Data Sheet

Edgewise Series

Analog Meters
Edgewise with Moving-Coil Movement

P 48 PrS
P 72 PrS
P 96 PrS
P 144 PrS
Application

The edgewise moving-coil panel meters P 48/72/96/144 PrS with a curved dial are used for measurement of DC currents and voltages. The edgewise case styles provide high ratio of scale length to panel area. These instruments are suitable to be mounted in switchboards, control panels, machine tool consoles or mosaic panels.

Movements

Self-shielding moving-coil movements with core-type magnet (P 72/96/144 PrS) resp. swivel coil (P 48 PrS), pivot suspended. Spring loaded jewel bearings for vibration and shock resistance.

Mechanical Data

case details  edgewise case suitable to be mounted in control / switchgear panels, machine tool consoles or mosaic panels, stackable
material of case  pressed steel (P 72/96/144 PrS) thermoplastics (P 48 PrS)
material of window glass 20% 30%
colour of bezel  black (similar to RAL 9005) black
position of use  vertical ±5°
panel fixing screw clamps
mounting  stackable next to each other (except P 144 PrS)
terminals
voltmeters and ammeters ≤ 3 A
connector blades 6.3 x 0.8 (P 48 PrS)
hexagon studs, M3 screws and wire clamps C6 (P 72/96 PrS)
hexagon studs, M5 screws and wire clamps C10 (P 144 PrS)
ammeters >3 A
hexagon studs, M5 screws an wire clamps C10
voltmeters ≥300 V (P 72/96 PrS)
connector blades 6.3 x 0.8 for protective wire
dimensions (in mm)
bezel 48 x 24 72 x 36 96 x 48 144 x 72
case 43 x 17 66 x 32 91 x 43 137 x 67
depth 75 94 107 174
panel cutout 45° 69° 92° 138° x 22.2° 33° 45° 68°
panel thickness 1 ... 25 1 ... 25 1 ... 12 1 ... 40
weight approx. 0.08 kg 0.2 kg 0.45 kg 1.0 kg

Electrical Data

measuring unit  DC voltages or DC currents
overload capacity (acc. 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 (P 48/72/96 PrS)
IP 50 case front side (P 144 PrS)
IP 00 for terminals without protection against accidental contact
IP 20 for terminals protected against accidental contact

also refer to "Options"

Measuring Ranges

For mains use

<table>
<thead>
<tr>
<th>DC current</th>
<th>internal resistance / voltage drop approx.</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 μA</td>
<td>1000 Ω 1) 6500 Ω 2) 6500 Ω 3) –</td>
</tr>
<tr>
<td>60 μA</td>
<td>1040 Ω 1) 5500 Ω 2) 5500 Ω 3) –</td>
</tr>
<tr>
<td>100 μA</td>
<td>1000 Ω 1) 4900 Ω 2) 4900 Ω 3) 2000 Ω 4)</td>
</tr>
<tr>
<td>150 μA</td>
<td>835 Ω 1) 3800 Ω 2) 3600 Ω 3) 2000 Ω 4)</td>
</tr>
<tr>
<td>250 μA</td>
<td>500 Ω 1) 2200 Ω 2) 2200 Ω 3) 1080 Ω 4)</td>
</tr>
<tr>
<td>400 μA</td>
<td>310 Ω 1) 1300 Ω 2) 1300 Ω 3) 497 Ω 4)</td>
</tr>
<tr>
<td>600 μA</td>
<td>210 Ω 1) 250 Ω 2) 250 Ω 3) 163 Ω 4)</td>
</tr>
<tr>
<td>1 mA</td>
<td>32 mV 48 Ω 1) 48 Ω 2) 69 Ω 3)</td>
</tr>
<tr>
<td>1.5 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 26.5 Ω 4)</td>
</tr>
<tr>
<td>2.5 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 10.8 Ω 4)</td>
</tr>
<tr>
<td>4 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 7.1 Ω 4)</td>
</tr>
<tr>
<td>5 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 5.8 Ω 4)</td>
</tr>
<tr>
<td>6 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 4.9 Ω 4)</td>
</tr>
<tr>
<td>10 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 3.3 Ω 4)</td>
</tr>
<tr>
<td>15 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 2.4 Ω 4)</td>
</tr>
<tr>
<td>20 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 2.1 Ω 4)</td>
</tr>
<tr>
<td>25 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 2.0 Ω 4)</td>
</tr>
<tr>
<td>40 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 1.7 Ω 4)</td>
</tr>
<tr>
<td>60 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 1.4 Ω 4)</td>
</tr>
<tr>
<td>100 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 1.1 Ω 4)</td>
</tr>
<tr>
<td>150 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 1.0 Ω 4)</td>
</tr>
<tr>
<td>250 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 0.7 Ω 4)</td>
</tr>
<tr>
<td>400 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 0.6 Ω 4)</td>
</tr>
<tr>
<td>600 mA</td>
<td>46 mV 60 mV 60 mV 60 mV 0.5 Ω 4)</td>
</tr>
<tr>
<td>1 A</td>
<td>46 mV 60 mV 60 mV 60 mV 0.4 Ω 4)</td>
</tr>
<tr>
<td>1.5 A</td>
<td>– 60 mV 60 mV 60 mV 0.3 Ω 4)</td>
</tr>
<tr>
<td>2.5 A</td>
<td>– 60 mV 60 mV 60 mV 0.3 Ω 4)</td>
</tr>
<tr>
<td>4 A</td>
<td>– 60 mV 60 mV 60 mV 0.3 Ω 4)</td>
</tr>
<tr>
<td>6 A</td>
<td>– 60 mV 60 mV 60 mV 0.3 Ω 4)</td>
</tr>
<tr>
<td>10 A</td>
<td>– 60 mV 60 mV 60 mV 0.3 Ω 4)</td>
</tr>
<tr>
<td>15 A</td>
<td>– 60 mV 60 mV 60 mV 0.3 Ω 4)</td>
</tr>
<tr>
<td>25 A</td>
<td>– 60 mV 60 mV 60 mV 0.3 Ω 4)</td>
</tr>
<tr>
<td>40 A</td>
<td>– – 60 mV 60 mV 0.2 Ω 4)</td>
</tr>
<tr>
<td>60 A</td>
<td>– – – 60 mV 0.1 Ω 4)</td>
</tr>
</tbody>
</table>

for use with external shunt

<table>
<thead>
<tr>
<th>DC voltage</th>
<th>P 48/72/96 PrS</th>
<th>P 144 PrS</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 V</td>
<td>150 V</td>
<td>–</td>
</tr>
<tr>
<td>150 mV</td>
<td>P 48/72/96 PrS</td>
<td>P 144 PrS</td>
</tr>
<tr>
<td>sensitivity</td>
<td>1000 Ω/V 1)</td>
<td>6 mA</td>
</tr>
<tr>
<td>current consumption</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>total lead resistance</td>
<td>0.050 Ω 1)</td>
<td></td>
</tr>
<tr>
<td>for connecting leads 1 m, 2 x 0.75 mm²</td>
<td>0.06 Ω</td>
<td></td>
</tr>
</tbody>
</table>

DC voltage >5V

<table>
<thead>
<tr>
<th>DC voltage</th>
<th>P 48/72/96 PrS</th>
<th>P 144 PrS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 V, 10 V, 15 V, 25 V, 40 V, 60 V, 100 V, 150 V</td>
<td>300 V</td>
<td>150 V</td>
</tr>
<tr>
<td>operating voltage</td>
<td>300 V</td>
<td>–</td>
</tr>
<tr>
<td>250 V</td>
<td>operating voltage</td>
<td>300 V</td>
</tr>
<tr>
<td>400 V, 500 V, 600 V</td>
<td>operating voltage</td>
<td>600 V</td>
</tr>
<tr>
<td>sensitivity</td>
<td>1000 Ω/V 1)</td>
<td>1000 Ω/V 1)</td>
</tr>
</tbody>
</table>

1) The resistance values are limited to a tolerance of ±20%
2) The resistance values are limited to a tolerance of ±30%
**Not for mains use**

<table>
<thead>
<tr>
<th>DC voltage ≤5V</th>
<th>P 48 PrS</th>
<th>P 72/96 PrS</th>
<th>P 144 PrS</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 mV sensitivity</td>
<td>–</td>
<td>3300 Ω/V</td>
<td>–</td>
</tr>
<tr>
<td>operating voltage</td>
<td>–</td>
<td>300 V</td>
<td>–</td>
</tr>
<tr>
<td>60 mV, 100 mV, 150 mV, 250 mV, 400 mV, 600 mV, 1 V, 1.5 V, 2.5 V, 4 V sensitivity</td>
<td>1000 Ω/V</td>
<td>1000 Ω/V</td>
<td>1000 Ω/V</td>
</tr>
<tr>
<td>operating voltage</td>
<td>300 V</td>
<td>300 V</td>
<td>150 V</td>
</tr>
</tbody>
</table>

For use on transducer ("live zero")

| 4 ... 20 mA | electrically suppressed zero, operating voltage 300 V, with zero adjustment, voltage drop approx. 900 mV |
| 0/4 ... 20 mA | electrically suppressed zero (P 72/96/144 PrS), operating voltage 300 V, without zero adjustment, voltage drop approx. 46 mV (P 48 PrS), approx. 60 mV (P 72/96 PrS), internal resistance 3 Ω ±30% (P 144 PrS) |

**Environmental**

| climatic suitability | climatic class 2 \(\text{according to VDE/VDI 3540 sheet 2}\) |
| operating temperature range | –25 ... +40°C |
| storage temperature range | –25 ... +65°C (P 48/72/96 PrS) |
| relative humidity | ≤75% annual average, non-condensing |
| shock resistance | 15 g, 11 ms |
| vibration resistance | 2.5 g, 5 ... 55 Hz (P 48/72/96 PrS) |
| 1.5 g, 5 ... 55 Hz (P 144 PrS) |

**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 – Part 1: Definitions and general requirements common to all parts – Part 2: Special requirements for ammeters and voltmeters – 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
- VDE/VDI 3540 sheet 2 reliability of measuring and control equipment (classification of climates) (non-condensing)
**Options**

- **measuring range**
  - special measuring range deviating from standard
- **measuring range adjustment**
  - adjustment potentiometer installed in voltmeters, adjustment range approx. \( \pm 10\% \) or \( \pm 20\% ... 50\% \) (except \( P \, 48/72 \, PrS \))
- **2nd measuring range**
  - with 3rd terminal for voltmeters, 2nd figuring and 1 or 2 scale divisions (except \( P \, 48/72 \, PrS \))
- **additional measuring ranges**
  - on request
- **accuracy class**
  - 1.0 with fine scale division (as far as possible)
- **adjustment of internal resistance**
  - to \( \pm 1\% \) at \( 23^\circ C \)
- **increased sensitivity**
  - to 2 k\( \Omega \)/V, 5 k\( \Omega \)/V, 10 k\( \Omega \)/V or 20 k\( \Omega \)/V for voltmeters \( \geq 1 \) V (as far as possible)
- **lead resistance**
  - calibration of a total value \( > 0.05 \)\( \Omega \)
- **case**
  - non-glaring glass
- **colour of bezel**
  - gray (similar to RAL 7037)
- **position of use**
  - horizontal or on request 15...165°
- **performance**
  - climatic suitability
    - limited use in the tropics, climatic class 3 according to VDE/VDI 3540 sheet 2
    - \(-10\, \ldots\, +55^\circ C\)
  - marine application
    - non-certified
  - enclosure code
    - IP 54 splash-water protected front (without zero adjustment)
  - terminal protection against accidental contact
    - protective sleeves B6 for \( P \, 48 \, PrS \)
    - SW6, SW10 (ammeters \( > 3A \)) for \( P \, 72/96 \, PrS \)
- **dial**
  - scale arrangement: vertical (bottom zero)
  - blank dial: pencil-marked on initial and end values
  - scale division
    - linear, full-scale values acc. to standardized series \( 1 \cdot 1.2 \cdot 1.5 \cdot 2 \cdot 2.5 \cdot 3 \cdot 4 \cdot 5 \cdot 6 \cdot 7.5 \) and their decimal multiples e.g. \( 150 \, \text{m}^3/\text{h} \) or deviating from standard;
    - special calibration from customer’s non-linear graph or chart;
    - scaling of voltmeters in ohms;
    - captions on request
  - 2nd scale division
    - linear including figuring, non-linear including figuring
  - 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
  - zero position
    - centre zero or off-set zero, mechanically suppressed zero, no zero adjustment, max. 40% of full-scale value for ammeters \( \geq 100 \, \mu A \), voltmeters \( \geq 60 \, \text{mV} \)
    - electrically suppressed zero for voltmeters \( \geq 6 \) V (\( P \, 72/96/144 \, PrS \) only)
  - expanded scale
    - expanded initial scale division by means of electronic circuits up to approx. 5% of full-scale value in centre of scale
- **dial illumination**
  - for \( P \, 48/144 \, PrS \)
  - internal LED 24 V DC
  - for \( P \, 96 \, PrS \)
  - 1 lamp 6 V, 12 V or 24 V

**Connections**

- **DC voltage**
  - \( \begin{align*}
  & \text{L–} \\
  & \text{L+} \\
  & \text{L–} \\
  & \text{L+}
  \end{align*} \)
  - \( \geq 300 \) V (\( P \, 72/96 \, PrS \) voltmeters only)

- **DC current**
  - \( \begin{align*}
  & \text{L–} \\
  & \text{L+} \\
  & \text{L–} \\
  & \text{L+}
  \end{align*} \)

**Dimensions**

- **P 48 PrS**
  - dimensions (in mm) \( a = 48 \), \( b = 24 \), \( c = 75 \), \( d = 17 \)
  - vertical mounting, horizontal scale (standard)
  - \( \text{I} \) vertical scale
  - \( \text{II} \) inclined mounting
  - \( \text{III} \) horizontal scale
  - \( \text{V} \) vertical scale
  - \( \text{V} \) horizontal scale

- **P 72/96 PrS**
  - dimensions (in mm) \( a = 72 \), \( b = 36 \), \( c = 94 \), \( d = 43 \)
  - \( \text{I} \) vertical scale
  - \( \text{III} \) horizontal scale

- **P 144 PrS**
  - dimensions (in mm) \( a = 144 \), \( b = 48 \), \( c = 107 \), \( d = 67 \)
  - \( \text{V} \) horizontal scale
  - \( \text{V} \) vertical scale
## Ordering Information

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Edgewise-type moving-coil panel meter</td>
</tr>
</tbody>
</table>

### Front Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 P</td>
<td>48 mm x 24 mm</td>
</tr>
<tr>
<td>72 P</td>
<td>72 mm x 36 mm</td>
</tr>
<tr>
<td>96 P</td>
<td>96 mm x 48 mm</td>
</tr>
<tr>
<td>144 P</td>
<td>144 mm x 72 mm</td>
</tr>
</tbody>
</table>

### Measuring Ranges

Refer to preceding table.

### "Live Zero"

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 ... 20 mA mechan. suppressed zero 1)</td>
<td>0/4 ... 20 mA electrically suppressed zero 3)</td>
</tr>
</tbody>
</table>

### Special Measuring Range

On request 2).

### Measuring Range Adjustment

None 1).

### 2nd Measuring Range

1 scale division, 2nd figuring 2).

### Accuracy Class

1.5 1).

### Adjustment

Internal resistance to ±20% 1).

### Sensitivity, Voltmeters

1 kΩ/V 1).

### Window

Glass 1).

### Colour of Bezel

Black (similar to RAL 9005) 1).

### Position of Use

Vertical 1).

### Climatic Suitability

Class 2, -25 ... +40°C 1).

### Marine Application

None 1).

### Enclosure Code

IP 54 splash-water protected front 1).

### Terminal Protection

Protective sleeves B6, SW6 resp. SW10 1).

### Scale Arrangement

Horizontal 1).

### Dial

Scale division & measuring range alike 1).
Blank dial.

### Dial Illumination

For P 48/144 P

- Internal LED 24 V DC
- 1 lamp 6 V, 12 V or 24 V

### Logo

WEIGEL 1)

### Zero Position

Left hand zero position 1).

### Ordering Example

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

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1) Standard
2) Please clearly add the desired specifications.
3) P 72/96/144 PrS only

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