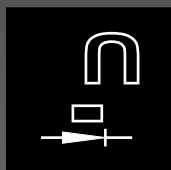
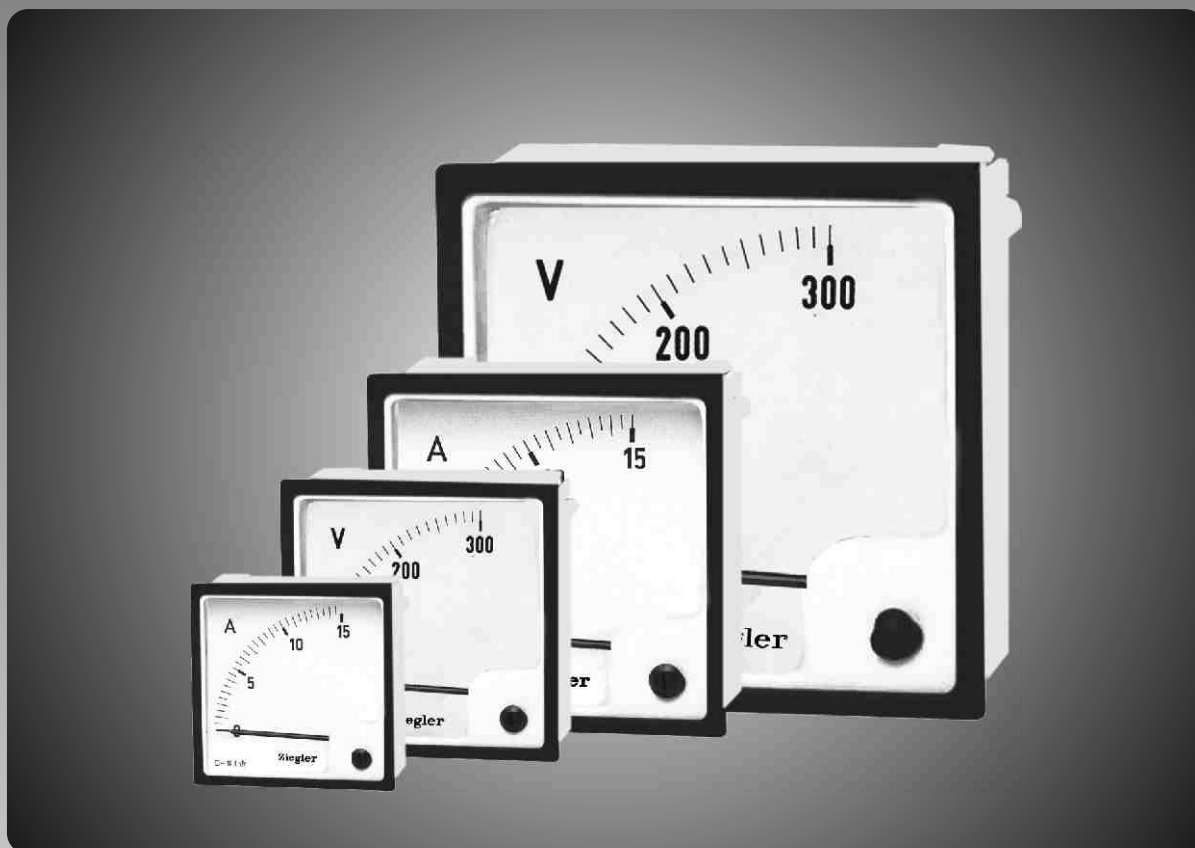


DG 48  
DG 72  
DG 96  
DG 144



# Data Sheet

Analogue Meters with  
Moving - Coil Movement  
and Rectifier



## Application

The moving-coil panel meters, VQ 48/72/96/144 housed in moulded polycarbonate cases are suitable for the measurement of AC currents and voltages.

Moving coil rectifier instruments measure average values and are calibrated to indicate RMS value, assuming a sinusoidal waveform for frequencies from 40 to 10000 Hz (AC Current 40 to 1000 Hz and for AC Voltage 40 to 10000 Hz)

These instruments offer several advantages in switchboards and generating Set Panels. Number of meters can be mounted in a single cut out (mosaic mounting). Front glass, Bezel & Dial can be easily replaced.

## Movement

Moving coil movement has pivots of very high hardness. Movement is suspended between spring loaded sapphire jewels. Movement is properly shielded and critically damped by eddy currents induced in coil former.

## Mechanical Data

<b>Case details</b>	moulded square case suitable for mounting in control / Switchgear panels, Machinery consoles.
<b>Case material</b>	Glass filled polycarbonate, Flame retardant and drip proof as per UL 94 V-0
<b>Front face</b>	Glass
<b>Colour of bezel</b>	Black
<b>Position of use</b>	Vertical
<b>Panel fixing</b>	Swivel screw
<b>Mounting</b>	Stackable in a single cutout
<b>Panel thickness</b>	≤ 40 mm
<b>Terminals</b>	
<b>Voltmeters and Ammeters &lt; 6 A</b>	Hexagon studs, M4 screws and wire clamps E3 (DIN 46282)
<b>Ammeters ≥ 6 A</b>	Threaded studs M6 with nuts

## Electrical Data

<b>Measured quantity</b>	: DC voltage or current
<b>Overload capacity</b>	(acc. to IEC 51)
<b>Continuously</b>	: 1.2 times rated voltage / current
<b>Short duration</b>	: 2 times rated voltage, 5 s max 10 times rated current, 5 s max
<b>Enclosure code</b>	: IP 52 case
<b>(IEC 529)</b>	IP 00 for terminals without back cover IP 20 for terminals with back cover
<b>Insulation class</b>	: Group A according to VDE 0110
<b>Rated insulating voltage</b>	VQ48                      VQ 72/96/144 600 V                      1000 V
<b>Proof Voltage</b>	2 kV                      3 kV
<b>Installation category</b>	600 V CAT III (IEC 1010)
<b>Insulation resistance</b>	> 50 Mohm at 500 V d.c.

## Standard Measuring Ranges

A.C. Current		A.C. Voltage	
Rated Value	Approx voltage drop	Rated Value	Sensitivity (+10%)
100 mA	1.3 V	6 V	900 ohm/V
150 mA	2.4 V	10 V	900 ohm/V
250 mA	2.4 V	15 V	900 ohm/V
400 mA	2.4 V	25 V	900 ohm/V
600 mA	2.4 V	40 V	900 ohm/V
1 mA	2.4 V	60 V	900 ohm/V
1.5 mA	1.4 V	100 V	900 ohm/V
2.5 mA	1.4 V	150 V	900 ohm/V
4 mA	1.4 V	250 V	900 ohm/V
6 mA	1.4 V	400 V	900 ohm/V
10 mA	1.4 V	500 V	900 ohm/V
15 mA	1.7 V	600 V	900 ohm/V
25 mA	1.7 V		
40 mA	1.7 V		
60 mA	1.7 V		
100 mA	1.7 V		
150 mA	1.33 V		
250 mA	0.80 V		
400 mA	0.50 V		
600 mA	0.33 V		
750 mA	0.27 V		
1 A <sup>*</sup>	0.20 V		
1.5 A <sup>*</sup>	0.14 V		
2.5 A <sup>*</sup>	0.80 V		
4 A <sup>*</sup>	0.50 V		
6 A <sup>*</sup>	0.03 V		
10 A <sup>*</sup>	0.02 V		

## Scale and pointer

Pointer	Knife-edge pointer
Pointer deflection	0 ... 90°
Scale characteristics	Linear <sup>*</sup>
Scale division	Coarse-fine
Scale length	DG 48   DG 72   DG 96   DG 144 41mm   63mm   97mm   146mm
Scale interchangeability	Interchangeable <sup>*</sup>

## Accuracy at Reference Conditions

<b>Accuracy class</b>	<b>1.5 according to IEC 51 / DIN EN 60051</b>
<b>Reference conditions</b>	
<b>Ambient temperature</b>	<b>23°C ± 2°C</b>
<b>Position of use</b>	<b>Nominal position ± 1°</b>
<b>Input</b>	<b>Rated value of measured quantity</b>
<b>Others</b>	<b>IEC 51 / DIN EN 60051</b>
<b>Nominal range of use</b>	
<b>Ambient temperature</b>	<b>0...50°C</b>
<b>Position of use</b>	<b>Vertical ± 6°</b>
<b>External magnetic field</b>	<b>0.5 mT</b>

<sup>\*</sup> Scale are Non linear & not interchangeable for Ammeters > 750mA

## Environmental conditions

<b>Climate suitability</b>	Climate class 3 according to VDE/VDI 3540
<b>Operating Temperature</b>	-10 ... +55 C
<b>Storage Temperature</b>	-25 ... +65 C
<b>Relative humidity</b>	≤ 75% annual average, non-condensing
<b>Shock resistance</b>	15g, 11 ms
<b>Vibration resistance</b>	10-150-10 Hz / 0.15 mm 1.5 g at about 50 Hz

## Applicable standards

**Nominal case & cutout dimensions for :** DIN 43700  
indicating Electrical Instruments

**Scales and pointer for electrical measuring instruments :** DIN 43802

**Connections and Terminal markings for panel meters :** DIN 43807

**Terminal bolts / leads :** DIN 46200/46262

**Clamp straps for connections :** DIN 46262

**Safety requirements and protective measures for Electrical indicating instruments and their accessories :** DIN 40050 / 8-70  
VDE 0110 / 11-72  
VDE 0410 / 10-76  
IEC 629, IEC 1010

**Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories :** IEC 61/  
DIN EN 60051  
DIN 43701

**Environmental conditions :** VDE / VDI 3540

**Front frames for indicating measuring instruments Principle dimensions :** DIN 43718

**UL Combustibility class :** UL 94 V-0

**Technical conditions of delivery for electrical instruments :** DIN 43701

**Mechanical strength (Free fall test, vibration test) :** VDE 0411, part 1,  
Sec.43/44,  
IEC 1010

## Options

<b>Case</b>	
<b>Front fascia</b>	Antiglare glass
<b>Colour of bezel</b>	Red, Yellow, Blue, White
<b>Red Index pointer</b>	Front adjustable on site
<b>Position of use</b>	On request 0 ... 180°
<b>Dial</b>	
<b>Blank dial</b>	With initial and end values marked
<b>Specific markings</b>	Numbering / Lettering
<b>Division dial</b>	Basic divisions without numbering
<b>Colour markings/bands</b>	Red or green
<b>Others</b>	
<b>Zero position</b>	Centre zero or off-set zero
<b>Increased sensitivity</b>	4kOhm/V for voltmeters 1...600V
<b>Adjustment of Resistance (sensitivity)</b>	Within ± 1% at 23 C

## Data Sheet

### Analogue Meters with Moving - coil Movement and Rectifier

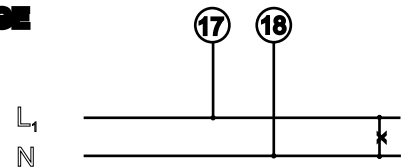
## Accessories

### Safety Terminal Protection

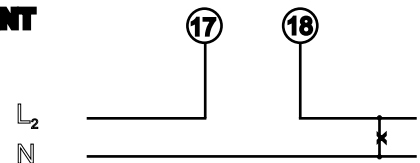
Full sized polycarbonate back cover to provide protection against accidental contact (hand and fingers) acc. to VDE 0410.

## Connections

### AC VOLTAGE



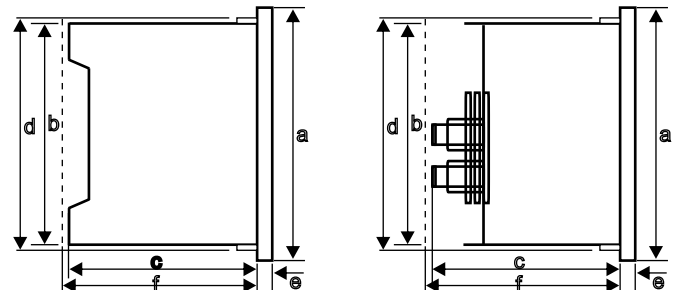
### AC CURRENT



## Dimensions

For Voltmeters & Ammeters < 6A

For Ammeters 6 - 10A



Dimensions (in mm)	DG48	DG72	DG96	DG144
<b>Bezel a</b>	□ 48	□ 72	□ 96	□ 144
<b>Case b</b>	□ 43.5	□ 66	□ 90	□ 136
<b>Depth c*</b>	53	53	53	53
<b>d</b>	□ 44.5	□ 67.5	□ 91.5	□ 137.5
<b>e</b>	5.5	5.5	5.5	5.5
<b>cutout size</b>	□ 45**	□ 68**0.7	□ 92**0.8	□ 138**1
<b>Wt. (approx.)</b>	0.20 kg	0.25 kg	0.30 kg	0.58 kg
<b>Depth with back cover f**</b>	64	64	64	64

\* c = 68mm, for I = 6 to 10 A

\*\* f = 70 mm, for I = 6 to 10 A

\*\* f = 75 mm, for VQ 48, I > 6A

## Ordering Information

Type DG	Moving - coil with rectifier panel meter
Front dimension 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 table inside
Front facia	Normal glass <sup>1</sup> antiglare glass <sup>3</sup>
Colour of Bezel	Black <sup>1</sup> Red, Blue, Yellow, White <sup>3</sup>
Position of use	Vertical <sup>1</sup> on request 0...180° <sup>3</sup>
Terminal protection	full sized polycarbonate back cover
Zero position	Centre <sup>1</sup> , off-set zero <sup>3</sup>
Increased sensitivity	4 kohm/V for voltmeters 1...600 V <sup>3</sup>
Adjustment of resistance (sensitivity)	within ± 1% to 23°C <sup>3</sup>
Dial	Standard scale same as measuring range <sup>1</sup> blank dial with division <sup>3</sup> additional lettering on request <sup>3</sup> additional numbering on request <sup>3</sup> coloured marking red or green <sup>3</sup> coloured sector red or green <sup>3</sup>
logo	Without <sup>3</sup> OEM logo <sup>3</sup>

<sup>1</sup> standard

<sup>3</sup> please clearly add the desired specifications while ordering.

## Safety precautions

- Instruments with damaged bezels or window glasses must be disconnected from the mains.
- Adequate safety clearance must be maintained to control panel fasteners and to sheet metal housing, if non-insulated connector wires are used.
- The back cover must be snapped into place after the connector wires have been clamped for protection against accidental contact.
- Scales should be replaced under voltage-free conditions.
- Bezels and window glasses should be replaced under voltage-free conditions.

### Ordering example

DG 72 measuring range 0 ... 100 mA, dial with 0 ... 100 C, red mark at 37 C.

Specifications are subject to change without notice (07/02)

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