



DATASHEET

Issue 1.0



Multifunction Meters

Transducers & Isolators

Temperature Controllers

Converters & Recorders

Digital Panel Meters

Current Transformers

Analogue Panel Meters

Shunts

Digital Multimeters

Clamp Meters

Insulation Testers

GAMMA 10 DIGITAL MULTIMETER

Gamma 10 is Analogue Digital Multimeter which measures VAC, VDC, VAC+DC, Frequency, mA DC, mA (AC+DC), Resistance, continuity, Diode, Farad, AC current measurement.

Features

- Automatic terminal blocking system (ABS)
- Min/Max value storage
- Indication of negative values on the analogue scale
- Overload warning

SUBJECT TO CHANGE WITHOUT NOTICE

This manual superseded all previous versions – please keep for future reference



Application

Gamma 10 is Analogue Digital Multimeter which measures VAC, VDC, VAC+DC, Frequency, mA DC, mA (AC+DC), Resistance, continuity, Diode, Farad, AC current measurement.

Product Features

Automatic Terminal Blocking System (ABS)	The automatic Terminal blocking system prevents incorrect connection of the test leads and incorrect selection of the measured quantity. This reduces danger to the user, the meter and the system to a remarkable extent.	Continuity Test	This permits testing for short circuit and open circuit. In addition to the display, a facility of sound signal is available.
Interface And Software RISH com 100	The multimeters are fitted with a serial RS-232 C interface via which the measured values can be transmitted to a PC. These values, electrically isolated, are transmitted to the attachable interface adaptor with infrared light through the case*	Temperature Measurement	It is possible to use all models of Gamma 12, in direct connection of temperature sensor Pt 100 / Pt 1000. The meters automatically detects the type of sensors connected to it & displays directly measured temperature.
MIN / MAX Value Storage	In addition to the display of the actual measured value, the minimum or maximum value can constantly be updated and stored.	Signalling in the case of a blown fuse	The display FUSE points to a blown fuse.
Indication Of Negative Values On The Analogue Scale	When measuring DC quantities, also negative values are shown on the analogue scale so that variations of the measured value can be observed at the zero point.	Power economizing circuit	The meter disconnects automatically when the measured value remains unchanged for about 10 minutes and no operating control was operated during this time. The disconnection facility can be disabled.
Indication Of Negative Values On The Analogue Scale	The measuring principle employed permits the measurement of the root-mean-square value (TRMS) of AC quantities and mixed quantities (AC and DC) regardless of the waveform.	Overload Warning	A sound signal indication violation of the overload limits.
Automatic Data Hold*	The DATA HOLD function makes it possible to hold the digitally displayed measured value. According to a patented method, it is ensured that no freak value but the actual measured value is held in the case of rapid changes in measured quantities. The held measured value appears on the digital display. The actual measured value continues to be shown on the analogue scale.	Protective holster for rough duty	A holster of soft rubber with tilt stand protects the meter against damage in the case of shock and drop. The rubber material makes for the meter to stand firmly even on vibrating surface.
Autorangeing / Manual Range Selection	The measured values are selected with rotary switch. The measuring range is automatically matched to the measured value. The measuring range can also be selected manually via the AUTO/MAN push button	Top model Gamma 10	The top model Gamma 10 features a 4 3/4 digit display (31 000 digits) as well as the following additional functions : Event counter, measurement of the duration of the event, time counter (stop watch), data compare, dB measurement, wide-range capacitance measurement.
		Calibration	Gamma mutli is automatically calibrated with respect to Fluke 5500 / Wavetek 9100. Automatic calibration is done through a developed calibration software with RS232 connection to the multimeter. Every multimeter is provided with the Test Certificate which is traceable to National / International standards. All the meters can be recalibrated at the Rishabh Instruments.

Technical Specifications

Analogue	
Indication	LCD scale with pointer
Scale length	55 mm on V and A ; 47 mm on all other ranges
Scaling	+ 5...0...+ 30 with 35 scale divisions on 0...30 with 30 scale divisions on all other ranges
Polarity indication	With automatic reversal
Overrange indication	By triangle
Sampling rate	20 readings/s, On 10 readings/s

Environmental conditions	
Temperature range	-20 0C... + 50 0C
Storage temperature range	-25 0C ... +70 0C (excl. batteries)
Climatic class	2z/-20/50/70/75% with reference to VDI/VDE 3540
Altitude above sea level	up to 2000m

Digital	
Display/ height of numerals	7 segment numerals / 12mm
Number of counts	4 ¾ digit 31000 counts
Overrange display	"OL" is shown
Polarity display	"-" sign is shown, When positive pole to "-"
Sampling rate	2 readings/s, On and 0C:1 reading/s

Mechanical Configuration	
Protection type	For meters; IP 50, for connection sockets: IP 20
Dimensions	84 mm x 195 mm x 35 mm
Weight	0.35 kg, approx., incl. battery

Applied rules and standards	
IEC 61010-1:2001	Safety requirements for electrical equipment for measurement, control and laboratory use.
DIN EN 61010 part 1	
VDE 0411 -1	
DIN 43751 IS 13875	Digital measuring instruments
EN 61326:2002	Generic emission standard; Residential, commercial and light industry
EN 61326:2002	Generic immunity standard; residential, commercial and light industry
VDI/VDE 3540	Reliability of measuring and control equipment.
DIN EN 60529	Test equipment and test procedures
DIN VDE 0470 part 1	-Degrees of protection provided by enclosures (IP Code)

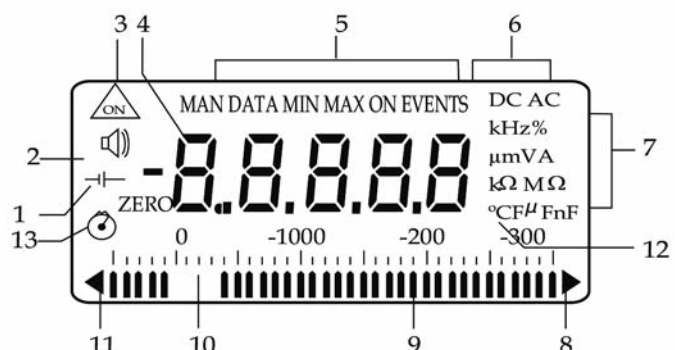
Warranty
3 year against defects in materials and workmanship & calibration from the date of purchase.

Scope of delivery
1 multimeter 1 Probe Set 1 copy of operating instructions 1 test certificate 1 rubber holster with tilt stand and carrying strap warranty card 1 set of extra fuses

Display

LCD field (65 mm x 30mm) with analogue indication and digital display and with annunciators for unit of measurement, function and various special functions.

- 1 Display with low battery voltage
- 2 Display with sound signal on
- 3 Symbol for "CONTINUOUSLY ON"
- 4 Digital display with indication of decimal point and polarity
- 5 Display with manual range selection as well as with data and MIN/MAX hold
- 6 Display of the selected function
- 7 Display of the unit of measurement
- 8 Display with overrange
- 9 Pointer for analogue indication
- 10 Scale for analogue indication
- 11 Indication that negative analogue range is exceeded
- 12 Display of the unit 0C when measuring temperature
- 13 Display with time counter switched on



Technical Specifications

Reference conditions Measuring current with diode test and / or continuity test	
Ambient temperature	+23Co + 2K
Relative humidity	45%... 55%
Frequency of the measured quantity	45 Hz... 65 Hz
Waveform of the measured quantity	Sinusoidal
Battery voltage	8V + 0.1 V

Technical Specifications

Meas. function	Measuring range	Resolution	Input impedance		Inherent error of the digital display + (...% of rdg.+... digits at reference conditions		Overload capacity ²⁾		Meas. function
				¹⁾		¹⁾	Overload value	Overload duration	
V	300.00 mV	10 μV	>10 GΩ	5 MΩ// < 40 pF	0.05 + 3; 0.05 + 20	1.0 + 30 (> 600 Digit)	1000 V	cont.	V
	3.0000 V	100 μV	11 MΩ	5 MΩ// < 40 pF	0.05 + 3	0.5 + 30 (> 300 Digit)	DC		
	30.000 V	1 mV	10 MΩ	5 MΩ// < 40 pF	0.05 + 3	0.5 + 30 (> 300 Digit)	AC		
	300.00 V	10 mV	10 MΩ	5 MΩ// < 40 pF	0.05 + 3	0.5 + 30 (> 300 Digit)	RMS		
	1000.0 V	100 mV	10 MΩ	5 MΩ// < 40 pF	0.05 + 3	0.5 + 30 (> 300 Digit)	sinusoidal		dB
dB	See table below		–	as at V~	–	+ 0.5			dB
			Voltage drop. approx.						
				¹⁾		¹⁾			
mA	300.00 μA	10 nA	15 mV	15 mV	0.2 + 20	1.2 + 30 (> 300 Digit)	0.36 A	cont.	mA
	3.0000 mA	100 nA	150 mV	150 mV	0.2 + 10	1.2 + 30 (> 300 Digit)			
	30.000 mA	1 μA	30mV	30mV	0.05 + 10	1.2 + 50 (> 300 Digit)			
	300.00 mA	10 μA	300 mV	300 mV	0.2 + 10	1.2 + 30 (> 300 Digit)			
A	3.0000 A	100 μA	150 mV	150 mV	0.5 + 10	1.2 + 50 (> 300 Digit)	12A ⁵⁾	5 min	A
	10.000 A	1 mA	400 mV	400 mV	0.5 + 10	1.2 + 30 (> 300 Digit)			
			No-load voltage	Short circuit current					
Ω	300.00 Ω	10 mΩ	max. 4.00 V	max. 1 mA	0.1 + 6; 0.1 + 30		1000 V DC AC RMS sinusoidal	1 min	Ω
	3.0000 kΩ	100 mΩ	max. 1.25 V	max. 100 μA	0.1 + 6				
	30.000 kΩ	1 Ω	max. 1.25 V	max. 10 μA	0.1 + 6				
	300.00 kΩ	10 Ω	max. 1.25 V	max. 1 μA	0.1 + 6				
	3.0000 MΩ	100 Ω	max. 1.25 V	max. 0.1 μA	0.1 + 6				
	30.000 MΩ	1kΩ	max. 1.25 V	max. 0.1 μA	1.0 + 6				
	3.0000 V-	1 mV	max. 4.00 V	–	0.2 + 3				
			Discharge resist	U _{0max}					
F	3.000 nF	1 pF	1.5 MΩ	4 V	1.0 + 8; 1.0 + 60		1000 V DC AC RMS sinusoidal	1 min	F
	30.00 nF	10 pF	1.5 MΩ	4 V	1.0 + 8; 1.0 + 30				
	300.0 nF	100 pF	150 kΩ	4 V	1.0 + 3				
	3.000 μF	1 nF	150 kΩ	4 V	1.0 + 3				
	30.00 μF	10 nF	15 kΩ	2 V	1.0 + 3				
	300.0 μF	100 nF	1.5 kΩ	2 V	5.0 + 6				
	3000 μF	1 μF	1.5 kΩ	2 V	5.0 + 6				
	10000 μF	10 μF	1.5 kΩ	2 V	5.0 + 6				

Technical Specifications

Meas. function	Measuring range	Resolution	Input impedance		Inherent error of the digital display + (...% of rdg.+... digits at reference conditions		Overload capacity ²⁾		Meas. function
			-----	¹⁾  ¹⁾ -----	-----	¹⁾  ¹⁾ -----	Overload value	Overload duration	
			f _{min} ⁶⁾						
Hz	300.00 Hz	0.01 Hz	10 Hz				≤3 kHz; 1000 V	cont.	Hz
	3.0000 kHz	0.1 Hz	10 Hz		0.1 + 3 ⁷⁾		≤30 kHz; 300 V		
	30.000 kHz 100.00 kHz	1 Hz 10 Hz	10 Hz				≤100 kHz;		
Pt 100	- 200.0... + 100.0 °C	0.1 °C	—	—	0.5 Kelvin + 3 ⁸⁾		1000 V DC AC rms sine	1 min.	°C
	+ 100.0... + 850.0 °C	0.1 °C	—	—	0.5 + 3 ⁸⁾				
°C Pt 1000	- 100.0... + 100.0 °C	0.1 °C	—	—	0.5 Kelvin + 3 ⁸⁾				
	+ 100.0... + 850.0 °C	0.1 °C	—	—	0.5 + 3 ⁸⁾				

dB ranges

Measuring Ranges	Display span at reference voltage $U = 0.775 \text{ V}$	Display span at reference voltage $U_{ref} \text{ (V)}$
300 mV ~ 3 V ~ 30 V ~ 300 V ~ 1000 V ~	- 48 dB... - 8 dB - 38 dB... + 12 dB - 18 dB... + 32 dB + 2 dB... + 52 dB + 22 dB... + 63 dB	- 40 dB... + 110 dB - 60 dB... + 100 dB - 80 dB... + 80 dB - 100 dB... + 60 dB - 110 dB... + 40 dB
	Display (dB) = $20 \lg U_X \text{ (V)} / 0.775 \text{ V}$	Display (dB) = $20 \lg U_X \text{ (V)} / U_{ref} \text{ (V)}$

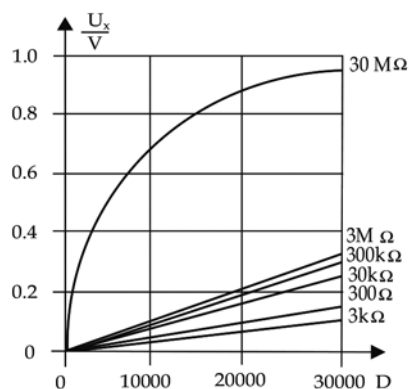
- 1) TRMS measurement
- 2) At - 10 °C... + 40 °C
- 3) With zero adjuster; without zero adjuster
- 4) At a resolution of 0.01 dB
- 5) 16 A for 30s
- 6) Lowest measurable frequency with a sinusoidal measuring signal which is symmetrical to zero
- 7) Range

3 V ~	: $U_e =$	1V eff/rms	10 V eff/rms
30 V ~	: $U_e =$	10V eff/rm.s.	100 V eff/rms
300 V ~	: $U_e =$	100V eff/rm.s.	1000 V eff/rms

8) Without sensor

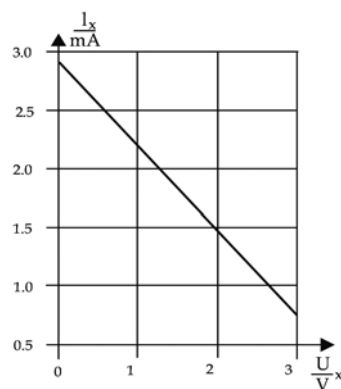
Measuring voltage with resistance measurement

Voltage U_x across the resistance R_x to be measured as a function of measuring range and display.

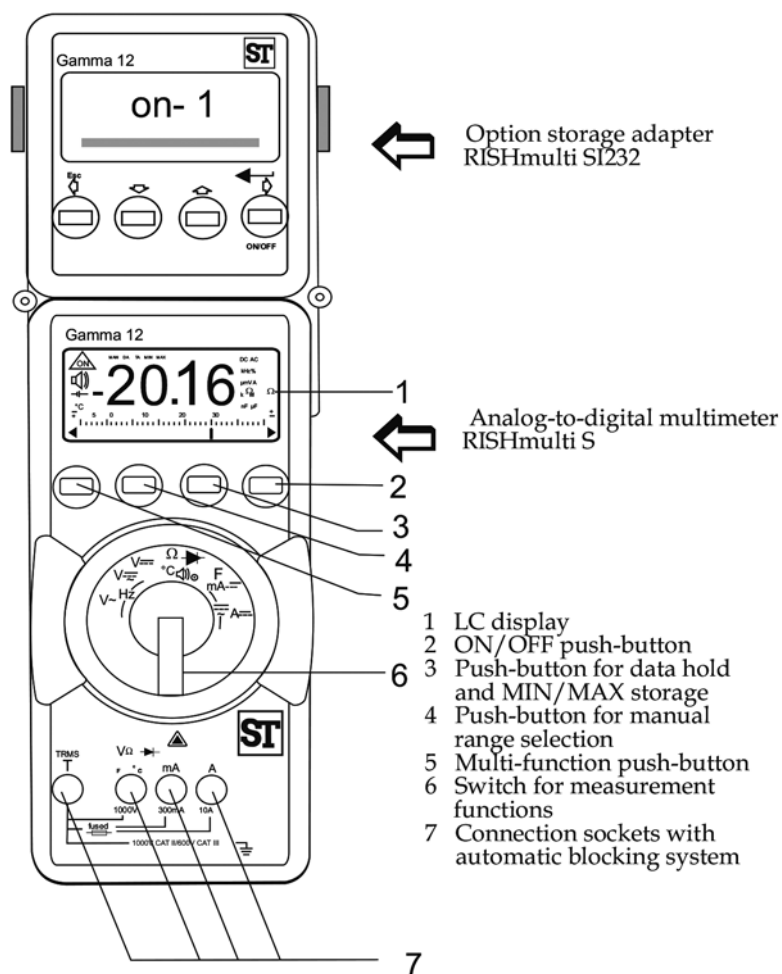


Measuring current with diode test and / or continuity test

Measuring current I_x as a function of the displayed voltage U_x on the device under test.



Operating controls



Ordering Information

GM20 - 7NB4000000000	GAMMA 10	Gamma 10 TRMS Backlit
GM20 - 7FB4000000000		Gamma 10 Fine Tip TRMS Backlit

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