

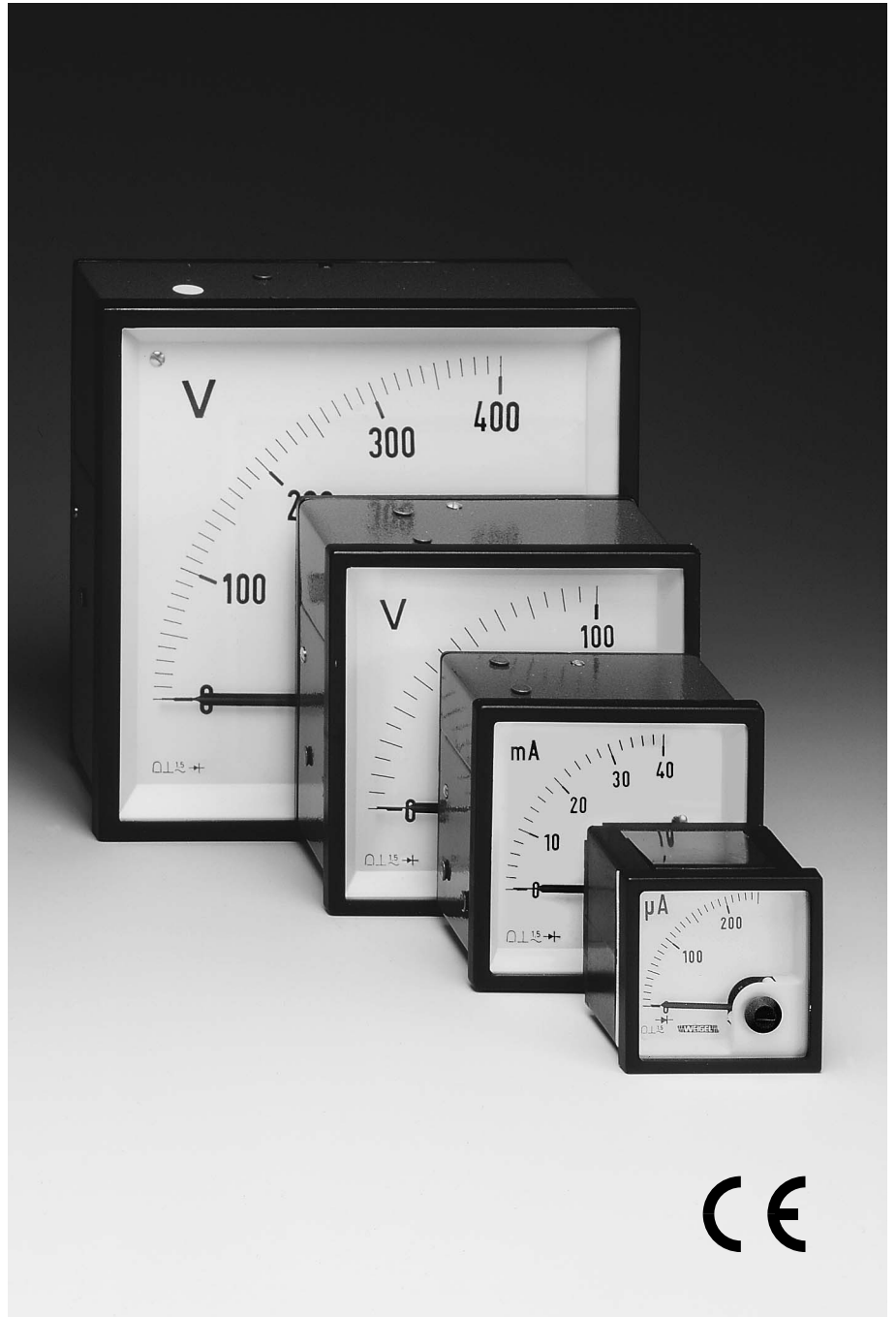


Data Sheet

M Series
015.D.101.06

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 > 5 V	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 ≤ 5 V	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	100 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	100 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	100 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

Accuracy at Reference Conditions

accuracy class 1.5 according to DIN EN 60 051 - 1

also refer to "Options"



Analog Meters with Moving-Coil Rectifier Movement 90° Dial

reference conditions

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

influences

ambient temperature	23 °C±2K
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 ▶ acc. to VDE/VDI 3540, sh. 2
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 43 718	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
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 - 1	Safety requirements for electrical measuring, control and laboratory equipment Part 1: General requirements
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. ±10% or ±20 ... 50%

2 nd measuring range	with 3 rd terminal for voltmeters 2 nd 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 ±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 acc. to VDE/VDI 3540, sheet 2
with operating temperature range	-10 ... +55 °C
marine application	non-certified
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

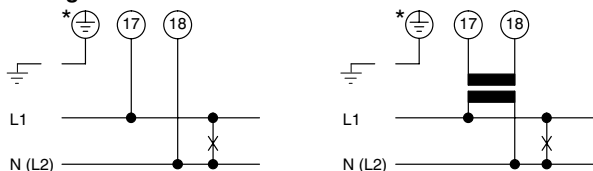
blank dial	pencil marked initial and end values
scale division and figuring	0 ... 100%, linear, full-scale values acc. to standardized series (1 – 1.5 – 2.5 – 4 – 5 – 6 and any decimal multiple of these numbers e.g. 150 m ³ /h) or deviating from standard series; special calibration from customer's non-linear graph or chart; scaling of voltmeters in ohms; captions optional
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 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

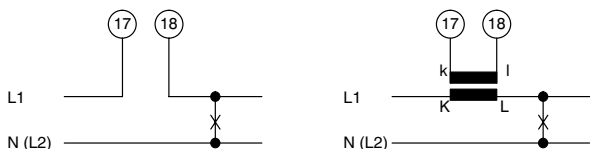
Connections

AC voltage

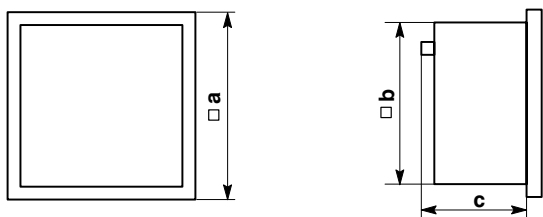


* GQ 72/96 RS voltmeters >150 V

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 ¹⁾	60	60

¹⁾ including built-in miniature current transformer

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 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
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⁾ 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

¹⁾ Standard

³⁾ GQ 72/96/144 RS only

²⁾ Please clearly add the desired specifications.

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– specifications subject to change without notice; date of issue 04/11 –

