



## 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 $\mu$ V ... 1000V
- Direct and alternating currents from 10 $\mu$ A ... 10.00A
- Resistance from 100m $\Omega$ ... 60.00M $\Omega$
- Capacitance from 1pF ... 40.00 mF with zero correction.
- Frequencies from 10.00Hz ... 10MHz
- 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.
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# 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.

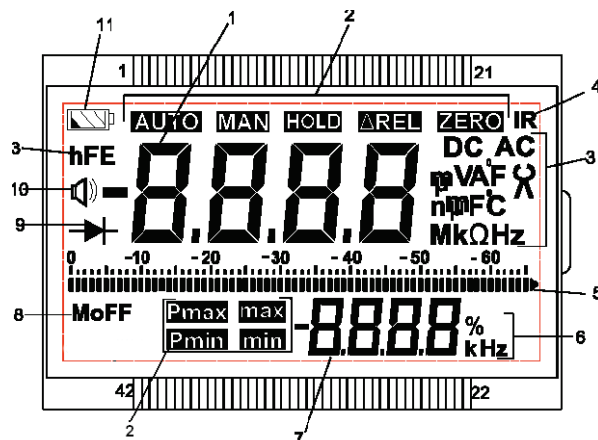
2) With unknown waveform (crest factor CF > 2), measure with manual range selection

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	From 0 to 50 % of upper range limit.
66 MΩ	0.2S	2.0S	
Diode	0.1S	1.0S	From 0 to 80 % of upper range limit.
6.6nF... 66μF	0.7S	Max.1S	
660μF...6.6 mF	1.4S	Max.3S	
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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