

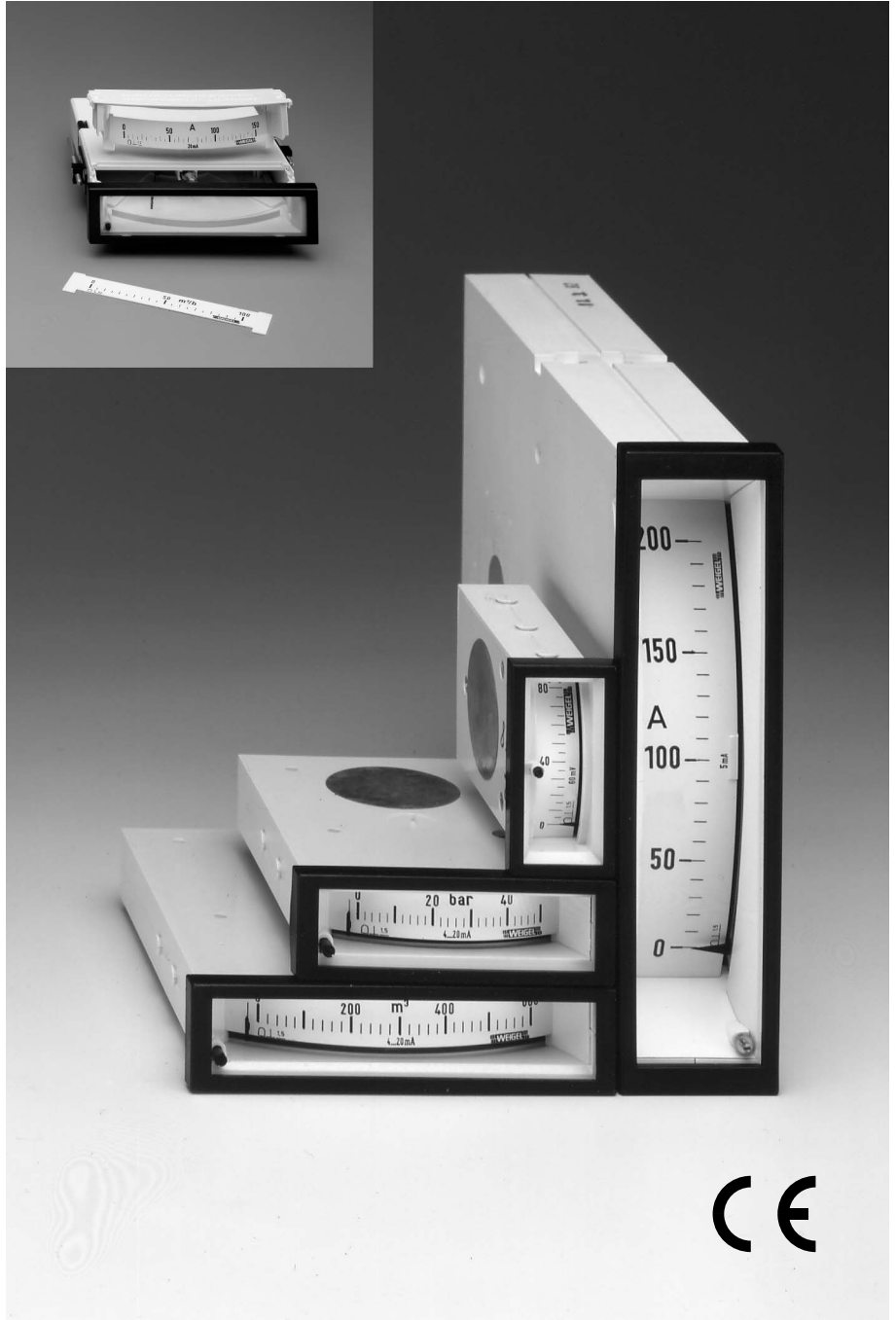


**Analog Meters  
Slim Edgewise with  
Moving-Coil Movement**

**MP 48x24  
MP 72x24  
MP 96x24 K  
P 144x36**

**MP 96x24 K**

**with Slide-In-Dial**



## Application

The edgewise moving-coil panel meters **MP 48x24**, **MP 72x24**, **MP 96x24 K** and **P 144x36** with a slim-line dial are used for measurement of **DC currents and voltages**.

The moving-coil movement is manufactured to newest findings and distinguishes in a small power consumption, a high accuracy and a very good damping.

The instruments are suitable to be mounted in switchboards, control panels, machine tool consoles and mosaic panels (except P 144x36).

With MP 96x24 K **the front panel, the front window and the dial** as well as the **dial illumination** (optional) can be exchanged easily. On the rear side a cable grip for the connecting leads is integrated.

## Movements

Self-shielding moving-coil movements with swivel coil, pivot suspended. Spring loaded jewel bearings for vibration and shock resistance.

## Mechanical Data

case details	edgewise case suitable to be mounted in control panels, machine tool consoles or mosaic panels (except P144x36), stackable			
material of case	thermoplastics			
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	1 ... 25 mm			
terminals	connector blades 6.3 x 0.8 or connector blades 2.8 x 0.8 (MP 96x24 K)			
<b>dimensions</b> (in mm)	MP 48x24	MP 72x24	MP 96x24 K	P 144x36
bezel	48 x 24	72 x 24	96 x 24	144 x 36
case	43 x 17	66 x 17	92 x 18	137 x 32
depth	75	98	108	173
panel cutout	45 <sup>+0.6</sup> x 22.2 <sup>+0.3</sup>	68 <sup>+0.7</sup> x 22.2 <sup>+0.3</sup>	92 <sup>+0.8</sup> x 22.2 <sup>+0.3</sup>	138 <sup>+1.0</sup> x 33 <sup>+0.6</sup>
weight approx.	0.08 kg	0.1 kg	0.12 kg	0.5 kg

## Electrical Data

measuring unit	DC voltage or DC current
overload capacity (acc. continuously)	to DIN EN 60 051 - 1) 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

▶ for other ratings refer to "Options"

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

<sup>2)</sup> sensitivity<sup>1)</sup> 1000 Ω/V ▶

<sup>3)</sup> MP 48x24 on request

## Measuring Ranges

### For mains use

DC current internal resistance<sup>1)</sup> / voltage drop approx.  
MP 48x24 MP 72x24/MP 96x24 K P 144x36

<b>100 μA</b>	1000 Ω	1000 Ω	652 Ω
<b>150 μA</b>	835 Ω	835 Ω	437 Ω
<b>250 μA</b>	500 Ω	500 Ω	256 Ω
<b>400 μA</b>	310 Ω	310 Ω	38 Ω
<b>600 μA</b>	208 Ω	208 Ω	100 Ω
<b>1 mA</b>	41 Ω	33 Ω	60 mV
<b>1.5 mA</b>	55 mV	47 mV	60 mV
<b>2.5 mA</b>	55 mV	47 mV	60 mV
<b>4 mA</b>	55 mV	47 mV	60 mV
<b>5 mA</b>	55 mV	47 mV	60 mV
<b>6 mA</b>	55 mV	47 mV	60 mV
<b>10 mA</b>	55 mV	47 mV	60 mV
<b>15 mA</b>	55 mV	47 mV	60 mV
<b>20 mA</b>	55 mV	47 mV	60 mV
<b>25 mA</b>	55 mV	47 mV	60 mV
<b>40 mA</b>	55 mV	47 mV	60 mV
<b>60 mA</b>	55 mV	47 mV	60 mV
<b>100 mA</b>	55 mV	47 mV	60 mV
<b>150 mA</b>	55 mV	47 mV	60 mV
<b>250 mA</b>	55 mV	47 mV	60 mV
<b>400 mA</b>	55 mV	47 mV	60 mV
<b>600 mA</b>	55 mV	47 mV	60 mV
<b>1 A</b>	55 mV	47 mV	60 mV

### for use with external shunt

<b>60 mV</b>	<sup>2)</sup>
<b>150 mV</b>	<sup>2)</sup>

a total lead resistance of 0.05 Ω is considered in the calibration of the indicator for connecting leads 1 m, 2 x 0.75 mm<sup>2</sup> ▶

### DC voltage >5V <sup>2)</sup>

**6 V, 10 V, 15 V, 25 V, 40 V, 60 V, 100 V, 150 V, 250 V  
400 V, 500 V, 600 V <sup>3)</sup>**

### Not for mains use

#### DC voltage ≤5V <sup>2)</sup>

**60 mV, 100 mV, 150 mV, 250 mV, 400 mV, 600 mV,  
1 V, 1.5 V, 2.5 V, 4 V**

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

**4 ... 20 mA** mechanically suppressed zero, without zero adjustment, voltage drop approx. 46 mV (MP 48x24)  
approx. 60 mV (MP 72x24/96x24 K, P 144x36)

**0/4 ... 20 mA** electrically suppressed zero (MP 72x24/96x24 K, P 144x36), with zero adjustment, voltage drop approx. 900 mV

## Operating Voltages

measuring ranges operating voltage  
MP 48x24 MP 72x24 MP 96x24 K P 144x36

<b>100 μA – 1 A</b>	300 V	600 V	300 V	300 V
<b>Shunt 60 mV, 150 mV</b>	300 V	600 V	300 V	300 V
<b>live zero (0/4...20 mA)</b>	300 V	600 V	300 V	300 V
<b>60 mV – 4 V</b>	50 V	100 V	300 V	100 V
<b>6 V – 40 V</b>	50 V	100 V	300 V	100 V
<b>60 V, 100 V</b>	300 V	100 V	300 V	100 V
<b>150 V, 250 V</b>	300 V	600 V	300 V	300 V
<b>400 V – 600 V <sup>3)</sup></b>	–	600 V	600 V	600 V



# Analog Meters Slim Edgewise with Moving-Coil Movement

## Scaling

pointer	bar pointer
zero adjustment	front accessible ▶
response time	1 s for full-scale deflection
scale arrangement	horizontal (left-hand zero) ▶
scale characteristics	linear
scale division	coarse-fine
scale length	MP 48x24 30 mm    MP 72x24 52 mm    MP 96x24 60 mm    K P 144x36 95 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
others	DIN EN 60 051 - 1

### influences

ambient temperature	23 °C ± 2K
position of use	nominal position ± 5 °
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

DIN IEC 61 554

Panel mounted equipment –  
Electrical measuring instruments –  
Dimensions for panel mounting  
reliability of measuring and control equipment (classification of climates) (non - condensing)

VDE/VDI 3540 sheet 2

## Options

### measuring range

“live zero” (MP 96x24 K) measuring range 0/4 ... 20 mA electrically suppressed zero with zero adjustment, voltage drop 900 mV approx. deviating from standard

special measuring range

internal resistance adjustment to ± 1% at 23 °C  
increased sensitivity for voltmeters 1 V and higher to 2 kΩ/V, 5 kΩ/V, 10 kΩ/V or 20 kΩ/V (as far as possible)

lead resistance

calibration of total value >0.05Ω

### case

window non-glaring glass  
colour of bezel gray (similar to RAL 7037)  
position of use horizontal or on request 15...165 °  
mounting (MP 96 x24 K) blade springs on the narrow sides

### performance

climatic suitability limited use in the tropics climatic class 3 according to VDE/VDI 3540 sheet 2  
with operating temperature range -10 ... +55 °C  
increased mechanical loads shock 30 g, 11 ms  
vibration 5 g, 5 ... 55 Hz  
marine application non-certified  
enclosure code IP 54 splash-water protected front (without zero adjustment or with zero adjustment rear accessible for MP 96x24 K)

### terminal protection against accidental contact

protective sleeves B6 for connector blades 6.3 x 0.8  
protective sleeves 110 for connector blades 2.8 x 0.8

### dial

scale arrangement vertical (bottom zero)  
blank dial pencil-marked on initial and end values  
scale division and figuring 0 ... 100%, 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  
2<sup>nd</sup> scale division including figuring (on request)  
coloured scale (MP 96x24 K only) scale in black; pointer, scale division and lettering yellow or white  
additional lettering on request e.g. "generator"  
additional figuring on request  
coloured marks red, green or blue for important scale values  
coloured segment red, green or blue within scale division  
logo on the dial none or on request  
zero position centre zero or off-set zero, mechanically suppressed zero, no zero adjustment, max. 40% of full-scale value for ammeters ≥ 100 µA, voltmeters ≥ 60 mV

zero adjustment  
(MP 96x24 K only)  
expanded scale

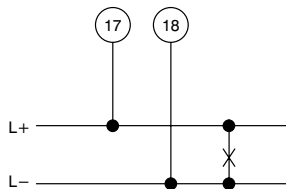
rear accessible  
expanded initial scale division  
by means of electronic circuits up to approx.  
5% of full-scale value in centre of scale  
for MP 72x24 / 96x24 K, P 144x36

dial illumination

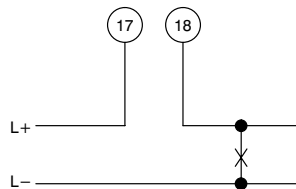
dial translucent 6 V, 12 V or 24 V  
MP 96x24 K only by 1 lamp  
P 144x36 only by 2 lamps

## Connections

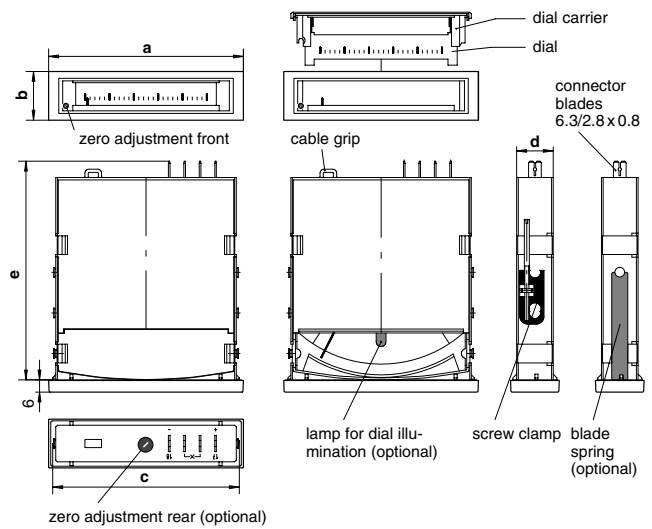
DC voltage



DC current

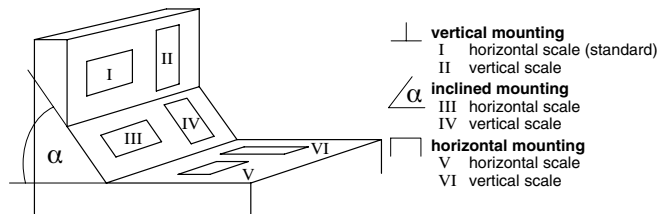


## Dimensions



dimensions (in mm)	MP 48x24	MP 72x24	MP 96x24 K	P 144x36
a	48	72	96	144
b	24	24	24	36
c	43	66	92	137
d	17	17	18	32
e	75	98	108	173

scales and position of use



- ⊥ **vertical mounting**
  - I horizontal scale (standard)
  - II vertical scale
- ∠ **inclined mounting**
  - III horizontal scale
  - IV vertical scale
- ⊥ **horizontal mounting**
  - V horizontal scale
  - VI vertical scale



# Data Sheet

Edgewise Series

010.D.301.07

## Analog Meters Slim Edgewise with Moving-Coil Movement



## Ordering Information

<b>type (M)P</b>	slim edgewise moving-coil panel meter for DC voltage or current
<b>front dimensions</b> 48x24 72x24 96x24 K 144x36	48 mm x 24 mm 72 mm x 24 mm 96 mm x 24 mm 144 mm x 36 mm
<b>measuring ranges</b>	refer to preceding table
<b>special measuring range</b>	on request <sup>2)</sup>
<b>"live zero"</b>	4 ... 20 mA mechan. suppressed zero <sup>1)</sup> 0/4 ... 20 mA electric. suppressed zero <sup>4)</sup>
<b>adjustment</b>	internal resistance $\pm 20\%$ <sup>1)</sup> internal resistance $\pm 1\%$ at 23 °C lead resistance $> 0,05 \Omega$
<b>sensitivity voltmeters</b>	1 k $\Omega/V$ <sup>1)</sup> 2 k $\Omega/V$ 5 k $\Omega/V$ 10 k $\Omega/V$ 20 k $\Omega/V$ as far as possible
<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> horizontal on request 15 ... 165 ° <sup>2)</sup>
<b>mounting</b>	screw clamps <sup>1)</sup> spring blades
<b>climatic suitability</b>	class 2, -25 ... +40 °C <sup>1)</sup> class 3, -10 ... +55 °C
<b>mechanical loads</b>	shock 15 g, vibration 2.5 g <sup>1)</sup> shock 30 g, vibration 5 g
<b>marine application</b>	none <sup>1)</sup> non-certified
<b>enclosure code</b>	IP 52 <sup>1)</sup> IP 54 splash-water protected front
<b>terminal protection</b>	none <sup>1)</sup> protective sleeves B6 (for 6.3 x 0.8) protective sleeves 110 (for 2.8 x 0.8)
<b>scale arrangement</b>	horizontal <sup>1)</sup> vertical

<b>dial</b>	scale division & measuring range alike <sup>1)</sup> blank dial scale division and figuring 0 ... 100% linear acc. to standardized series <sup>2)</sup> linear deviating from standard <sup>2)</sup> calibration f. non-linear graph or chart <sup>2)</sup> scaling in ohms for voltmeters <sup>2)</sup> 2 scale divisions on request <sup>2)</sup> yellow on black dial <sup>3)</sup> white on black dial <sup>3)</sup> additional lettering on request <sup>2)</sup> additional figuring on request <sup>2)</sup> coloured marks red, green or blue <sup>2)</sup> coloured sector red, green or blue <sup>2)</sup>
<b>logo</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> mechan. suppressed z.p. <sup>2)</sup> ( $\geq 100 \mu A / 60 mV$ )
<b>zero adjustment</b>	front accessible <sup>1)</sup> rear accessible <sup>3)</sup>
<b>expanded scale</b> (not for MP 48x24)	none <sup>1)</sup> up to approx. 5% of full-scale value in center scale electronically <sup>2)</sup>
<b>dial illumination</b>	none <sup>1)</sup> with 1 or 2 lamps 6, 12 or 24 V <sup>2)</sup> only MP 96x24 K with 1 lamp only P 144x36 with 2 lamps

<sup>1)</sup> Standard

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

<sup>3)</sup> MP 96x24 K only

<sup>4)</sup> MP 72x24/96x24 K, P 144x36 only

### ordering example

MP 72x24, measuring range 0 ... 20 mA, horizontal scale 0 ... 100%, vertical mounting, window non-glaring glass, WEIGEL logo

## Weigel Meßgeräte GmbH

Postfach 720 154 • 90241 Nürnberg • Phone: 0911/42347-0  
Erlenstraße 14 • 90441 Nürnberg • Fax: 0911/42347-39  
Sales: Phone: 0911/42347-94  
Internet: <http://www.weigel-messgeraete.de>  
e-mail: [vertrieb@weigel-messgeraete.de](mailto:vertrieb@weigel-messgeraete.de)

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

