

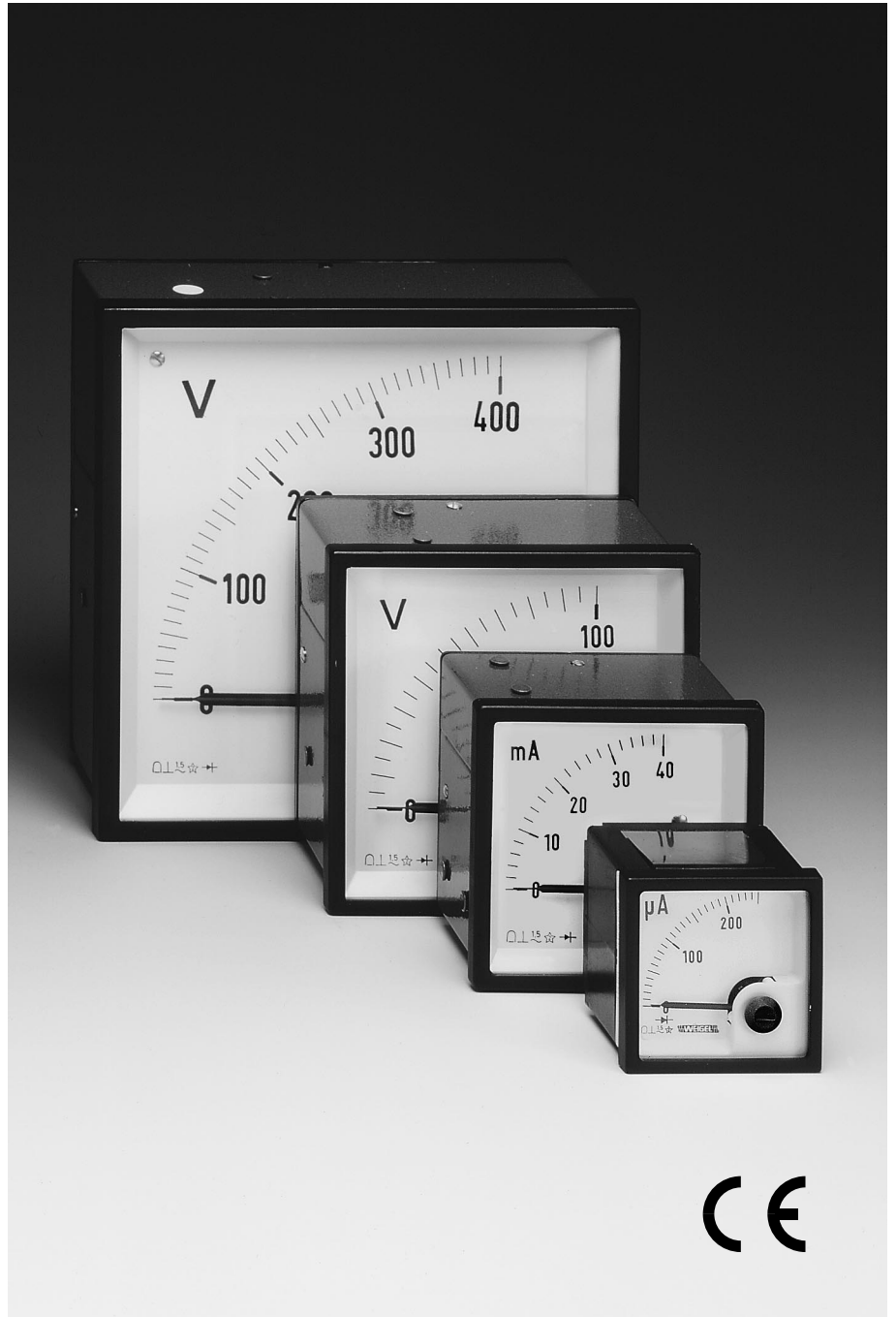


Data Sheet

M – Series
015.D.101.02

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, pivot 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 |

| 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) | |
| continuously | 1.2 times rated voltage / current |
| 5 s max. | |
| voltmeters | 2 times rated voltage |
| ammeters | 10 times rated current |
| protection class | I |
| enclosure code | IP 52 case |
| | IP 00 for terminals without protection against accidental contact |
| | IP 20 for terminals protected against accidental contact |
| insulation class | group A according to VDE 0110 |
| rated insulation voltage | 660 V |
| dielectric test | 2 kV based on 50 Hz, 1 min acc. to DIN 57 410 |

Measuring Ranges

| AC current | voltage drop approx. | AC voltage | sensitivity [*]) |
|--|----------------------|--|----------------------------|
| 100 μ A | 1.5 V | 1.5 V | 900 Ω/V |
| 150 μ A | 1.5 V | 2.5 V | 900 Ω/V |
| 250 μ A | 1.5 V | 4 V | 900 Ω/V |
| 400 μ A | 1.5 V | 6 V | 900 Ω/V |
| 600 μ A | 1.5 V | 10 V | 900 Ω/V |
| 1 mA | 1.5 V | 15 V | 900 Ω/V |
| 1.5 mA | 1.5 V | 25 V | 900 Ω/V |
| 2.5 mA | 1.5 V | 40 V | 900 Ω/V |
| 4 mA | 1.5 V | 60 V | 900 Ω/V |
| 6 mA | 1.5 V | 100 V | 900 Ω/V |
| 10 mA | 1.5 V | 150 V | 900 Ω/V |
| 15 mA | 1.5 V | 250 V | 900 Ω/V |
| 25 mA | 1.5 V | 400 V | 900 Ω/V |
| 40 mA | 1.5 V | 500 V | 900 Ω/V |
| 60 mA | 1.5 V | 600 V | 900 Ω/V |
| 100 mA | 1.5 V | | |
| 150 mA | 1.5 V | | |
| 250 mA | 1.5 V | | |
| 400 mA | 1.5 V | | |
| 600 mA | 1.5 V | | |
| 1 A ^{**)} | 0.2 V | | |
| 1.5 A ^{**)} | 0.2 V | | |
| 2.5 A ^{**)} | 0.2 V | | |
| 4 A ^{**)} | 0.3 V | | |
| 6 A ^{**)} | 0.3 V | | |
| 10 A ^{**)} | 0.3 V | | |
| 15 A ^{**)} | 0.3 V | | |
| 25 A ^{**)} | 0.3 V | | |
| for use on current transformer^{***)} | | for use on voltage transformer^{***)} | |
| N/1 A ^{**)} | 0.2 V | 100 V sec. | 900 Ω/V |
| N/5 A ^{**)} | 0.3 V | 110 V sec. | 900 Ω/V |

^{*}) the resistance values are limited to a tolerance of $\pm 20\%$

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

^{***)} 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 |

Accuracy at Reference Conditions

| | |
|-----------------------------|---------------------------------------|
| accuracy class | 1.5 according to DIN EN 60 051 |
| reference conditions | |
| ambient temperature | 23°C \pm 1K |
| 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 |

also refer to "Options"



Analog Meters with Moving–Coil Rectifier Movement 90° – Dial

influences

| | |
|----------------------|----------------------------|
| ambient temperature | –25°C ... +23°C ... +40°C |
| position of use | nominal position ±5° |
| frequency | 40 Hz ... 50 Hz ... 10 kHz |
| stray magnetic field | 0.5 mT |

Environmental

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

Rules and Standards

| | |
|-----------------------|--|
| DIN 43 700 | measuring and control instruments for panel mounting; nominal case and cutout dimensions |
| DIN 43 701 | electrical switchboard instruments |
| DIN 43 718 | bezels and front panels |
| DIN 43 802 | scales and pointers for electrical measuring instruments |
| DIN 16 257 | nominal position of use and position symbols applicable for measuring instruments |
| DIN 57 410 / VDE 0410 | safety requirements for electrically operated measuring, control and laboratory equipment |
| DIN EN 60 051 | direct acting indicating electrical measuring instruments and their accessories |
| DIN VDE 01 10 | dimensioning of clearances and creepage distances |
| DIN VDE 04 11 | protective measures for electronically operated measuring equipment |
| DIN 40 050 | enclosure codes; protection of electrical equipment against ingress of solid foreign bodies and of water |
| 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. ±10% or ±20 ... 50% |
| 2 nd measuring range | with 3 rd terminal for voltmeters 2 nd figuring and 1 or 2 scale divisions on request |
| additional measuring ranges | |
| accuracy class | 1.0 with fine scale division (as far as possible) |
| adjustment of internal resistance | to ± 1% at 23°C |
| increased sensitivity | to 2 kΩ/V, 5 kΩ/V, 10 kΩ/V or 20 kΩ/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 according to VDE/VDI 3540 –10 ... +55°C |
| with operating temperature range | non–certified |
| marine application | |
| enclosure code | IP 54 splash–water protected front |
| dielectric test | 3 kV based on 50 Hz, 1 min acc. to DIN 57 410 |

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 |

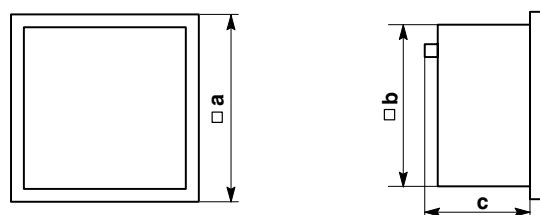
dial

| | |
|-----------------------------|---|
| 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 m ³ /h) or deviating from standard series; special calibration from customer's non–linear graph or chart; scaling of voltmeters in ohms; captions optional including figuring |
| 2 scale divisions | dial plate black; pointer, DIN scale division and figuring yellow or white (not applying to GSQ 48) |
| coloured scale | to be specified e.g. "generator" |
| additional lettering | to be specified |
| additional figuring | red, green or blue for important scale values |
| coloured marks | red, green or blue within scale division |
| coloured sector | none or to be specified |
| logo on the dial | mechanically suppressed zero, no zero adjustment, max. 40% of full–scale value or electrically suppressed zero for voltmeters ≥ 6 V |
| zero position | initial scale expanded up to approx. 5% of full–scale value in centre–scale electronic based |
| expanded scale | to approx. 40%, 30% or 20% of full–scale value in centre scale magnetic based (not applying to GSQ 48) |

dial illumination by one (GQ 72/96 RS) resp. two lamps (GQ 144 RS) 6 V, 12 V or 24 V rear mounted, dial translucent

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

Dimensions

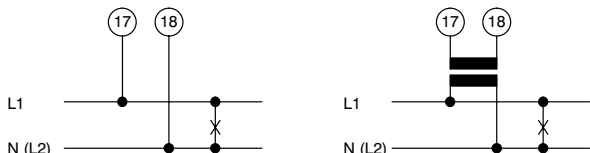


| dimensions (in mm) | GSQ48 | GQ72RS | GQ96RS | GQ144RS |
|--------------------|-------|-----------|--------|---------|
| a | 48 | 72 | 96 | 144 |
| b | 45 | 66 | 90 | 137 |
| c | 48 | 57 / 94*) | 60*) | 60*) |

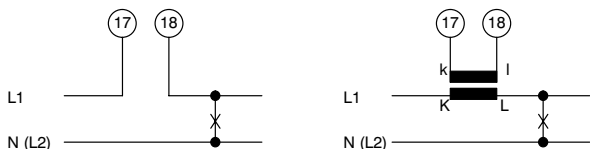
*) including built-in miniature current transformer

Connections

AC voltage



AC current



Ordering Information

| | |
|--|--|
| type (GSQ)GQ | moving-coil rectifier instrument for AC voltage or current |
| front dimensions | |
| 48 | 48 mm x 48 mm |
| 72 RS | 72 mm x 72 mm |
| 96 RS | 96 mm x 96 mm |
| 144 RS | 144 mm x 144 mm |
| measuring ranges | refer to preceding table |
| sp. measuring range | on special order **) |
| measuring range adjustment (voltmeters) | none *) adjustment range $\pm 10\%$ approx. adjustment range $\pm 20 \dots 50\%$ approx. |
| 2nd measuring range (voltmeters) | none *) 1 scale division, 2 nd figuring 2 scale divisions, 2 figurings ***) |
| accuracy class | 1.5 *) 1.0 with fine scale division |
| adjustments | internal resistance $\pm 20\%$ *) internal resistance to $\pm 1\%$ at 23°C |
| sensitivity (voltmeters) | 900 Ω/V *) 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 *) non-glaring glass |
| colour of bezel | black (similar to RAL 9005) *) gray (similar to RAL 7037) |
| position of use | vertical *) to special order 15 ... 165° **) |
| panel fixing (GSQ 48) | plate springs, top and bottom *) plate springs, left and right side |
| mechanical loads | shock 15 g, vibration 2.5 g *) shock 30 g, vibration 5 g |

| | |
|-----------------------------------|--|
| climatic suitability | class 2, -25 ... +40°C *) class 3, -10 ... +55°C |
| marine application | none *) non-certified |
| enclosure code | IP 52 *) IP 54 splash-water protected front |
| dielectric test | 2 kV *) 3 kV |
| terminal safety protection | none *) full-sized rear cover ***) protective sleeves |
| terminals | screws and wire clamps *) connector blades 6.3 x 0.8 |
| dial | scale division & measuring range alike resp. standard series for use on transformers *) blank dial scale division and figuring 0 ... 100% linear acc. to standardized series linear deviating from standard **) calibration fr. non-linear graph or chart **) scaling in ohms for voltmeters **) 2 scale divisions **) black dial, yellow scale division ***) black dial, white scale division ***) additional lettering to be specified **) additional figuring to be specified **) coloured marks red, green or blue **) coloured sector red, green or blue ***) |
| logo | WEIGEL *) none OEM logo **) |
| zero position | left-hand zero *) mechanically suppressed zero **) electrically suppressed zero **) |
| expanded initial scale | none *) up to 5% full-scale value, electronically up to approx. 20%, 30% or 40%, magnetically ***) |
| dial illumination | none *) with 1 lamp 6 V, 12 V or 24 V (models GQ 72/96 RS only) with 2 lamps 6 V, 12 V or 24 V (model GQ 144 RS only) |
| sp. dial illumination | with light-carrier dial 6, 12 or 24 V |

*) standard

**) Please clearly add the desired specifications.

***) 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

- specifications subject to change without notice; date of issue 02/99 -

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