



## Technical Data Sheet

# *Gamma 12*



**Gamma 12** It is Analog Digital Multimeter which measures VAC, VDC, VAC+DC, Frequency, mA DC, mA (AC+DC), Resistance, continuity, Diode, Farad, AC current measurement.

### Special Features

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

## Application

**Gamma 12** is the Analog Digital Multimeter which measures VAC, VDC, VAC+DC, Frequency, mA DC, mA (AC+DC), Resistance, continuity, Diode, Farad, AC current measurement.

## Product Features

<b>Automatic Terminal Blocking System (ABS)</b>	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.	<b>Continuity Test</b>	This permits testing for short circuit and open circuit. In addition to the display, a facility of sound signal is available.
<b>Interface And Software</b>	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*	<b>Temperature Measurement</b>	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.
<b>MIN / MAX Value Storage</b>	In addition to the display of the actual measured value, the minimum or maximum value can constantly be updated and stored.	<b>Signalling in the case of a blown fuse</b>	The display FUSE points to a blown fuse.
<b>Indication Of Negative Values On The Analog Scale</b>	When measuring DC quantities, also negative values are shown on the analog scale so that variations of the measured value can be observed at the zero point.	<b>Power economizing circuit</b>	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.
<b>Indication Of Negative Values On The Analog Scale</b>	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.	<b>Overload Warning</b>	A sound signal indication violation of the overload limits.
<b>Automatic Data Hold*</b>	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 analog scale.	<b>Protective holster for rough duty</b>	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.
<b>Autoranging / Manual Range Selection</b>	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/MAIN push button.	<b>Top model Gamma 12</b>	The top model Gamma 12 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.
		<b>Calibration</b>	Gamma multi 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

### Analog

Indication	LCD scale with pointer
Scale length	55 mm on V $\overline{\text{---}}$ and A $\overline{\text{---}}$ ; 47 mm on all other ranges
Scaling	+ 5...0...+ 30 with 35 scale divisions on $\overline{\text{---}}$ , 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 $\Omega$ 10 readings/s

### Environmental conditions

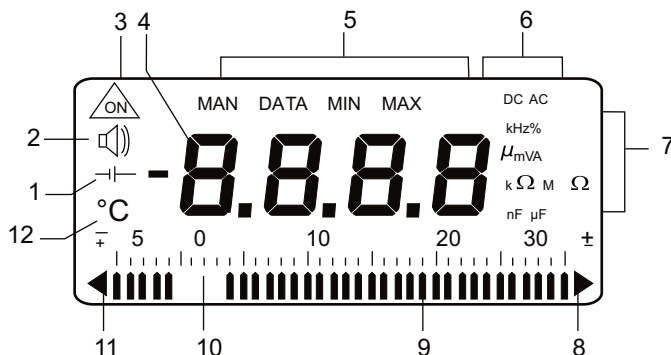
Temperature range	-10° C... + 50°C
Storage temperature range	-25°C ... +70°C (excl. batteries)
Climatic class	2z/-10/50/70/75% with reference to VDI/VDE 3540
Altitude above sea level	up to 2000m

### Digital

Display/ height of numerals	7 segment numerals / 15mm
Number of counts	Gamma 12, 3 $\frac{3}{4}$ digit $\triangleq$ 3100 counts Gamma 10: 4 $\frac{3}{4}$ digit $\triangleq$ 31000 counts
Overrange display	"OL" is shown
Polarity display	"-" sign is shown, When positive pole to "1"
Sampling rate	2 readings/s, On $\Omega$ and C:1 reading/s

### Display

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



### 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 DIN EN 61010 part 1 VDE 0411 -1	Safety requirements for electrical equipment for measurement, control and laboratory use.
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 DIN VDE 0470 part 1	Test equipment and test procedures -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.

# Technical Specifications

Meas. function	Measuring range		Resolution	Input impedance	Inherent deviation of the digital display± (...% of meas. val. +...digits) for reference condition	Overload capacity <sup>4)</sup>		Meas. function
						Overload value	Overload duration	
V $\overline{\text{---}}$	30.00 mV	●	10 $\mu$ V	> 10G $\Omega$ // < 40 pF	0.5 + 3 <sup>5)</sup>	1000 V	cont.	V $\overline{\text{---}}$
	300.0mV	●	100 $\mu$ V	> 10G $\Omega$ // < 40 pF	0.5 + 3			
	3.000 V	●	1 mV	11M $\Omega$ // < 40 pF	0.1 + 1			
	30.00 V	●	10 mV	10M $\Omega$ // < 40 pF	0.1 + 1			
	300.0 V	●	100 mV	10M $\Omega$ // < 40 pF	0.1 + 1			
	1000 V	●	1V	10M $\Omega$ // < 40 pF	0.1 + 1			
V $\sim$	3.000 V	● 1)	1 mV	11M $\Omega$ // < 40 pF		effective sinusoidal		V $\sim$
	30.0 V	● 1)	10 mV	10M $\Omega$ // < 40 pF	0.75 + 3			
	300.0 V	● 1)	100 mV	10M $\Omega$ // < 40 pF	(> 10 D)			
	1000 V	● 1)	1 V	10M $\Omega$ // < 40 pF				
V $\overline{\sim}$	3.000 V	● 1)	1 mV	11M $\Omega$ // < 40 pF				V $\overline{\sim}$
	30.00 V	● 1)	10 mV	10M $\Omega$ // < 40 pF	0.75 + 3			
	300.0 V	● 1)	100 mV	10M $\Omega$ // < 40 pF	(> 10 D)			
	1000 V	● 1)	1 V	10M $\Omega$ // < 40 pF				
				Voltage drop. approx.				
A $\overline{\text{---}}$	300.0 $\mu$ A	●	100 nA	15 mV	0.5 + 5 (> 10 D)	0.36 A	cont.	A $\overline{\text{---}}$
	3.000 mA	●	1 $\mu$ A	150 mV	0.5 + 2			
	30.00 mA	●	10 $\mu$ A	650 mV	0.5 + 5 (> 10 D)			
	300.0 mA	●	100 $\mu$ A	1 V	0.5 + 2	7)	7)	
	3.000 A	●	1 mA	100 mV	1.0 + 5 (> 10 D)			
	10.00 A	●	10 mA	270 mV	1.0 + 2			
A $\sim$	3.000 mA		1 $\mu$ A	150 mV	---	0.36 A	cont.	A $\sim$
	30.00 mA		10 $\mu$ A	---	---			
	300.0 mA		100 $\mu$ A	1 V	---	7)	7)	
	10.00 A		10 mA	270 mV	---			
A $\overline{\sim}$	30.00 A <sup>2)</sup>		10 mA	---	---	0.36 A	cont.	A $\overline{\sim}$
	300.0 A <sup>2)</sup>		100 mA	---	---			
A $\overline{\text{---}}$	3.000 mA	● 1)	1 $\mu$ A	150 mV	1.5 + 4 (> 10 D)	12 A	10 min	A $\overline{\text{---}}$
	300.0 mA	● 1)	100 $\mu$ A	1 V	1.5 + 4 (> 10 D)			
	10.00 A	● 1)	10 mA	270 mV	1.75 + 4 (> 10 D)			

## Technical Specifications

Meas. function	Measuring range		Resolution	Input impedance		Inherent deviation of the digital display± (...% of meas. val. +...digits) for reference condition	Overload capacity <sup>4)</sup>		Meas. function	
							Overload value	Overload duration		
				<b>No-load voltage</b>						
<b>Ω</b>	30.00 Ω	●	10 mΩ	max. 3.2 V		0.4 + 3 <sup>5)</sup>	1000 V DC AC effective sinusoidal	10 min	<b>Ω</b>	
	300.0 Ω	●	100 mΩ	max. 3.2 V		0.4 + 3				
	3.000 kΩ	●	1Ω	max. 1.25 V		0.2 + 1				
	30.00 kΩ	●	10Ω	max. 1.25 V		0.2 + 1				
	300.0 kΩ	●	100Ω	max. 1.25 V		0.2 + 1				
	3.000 MΩ	●	1 kΩ	max. 1.25 V		0.4 + 1				
	30.00 MΩ	●	10 kΩ	max. 1.25 V		2.0 + 1				
	2.000 V	●	1 mV	max. 3.2 V		0.1 + 1				
				<b>Discharge resistance</b>	<b>U 0 max</b>					
<b>F</b>	30.00 nF	●	10 pF	250 kΩ	2.5 V	1.0 + 3 <sup>6)</sup>	1000 V DC AC effective sinusoidal	10 min	<b>F</b>	
	300.0 nF	●	100 pF	250 kΩ	2.5 V	1.0 + 3				
	3.000 μF	●	1 nF	25 kΩ	2.5 V	1.0 + 3				
	30.00 μF	●	10 nF	25 kΩ	2.5 V	3.0 + 3				
				<b>Sensor</b>	<b>F min V ---</b>	<b>F min V ~</b>				
<b>Hz</b>	300.0 Hz	●	0.1 Hz	1 Hz	45 Hz	0.5 + 1 <sup>8)</sup>	≤ 3 kHz: 1000V ≤ 30 kHz: 300V ≤ 100 kHz: 30 V	cont.	<b>Hz</b>	
	3.000 kHz	●	1 Hz	1 Hz	45 Hz					
	30.00 kHz	●	10 Hz	10 Hz	45 Hz					
	100.0 kHz	●	100 Hz	100 Hz	100 Hz					
<b>%</b>	2.0... 98.0 %	●	0.1 %	1 Hz	---	1 Hz.....1kHz: + 5 D <sup>9)</sup> 1Hz.....10kHz: +5 D/kHz <sup>9)</sup>			<b>%</b>	
<b>°C</b>	- 200.0... + 200.0 °C	●	0.1 °C	Pt 100	---	---	2 Kelvin + 5 D <sup>10)</sup>	1000 V DC AC effective sinusoidal	10 min	<b>°C</b>
	+ 200.0... + 850.0 °C	●	0.1 °C		---	---	1.0 + 5 <sup>10)</sup>			
	-100.0... + 200.0 °C	●	0.1 °C	Pt 1000	---	---	2 Kelvin + 2 D <sup>10)</sup>			
	+ 200.0 ... + 850.0 °C	●	0.1 °C		---	---	1.0 + 2 <sup>10)</sup>			

1) TRMS measurement

2) Direct display with clip-on transformer 1000:1

4) At 0°C... + 40 °C

5) With zero setting; w/o zero setting + 35 digits

6) With zero setting; w/o zero setting + 50 digits

7) Gamma 12 (w/o 16 A fuse!) : 16A cont., 20A for 5 min;

Gamma 12 : 12A for 5 min, 16A for 30s

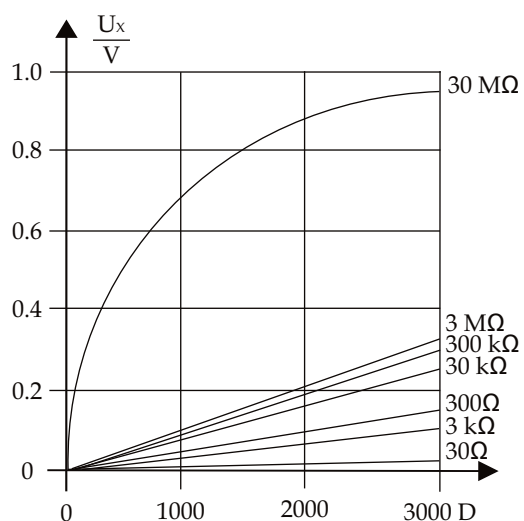
8) Range 3 V :  $\simeq U = 1.5 V_E \text{ rms ... } 100 \text{ Vrms}$ 30 V :  $\simeq U = 15 V_E \text{ rms ... } 300 \text{ Vrms}$ 300 V :  $\simeq U = 150 V_E \text{ rms ... } 1000 \text{ Vrms}$ 

9) On the range 3V --- rectangular signal positive at one end 5 ... 15 V, f = const., not 163.84 Hz or integer multiple.

10) Without sensor

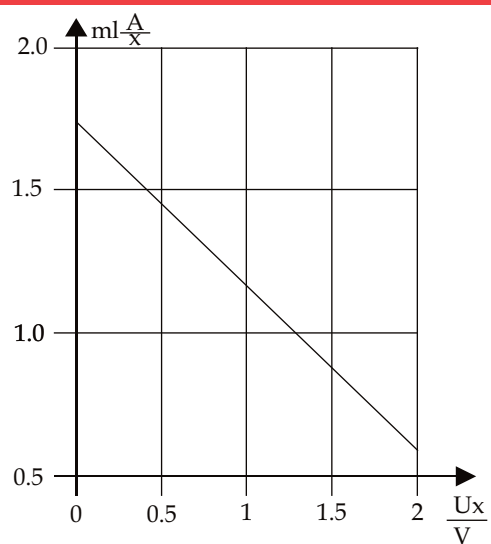
## Measuring voltage with resistance measurement

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

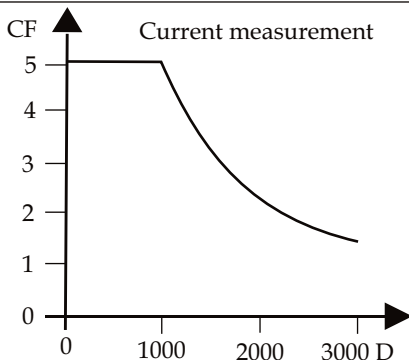
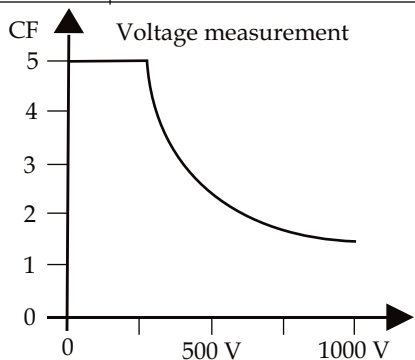
Measuring current  $I_x$  as a function of the displayed voltage  $U_x$  on the device under test.



## Influence quantities and variations

Influence quantity	Influence range	Measured quantity / measuring range	Variation <sup>1)</sup> ± (...% of meas. val. +... digits)
Temperature	0 °C... + 21 °C and +25 °C... + 40 °C	30/300 mV $\overline{\text{---}}$	1.0 + 1
		3... 300 V $\overline{\text{---}}$	0.1 + 1
		1000 V $\overline{\text{---}}$	0.1 + 1
		V $\sim$	0.3 + 2
		300 $\mu$ A <sup>2</sup> ... 300 mA $\overline{\text{---}}$	0.15 + 1
		3A / 10 (16) A $\overline{\text{---}}$	
		A $\sim$	0.75 + 3
		30 $\Omega$	0.15 + 2
		300 $\Omega$	0.15 + 2
		3 k $\Omega$ ... 3 M $\Omega$	0.1 + 1
		30 M $\Omega$	0.6 + 1
		30 nF <sup>2)</sup> ... 3 $\mu$ F	0.5 + 2
		30 $\mu$ F	2.0 + 2
		Hz	0.5 + 1
		%	±5 D
		-200... + 20 0 °C	0.5 K + 2
+ 200... + 8 50 °C	0.5 + 2		
Frequency of the measured quantity	15 Hz... < 30 Hz	3 ... 300 V $\sim$	1.0 + 3
	30 Hz... < 45 Hz		0.5 + 3
	> 65 Hz... 400Hz		0.5 + 3
	> 400 Hz... 1 kHz		1.0 + 3
	> 1kHz... 20 kHz		2.0 + 3
	15 Hz... < 30 Hz	1000 V $\sim$	1.0 + 3
	30 Hz... < 45 Hz		0.5 + 3
	> 65 Hz... 1kHz		2.0 + 3
	15 Hz... < 30 Hz	A $\sim$	1.0 + 3
	30 Hz... <45 Hz		0.5 + 3
> 65 Hz...1kHz	3.0 + 3		
Crest factor CF	1 ...3	V $\sim$ <sup>4)</sup> , A $\sim$ <sup>4)</sup>	±1% of rdg.
	> 3 ...5		±3 % of rdg.
The permissible crest factor CF of the AC quantity to be measured is a function of the displayed value :			

Waveform of the measured quantity<sup>3)</sup>



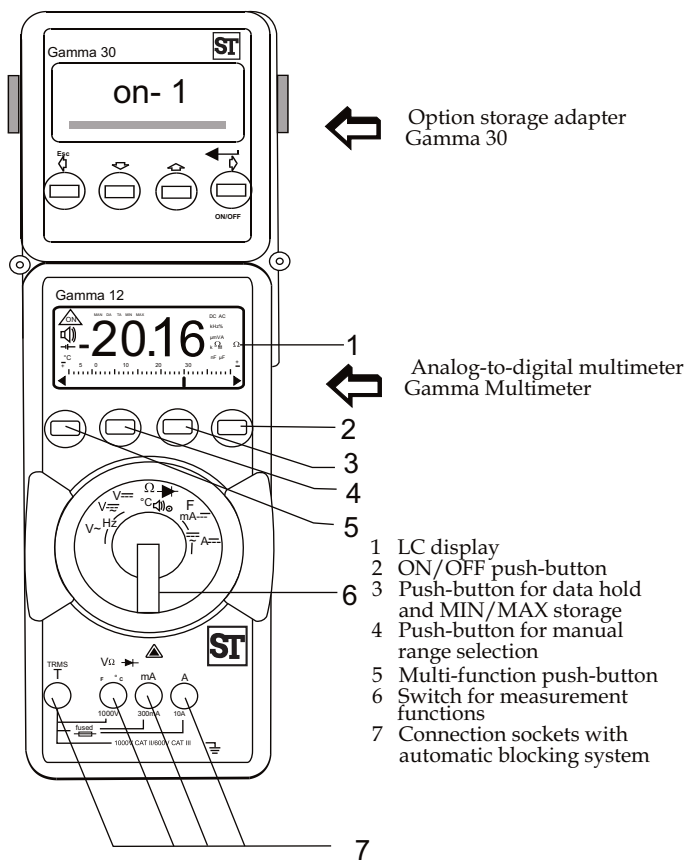
## Influence quantities and variations

Influence quantity	Influence range	Measured quantity / measuring range	Variation Gamma 12
Battery voltage	$\text{---}^{\text{5)}$ ... < 7.9 V > 8.1 V... 10.0 V	V $\text{---}$	+ <u>2</u> D
		V $\sim$	+ <u>4</u> D
		A $\text{---}$	+ <u>4</u> D
		A $\sim$	+ <u>6</u> D
		30 $\Omega$ / 300 $\Omega$ / $^{\circ}\text{C}$	+ <u>4</u> D
		3 k $\Omega$ ... 30 M $\Omega$	+ <u>3</u> D
		nF, $\mu\text{F}$	+ <u>1</u> D
		Hz	+ <u>1</u> D
		%	+ <u>1</u> D
Relative humidity	75 %  3 days  Meter off	V $\simeq$	1x Intrinsic error
		A $\simeq$	
		$\Omega$	
		F	
		Hz	
		%	
DATA		$^{\circ}\text{C}$	$\pm 1$ D
MIN / MAX		V $\simeq$ , A $\simeq$	$\pm 2$ D

- 1) With temperature; Error data is per 10 K change in temperature. With frequency; Error data is valid from a display of 300 digits.
- 2) With zero setting
- 3) With unknown waveform (crest factor CF > 2), the measurement must be made with manual range selection.
- 4) Except for sinusoidal waveform
- 5) From the time the symbol " $\text{---}^{\text{5)}$ " appears.



## Operating controls



## Ordering Information

Product Code	GM 20-	X	X	X	X	X	X	000000
Type	Gamma 12	6						
Probe Set	Normal		N					
	Fine Tip		F					
Backlit	With Backlit			B				
	Without Backlit			Z				
CE Marking	CAT IV				4			
	CAT III				3			
Carrying Case	Without Carrying Case					0		
	With Carrying Case					1		
Gamma 30	Without Gamma 30						0	
	With Gamma 30						1	



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