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PRECISION INSTRUMENTATION

DIGITAL MULTIMETER
Gamma 12
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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 12
DIGITAL MULTIMETER

Gamma 12. An Analog Digital Multimeter which measures VAC, VDC, AC+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This manual superseded all previous versions – please keep for future reference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 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

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.
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*
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.
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.
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.
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.
Autoranging / 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

Continuity Test	This permits testing for short circuit and open circuit. In addition to the display, a facility of sound signal is available.
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.
Signalling in the case of a blown fuse	The display FUSE points to a blown fuse.
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.
Overload Warning	A sound signal indication violation of the overload limits.
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.
Top model Gamma 12	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.
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 Ω 10 readings/s

Environmental conditions	
Temperature range	-10°C... + 50°C
Storage temperature range	-25°C ... +70°C (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 / 15mm
Number of counts	Gamma 12 3 ¾ digit ⩲ 31000 counts Gamma 10 4 ¾ digit ⩲ 31000 counts
Overange display	**"OL"** is shown
Polarity display	"-" sign is shown, When positive pole to " 1 "
Sampling rate	2 readings/s, On Ω 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

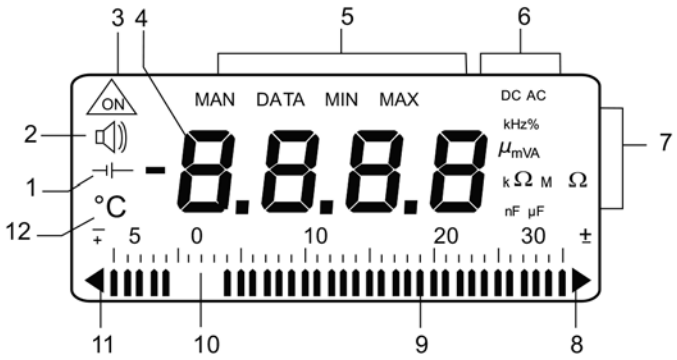
Applied rules and standards	
IEC 61010-1:2001 DIN EN 61010 part 1 VDE 0411 -1	Safety requirements for electrical equipment for measurement, control and laboratory use.
DIN 43751 IS 13875	Digital measuring instruments
EN 61326:2002	Generic emission standard; Residential, commercial and light industry
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

Display

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



Technical Specifications

Meas. function	Measuring range		Resolution	Input impedence	Inherent deviation of the digital display+ (...% of meas. val. +...digits) for reference condition	Overload capacity [4]		Meas. function
						Overload value	Overload duration	
V ⎓	30.00 mV	•	10 µV	> 10GΩ // < 40 pF	0.5 + 3 [5]	1000 V DC AC effective sinusoidal	cont.	V ⎓
	300.0mV	•	100 µV	> 10GΩ // < 40 pF	0.5 + 3			
	3.000 V	•	1 mV	11MΩ // < 40 pF	0.1 + 1			
	30.00 V	•	10 mV	10MΩ // < 40 pF	0.1 + 1			
	300.0 V	•	100 mV	10MΩ // < 40 pF	0.1 + 1			
	1000 V	•	1V	10MΩ // < 40 pF	0.1 + 1			
V ~	3.000 V	• 1)	1 mV	11MΩ // < 40 pF				V ~
	30.0 V	• 1)	10 mV	10MΩ // < 40 pF	0.75 + 3			
	300.0 V	• 1)	100 mV	10MΩ // < 40 pF	(> 10 D)			
	1000 V	• 1)	1 V	10MΩ // < 40 pF				
V ⎓ ~	3.000 V	• 1)	1 mV	11MΩ // < 40 pF				V ⎓ ~
	30.00 V	• 1)	10 mV	10MΩ // < 40 pF	0.75 + 3			
	300.0 V	• 1)	100 mV	10MΩ // < 40 pF	(> 10 D)			
	1000 V	• 1)	1 V	10MΩ // < 40 pF				
				Voltage drop. approx.				
A ⎓	300.0µ A	•	100 nA	15 mV	0.5 + 5 (> 10 D)	0.36 A	cont.	A ⎓
	3.000 mA	•	1µ A	150 mV	0.5 + 2			
	30.00 mA	•	10 µA	650 mV	0.5 + 5 (> 10 D)			
	300.0 mA	•	100 µA	1 V	0.5 + 2			
	3.000 A	•	1 mA	100 mV	0.5 + 5 (> 10 D)	7)	7)	
	10.00 A	•	10 mA	270 mV	1.0 + 2			
A ~	3.000 mA		1 µA	150 mV	---	0.36 A	cont.	A ~
	30.00 mA		10 µA	---	---			
	300.0 mA		100 µA	1 V	---	7)	7)	
	10.00 A		10 mA	270 mV	---			
A ~ ⋊	30.00 A [2]		10 mA	---	---	0.36 A	cont.	A ~ ⋊
	300.0 A [2]		100 mA	---	---			
A ⎓ ~	3.000 mA	• 1)	1 µA	150 mV	1.5 + 4 (> 10 D)	12 A	10 min	A ⎓ ~
	300.0 mA	• 1)	100 µA	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 impedence			Inherent deviation of the digital display+ (...% of meas. val. +...digits) for reference condition	Overload capacity [4]		Meas. function
								Overload value	Overload duration	
				No-load voltage						
Ω	30.00Ω	•	10 m	max. 3.2 V			0.4 + 3 [5]	1000V DC AC effective sinusoidal	10 min	Ω
	300.0Ω	•	100 m	max. 3.2 V			0.4 + 3			
	3.000 kΩ	•	1	max. 1.25 V			0.2 + 1			
	30.00 kΩ	•	10	max. 1.25 V			0.2 + 1			
	300.0 kΩ	•	100	max. 1.25 V			0.2 + 1			
	3.000 MΩ	•	1 k	max. 1.25 V			0.4 + 1			
	30.00 MΩ	•	10 k	max. 1.25 V			0.2 + 1			
→|←	2.000 V	•	1 mV	max. 3.2 V			0.1 + 1			→|←
					Discharge resistance	$U_{0\ max}$				
F	30.00 nF	•	10 pF		250 k	2.5 V	1.0 + 3 [6]	1000 V DC AC effective sinusoisal	10 min	F
	30.00 nF	•	100 pF		250 k	2.5 V	1.0 + 3			
	30.00 µF	•	1 nF		25 k	2.5 V	1.0 + 3			
	30.00 µF	•	10 nF		25 k	2.5 V	3.0 + 3			
				Sensor	F min V ~	F minV				
Hz	300.0 Hz	•	0.1 Hz		1 Hz	45 Hz	0.5 + 1 [8]	≤ 3 kHz: 1000V ≤ 30 kHz: 300V ≤ 100 kHz: 30 V	cont.	Hz
	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				
%	2.0... 98.0 %	•	0.1%		1 Hz	---	1 Hz.....1kHz: + 5 D [8] 1Hz.....10kHz:+5 D/kHz [9]			
°C	- 200.0... + 200.0 °C	•	0.1 °C	Pt 100	---	---	2 Kelvin + 5 D 10)	1000 V DC AC effective sinusoidal	10 min	°C
	+ 200.0... + 850.0 °C	•	0.1 °C		---	---	1.0 + 5 10)			
	-100.0... + 200.0 °C	•	0.1 °C	Pt100	---	---	2 Kelvin + 2 D 10)			
	+ 200.0 ... + 850.0 °C	•	0.1 °C		---	---	1.0 + 2 10)			

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

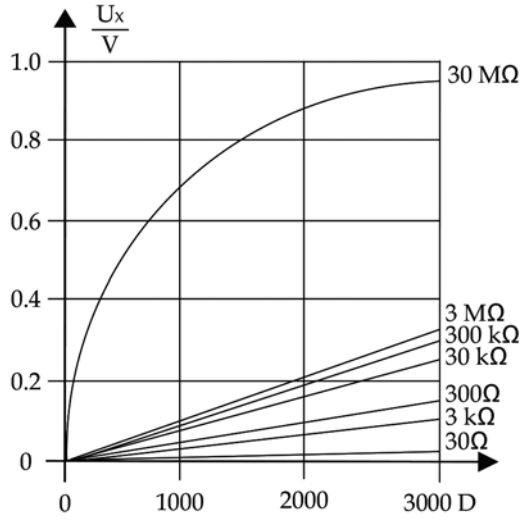
8) Range 3 V : ⎓ U = 1.5 VE rms ... 100 Vrms
30 V : ⎓ U = 15 VE rms ... 300 Vrms
300 V : ⎓ U = 150 VE rms ... 1000 Vrms

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

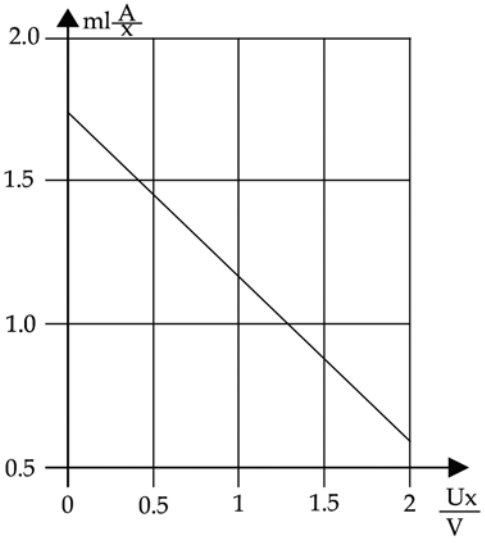
Measuring voltage with resistance measurement

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



Measuring current with diode test and / or continuity test

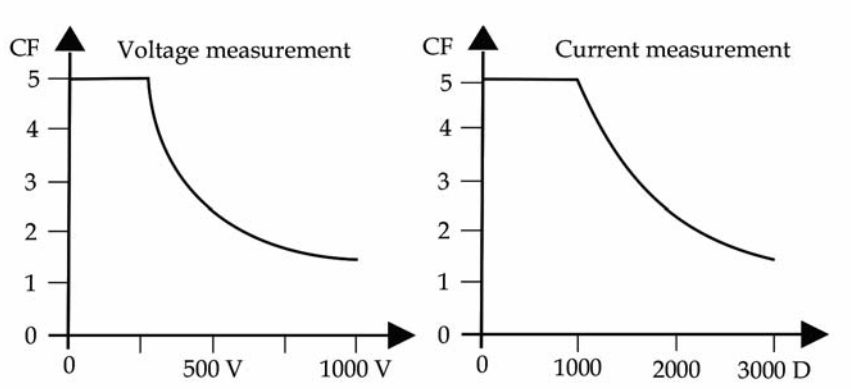
Measuring current Ix as a function of the displayed voltage Ux on the device under test.



Influence quantities and variations

Influence quantity	Influence range	Measured quantity / measuring range	Variation 1) ± (...% of meas. val. ±...digits)
Temperature	0 °C... + 21 °C and +25 °C... + 40 °C	30/300 mV ⎓	1.0 + 1
		3... 300 V ⎓	0.1 + 1
		1000 V ⎓	0.1 + 1
		V~	0.3 + 2
		300 µA [2] ...	0.15 + 1
		300 mA ⎓	
		3A / 10 (16) A ⎓	
		A~	0.75 + 3
		30 Ω	0.15 + 2
		300 Ω	0.15 + 2
		3 k ...3 MΩ	0.1 + 1
		30 MΩ	0.6 + 1
		30 nF [2] ... 3µF	0.5 + 2
		30 µF	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~	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		1.0 + 3
	30 Hz... < 45 Hz	1000 V~	0.5 + 3
	> 65 Hz... 1kHz		2.0 + 3
	15 Hz... < 30 Hz		1.0 + 3
	30 Hz... <45 Hz	A~	0.5 + 3
	> 65 Hz...1kHz		3.0 + 3
	Crest factor CF 1 ...3 / > 3 ...5	V ~ [4] , A~ [4]	± 1% of rdg. / ± 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 [3]



Influence quantities and variations

Influence quantity	Influence range	Measured quantity / measuring range	Variation 1) ± (...% of meas. val. ±...digits)
Battery voltage	⊣├— 5) ... < 7.9 V > 8.1 V... 10.0 V	V ⎓	+ 2 D
		V~	+ 4 D
		A ⎓	+ 4 D
		A~	+ 6 D
		30Ω / 300Ω / °C	+ 4 D
		3 kΩ ... 30 MΩ	+ 3 D
		nF, µF	+ 1 D
		Hz	+ 1 D
		%	+ 1 D
Relative humidity	75 % 3 days Meter off	V A Ω F Hz %	1x Intrinsic error
DATA		°C	±1 D
MIN / MAX		V⎓~, A⎓~	± 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.

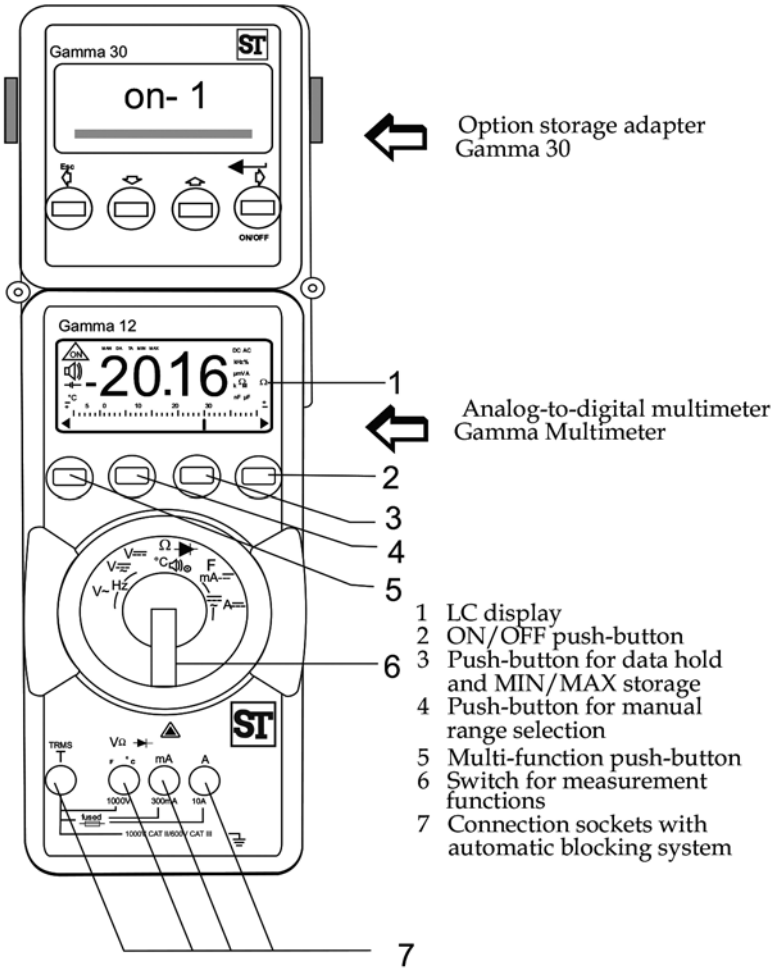
2) With zero setting

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 " ⊣├— " appears.

Operating controls



Ordering Information

GM20 - 6NB4000000000	GAMMA 12	Gamma 12 TRMS Backlit
GM20 - 6FB4000000000		Gamma 12 TRMS Fine Tip TRMS Backlit

Contact

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