

## Data Sheet

### Analog Meters with Moving-Iron Movement 90° – Dial

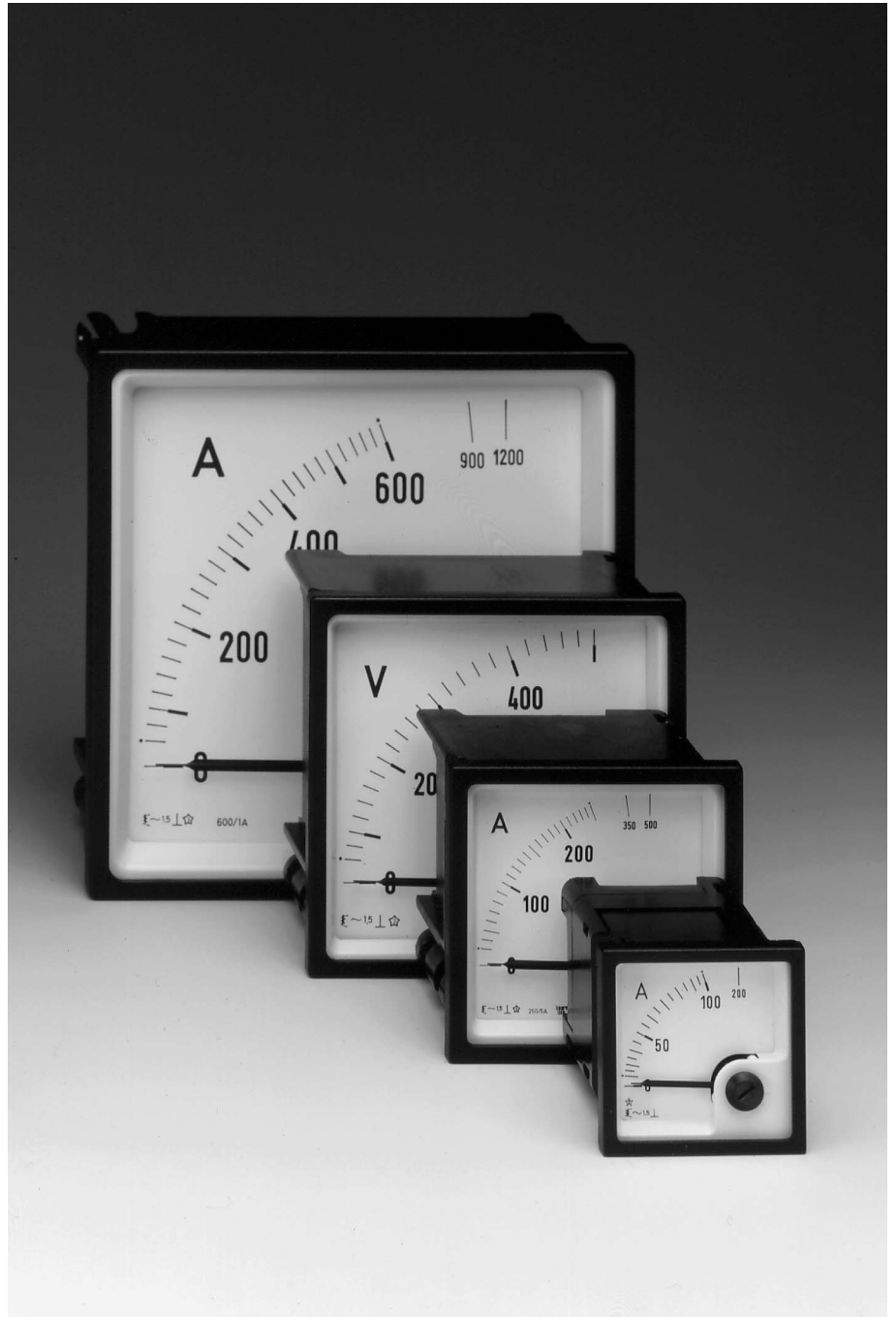
**EQ 48**

**EQ 72**

**EQ 96**

**EQ 144**

**with Slide-In-Dial**



## Application

The moving-iron panel meters **EQ 48/72/96/144** housed in moulded thermoplastic cases are mainly used for the measurement of AC currents and voltages in the usual technical frequency range of  $16\frac{2}{3}$  ... 100 Hz.

Moving-iron meters indicate rms-values practically independent of wave form even of high harmonics. Error of indication may occur for extreme wave forms (e.g. phase gating controls) and / or frequencies above 100 Hz.

These meters are **not** suitable for use with shunts or tachogenerators due to their high power consumption.

The K-series meters offer application-oriented advantages in switch-board and generating set production, also suitable for mosaic panel mounting. The bezel, the glass window and the dial can be easily exchanged on site.

## Movements

Moving-iron movement with pivot suspension, spring loaded shock absorbing jewel bearings and silicon oil damping.

## Mechanical Data

|                                  |                                                                                                                              |                      |                      |                     |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|---------------------|
| case details                     | moulded square case suitable to be mounted in control / switchgear panels, machine tool consoles or mosaic panels, stackable |                      |                      |                     |
| material of case                 | polycarbonate thermoplastics, flame retardant with UL rating of 94 V - 0                                                     |                      |                      |                     |
| material of window               | glass ♦                                                                                                                      |                      |                      |                     |
| colour of bezel                  | black (similar to RAL 9005) ♦                                                                                                |                      |                      |                     |
| position of use                  | vertical $\pm 5^\circ$ ♦                                                                                                     |                      |                      |                     |
| panel fixing                     | screw clamps or spring clamps (except EQ 144 )                                                                               |                      |                      |                     |
| mounting                         | stackable next to each other                                                                                                 |                      |                      |                     |
| panel thickness                  | $\leq 40$ mm                                                                                                                 |                      |                      |                     |
| terminals                        |                                                                                                                              |                      |                      |                     |
| voltmeters and ammeters $< 25$ A | hexagon studs, M4 screws and wire clamps E3                                                                                  |                      |                      |                     |
| ammeters $\geq 25$ A             | threaded studs M6 with nuts                                                                                                  |                      |                      |                     |
| ammeters $\geq 60$ A             | threaded studs M8 with nuts                                                                                                  |                      |                      |                     |
| <b>dimensions</b> (in mm)        | <b>EQ 48</b>                                                                                                                 | <b>EQ 72</b>         | <b>EQ 96</b>         | <b>EQ 144</b>       |
| bezel                            | □ 48                                                                                                                         | □ 72                 | □ 96                 | □ 144               |
| case                             | □ 42.5                                                                                                                       | □ 66                 | □ 90                 | □ 136               |
| depth                            | 53                                                                                                                           | 53                   | 53                   | 53                  |
| panel cutout                     | □ 45 <sup>+0.6</sup>                                                                                                         | □ 68 <sup>+0.7</sup> | □ 92 <sup>+0.8</sup> | □ 138 <sup>+1</sup> |
| weight approx.                   | 0.1 kg                                                                                                                       | 0.15 kg              | 0.2 kg               | 0.25 kg             |

♦ also refer to "Options"

## Electrical Data

|                                                                   |                                   |  |  |
|-------------------------------------------------------------------|-----------------------------------|--|--|
| measuring unit                                                    | AC voltage / current              |  |  |
| frequency range                                                   | $16\frac{2}{3}$ ... 100 Hz        |  |  |
| power consumption                                                 |                                   |  |  |
| voltmeters                                                        | $< 4.5$ VA                        |  |  |
| ammeters $\leq 15$ A                                              | $< 0.5$ VA                        |  |  |
| ammeters $> 15$ A                                                 | $< 0.8$ VA                        |  |  |
| overload capacity (acc. to DIN EN 60 051)                         |                                   |  |  |
| continuously                                                      | 1.2 times rated voltage / current |  |  |
| voltmeters                                                        |                                   |  |  |
| 5 s max.                                                          | 2 times, 1000 V max.              |  |  |
| ammeters                                                          |                                   |  |  |
| EQ 48 K                                                           | EQ 72/96/144 K                    |  |  |
| 5 s max.                                                          | 10 times, 200 A max.              |  |  |
| 1 s max.                                                          | — 40 times, up to 250 A           |  |  |
| pollution level                                                   | 2                                 |  |  |
| operating voltage                                                 | refer to Measuring Ranges         |  |  |
| measurement category                                              | CAT III                           |  |  |
| enclosure code                                                    |                                   |  |  |
| IP 52 case                                                        |                                   |  |  |
| IP 00 for terminals without protection against accidental contact |                                   |  |  |
| IP 20 for terminals protected against accidental contact ♦        |                                   |  |  |

## Measuring Ranges

| measuring ranges                                 | operating voltage |       |       |        |
|--------------------------------------------------|-------------------|-------|-------|--------|
| <b>AC current</b>                                | EQ 48             | EQ 72 | EQ 96 | EQ 144 |
| 1; 1.5; 2.5; 4; 5; 6; 10; 15; 25 A <sup>1)</sup> | 300 V             | 300 V | 300 V | 600 V  |
| 40; 60; 100 A <sup>1)</sup> *)                   | —                 | 300 V | 300 V | 600 V  |
| <b>AC voltage</b>                                | EQ 48             | EQ 72 | EQ 96 | EQ 144 |
| 60 V, 100 V                                      | 150 V             | 150 V | 150 V | 150 V  |
| 150 V                                            | 150 V             | 150 V | 150 V | 150 V  |
| 250 V                                            | 300 V             | 300 V | 300 V | 600 V  |
| 400 V, 500 V                                     | 300 V             | 600 V | 600 V | 600 V  |
| 600 V *)                                         | —                 | 600 V | 600 V | 600 V  |
| <b>for use on VT/CT</b>                          | EQ 48             | EQ 72 | EQ 96 | EQ 144 |
| N/1 A, N/5 A <sup>1)</sup>                       | 150 V             | 150 V | 150 V | 150 V  |
| N/100 V, N/110 V <sup>2)</sup>                   | 150 V             | 150 V | 150 V | 150 V  |

Please state transformer ratio when ordering.

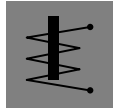
\*) not for EQ 48

<sup>1)</sup> full scale value = 2 times rated value (overload scaling) ♦

<sup>2)</sup> full scale value = 1.2 times rated value ( — " — )

## Scaling

|                                            |                                                        |       |       |        |
|--------------------------------------------|--------------------------------------------------------|-------|-------|--------|
| pointer                                    | bar / knife-edge pointer                               |       |       |        |
| pointer deflection                         | 0 ... 90°                                              |       |       |        |
| scale characteristics                      | practically linear above 10% of rated full-scale value |       |       |        |
| scale division                             | coarse-fine                                            |       |       |        |
| scale length                               | EQ 48                                                  | EQ 72 | EQ 96 | EQ 144 |
|                                            | 41 mm                                                  | 61 mm | 97 mm | 146 mm |
| overload scaling                           |                                                        |       |       |        |
| ammeters                                   | 2 times rated current ♦                                |       |       |        |
| voltmeters for use on voltage transformers | 1.2 times rated voltage                                |       |       |        |



# Data Sheet

## Analog Meters with Moving-Iron Movement 90° – 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  
wave form sinusoidal, distortion factor ≤ 5%  
frequency 45 ... 65 Hz  
others DIN EN 60 051

#### influences

ambient temperature –10°C ... +23°C ... +55°C  
position of use nominal position ± 5°  
frequency 15 ... 100 Hz (voltage)  
15 ... 400 Hz (current)  
stray magnetic field 0.5 mT

### Environmental

climatic suitability climatic class 3 acc. to VDE/VDI 3540 sheet 2  
operating temperature range –10 ... +55°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 40 050 enclosure codes; protection of electrical equipment against ingress of solid foreign bodies and of water  
DIN EN 60 051 direct acting indicating electrical measuring instruments and their accessories  
DIN EN 61 010 safety requirements for electrically operated measuring, control and laboratory equipment  
VDE/VDI 3540 sheet 2 reliability of measuring and control equipment (classification of climates)

### Options

#### case

window non–glaring glass  
colour of bezel gray (similar to RAL 7037)  
index marking pointer red, front adjustable  
position of use on request 15° ... 165°  
marine application non–certified or with approbation by "Germanischer Lloyd" (except EQ 48)

#### terminal safety protection

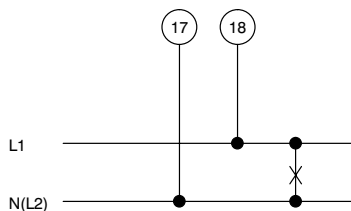
full–sized rear cover (except direct–connected ammeters > 25 A),  
protective sleeves to go on hexagon studs and M4 screws with wire clamps E3  
protection against accidental contact (hand and fingers)  
acc. to VBG 4 / DIN 57 106, sec. 100

#### dial

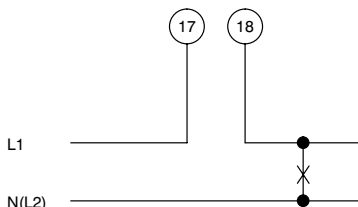
non–calibrated with dial symbols  
blank dial pencil–marked on initial and end values  
scale division 0 ... 100%  
and figuring  
linear scale division non–standard captions on request  
additional lettering on request e.g. "generator"  
additional figuring on request  
coloured marks red, green or blue for important scale values  
coloured sector red, green or blue within scale division  
logo on the dial none or on request  
overload scaling no overload range or  
(ammeters) overload range 5 times rated current

## Connections

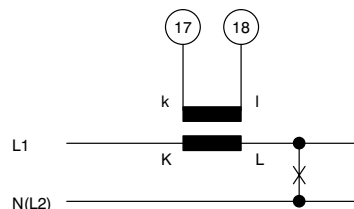
### AC voltage (direct-connected)



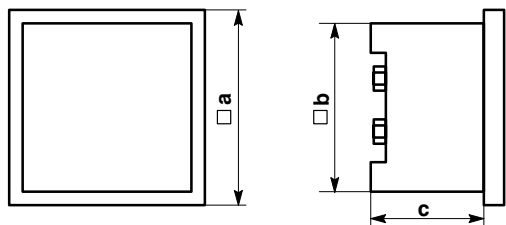
### AC current (direct-connected)



### AC current (for use on current transformer)



## Dimensions



| dimensions (in mm) | EQ 48 | EQ 72 | EQ 96 | EQ 144 |
|--------------------|-------|-------|-------|--------|
| a                  | 48    | 72    | 96    | 144    |
| b                  | 42.5  | 66    | 90    | 136    |
| c                  | 53    | 53    | 53    | 53     |

## Ordering Information

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>type</b><br>EQ                                | moving-iron panel meter                                                                                                                                                                                                                                                                                                                                                          |
| <b>front dimensions</b><br>48<br>72<br>96<br>144 | 48 mm x 48 mm<br>72 mm x 72 mm<br>96 mm x 96 mm<br>144 mm x 144 mm                                                                                                                                                                                                                                                                                                               |
| <b>measuring ranges</b>                          | refer to preceding table                                                                                                                                                                                                                                                                                                                                                         |
| <b>window</b>                                    | glass *)<br>non-glaring glass                                                                                                                                                                                                                                                                                                                                                    |
| <b>colour of bezel</b>                           | black (similar to RAL 9005) *)<br>gray (similar to RAL 7037)                                                                                                                                                                                                                                                                                                                     |
| <b>index marking pointer</b>                     | none *)<br>red, front adjustable                                                                                                                                                                                                                                                                                                                                                 |
| <b>position of use</b>                           | vertical *)<br>on request 15 ... 165° **)                                                                                                                                                                                                                                                                                                                                        |
| <b>marine application</b>                        | none *)<br>non-certified<br>with approbation by<br>"Germanischer Lloyd" (except EQ 48)                                                                                                                                                                                                                                                                                           |
| <b>panel fixing</b>                              | screw clamps *)<br>spring clamps (except EQ 144)                                                                                                                                                                                                                                                                                                                                 |
| <b>terminal safety protection</b>                | none *)<br>full-sized rear cover<br>protective sleeves                                                                                                                                                                                                                                                                                                                           |
| <b>dial</b>                                      | according to measuring range resp.<br>standard series for use on transformers *)<br>non-calibrated, with dial symbols<br>blank dial<br>scale division and figuring<br>0 ... 100%<br>according to standard series<br>additional lettering on request **)<br>additional figuring on request **)<br>coloured marks red, green or blue **)<br>coloured sector red, green or blue **) |
| <b>overload scaling</b><br>(ammeters)            | no overload range<br>2 times rated current *)<br>5 times rated current                                                                                                                                                                                                                                                                                                           |
| <b>logo</b>                                      | none<br>OEM logo **)                                                                                                                                                                                                                                                                                                                                                             |

\*) standard

\*\*) Please clearly add the desired specifications.

### ordering example

EQ 72, measuring range 0 ... 150 V, window non-glaring glass, dial 0 ... 100%, no logo

– specifications subject to change without notice; date of issue 12/05 –

