



# GW Instek GBM-3100H

## 1000V Battery Meter

### New Product Announcement

This document allows GW INSTEK' partners to quickly grasp product's main features, FAB and ordering information.

## GBM-3100H (1000V) Battery Meter

### New Product Announcement

GW Instek Battery Meter ~ The GBM-3100H is an expansion model of the existing GBM-3000 series, providing measurement capabilities up to 1000V DC voltage which is suitable for measurement of EV and PHEV battery packs. This expanded model is equipped with a 3.5-inch color display and has high measurement accuracy (0.01%) for battery voltage and (0.5%) for internal resistance of battery.

The GBM-3000 series, which uses AC 1kHz as the test signal and measures battery's voltage and internal resistance to 1000V (GBM-3100H), 300V (GBM-3300) and 80V (GBM-3080). The series features 3.5" TFT LCD, 4-wire measurement method, high-resolution (6-digit voltage / 5-digit resistance) measurement display capability, and independent GO/NOGO determination of voltage and resistance, various communications interfaces, etc. to meet various types of battery measurements, ranging from single cell, battery cell, to the end product, etc. so as to facilitate users in achieving accurate measurements at all stages of production.

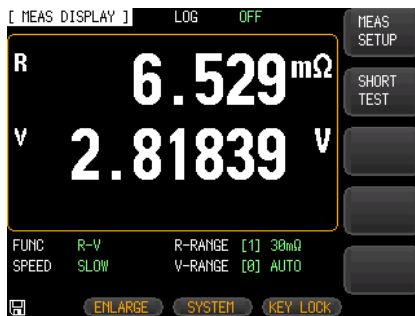
The GBM-3000 series provides excellent features for various types of batteries in measuring open circuit voltage and resistance. For voltage measurement, the accuracy is as high as  $\pm$  (0.01% reading + 5 digits), and measurement resolution is up to 10 $\mu$ V (at 8V). For resistance measurement, the accuracy reaches  $\pm$  (0.5% reading + 5 digits) and the resolution achieves 0.1 $\mu\Omega$  (at 3m $\Omega$ ) that is especially suitable for the sorting of single cell measurements, which is to achieve a better output balance for the follow-up series and parallel connections. In the meantime, in order to facilitate users to quickly and clearly interpret the measurement results, the GBM-3000 series features HI/LO determination respectively based on voltage and resistance, and can be switched to the simple (big numerical display) mode to meet the requirements of test accuracy, clear and easy-to-read, and elevated inspection efficiency and capabilities.

Other than the excellent measurement capabilities, the GBM-3000 series also provides a number of functions to ensure effectiveness and convenience. For the effectiveness, the test lead (probe) contact status detection function is to effectively prompt users whether test lead (probe) and DUT are in good contact to ensure the validity of the measured value. In terms of convenience, the GBM-3000 series provides two data storage methods (up to 10,000 lots of measurement values). "General storage" only stores the measured voltage and resistance values; "statistical storage" has the related parameters (Cp/Ckp/Mean/MAX/MIN...) for the statistical analysis. Users can store the data from the measurement process in the internal memory first and then transfer the data to the computer via flash drive for subsequent analysis without being limited to the connection with the computer.

In addition, for retrieving and storing measurement results via the transmission method, the GBM-3000 series provides RS-232C/USB device (virtual COM) for writing programs and retrievals. The handler interface is provided for external trigger control via PLC. All interfaces are standard-equipped that not only save the cost of instruments, but also meet the requirement of using different automated measurement systems.

## Two display modes

The GBM-3000 series offers two display modes to facilitate users in maximizing the benefits of their measurements – Standard mode: The main measurement parameters (three combinations: R+V/R/V) and parameter settings for the related measurements can be displayed simultaneously. This mode is applicable to R&D design and engineering certification. Simple mode: Big numerical display only shows the results of main measurement parameters to increase the visibility of observations. This mode is suitable for production measurements.



Standard mode  
(Setting conditions and R+V measurement parameters)



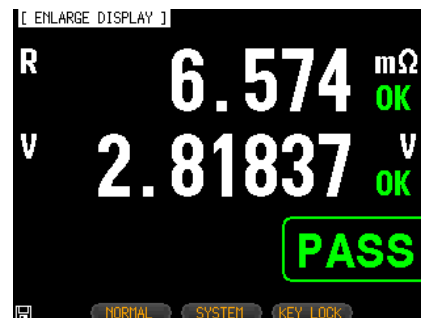
Simple mode  
(R+V measurement parameters)

## Independent GO/NOGO determination

The GBM-3000 provides independent HI/LO determination settings for both voltage and resistance and can be set according to the required mode, such as SEQ, PER or ABS. In addition to displaying the results of the final determination, the results of individual measurement parameters are also provided for subsequent actions.



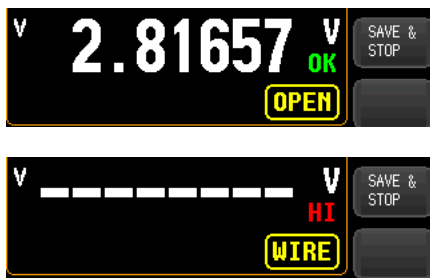
Independent HI/LO Setting



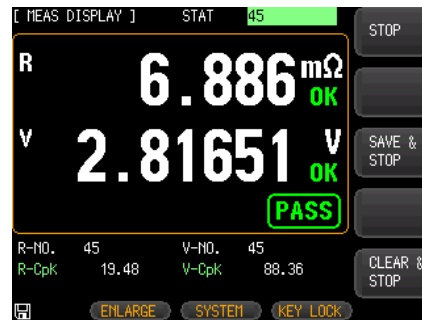
Separate & Totally judgement

### Excellent supplementary measurement capability

In addition to providing accurate measurements, the ability of the GBM-3000 Series to supplement the measurement of production lines is also a major feature of the series. For example, the ability to detect disconnect/contact. The display screen can clearly show bad contact of the test lead (probe).The series can store up to 10,000 lots of measurement data and has the statistical calculation function to allow the status of the production process to be clearly observed and retained in real time without any manual calculation or connection to the computer. After the measurement is completed, the result can be transferred to the computer through flash drive for long-term storage and subsequent analysis.



Disconnect/contact display



Statistical function

### Comprehensive standard interfaces

Finally, the GBM-3000 series provides a variety of practical and standard-equipped interfaces including RS-232C/USB device/Handler, which are for measurement result collection in the remote program control or collocating with system integration for external trigger measurement through PLC.



**Main Features**

- 3.5' TFT LCD (320x240)
- Measurement items: DC voltage and AC resistance
  - Voltage measurement: 1000V (GBM-3100H) or 300V (GBM-3300) or 80V (GBM-3080)
  - Resistance measurement: 0mΩ~ 3.2kΩ(max.)
- Basic accuracy for voltage measurement: 0.01%
- Basic accuracy for resistance measurement: 0.5%
- Measurement resolution up to 0.1μΩ and 10μV, suitable for single-cell measurement
- Independent GO/NOGO determination function for voltage and resistance respectively
- The judgment mechanism of test lead (probe) disconnect/contact failure is to ensure the measurement reliability
- Standard interfaces: USB host/device, RS-232C and Handler

**3.5' TFT LCD screen provides excellent setting parameters and measurement data observation**

**Numerical and directional keys provide a convenient operating environment**



**Input terminals (1000V/300V/80V)**

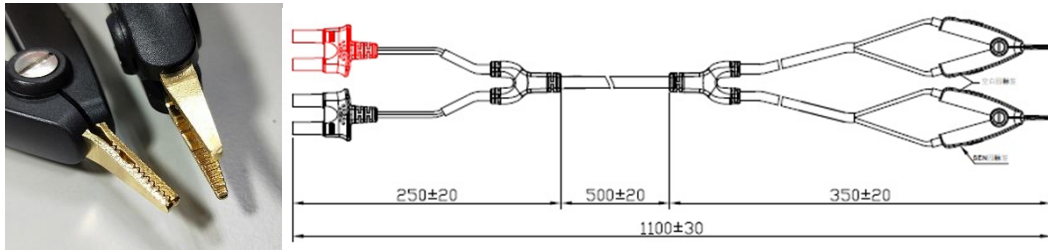
**Standard ~ RS232 / USB (device) for remote program control**



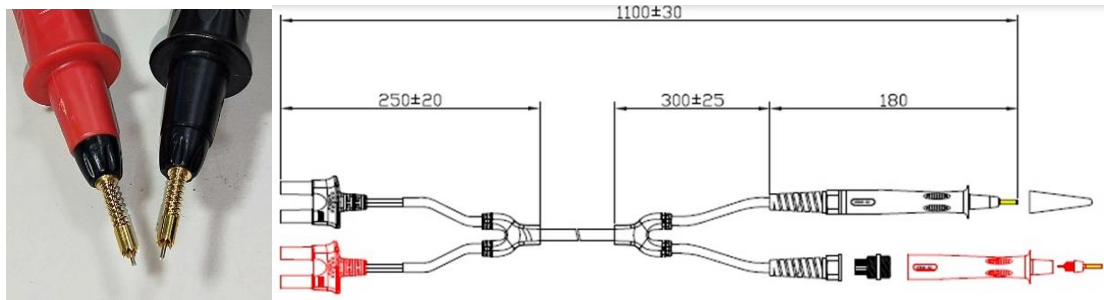
**Standard ~ HANDLER, suitable for the external trigger control via PLC**



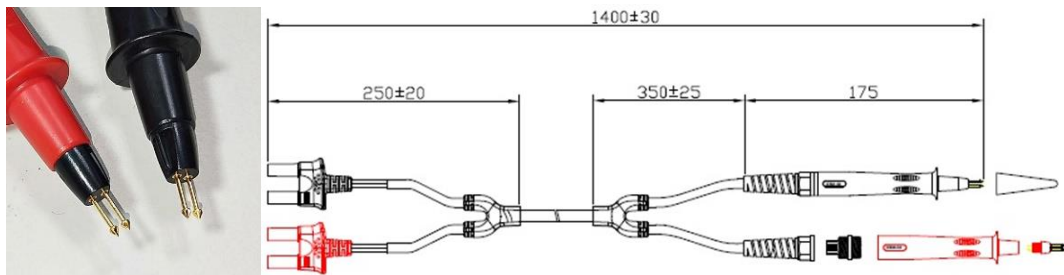
**GBM-01 (Standard): Four wire (Kelvin Clip) test lead ~ 90V max.**



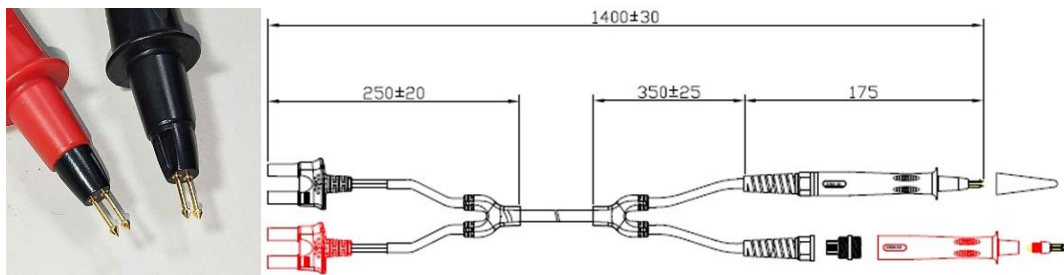
**GBM-02 (Optional): Four wire (Single Pin) test probe ~ 90V max.**



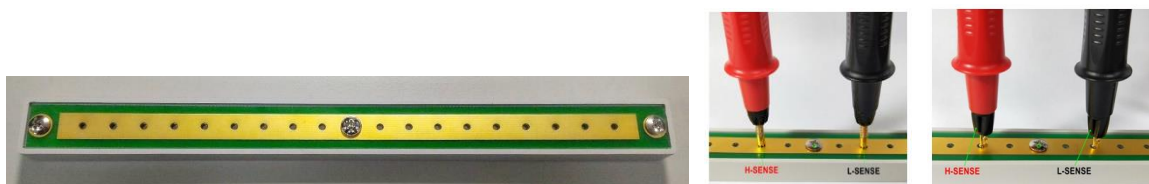
**GBM-03 (Optional): Four wire (Twin Pin) test probe ~ 300V max.**



**GBM-03A (Optional): Four wire (Twin Pin) test probe ~ 1000V max.**





**GBM-S1 (Optional): SHORT BAR for GBM-02/GBM-03/GBM-03A**



Comparison Chart ~ GBM-3100H vs BT3564

Specifications highlighted in red represent better performance



"X" represents "no such function" or "function not available"

	GW GBM-3100H	HIOKI BT3564
		
Display	<b>3.5" LCD</b>	RED LED
Parameters	AC resistance, DC voltage	AC resistance, DC voltage
Accuracy	R:0.5%+5dgt V:0.01%+5dgt	R:0.5%+5dgt V:0.01%+3dgt
Range	5 digits R: 3m/30m/300m/3/30/300/3kΩ 6 digits V: 10V/100V/1000V DC	5 digits R: 3m/30m/300m/3/30/300/3kΩ 6 digits V: 10V/100V/1000V DC
	Automatic or manual	Automatic or manual
Signal Source	AC 1kHz±0.5Hz Current: 100mA(3mΩ) ~ 10μA(3kΩ)	AC 1kHz±0.2Hz Current: 100mA(3mΩ) ~ 10uA(3.000kΩ)
Speed (V+Ω) typical	Ex. Fast	Fast
	60 t/s	25 t/s
Result Display	Medium	Slow
	11 t/s	4 t/s
Adjustment	Fast	Medium
	36 t/s	14 t/s
Comparator	Slow	Fast
	3 t/s	36 t/s
Other Function	R+V, R, V	Show, Δ%, sorting result
Interface	MEAS SHORT	Short-circuit reset for all range(1000 count)
	ABS, PER, SEQ	Ω/V ~ Hi/IN/Lo (display/beeper)
	Internal, manual, external and remote	Internal, manual, external and remote
	Detects test probe contact failure and broken leads	Detects test probe contact failure and broken leads
	Automatically corrected drift and gain fluctuations	Automatically corrected drift and gain fluctuations
	<b>Average:1~256 times</b>	Average:2~16 times
PC software	Delay:0~10s	Delay:0~9.999s
	<b>Store up to 10,000 measurement values</b>	Store up to 400 measurement values
	Apply statistical up to 10,000 data points (Total data count / valid data count / maximum / minimum / average values / standard deviation / Cp / CpK)	<b>Apply statistical up to 30,000 data points</b> (Total data count / valid data count / maximum / minimum / average values / standard deviation / Cp / CpK)
	RS-232C	RS-232C
Standard Accessory	HANDLER	EXT I/O
	<b>USB Device / USB host</b>	X
	X	<b>Analog Output</b>
	Free download	Free download
Power Source	Free download	Free download
	<b>GBM-01 (kelvin clip)</b>	No cable
Dimension & weight	AC 100 - 240V, 50/60Hz Power consumption: Max 10W	Voltage: 100 - 240VAC, 50/60Hz Power consumption: Max 30VA
	264mm(W)x 107mm(H)x 309mm(D) 2.8kg	215mm(W)x 80mm(H)x 295mm(D) 2.4kg

Comparison Chart ~ GBM-3300 vs BT3563A

Specifications highlighted in red represent better performance

“X” represents “no such function” or “function not available”



	GW GBM-3300				HIOKI BT3563A			
								
Display	3.5" LCD				RED LED			
Parameters	AC resistance, DC voltage				AC resistance, DC voltage			
Accuracy	R:0.5%+5dgt V:0.01%+5dgt				R:0.5%+5dgt V:0.01%+3dgt			
Range	5 digits R: 3m/30m/300m/3/30/300/3kΩ 6 digits V: 8V/80V/300V DC				5 digits R: 3m/30m/300m/3/30/300/3kΩ 6 digits V: 6V/60V/300V DC			
	Automatic or manual				Automatic or manual			
Signal Source	AC 1kHz±0.5Hz Current: 100mA(3mΩ) ~ 10μA(3kΩ)				AC 1kHz±0.2Hz Current: 100mA(3mΩ) ~ 10uA(3000Ω)			
Speed (V+Ω) typical	Ex. Fast	Fast	Medium	Slow	Ex. Fast	Fast	Medium	Slow
	60 t/s	25 t/s	11 t/s	4 t/s	125 t/s	42 t/s	14 t/s	4 t/s
Result Display	R+V, R, V				Show, Δ%, sorting result			
Adjustment	MEAS SHORT				Short-circuit reset for all range(1000 count)			
Comparator	ABS, PER, SEQ				Ω/V ~ Hi/IN/Lo (display/beeper)			
Trigger	Internal, manual, external and remote				Internal, manual, external and remote			
Other Function	Detects test probe contact failure and broken leads				Detects test probe contact failure and broken leads			
	Automatically corrected drift and gain fluctuations				Automatically corrected drift and gain fluctuations			
	Average:1~256 times				Average:2~16 times			
	Delay:0~10s				Delay:0~9.999s			
	Store up to 10,000 measurement values				Store up to 400 measurement values			
	Apply statistical up to 10,000 data points (Total data count / valid data count / maximum / minimum / average values / standard deviation / Cp / CpK)				Apply statistical up to 30,000 data points (Total data count / valid data count / maximum / minimum / average values / standard deviation / Cp / CpK)			
Interface	RS-232C				RS-232C			
	HANDLER				EXT I/O			
	USB Device / USB host							
PC software	Free download				Free download			
Standard Accessory	GBM-01 (kelvin clip)				No cable			
Power Source	AC 100 - 240V, 50/60Hz Power consumption: Max 10W				Voltage: 100 - 240VAC, 50/60Hz Power consumption: Max 30VA			
Dimension & weight	264mm(W)x 107mm(H)x 350mm(D) 2.8kg				215mm(W)x 80mm(H)x 295mm(D) 2.4kg			



Comparison Chart ~ GBM-3080 vs BT3562A

Specifications highlighted in red represent better performance

"X" represents "no such function" or "function not available"

	GW GBM-3080				HIOKI BT3562A			
								
Display	<b>3.5" LCD</b>				RED LED			
Parameters	AC resistance, DC voltage				AC resistance, DC voltage			
Accuracy	R:0.5%+5dgt V:0.01%+5dgt				R:0.5%+5dgt V:0.01%+3dgt			
Range	5 digits R: 3m/30m/300m/3/30/300/3kΩ 6 digits V: 8V/80V DC				5 digits R: 3m/30m/300m/3/30/300/3kΩ 6 digits V: 6V/100V DC			
	Automatic or manual				Automatic or manual			
Signal Source	AC 1kHz±0.5Hz Current: 100mA(3mΩ) ~ 10μA(3kΩ)				AC 1kHz±0.2Hz Current: 100mA(3mΩ) ~ 10uA(3000Ω)			
Speed (V+Ω) typical	Ex. Fast	Fast	Medium	Slow	Ex. Fast	Fast	Medium	Slow
	60 t/s	25 t/s	11 t/s	4 t/s	<b>125 t/s</b>	<b>42 t/s</b>	<b>14 t/s</b>	4 t/s
Result Display	R+V, R, V				Show,Δ%, sorting result			
Adjustment	MEAS SHORT				Short-circuit reset for all range(1000 count)			
Comparator	ABS, PER, SEQ				Ω/V ~ Hi/IN/Lo (display/beeper)			
Trigger	Internal, manual, external and remote				Internal, manual, external and remote			
Other Function	Detects test probe contact failure and broken leads				Detects test probe contact failure and broken leads			
	Automatically corrected drift and gain fluctuations				Automatically corrected drift and gain fluctuations			
	<b>Average:1~256 times</b>				Average:2~16 times			
	Delay:0~10s				Delay:0~9.999s			
	<b>Store up to 10,000 measurement values</b>				Store up to 400 measurement values			
	Apply statistical up to 10,000 data points (Total data count / valid data count / maximum / minimum / average values / standard deviation / Cp / CpK)				<b>Apply statistical up to 30,000 data points</b> (Total data count / valid data count / maximum / minimum / average values / standard deviation / Cp / CpK)			
Interface	RS-232C				RS-232C			
	HANDLER				EXT I/O			
	<b>USB Device / USB host</b>							
PC software	Free download				Free download			
Standard Accessory	<b>GBM-01 (kelvin clip)</b>				No cable			
Power Source	AC 100 - 240V, 50/60Hz Power consumption: Max 10W				Voltage: 100 - 240VAC, 50/60Hz Power consumption: Max 30VA			
Dimension & weight	264mm(W)x 107mm(H)x 350mm(D) 2.8kg				215mm(W)x 80mm(H)x 295mm(D) 2.4kg			

## Target Markets and Associated Features

1. Battery manufactory
2. Battery research
3. Battery seller
4. Battery user

### ■ Manufacturing Engineering

- High measurement accuracy and resolution (voltage: 0.01%, resolution: 10 $\mu$ V; resistance: 0.5%, resolution: 0.1 $\mu$  $\Omega$ ) meet the requirements of measurement accuracy at each stage of production process inspection.
- Simple (big numerical display) mode allows clearer and easier observations.
- The disconnect/contact detection function ensures the validity of the measurement.
- Independent GO/GNOGO determination to effectively facilitate the production process so as to improve the inspection efficiency.
- The statistical function quickly obtains the yield rate of the manufacturing process in the production process.
- RS-232C/USB device / Handler meet the requirements of automated control for the manufacturing process, collect and manage test results to facilitate product analysis and improvement.

### ■ Research and Development

- High resolution (voltage resolution 10 $\mu$ V max.; resistance resolution 0.1 $\mu$  $\Omega$  max.) meets the need of measurement analysis for R&D designs.
- RS-232C/USB device / Handler provide collection in a long period of time and management of test results to facilitate design analysis and improvement.

### ■ Quality Assurance Verification

- High measurement accuracy and resolution (voltage: 0.01%, resolution: 10 $\mu$ V; resistance: 0.5%, resolution: 0.1 $\mu$  $\Omega$ ) meet the requirements of measurement accuracy for quality verification.
- The statistical function meets the measurement requirement for quality verification.
- RS-232C/USB device / Handler meet the requirements of automated control for the manufacturing process, collect and manage test results to facilitate product analysis and improvement.

## Key Dates for Product Announcement

1. Distributor Announcement & Demo Unit Order and Shipping (31<sup>st</sup> of May)
2. Global Market Announcement (31<sup>st</sup> of May)

## Service Policy

1. **2 year warranty**
2. **Service Support**

The service instructions in the Service Manual will help distributors repair defective units promptly. Should the board replacement is necessary to fix the defective unit, the board swapping service support is provided by Good Will Instrument to facilitate the repair jobs done at the distributor's site.

3. GW Instek continually provides the after-sales support through its website. The most up-to-date version of service manual and Marcom material of GBM-3000 will be posted on the distributor zone of GW Instek Website at <https://www.gwinstek.com>

## Specifications

### General



NOTE

Below are the basic conditions required to operate the GBM-3000 series within specification

- Calibration : Yearly
- Reset adjustment: Perform short circuit clear before testing
- The specifications Apply when it warmed up for at least 60 minutes.
- Test current accuracy : 10%
- Test current frequency accuracy : 1kHz(±0.5Hz)

Specification Condition	Temperature: 23°C±5°C Humidity: <70%RH(non-condensing)
Operation Condition	Temperature 0°C ~ 40°C, Relative Humidity < 70%RH(non-condensing)
Storage Condition	Temperature -40°C ~ 70°C Relative Humidity < 80%RH(non-condensing)
Power Source	AC 100-240V, 50-60Hz ; Consumption Max. 10W
Dimension & Weight	264(W) x 107(H) x 350(D) mm, Approx. 2.8kg

### Other

Display	3.5" TFT LCD color display
Test speed	Slow : 4 time/ second Medium : 11 times/ second Fast : 25 times/ second Extreme Fast : 60 times/ second
Range	Auto range, Hold range, Nom range
Comparator	ABS, PER and SEQ
Handler	Resistance HI/IN/LO, Voltage HI/IN/LO and
Buzzer	OFF, Pass, Fail
Trigger	INT, EXT
Interface	RS232C, USB host/device, Handler

### Resistance Measurement (ALL Model)

Range No.	Range	Maximum Displayed Values	Resolution	Measured current
0	3mΩ	3.1000m	0.1μΩ	100mA
1	30mΩ	31.000m	1μΩ	100mA
2	300mΩ	310.00m	10μΩ	10mA
3	3Ω	3.1000	100μΩ	1mA
4	30Ω	31.000	1mΩ	100μA
5	300Ω	310.00	10mΩ	10μA
6	3kΩ	3200.0	100mΩ	10μA

Range No.	Speed	Accuracy	Temperature coefficient
0	Slow	±0.5%rdg ± 10dgt	(±0.05%rdg ± 1dgt)/°C
	Medium	±0.5%rdg ± 15dgt	
	Fast	±0.5%rdg ± 20dgt	
	EX. Fast	±0.5%rdg ± 40dgt	
1~6	Slow	±0.5%rdg ± 5dgt	(±0.05%rdg ± 0.5dgt)/°C
	Medium	±0.5%rdg ± 7dgt	
	Fast	±0.5%rdg ± 7dgt	
	EX. Fast	±1%rdg ± 8dgt	

### Voltage Measurement (GBM-3100H)

Range No.	Range	Maximum Displayed Values	Resolution
0	10V	±9.99999	10μV
1	100V	±99.9999	100μV
2	1000V	±1009.99	1mV / 10mV

Range No.	Speed	Accuracy	Temperature coefficient
0~2	Slow	±0.01%rdg ± 5dgt	(±0.001%rdg ± 0.5dgt)/°C
	Medium	±0.01%rdg ± 7dgt	
	Fast	±0.05%rdg ± 7dgt	
	EX. Fast	±0.1%rdg ± 10dgt	

### Voltage Measurement (GBM-3300/3080)

Range No.	Range	Maximum Displayed Values	Resolution
0	8V	±8.08000	10μV
1	80V	±80.8000	100μV
2	300V (For GBM-3300 only)	±303.000	1mV

Range No.	Speed	Accuracy	Temperature coefficient
0~2	Slow	±0.01%rdg ± 5dgt	(±0.001%rdg ± 0.5dgt)/°C
	Medium	±0.01%rdg ± 7dgt	
	Fast	±0.05%rdg ± 7dgt	
	EX. Fast	±0.1%rdg ± 10dgt	



**Ordering Information**

**Machine**  
**GBM-3100H** (1000V) Battery Meter (including RS-232C / USB and Handler interface)  
**Part Number:** 01BM310H00GS **EAN Code:** 4711458121914

**Optional Accessory**

**GBM-03A** 4 Wire (twin pin) test probe, 1000V (max.), approx. 1400mm  
**Part Number:** 1100MBM03A001 **EAN Code:** 4711458121921

Standard Accessories

Safety sheet x 1

Power cord x 1

GBM-01 x 1 : 4 Wire (kelvin clip) test lead, 90V (max.), approx..1100mm

CD x 1 (including complete user manual and USB driver)

Optional Accessories

**GBM-02** 4 Wire (single pin) test probe, 90V (max.), approx. 1100mm

**GBM-03** 4 Wire (twin pin) test probe, 300V (max.), approx. 1400mm

**GBM-03A** 4 Wire (twin pin) test probe, 1000V (max.), approx. 1400mm

**GBM-S1** Short Bar (for GBM-02/GBM-03)

**GTL-232** RS-232C cable, 9-pin Female to 9-pin, null modem for computer, Approx. 2000mm

**GTL-246** USB cable, A-B type, approx.1200mm

**GRA-422** Rack Mount kit

**GRA-454** Rack Mount Kit, 19" 2U size for one or two sets

Should you have any questions on the GBM-3000 announcement, please don't hesitate to contact us.