 + 2.00	2.00 + 2.00	2.00 + 2.00	0.05 + 0.05	2.00 + 2.00
	10.00 nF	—	2.00 + 1.00	2.00 + 1.00	2.00 + 1.00	0.05 + 0.01	2.00 + 1.00
	100.0 nF	—	2.00 + 0.40	2.00 + 0.40	2.00 + 0.40	0.05 + 0.01	2.00 + 0.40
	1.000 µF	—	2.00 + 0.40	2.00 + 0.40	2.00 + 0.40	0.05 + 0.01	2.00 + 0.40
	10.00 µF	—	2.00 + 0.40	2.00 + 0.40	2.00 + 0.40	0.05 + 0.01	2.00 + 0.40
	100.0 µF	—	2.00 + 0.40	2.00 + 0.40	2.00 + 0.40	0.05 + 0.01	2.00 + 0.40
Display		4.3" color TFT WQVGA (480x272) with LED backlight					
Interface		RS -232C, USB host/device, LAN, Digital I/O; GPIB(optional)					
Power Source		AC 100 V / 120 V / 220 V / 240 V ± 10%					
Power Line Frequency		50 Hz / 60 Hz and 400 Hz ± 10%					
Power Consumption		Max. 25 VA					
Dimensions (W x H x D)		267 mm x 107 mm x 302 mm ~ with bumper 220 mm x 88 mm x 277 mm ~ without bumper					
Weight		Approx. 3.53 kg without option					

[1]. DC Specification: In addition to the availability that requires warm-up of 60 minutes, it must be set in 5/s speed rate (60/s speed rate for Continuity and Diode), A-Zero on.

[2]. The entire range of measurement will pass the set range by 20% except the tests of 1000 DCV, 750 ACV, 3 A DC, 3A AC and diode.

[3]. This specification applies to 4-wire resistance measurement, whilst it requires using "REL" function for offset on 2-wire resistance measurement. 2-wire resistance measurement will cause additional error of 0.2 Ω if REL function is not executed.

[4]. This specification applies to the voltage measured from input terminal. 1 mA test current is the typical value. The change of current source leads to the variation in buck of diode junction.

[5]. Accuracy is ± (DC Input accuracy + DC Reference accuracy), where Input accuracy = DC Voltage accuracy for the Input HI to LO (in % of the Input voltage), and Reference accuracy = DC Voltage accuracy for the HI to LO (Sense) Reference (in % of the Reference voltage).

[6]. AC Specification: It will be available after 60 minutes of warm-up, sine wave as well as 1/s speed rate.

[7]. Specifications are for sinewave input > 5% of range. For inputs from 1% to 5% of range and < 50 kHz, add 0.1% of range additional error. For 50 kHz to 100 kHz, add 0.13% of range. The measurement range of 750 ACV is limited within the range of 7.5 x 10^7 Volt–Hz.

[8]. Three speed settings provided for low-frequency performance: 1/s (3 Hz), 5/s (20 Hz), 20/s (200 Hz). Additional errors will Not occur for the frequency greater than the filter settings.

[9]. Specifications are for sinewave input > 5% of range, and is beyond 10 μA AC. For inputs from 1% to 5% of range, add 0.1% of range additional error.

[10]. This specification will be available after 60 minutes of warm-up and sine wave input, unless stated otherwise. This specification applies to 1s gate time.

[11]. This specification is available when both sine wave and square wave input ≥ 100 mV. For the input of 10 mV to 100 mV, the % of reading error needs to be multiplied by 10 times.

[12]. The amplitude range is from 10% to 120% and is lower than 750 ACV.

[13]. The input ≥ 60 mV, for 300 kHz to 1 MHz, within 100 mV range.

[14]. The actual measurement range and test lead error will be constrained by the adopted test lead. The test lead accuracy adder covers all errors of measurements and ITS-90 temperature change.

[15]. Specifications are for film Capacitance inputs that are greater than 10% range