



# Data Sheet

K Series  
411.D.101.08

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

LSP 72 K  
LSP 96 K  
LSG 72 K  
LSG 96 K

with Slide-In-Dial



**WEIGEL**

## Application

The 240° moving-coil panel meters **LSP 72/96 K** (K series) are used for measuring DC currents or DC voltages; the moving-coil rectifier meters **LSG 72/96 K** measure sinusoidal AC currents or AC voltages.

The instruments cases are injection moulded in flame retardant thermoplastic. The meters are suitable to be mounted in switchboards, control panels, machinery and/or mosaic grid panels.

The bezel, glass window, and dial can easily be exchanged on-site.

## Movements

Moving-coil movement with a swivel coil system; dual spring loaded jewel bearings for vibration and shock resistance.

The models LSG 72/96 K are AC rectified.

## 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	polycarbonate thermoplastics, self-extinguishing, non-dripping with UL rating of 94 V-0	
material of window	glass	
colour of bezel	black (similar to RAL 9005)	
position of use	vertical ±5°	
panel fixing	screw clamps	
mounting	stackable next to each other	
panel thickness	≤ 40 mm	
terminals	hexagon studs with M3 (LSP/G 72 K) or M4 (LSG/G 96 K) screws and wire clamps E3	
<b>dimensions</b>	<b>LSP/G 72 K</b>	<b>LSG/G 96 K</b>
bezel	□ 72 mm	□ 96 mm
case	□ 66 mm	□ 90 mm
depth	53 mm	53 mm / 104 mm <sup>5)</sup>
panel cutout	□ 68 <sup>+0.7</sup> mm	□ 92 <sup>+0.8</sup> mm
weight approx.	0.25 kg	0.3 kg

## Electrical Data

measuring unit	LSP	DC current or DC voltage
	LSG	AC current or AC voltage
frequency range	LSG	voltage 40 Hz ... 50 Hz ... 10 kHz current 50 Hz (others on request)
overload capacity (acc. continuously)	to DIN EN 60 051 - 1) 1.2 times rated voltage / current	
5 s max. voltmeters	2 times rated voltage	
5 s max. 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	

also refer to "Options"

<sup>1)</sup> the resistance values are limited to a tolerance of ±20%

<sup>2)</sup> not for LSP 72 K    <sup>3)</sup> not for LSG 72 K

<sup>4)</sup> LSG 72 K with separate miniature CT 50 Hz, 10 mA sec. included

<sup>5)</sup> LSG 96 K with attached miniature CT 50 Hz, 10 mA sec. included

## Measuring Ranges

### For mains use

Current ▶	internal resistance <sup>1)</sup> / voltage drop approx.		Voltage >5V ▶	sensitivity <sup>1)</sup>	
	LSP	LSG		LSP	LSG
100 µA	6500 Ω	1.5 V	6 V	1 kΩ/V	900 Ω/V
150 µA	4900 Ω	1.5 V	10 V	1 kΩ/V	900 Ω/V
250 µA	2500 Ω	1.5 V	15 V	1 kΩ/V	900 Ω/V
400 µA	2500 Ω	1.5 V	25 V	1 kΩ/V	900 Ω/V
600 µA	1700 Ω	1.5 V	40 V	1 kΩ/V	900 Ω/V
1 mA	270 Ω	1.5 V	60 V	1 kΩ/V	900 Ω/V
1.5 mA	225 Ω	1.5 V	100 V	1 kΩ/V	900 Ω/V
2.5 mA	135 Ω	1.5 V	150 V	1 kΩ/V	900 Ω/V
4 mA	85 Ω	1.5 V	250 V	1 kΩ/V	900 Ω/V
5 mA	12 Ω	1.5 V	400 V <sup>2)</sup>	1 kΩ/V	900 Ω/V
6 mA	60 mV	1.5 V	500 V <sup>2)</sup>	1 kΩ/V	900 Ω/V
10 mA	60 mV	1.5 V	600 V <sup>2)3)</sup>	1 kΩ/V	900 Ω/V
15 mA	60 mV	1.5 V			
20 mA	60 mV	1.5 V			
25 mA	60 mV	1.5 V			
40 mA	60 mV	1.5 V			
60 mA	60 mV	1.5 V			
100 mA	60 mV	1.5 V			
150 mA	60 mV	1.5 V			
250 mA	60 mV	1.5 V			
400 mA	60 mV	1.5 V			
600 mA	60 mV	1.5 V			
1 A <sup>4)5)</sup>	60 mV	0.2 V			
1.5 A <sup>4)5)</sup>	60 mV	0.2 V			
2.5 A <sup>4)5)</sup>	60 mV	0.2 V			
4 A <sup>4)5)</sup>	60 mV	0.3 V			
5 A <sup>4)5)</sup>	–	0.3 V			
<b>LSG for use on transformer</b>					
N/1 A <sup>4)5)</sup>	–	0.2 V	sec. 100 V	–	900 Ω/V
N/5 A <sup>4)5)</sup>	–	0.3 V	sec. 110 V	–	900 Ω/V

(scaling without overload range) ▶

### LSP for use with external shunt

60 mV; 150 mV    sensitivity 200 Ω/V<sup>1)</sup>  
a total lead resistance of 0.050 Ω is considered in the calibration of the indicator for interconnecting leads 1 m, 2x 0.75 mm<sup>2</sup> ▶

### Not for mains use

Voltage ≤5V ▶	sensitivity <sup>1)</sup>	LSP	LSG
60 mV; 100 mV; 150 mV; 250 mV	200 Ω/V	–	–
400 mV; 600 mV; 1 V	1 kΩ/V	–	–
1.5 V; 2.5 V; 4 V	1 kΩ/V	900 Ω/V	–

### LSP for use on transducer ("live zero")

4 ... 20 mA	mechanically suppressed zero, without zero adjustment, voltage drop approx. 60 mV
0/4 ... 20 mA	electrically suppressed zero, with zero adjustment, voltage drop approx. 900 mV

## Operating Voltages

measuring ranges	operating voltage			
current	150 V (LSP/LSG 72/96 K)			
voltage	LSP 72 K	LSP 96 K	LSG 72 K	LSG 96 K
60; 100; 150; 250; 400; 600 mV; 1 V	150 V	150 V	–	–
1.5; 2.5; 4; 6; 10; 15; 25; 40; 60; 100 V	150 V	150 V	150 V	150 V
150 V	150 V	150 V	150 V	150 V
250 V	300 V	600 V	300 V	600 V
400; 500 V <sup>2)</sup>	–	600 V	300 V	600 V
600 V <sup>2)3)</sup>	–	600 V	–	600 V



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

### Scaling

scale	flat dial	
pointer	bar / knife-edge pointer	
colour of pointer	black ▶	
pointer deflection	0 ... 240°	
colour of dial	white ▶	
scale characteristics	linear	
scale division	coarse-fine	
scale length	LSP/G 72 K 106 mm	LSP/G 96 K 142 mm

### Accuracy at Reference Conditions

accuracy class 1.5 ▶ according to DIN EN 60 051 - 1

#### reference conditions

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

#### influences

ambient temperature	23°C ±2K
position of use	nominal position ±5°
frequency LSG	40 Hz ... 50 Hz ... 10 kHz
stray magnetic field	0.5 mT

### Environmental

climatic suitability	climatic class 2 ▶ according to VDE/VDI 3540 sheet 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

LSG only: (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 adjustment range approx. ±10% or approx. ±20 ... 50% (only voltmeters LSP/LSG 96 K, ammeters and LSP/G 72 K on request)
accuracy class	1.0 with fine scale division (as far as practicable)
adjustment	of internal resistance to ±1% at 23°C
lead resistance	calibration to >0.05Ω
increased sensitivity	to 2 kΩ/V, 5 kΩ/V or 10 kΩ/V for voltmeters 1 ... 600 V (as far as practicable)

#### case

window	non-glaring glass
colour of bezel	gray (similar to RAL 7037)
position of use	horizontal or to be specified 15...165°
terminals	connector blades 6.3 x 0.8

#### performance

climatic suitability	limited use in the tropics climatic class 3 according to VDE/VDI 3540 -25 ... +55°C
with operating temperature range	
marine application	non-certified
enclosure code	at least IP 53 (front of case with meter mounted)

#### terminal protection

full-sized rear cover or protective sleeves

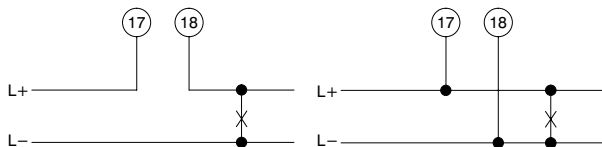
#### dial

blank dial	pencil marked initial and end values
scale division and figuring	0 ... 100%, linear, full-scale values acc. to DIN series (1-1.2-1.5-2-2.5-3-4-5-6-7.5 and any decimal multiple of these numbers e.g. 150 m <sup>3</sup> /h) or deviating from DIN series; special calibration from non-linear graph or chart; scaling of voltmeters in ohms; captions optional
2 <sup>nd</sup> scale division	including figuring
coloured dial	dial plate black; pointer, DIN scale division and figuring yellow or white, non-glaring glass window included to be specified e.g. "generator"
additional lettering	to be specified
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	centre zero or off-set zero
overload scaling	2 to 5 times rated current for LSG ammeters for use on CT
expanded scale	expanded initial scale division (electronically) up to approx. 5% of full-scale in centre scale by two lamps 6 V, 12 V or 24 V, dial translucent (LSP/LSG 96 K only; not for LSG 96 K with attached miniature CT; LSP/LSG 72 K on request)

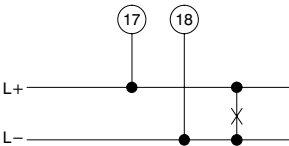
#### dial illumination

## Connections

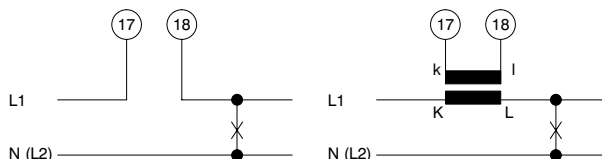
### DC current



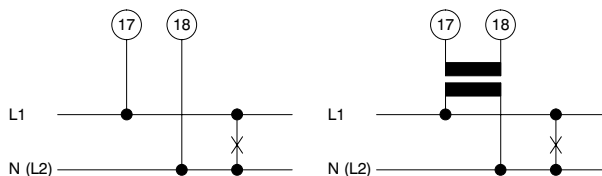
### DC voltage



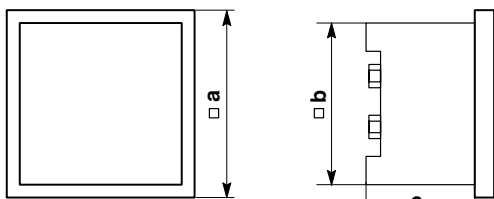
### AC current



### AC voltage



## Dimensions



dimensions (in mm)	LSP/G 72 K	LSP/G 96 K
a	72	96
b	66	90
c	53	53 / 104 <sup>5)</sup>

## Ordering Information

<b>type</b> LSP LSG	240° moving-coil panel meter measuring DC current or DC voltage measuring AC current or AC voltage
<b>front dimensions</b> 72 K 96 K	72 mm x 72 mm 96 mm x 96 mm
<b>measuring ranges</b>	refer to preceding table
<b>"live zero"</b>	4 ... 20 mA mechan. suppressed zero <sup>1)</sup> 0/4 ... 20 mA electrically suppressed zero
<b>sp. measuring range</b>	to be specified <sup>2)</sup>
<b>measuring range adjustment</b>	none <sup>1)</sup> adjustment range ±10% approx. <sup>3)</sup> adjustment range ±20 ... 50% approx. <sup>3)</sup>

<b>accuracy class</b>	1.5 <sup>1)</sup> 1.0 with fine scale division
<b>adjustments</b>	internal resistance to ±20% <sup>1)</sup> internal resistance to ±1% at 23°C lead resistance >0.05 Ω
<b>sensitivity (voltmeters)</b>	1 kΩ/V <sup>1)</sup> increased to 2 kΩ/V increased to 5 kΩ/V increased to 10 kΩ/V
<b>window</b>	glass <sup>1)</sup> non-glaring glass
<b>colour of bezel</b>	black (similar to RAL 9005) <sup>1)</sup> gray (similar to RAL 7037)
<b>position of use</b>	vertical <sup>1)</sup> to special order 15 ... 165°
<b>climatic suitability</b>	class 2, -25 ... +40°C <sup>1)</sup> class 3, -25 ... +55°C
<b>marine application</b>	none <sup>1)</sup> non-certified
<b>enclosure code</b>	IP 52 <sup>1)</sup> IP 53 at least
<b>terminal safety protection</b>	none <sup>1)</sup> full-sized rear cover <sup>3)</sup> protective sleeves
<b>terminals</b>	screws and wire clamps <sup>1)</sup> connector blades 6.3 x 0.8
<b>dial</b>	scale division and measuring range alike resp. full-scale values to DIN series <sup>1)</sup> blank dial scale division and figuring 0 ... 100% deviating from DIN series <sup>2)</sup> calibration fr. non-linear graph or chart <sup>2)</sup> scaling in ohms for voltmeters <sup>2)</sup> 2 <sup>nd</sup> scale division <sup>2)</sup> black dial, yellow scale division black dial, white scale division additional lettering to be specified <sup>2)</sup> additional figuring to be specified <sup>2)</sup> coloured marks red, green or blue <sup>2)</sup> coloured sector red, green or blue <sup>2)</sup>
<b>logo on dial</b>	WEIGEL <sup>1)</sup> none OEM logo <sup>2)</sup>
<b>zero position</b>	left hand zero position <sup>1)</sup> centre or off-set zero position <sup>2)</sup>
<b>expanded initial scale</b>	none <sup>1)</sup> up to approx. 5%, electronically
<b>overload scaling</b> LSG ammeters for CT use	without overload range <sup>1)</sup> 2 to 5 times rated current
<b>dial illumination</b>	none <sup>1)</sup> by 2 lamps 6 V, 12 V or 24 V <sup>4)</sup>

<sup>1)</sup> Standard

<sup>2)</sup> Please clearly add the desired specifications.

<sup>3)</sup> LSP/G 96 K voltmeters only, LSP/G 72 K and ammeters on request

<sup>4)</sup> not for <sup>5)</sup> LSG 96 K with attached miniature CT

### ordering example

LSP 72 K, measuring range 0 ... 20 mA, scale 0 ... 100 A,  
window non-glaring glass, WEIGEL logo

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

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