

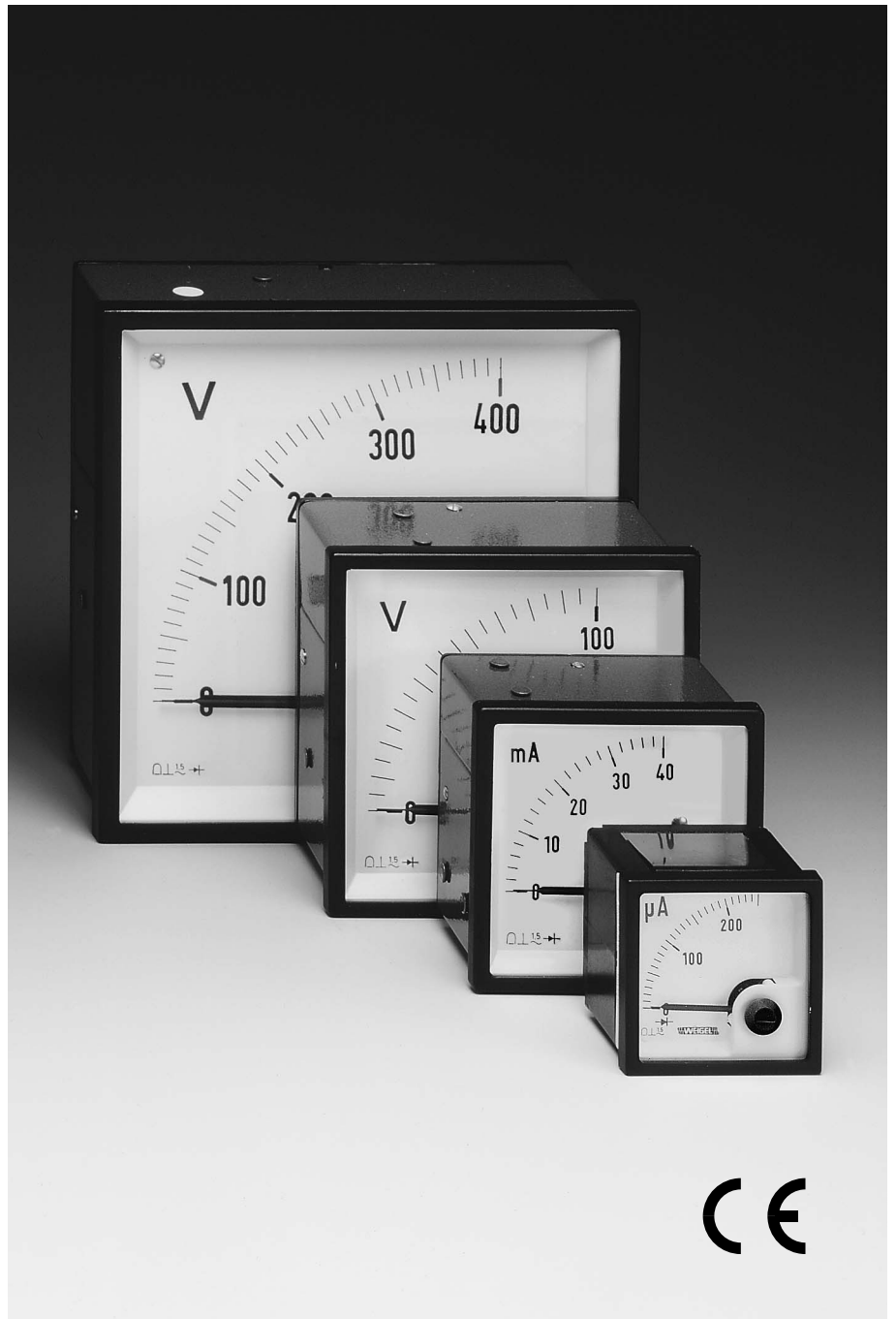


Data Sheet

M Series
015.D.101.09

Analog Meters with Moving-Coil Rectifier Movement 90° Dial

GSQ 48
GQ 72 RS
GQ 96 RS
GQ 144 RS



WEIGEL

Application

The square moving-coil rectifier instruments **GSQ 48** in a housing of moulded thermoplastics with slide-in dial and **GQ 72/96/144 RS** models of the M series in pressed steel cases are used for the measurement of sinusoidal AC currents or voltages.

Moving-coil rectifier instruments measure average values and are scaled to indicate r.m.s., assuming a sinusoidal wave form.

These instruments are suitable to be mounted in switchboards, control panels, machine tool consoles or mosaic grid panels.

Movements

Self-shielding moving-coil movements with core-type magnetic systems, pivots suspended. Series-connected rectifier incorporated. Spring loaded jewel bearings for vibration and shock resistance.

Mechanical Data

| | |
|--------------------|---|
| case details | square case suitable to be mounted in control / switchgear panels, machine tool consoles or mosaic grid panels, stackable |
| material of case | thermoplastics, flame retardant (GSQ 48) pressed steel (GQ 72/96/144 RS) |
| material of window | glass |
| colour of bezel | black (similar to RAL 9005) |
| position of use | vertical $\pm 5^\circ$ |
| panel fixing | plate springs, at top and bottom (GSQ 48) screw clamps (GQ 72/96/144 RS) |
| panel thickness | 1 ... 15 mm |
| mounting | stackable next to each other |

terminals

| | |
|--|--|
| voltmeters and ammeters ≤ 600 mA (GSQ 48) | hexagon studs, M4 screws and wire clamps |
| voltmeters and ammeters ≤ 3 A (GQ 72/96/144 RS) | hexagon studs, M3 screws and wire clamps |
| ammeters > 3 A | hexagon studs, M5 screws and wire clamps |
| voltmeters > 150 V | (GQ 72/96 RS) |
| | connector blades 6.3 x 0.8 for protective wire |
| dimensions (in mm) | GSQ 48 GQ 72 RS GQ 96 RS GQ 144 RS |
| bezel | □ 48 □ 72 □ 96 □ 144 |
| case | □ 45 □ 66.5 □ 90.5 □ 137 |
| depth | 48 57 / 94 [*] 60 60 |
| panel cutout | □ 45.2 ^{+0.3} □ 68.3 ^{+0.4} □ 92 ^{+0.8} □ 138 ⁺¹ |
| weight approx. | 0.1 kg 0.2 kg 0.3 kg 0.6 kg |

^{*}) including built-in miniature current transformer

Electrical Data

| | |
|---|---|
| measuring unit | AC current or voltage |
| frequency range | voltage 40 Hz ... 50 Hz ... 10 kHz current 50 Hz (others on request) |
| overload capacity (acc. to DIN EN 60 051 - 1) | |
| continuously | 1.2 times rated voltage / current |
| 5 s max. | |
| voltmeters | 2 times rated voltage |
| ammeters | 10 times rated current |
| measurement category | CAT III |
| operating voltage | refer to Measuring Ranges |
| pollution level | 2 |
| enclosure code | IP 52 case front side |
| | IP 00 for terminals without protection against accidental contact |
| | IP 20 for terminals protected against accidental contact |

Measuring Ranges

For mains use

| | |
|---|---------------------------|
| AC current | approx. voltage drop |
| 100; 150; 250; 400; 600 μ A | 1.5 V |
| 1; 1.5; 2.5; 4; 6; 10; 15; 25; 40; 60; 100; 150; 250; 400; 600 mA | 1.5 V |
| 1; 1.5; 2.5 A ²⁾ | 0.2 V |
| 4; 6; 10; 15; 25 A ²⁾ | 0.3 V |
| for use on current transformer³⁾ | |
| N/1 A ²⁾ | 0.2 V |
| N/5 A ²⁾ | 0.3 V |
| AC voltage > 5V | sensitivity ¹⁾ |
| 16; 10; 15; 25; 40; 60; 100; 150; 250; 400; 500; 600 V | 900 Ω /V |
| for use on voltage transformer³⁾ | |
| N/100 V; N/110 V | 900 Ω /V |

Not for mains use

| | |
|--|---------------------------|
| AC voltage ≤ 5V | sensitivity ¹⁾ |
| 1.5; 2.5; 4 V | 900 Ω /V |

Operating Voltages

| | | | | |
|---------------------------------|-------------------|----------|----------|------------|
| measuring ranges | operating voltage | | | |
| AC current | GSQ 48 | GQ 72 RS | GQ 96 RS | GQ 144 RS |
| 100; 150; 250; 400; 600 μ A | | | | |
| 1; 1.5; 2.5; 4; 6; 10; | | | | |
| 15; 25; 40; 60; 100; | | | | |
| 150; 250; 400; 600 mA | 300 V | 150 V | 150 V | 150 V |
| 1; 1.5; 2.5; 4; 6; 10; | | | | |
| 15; 25 A; N/1 A; N/5 A | 300 V | 300 V | 300 V | 300 V |
| AC voltage | GSQ 48 | GQ 72 RS | GQ 96 RS | GQ 144 RS |
| 1.5; 2.5; 4; 6; 10; 15; | | | | |
| 25; 40; 60; 100 V | 300 V | 150 V | 150 V | 150 V |
| 150 V | 300 V | 150 V | 150 V | 150 V |
| 250; 400; 500 V | 300 V | 600 V | 600 V | 300 V |
| 600 V | on request | 600 V | 600 V | on request |
| N/100 V | 300 V | 150 V | 150 V | 150 V |
| N/110 V | 300 V | 150 V | 150 V | 150 V |

¹⁾ the resistance values are limited to a tolerance of $\pm 20\%$

²⁾ separate (GSQ 48, GQ 72 RS) resp. built-in (GQ 72/96/144 RS) miniature current transformer 50 Hz, 10 mA sec. included

³⁾ no overload scaling

Scaling

| | |
|-----------------------|--|
| pointer | bar / knife-edge pointer |
| colour of pointer | black |
| pointer deflection | 0 ... 90° |
| colour of dial | white |
| scale characteristics | practically linear for current and voltages > 20 V initial scale slightly compressed for voltages ≤ 20 V |
| scale division | coarse-fine |
| scale length | GSQ 48 GQ 72 RS GQ 96 RS GQ 144 RS |
| | 44 mm 69 mm 94 mm 146 mm |

also refer to "Options"



Analog Meters with Moving-Coil Rectifier Movement 90° Dial

Accuracy at Reference Conditions

accuracy class 1.5 \blacklozenge according to DIN EN 60 051 - 1

reference conditions

ambient temperature 23 °C
position of use nominal position $\pm 1^\circ$
input rated measuring value
frequency 50 \pm 2 Hz
wave form sinusoidal, distortion factor < 5%
others DIN EN 60 051 - 1

influences

ambient temperature 23 °C \pm 2K
position of use nominal position $\pm 5^\circ$
frequency 40 Hz ... 50 Hz ... 10 kHz
stray magnetic field 0.5 mT

Environmental

climatic suitability climatic class 2 \blacklozenge acc. to VDE/VDI 3540, sh. 2
operating temperature range -25 ... +40 °C \blacklozenge
storage temperature range -25 ... +65 °C
relative humidity \leq 75% annual average, non-condensing
shock resistance 15 g, 11 ms \blacklozenge
vibration resistance 2.5 g, 5 ... 55 Hz \blacklozenge

Rules and Standards

DIN 43 718 Measurement and control; front-frames and frontpanels of measurement and control equipment; principal dimensions
DIN 43 802 Line scales and pointers for indicating electrical measuring instruments; general requirements
-2 designs and dimensions
-3 scale graduation and numbering
-4
DIN 16 257 Nominal positions and position symbols used for measuring instruments
DIN EN 60 051 Direct acting indicating analogue electrical measuring instruments and their accessories
-1 Part 1: Definitions and general requirements common to all parts
-2 Part 2: Special requirements for ammeters and voltmeters
-9 Part 9: Recommended test methods
DIN EN 60 529 Enclosure codes by housings (IP-code)
DIN EN 61 010 Safety requirements for electrical measuring, control and laboratory equipment
-1 Part 1: General requirements
-2-030 Part 2-030: Particular requirements for testing and measuring circuits
DIN EN 61 326 - 1 Electrical equipment for measurement, control and laboratory use – EMC requirements
Part 1: General requirements
(IEC 61 000 - 4 - 3 evaluation criterion B)
DIN IEC 61 554 Panel mounted equipment – Electrical measuring instruments – Dimensions for panel mounting
VDE/VDI 3540 sheet 2 reliability of measuring and control equipment (classification of climates)

Options

measuring range

special measuring range deviating from standard
measuring range adjustment adjustment potentiometer installed in voltmeters, adjustment range approx. $\pm 10\%$ or $\pm 20 \dots 50\%$
2nd measuring range with 3rd terminal for voltmeters 2nd figuring and 1 or 2 scale divisions
additional measuring ranges on request
accuracy class 1.0 with fine scale division (as far as possible)
adjustment of internal resistance to $\pm 1\%$ at 23 °C
increased sensitivity to 2 k Ω /V, 5 k Ω /V, 10 k Ω /V or 20 k Ω /V for voltmeters (as far as possible)

case

window non-glaring glass
colour of bezel gray (similar to RAL 7037)
position of use horizontal or to be specified 15...165°
panel fixing (GSQ 48) plate springs on the left and right side

performance

increased mechanical loads shock 30 g, 11 ms
vibration 5 g, 5 ... 55 Hz
climatic suitability limited use in the tropics
climatic class 3 acc. to VDE/VDI 3540, sheet 2
with operating temperature range -10 ... +55 °C
marine application non-certified or type approval by "Germanischer Lloyd" (except GSQ 48)

enclosure code

IP 54 splash-water protected front

accessories

terminal protection against accidental contact full-sized rear cover (not applying to GSQ 48) or protective sleeves
terminals connector blades 6.3 x 0.8

dial

blank dial pencil marked initial and end values
scale division and figuring 0 ... 100%,
linear, full-scale values acc. to standardized series (1 - 1.5 - 2.5 - 4 - 5 - 6 and any decimal multiple of these numbers e.g. 150 m³/h) or deviating from standard series; special calibration from customer's non-linear graph or chart; scaling of voltmeters in ohms; captions optional
2 scale divisions including figuring
coloured scale dial plate black; pointer, DIN scale division and figuring yellow or white (not applying to GSQ 48)
additional lettering to be specified e.g. "generator"
additional figuring to be specified
coloured marks red, green or blue for important scale values
coloured sector red, green or blue within scale division
logo on the dial none or to be specified
zero position mechanically suppressed zero, no zero adjustment, max. 40% of full-scale value or electrically suppressed zero for voltmeters ≥ 6 V

expanded scale initial scale expanded up to approx. 5% of full-scale value in centre-scale electronic based

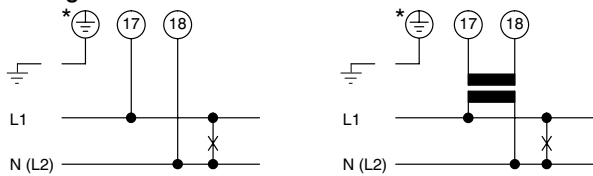
to approx. 40%, 30% or 20% of full-scale value in centre scale magnetic based (not applying to GSQ 48)

dial illumination pluggable, dial translucent
 for GQ 72/96 RS 1 lamp 6 V, 12 V or 24 V
 for GQ 144 RS 2 lamps 6 V, 12 V or 24 V
 for GQ 72/96 RS 1 LED 24 V DC / 0.4 W
 for GQ 144 RS 2 LEDs 24 V DC / 0.4 W

special dial illumination with light-carrier dial and dial mask, black dial plate; scale division, pointer and figuring yellow or white; illumination white or red, supply voltage 6 V, 12 V or 24 V

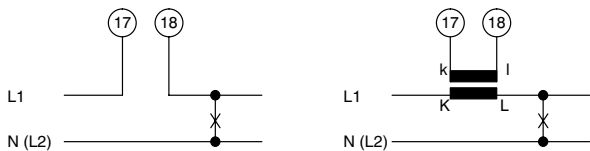
Connections

AC voltage

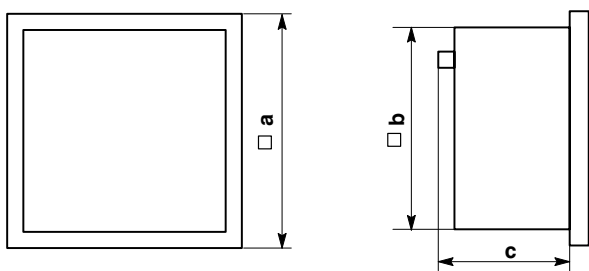


* GQ 72/96 RS voltmeters >150 V

AC current



Dimensions



| dimensions (in mm) | GSQ 48 | GQ 72 RS | GQ 96 RS | GQ 144 RS |
|--------------------|--------|-----------|----------|-----------|
| a | 48 | 72 | 96 | 144 |
| b | 45 | 66 | 90 | 137 |
| c | 48 | 57 / 94*) | 60 | 60 |

*) including built-in miniature current transformer

Ordering Information

| | |
|---|---|
| type (GSQ)GQ | moving-coil rectifier instrument for AC voltage or current |
| front dimensions 48 72 RS 96 RS 144 RS | 48 mm x 48 mm 72 mm x 72 mm 96 mm x 96 mm 144 mm x 144 mm |
| measuring ranges | refer to preceding table |
| sp. measuring range | on special order ²⁾ |
| measuring range adjustment (voltmeters) | none ¹⁾ adjustment range $\pm 10\%$ approx. adjustment range $\pm 20 \dots 50\%$ approx. |
| 2nd measuring range (voltmeters) | none ¹⁾ 1 scale division, 2 nd figuring 2 scale divisions, 2 figurings ³⁾ |
| accuracy class | 1.5 ¹⁾ 1.0 with fine scale division |
| adjustments | internal resistance $\pm 20\%$ ¹⁾ internal resistance to $\pm 1\%$ at 23°C |
| sensitivity (voltmeters) | 900 Ω/V ¹⁾ increased to 2 k Ω/V increased to 5 k Ω/V increased to 10 k Ω/V increased to 20 k Ω/V as far as possible |
| window | glass ¹⁾ non-glaring glass |
| colour of bezel | black (similar to RAL 9005) ¹⁾ gray (similar to RAL 7037) |
| position of use | vertical ¹⁾ to special order 15 ... 165° ²⁾ |
| panel fixing (GSQ 48) | plate springs, top and bottom ¹⁾ plate springs, left and right side |
| mechanical loads | shock 15 g, vibration 2.5 g ¹⁾ shock 30 g, vibration 5 g |
| climatic suitability | class 2, -25 ... +40°C ¹⁾ class 3, -10 ... +55°C |
| marine application | none ¹⁾ non-certified type approval by "Germanischer Lloyd" ³⁾ |
| enclosure code | IP 52 ¹⁾ IP 54 splash-water protected front |
| terminal safety protection | none ¹⁾ full-sized rear cover ³⁾ protective sleeves |
| terminals | screws and wire clamps ¹⁾ connector blades 6.3 x 0.8 |

| | |
|-------------------------------|--|
| dial | scale division & measuring range alike resp. standard series for use on transformers ¹⁾ blank dial scale division and figuring 0 ... 100% linear acc. to standardized series linear deviating from standard ²⁾ calibration fr. non-linear graph or chart ²⁾ scaling in ohms for voltmeters ²⁾ 2 scale divisions ²⁾ black dial, yellow scale division ³⁾ black dial, white scale division ³⁾ additional lettering to be specified ²⁾ additional figuring to be specified ²⁾ coloured marks red, green or blue ²⁾ coloured sector red, green or blue ²⁾ |
| logo | WEIGEL ¹⁾ none OEM logo ²⁾ |
| zero position | left-hand zero ¹⁾ mechanically suppressed zero ²⁾ electrically suppressed zero ²⁾ |
| expanded initial scale | none ¹⁾ up to 5% full-scale value, electronically up to approx. 20%, 30%, 40% magnetically ³⁾ |
| dial illumination | none ¹⁾ for GQ 72/96 RS for GQ 144 RS for GQ 72/96 RS for GQ 144 RS |
| sp. dial illumination | with light-carrier dial 6, 12 or 24 V |

¹⁾ Standard

²⁾ Please clearly add the desired specifications.

³⁾ GQ 72/96/144 RS only

ordering example

GQ 144 RS, measuring range 0 ... 1 A, dial 0 ... 10 kA,
window non-glaring glass, gray bezel, WEIGEL logo

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– specifications subject to change without notice; date of issue 12/15 –

