



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 μ V ... 1000V
- Direct and alternating currents from 10 μ A ... 10.00A
- Resistance from 100m Ω ... 60.00M Ω
- 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

| | | | |
|--|--|---------------------------------------|--|
| Root mean square value with distorted wave form (for 616 only). | Measuring principal employed permits the measurement of root mean square value (TRMS) of AC quantities regardless of wave form. | Auto Power OFF (APO) | 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. |
| Dual Display | 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. | Hold | By pressing the HOLD/ON key, the currently displayed Measurement value can be held and "HOLD" is simultaneously displayed. |
| Peak Hold | Minimum and maximum Peak values are hold in VAC, mAAC, AAC. | Relative measurement (REL) | 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. |
| MIN/MAX Function | By pressing min/max button instrument will start recording minimum and maximum readings. All functions can measure MIN/MAX except Hz/Duty functions. | Automatic blocking System(ABS) | The automatic terminal blocking system prevents incorrect connection of test lead and incorrect selection of measurement quantity, which provide safety to the user. |
| Temperature measurement | Multimeters measures temperature with "K" type thermocouple (NiCr - Ni) sensor in the range from 0°C to 1300°C. | Auto and Manual ranging modes | 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. |
| Indication of negative values on the analog scale. | 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. | Diode and Continuity testing | 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. |
| Analog Scale | Analog scale that updates at the rate 28 times/sec to observe | Backlit | Large white LED backlit to work in poorly light area. |
| Protection from dust and water | Instrument: IP 52 For terminals: IP20 as per IEC60529. | Continuous ON mode | In this mode, AUTO POWER OFF is disabled. |
| Applicable International Safety standards | 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 | for Gamma 40,50,60, 600 hrs. for VDC, ADC 300 hrs. for VAC, AAC for Gamma 70 400 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 ¹⁾ | | | |
|----------------|-----------------|----|-----|----|------|------------|--|--|--|-------------------|---------|--|
| | | | | | | | | | 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 ²⁾ | | | | |
| | 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 ³⁾ 1 kHz ...10 kHz; ± 5 Digit/kHz ³⁾ | | | | | |
| C/F | 0...1300 °C | • | • | • | • | 1°C | — | 2.0+3 ⁴⁾ | | | | |
| | | • | • | • | • | | | 3.0+300 | - | - | | |

1) At 0°C ... + 40 °C

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

3) For <10 KHz ,Square wave, Bipolar inputs

4) Without sensor

Influence Quantities

| Influence Quantity | Range of Influence | Measured Quantity / Measuring Range | Variation ¹⁾ ± (...% 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 ²⁾ | Crest Factor CF | 1....1.4 | ± 1 % of rdg |
| | | 1.4....5 | ± 5 % of rdg |
| Battery Voltage | ⚡ ⁴⁾ ...< 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.

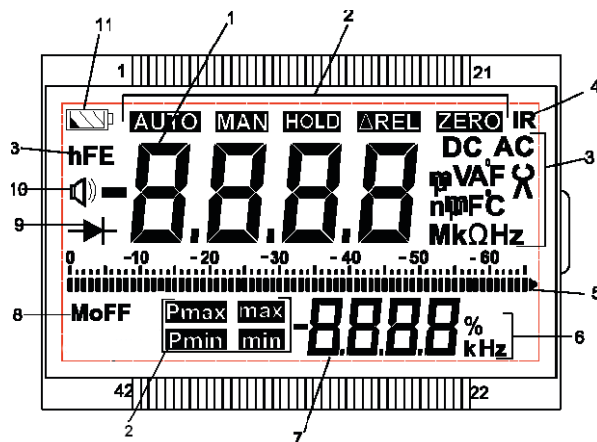
2) With unknown waveform (crest factor CF > 2), measure with manual range selection

| 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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