

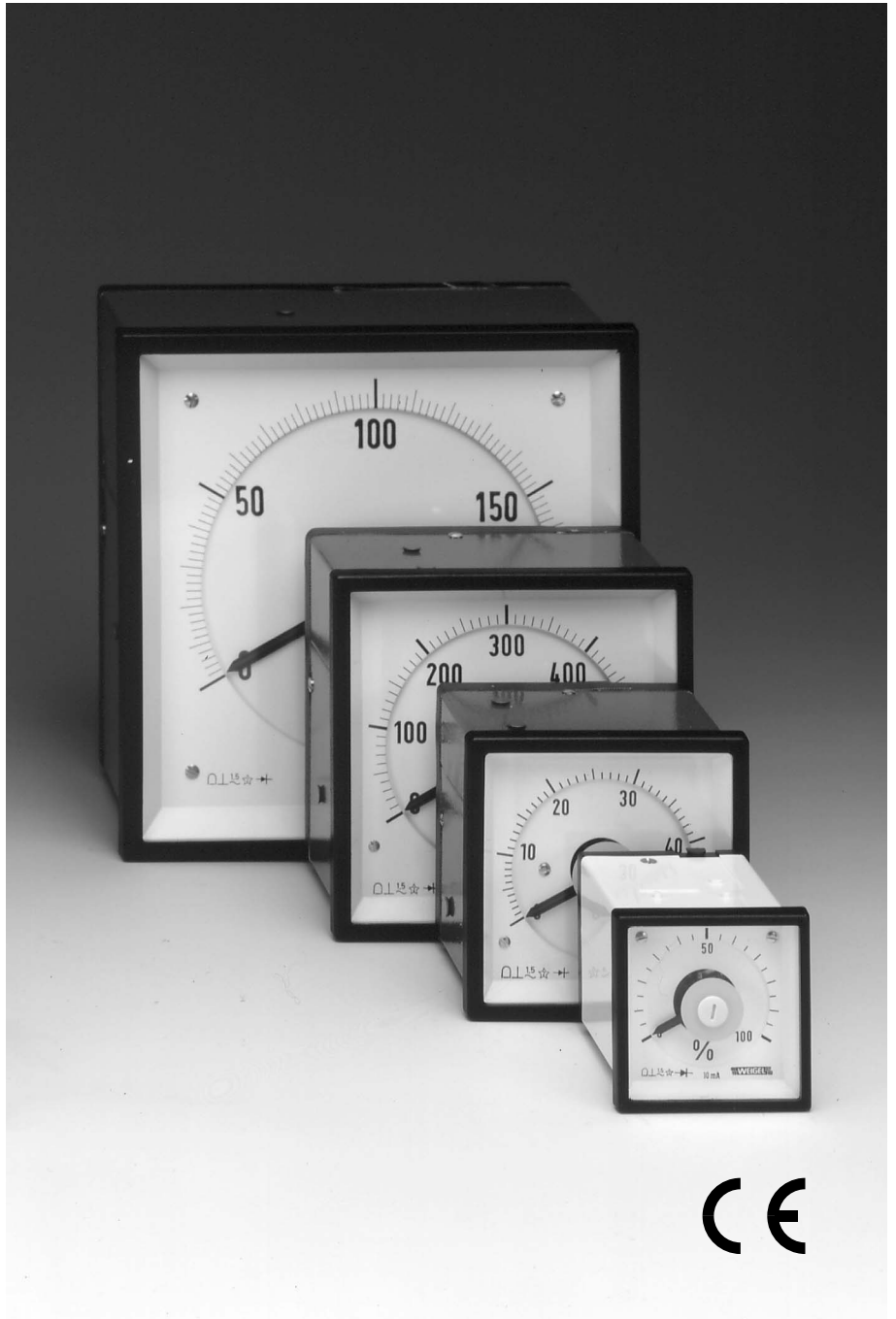


Data Sheet

M - Series
016.D.101.03

Analog Meters with Moving-Coil Rectifier Movement 240° -Dial

LSG 48
LSG 72
LSG 96
LSG144



WEIGEL

Application

The 240° moving-coil rectifier instruments **LSG 48/72/96/144** (M-series) are used for the measurement of sinusoidal AC currents and 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 and mosaic panels.

Movements

Moving-coil movements with swivel coil, pivot suspended.
Spring loaded jewel bearings for vibration and shock resistance.
Series-connected rectifier incorporated.

Mechanical Data

case details	square case suitable to be mounted in control / switchgear panels, machine tool consoles or mosaic panels, stackable			
material of case	pressed steel (LSG 72/96/144) thermoplastics, flame retardant (LSG 48)			
material of window	glass			
colour of bezel	black (similar to RAL 9005)			
position of use	vertical $\pm 5^\circ$			
panel fixing	screw clamps			
mounting	stackable next to each other			
panel thickness	1 ... 15 mm			
terminals				
voltmeters and ammeters ≤ 3 A	hexagon studs, M3 screws and wire clamps C6			
ammeters > 3 A	hexagon studs, M5 screws and wire clamps C10			
ammeters > 30 A	hexagon studs, M6 screws and wire clamps C10			
dimensions (in mm)	LSG 48	LSG 72	LSG 96	LSG 144
bezel	□ 48	□ 72	□ 96	□ 144
case	□ 45	□ 66	□ 90	□ 137
depth	≤ 66	≤ 60	≤ 69	≤ 70 ≤ 94 including built-in miniature current transformer
panel cutout	□45.2 ^{+0.6}	□68.3 ^{+0.4}	□92 ^{+0.8}	□138 ⁺¹
weight approx.	0.2 kg	0.3 kg	0.4 kg	0.9 kg

Electrical Data

measuring unit	AC voltage or current
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.	2 times rated voltage, 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
		(the resistance values are limited to a tolerance of $\pm 20\%$)	
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

*) LSG 72/96/144 only

**) separate (LSG 48/72) resp. built-in (LSG 96/144)

miniature current transformer 50 Hz, 10 mA sec. included

***) also with overload scaling 2 times rated current (LSG 72)

also with overload scaling 2 ... 5 times rated current (LSG 96/144)

Scaling

dial	flat dial
pointer	bold bar pointer
pointer deflection	0 ... 240°
scale characteristics	linear
scale division	coarse-fine
scale length	LSG 48 LSG 72 LSG 96 LSG 144
	69 mm 106 mm 147 mm 224 mm

for other ratings refer to "Options"



Analog Meters with Moving-Coil Rectifier Movement 240°-Dial

Accuracy at Reference Conditions

accuracy class 1.5 according to DIN EN 60 051 ▶

reference conditions

ambient temperature 23°C ± 1K
 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

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 0110 dimensioning of clearances and creepage distances
 DIN VDE 0411 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%, ammeters on request

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 resistance to ± 1% at 23°C
 increased sensitivity to 2 kΩ/V, 5 kΩ/V or 10 kΩ/V for voltmeters

case

window non-glaring glass
 colour of bezel gray (similar to RAL 7037)
 position of use on request 15° ... 165°

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
 with operating temperature range -10 ... +55°C
 marine application non-certified
 enclosure code IP 54 splash-water protected front
 dielectric test 3 kV based on 50 Hz, 1 min acc. to DIN 57 410
 terminal protection against accidental contact full-sized rear cover or protective sleeves SW6 / SW10
 terminals connector blades 6.3 x 0.8
 pointer bar / knife-edge pointer (in combination with fine scale division or flat dial)

dial

blank dial pencil-marked on initial and end values
 scale division 0 ... 100%,
 and figuring linear, full-scale values acc. to standardized series (1 – 1.2 – 1.5 – 2 – 2.5 – 3 – 4 – 5 – 6 – 7.5 and their decimal multiples e.g. 150 m³/h) or deviating from standard; special calibration from customer's non-linear graph or chart; scaling of voltmeters in ohms; captions on request

platform dial

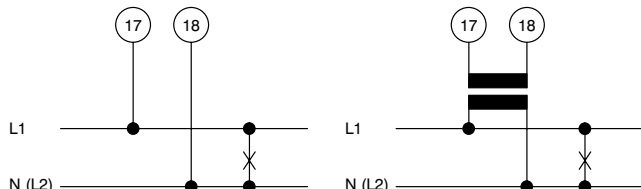
2 scale divisions including figuring (for flat dial only)
 dial black enamelled, scale division acc. to DIN, black on yellow or white ring, pointer and figuring yellow or white, non-glaring glass included
 additional lettering on request e.g. "generator"
 additional figuring on request
 coloured marks red, green or blue for important scale values
 coloured sector red, green or blue within scale division
 logo on the dial none or on request
 expanded scale for LSG 72/96/144 expanded initial scale division by means of electronic circuits up to approx. 5% of full-scale value in centre of scale

dial illumination by 2 lamps 6 V, 12 V or 24 V
 dial resp. sectors translucent, non-glaring glass included (LSG 96/144 with flat dial only)

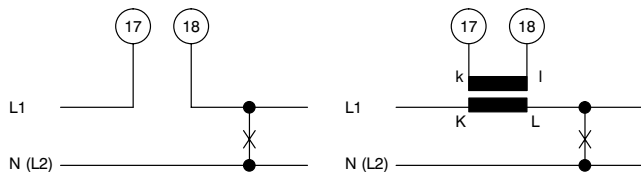
special dial illumination with light-carrier dial and dial-mask, dial black enamelled, scale division, figuring and pointer yellow or white, illumination white or red, power supply 6 V, 12 V or 24 V

Connections

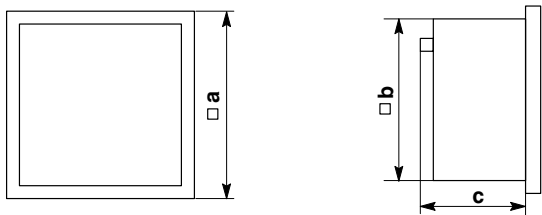
AC voltage



AC current



Dimensions



dimensions (in mm)	LSG 48	LSG 72	LSG 96	LSG 144
a	48	72	96	144
b	45	66	90	137
c	≤ 66	≤ 60	≤ 69	≤ 70
		≤ 94 including built-in miniature current transformer		

Ordering Information

type LSG	240° moving-coil rectifier meter
front dimensions 48 72 96 144	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
special measuring range	on request **)
measuring range adjustment	none *) voltage ±10% voltage ±20 ... 50% current on request
2 nd measuring range	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 ±20% *) internal resistance ±1% at 23°C
sensitivity (voltmeters)	900 Ω/V *) increased to 2 kΩ/V increased to 5 kΩ/V increased to 10 kΩ/V
window	glass *) non-glaring glass
colour of bezel	black (similar to RAL 9005) *) gray (similar to RAL 7037)
position of use	vertical *) on request 15 ... 165° **)
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 protection	none *) full-sized rear cover protective sleeves SW6 / SW10
terminals	screws and wire clamps *) connector blades 6.3 x 0.8
pointer	bold bar pointer *) bar / knife-edge pointer
dial	flat dial with scale div. & meas. range alike *) platform dial 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 **) flat dial 2 scale divisions with flat dial **) black dial, yellow ring black dial, white ring additional lettering on request **) additional figuring on request **) coloured marks red, green or blue **) coloured sector red, green or blue **)
logo	WEIGEL *) none OEM logo **)
expanded scale	none *) electr. up to approx. 5% full-scale value ***)
dial illumination	none *) with 2 lamps 6 V, 12 V or 24 V with light-carrier dial 6 V, 12 V or 24 V

*) standard

**) Please clearly add the desired specifications.

***) LSG 72/96/144 only

ordering example

LSG 72, measuring range 0 ... 250 V, dial 0 ... 250 V,
window non-glaring glass, WEIGEL logo

– specifications subject to change without notice; date of issue 09/04 –

WEIGEL – MESSGERÄTE GmbH

P.O.B. 720 154 • D-90241 Nürnberg • Telephone: 0911/42347-0
Erlenstraße 14 • D-90441 Nürnberg • Fax: 0911/42347-39
Internet: <http://www.weigel-messgeraete.de>
e-mail: webmaster@weigel-messgeraete.de

