



## Technical Data Sheet

# *Gamma 40/50/60/70*



*Gamma 40/50/60/70* digital multimeters are suited for universal, general applications in the electrical and electronics radio and television service, training and education.

### Special Features

- Direct and alternating voltages from  $100\mu\text{V}$  ... 1000V
- Direct and alternating currents from  $10\mu\text{A}$  ... 10.00A
- Resistance from  $100\text{m}\Omega$ ...  $60.00\text{M}\Omega$
- Capacitance from  $1\text{pF}$  ...  $40.00\text{mF}$  with zero correction.
- Frequencies from  $10.00\text{Hz}$  ...  $10\text{MHz}$
- Diode measurement and continuity testing
- Hold measurement
- Relative measurement
- Duty cycle (%) measurement
- Temperature measurement with K type Thermocouple
- Peak value measurement

## Application

Gamma 40/50/60/70 digital multimeters are suited for universal, general applications in the electrical and electronics radio and television service, training and education.

## Product Features

<b>Root mean square value with distorted wave form (for 616 only).</b>	Measuring principal employed permits the measurement of root mean square value (TRMS) of AC quantities regardless of wave form.	<b>Auto Power OFF (APO)</b>	Multimeter has a default auto power off function. If the Meter is idle for more than the 15 minutes, the meter automatically turns the power off.
<b>Dual Display</b>	The dual display included a main display and a sub display. Main display always display current measurement value where as sub display shows some special measurements like maximum/minimum value, reference value for relative value measurement. Also dual display is used to display at the same time Voltage/ Current with Frequency, Frequency with Duty cycle etc.	<b>Hold</b>	By pressing the HOLD/ON key, the currently displayed Measurement value can be held and "HOLD" is simultaneously displayed.
<b>Peak Hold</b>	Minimum and maximum Peak values are hold in VAC, mAAC, AAC.	<b>Relative measurement (REL)</b>	By pressing and holding PEAK and then pressing AUTO/MAN key, the zero correction is made and relative Value is measured. It is not active in Hz/ Duty functions.
<b>MIN/MAX Function</b>	By pressing min/max button instrument will start recording minimum and maximum readings. All functions can measure MIN/MAX except Hz/Duty functions.	<b>Automatic blocking System(ABS)</b>	The automatic terminal blocking system prevents incorrect connection of test lead and incorrect selection of measurement quantity, which provide safety to the user.
<b>Temperature measurement</b>	Multimeters measures temperature with "K" type thermocouple (NiCr - Ni) sensor in the range from 0°C to 1300°C.	<b>Auto and Manual ranging modes</b>	In AUTO ranging mode the instrument automatically selects the range with best resolution depending on the applied input. In manual ranging mode range is user selectable using AUTO/MAN Key. Note: For AAC, ADC, Temperature, Continuity, Diode and Duty cycle measuring range is manual. No AUTO range selection is possible.
<b>Indication of negative values on the analog scale.</b>	When measuring DC quantities negative values are shown on the analog scale so that variations of the measured value can be observed at the Zero point.	<b>Diode and Continuity testing</b>	This provides for the testing of the polarity of diodes, as well as inspection for short -circuits and circuit interruptions. In addition to the display, resistance of less than 30Ω (approx.) Are Indicated with an acoustic signal.
<b>Analog Scale</b>	Analog scale that updates at the rate 28 times/sec to observe	<b>Backlit</b>	Large white LED backlit to work in poorly light area.
<b>Protection from dust and water</b>	Instrument: IP 52 For terminals: IP20 as per IEC60529.	<b>Continuous ON mode</b>	In this mode, AUTO POWER OFF is disabled.
<b>Applicable International Safety standards</b>	1000 V CAT III/600V CAT IV as per International Safety standard IEC 61010-1- 2010 and IEC 61557		


## Technical Specifications

Reference conditions for Accuracy		Digital	
Reference Temperature	23°C ± 2K	Display	7 segment
Relative Humidity	45%...55% RH	Character height	Main Display Character : 12mm Sub Display Character : 7mm
Waveform of measured quantity	Sinusoidal	Number of digits/Counts	4 digits 6600 steps
Input frequency	50 or 60 Hz ±2%	Overrange display	"OL" is displayed.
Battery Voltage	3 V ± 0.1 V	Polarity display	"-" sign is displayed when positive pole at "1"
		Sampling rate	2.8 times / sec

## Technical Specifications

Applicable regulations and standards	
EMC	IEC 61326: Class B
Immunity	IEC 61000-4-2 : 8 KV atmosphere discharge, 4 KV contact discharge IEC 61000-4-3 : 3 V/m
Safety	IEC 61010-1-2010
IP for water & dust	IEC 60529
Pollution degree:	2
Installation category:	1000 V CATIII / 600 V CATIV (for 616,615,612) 1000 V CATII / 600 V CATIII (for 613)
High Voltage Test	6.7 kV (IEC 61010-1-2010) (for 616,615,612) 3.5 kV (IEC 61010-1-2010) (for 613)

Environmental Conditions	
Operating temperature	0 to +50°C
Storage temperature	- 25 to +70°C
Relative humidity	<75% non condensing.
Terminal Protection	IP 52 for instrument and I.P20 for terminals.
Altitude	Up to 2000 m

Battery	
Battery Voltage	2 X 1.5 V Cells
Battery type	Alkaline manganese Dioxide cells.
Battery Life	<b>for Gamma 40,50,60,</b> 600 hrs. for VDC, ADC 300 hrs. for VAC, AAC <b>for Gamma 70</b> 400 hrs. for VDC, ADC 200 hrs. for VAC, AAC
Battery test	Automatic display of  symbol when battery voltage drops below approx. 2.4V

Analog	
Indication	LCD scale Analog Bar graph
Scale length	55 mm
Scaling	0 to 60 with 66 scale divisions
Polarity Indication	"-" sign on scale digits.
Over range indication	By triangle
Sampling rate	28 times/sec

Fuse	
Fuse for ranges up to 660 mA	1.6 A / 1000V; 6.3 mm x 32 mm
Fuse for 10 A range	16 A / 1000V; 10 mm x 38 mm

Ambient Conditions	
Operating temperature range	0 °C ... + 50 °C
Storage temperature range	- 25°C ... + 70 °C (without batteries)
Relative humidity	45 ... 75 %
Elevation	up to 2000 m

Mechanical Design	
Protection	Instruments: IP 52 Connector sockets: IP 20
Dimensions	W x H x D:
With Holster	86 mm x 188 mm x 53 mm
Without Holster	79 mm x 174 mm x 38 mm
Weight	Approx. 0.480 Kg with battery

Standard Scope Of Supply	
1 Multimeter	
1 Cable set	
1 Copy Operating Instructions	
1 Protective Case (Holster).	

Display	
LCD display field 58 mm X 31.4 mm with digital display, analog scale and with display of measurement unit, and Various special functions.	

# Technical Specifications

Meas. Function	Measuring Range	40	50	60	70	Resolution	Input Impedance	Digital display Inherent deviation at reference condition+ (...%rdg + ...digits)	Overload capacity <sup>1)</sup>			
									Overload Values	Overload Duration		
V(DC)	660.0mV	•	•	•	•	100μV	>100 MΩ // <40pF	0.7 + 5	1000 V DC AC eff / rms Sine wave	Cont.		
	6.600V	•	•	•	•	1mV	11 MΩ // <40pF	0.4 + 5				
	66.00V	•	•	•	•	10mV	10 MΩ // <40pF	0.4 + 5				
	660.0V	•	•	•	•	100mV	10 MΩ // <40pF	0.4 + 5				
	1000.0V	•	•	•	•	1V	10 MΩ // <40pF	0.4 + 5				
V(AC)	660.0mV	•	•	•	•	100μV	>100 MΩ // <40pF	1.2 + 5			1.0 + 3	
	6.600V	•	•	•	•	1mV	11 MΩ // <40pF					
	66.00V	•	•	•	•	10mV	10 MΩ // <40pF					
	660.0V	•	•	•	•	100mV	10 MΩ // <40pF					
	1000V	•	•	•	•	1V	10 MΩ // <40pF					
A(DC)							Voltage Drop		0.7A	Cont.		
	66.00mA	•	•	•	•	10μA	66.00mV	0.8 + 5				
	660.0mA	•	•	•	•	100μA	66.00mV	0.8 + 5				
A(AC)	10.00A		16A	•	•	10mA	10.00mV	1.5 + 5	12A	0.7A	Cont.	
	66.0mA	•	•	•	•	10μA	66.00mV	0.8 + 5				
	660.0mA	•	•	•	•	100μA	66.00mV	0.8 + 5				
>C (AC)	10.00A		16A	•	•	10mA	10.00mV	1.5 + 5	12A	0.7A	Cont.	
	66.00A	•				10mA	66.00mV	0.8 + 5				
Ω	660.0A	•				100mA	66.00mV	0.8 + 5	No load Voltage			
	660.0Ω	•	•	•	•	100mΩ	-3.3V	0.8 + 5				
	6.600KΩ	•	•	•	•	1Ω	-1.08V	0.8 + 5				
	66.00KΩ	•	•	•	•	10Ω	-1.08V	0.8 + 5				
	660.0KΩ	•	•	•	•	100Ω	-1.08V	0.8 + 5				
BUZZER	6.600MΩ	•	•	•	•	1KΩ	-1.08V	1.0 + 5	2.0 + 5			
	66.00MΩ	•	•	•	•	10KΩ	-1.08V	2.0 + 5				
DIODE	660.0Ω	•	•	•	•	100mΩ	-3.3V	0.8 + 5	1000 V DC AC eff / rms Sine wave	10 Sec.		
F	2.000V	•	•	•	•	1mV	3.3V	2.0 + 10				
	6.600nF			•	•	1pF		3.0+40				
	66.00nF			•	•	10pF		2.0+10				
	660.0nF			•	•	100pF		2.0+10				
	6.600μF			•	•	1nF		2.0+10				
	66.00μF			•	•	10nF		2.0+10				
	660.0μF			•	•	100nF		5.0+10				
	6.600mF			•	•	1μF		5.0+10				
40.00mF			•	•	10μF		5.0+10					
Hz	66.00Hz			•	•	0.01Hz	10 Hz(Fmin)	0.2 + 2 <sup>2)</sup>				
	660.0Hz			•	•	0.1Hz						
	6.600KHz			•	•	1Hz						
	66.00KHz			•	•	10Hz	—					
	660.0KHz			•	•	100Hz						
	6.600MHz			•	•	1KHz						
	10.00MHz			•	•	10KHz						
%	1.0...98.90%			•	•	0.01 %	10 Hz...1kHz ± 5 Digit <sup>3)</sup> 1 kHz ...10 kHz; ± 5 Digit/kHz <sup>3)</sup>					
C/F	0...1300 °C	•	•	•	•	1°C	—	2.0+3 <sup>4)</sup>				
		•	•	•	•			3.0+300	-	-		

1) At 0°C ... + 40 °C

2) At input ≥ 3.5Vrms ,Square wave, Bipolar inputs.

3) For &lt;10 KHz ,Square wave, Bipolar inputs

4) Without sensor

## Influence Quantities

Influence Quantity	Range of Influence	Measured Quantity / Measuring Range	Variation <sup>1)</sup> ± (...% of rdg. + ...digits)
Temperature	0 °C +21 °C and +25 °C...+40°C	VDC	1 X Intrinsic error / K
		VAC	
		ADC	
		AAC	
		Ω	
		Diode	
		F	
		Hz	
		%	
Frequency of the Measured quantity	20 Hz...< 50 Hz	660mV~	1.0+3
	> 50Hz... 200 Hz		5.0+3
	20 Hz...< 50 Hz	6.6.....1000V~	1.0+3
	> 50Hz... 2 KHz		5.0+7
	20 Hz...< 50 Hz	A~	1.0+3
	> 50Hz... 2 KHz		5.0+7
Waveform of the Measured quantity <sup>2)</sup>	Crest Factor CF	1....1.4	± 1 % of rdg
		1.4....5	± 5 % of rdg
Battery Voltage	⚡ <sup>4)</sup> ...< 2.49 V > 2.49 V ...3 V	VDC	5 Digit
		V~,ADC	10 Digit
		AAC	6 Digit
		600Ω	4 Digit
		6.600 kΩ - 66 MΩ	3 Digit
		nF,μF,mF	5 Digit
		Hz	5 Digit
		%	5 Digit
Relative Humidity	75% 3 Days Meter off	V~,VDC	1 x intrinsic error
		A~,ADC	
		Ω	
		F	
		Hz	
		°C	
		%	

1) With temperature: Error data apply per 10 K change in temperature.

3) With the exception of sinusoidal waveform.

With frequency: Error data apply to a display from 300 digits onwards.

4) After the "⚡" symbol is displayed.

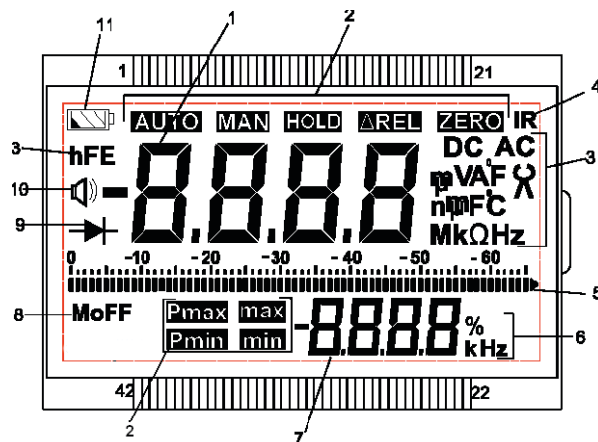
2) With unknown waveform (crest factor CF > 2), measure with manual range selection

Influence Quantity	Range of Influence	Measured Quantity / Measuring Range	Attenuation
Common Mode interference voltage	Noise quantity max. 1000 V dc	VDC	> 100 dB
		V~	> 100 dB
	Noise quantity max. 1000 V ~ 50 Hz, 60 Hz sinusoidal	VDC	>100 dB
		V~	> 50 dB
Normal Mode interference voltage	Noise quantity V ~ Value of the measuring range at a time Max. 1000V~,50Hz, 60Hz Sinusoidal	660mVDC, 6.6VDC, 660VDC, 1000VDC	> 43 dB
		66 VDC	> 35 dB
	Noise quantity max. 1000 V dc	V~	> 45 dB

## Response time (After manual range selection)

Measured Quantity/ Measured range	Response Time		Attenuation
	Of Analog indication	Of digital indication	
VDC ,VAC, °C	0.1S	1.0S	From 0 to 80 % of upper range limit.
A~,ADC	0.1S	1.0S	
660Ω...6.6 MΩ	0.1S	1.0S	
66 MΩ	0.2S	2.0S	From 0 to 50 % of upper range limit.
Diode	0.1S	1.0S	
6.6nF... 66μF	0.7S	Max.1S	
660μF...6.6 mF	1.4S	Max.3S	From 0 to 80 % of upper range limit.
66 mF	7.0S	Max.15S	
660 Hz,6.6KHz	2.0S	Max.2S	
66 KHz,660 Khz,1MHz	0.5S	Max.1S	
% (10 Hz)	0.7S	Max.2.5S	

## Multimeter display



- 1 Digital Main display with decimal point and polarity
- 2 Display for Automatic ,manual range Selection ,HOLD ,Relative ,Zero Peak ,Max ,Min.
- 3 Measurement unit of main display.
- 4 Display for IR mode indication.
- 5 Display for Analog scale.
- 6 Measurement unit of Sub display.
- 7 Digital Sub display with decimal point and polarity
- 8 Display for Auto off indication (After 15 Min meter will turn OFF)
- 9 Diode test Display.
- 10 Continuity test display.  
Speaker symbol appears when acoustic signal is switched on
- 11 Low battery indication.

## Ordering Information

Product Code	GM 47-	XXX	X	X	00000000
Type	Gamma 40	612			
	Gamma 50	613			
	Gamma 60	615			
	Gamma 70	616			
Probe Set	Normal		N		
	Fine Tip		F		
Additional Probe Set	Without Additional Probe Set			0	
	With Additional Probe Set			1	



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