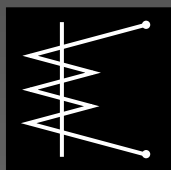
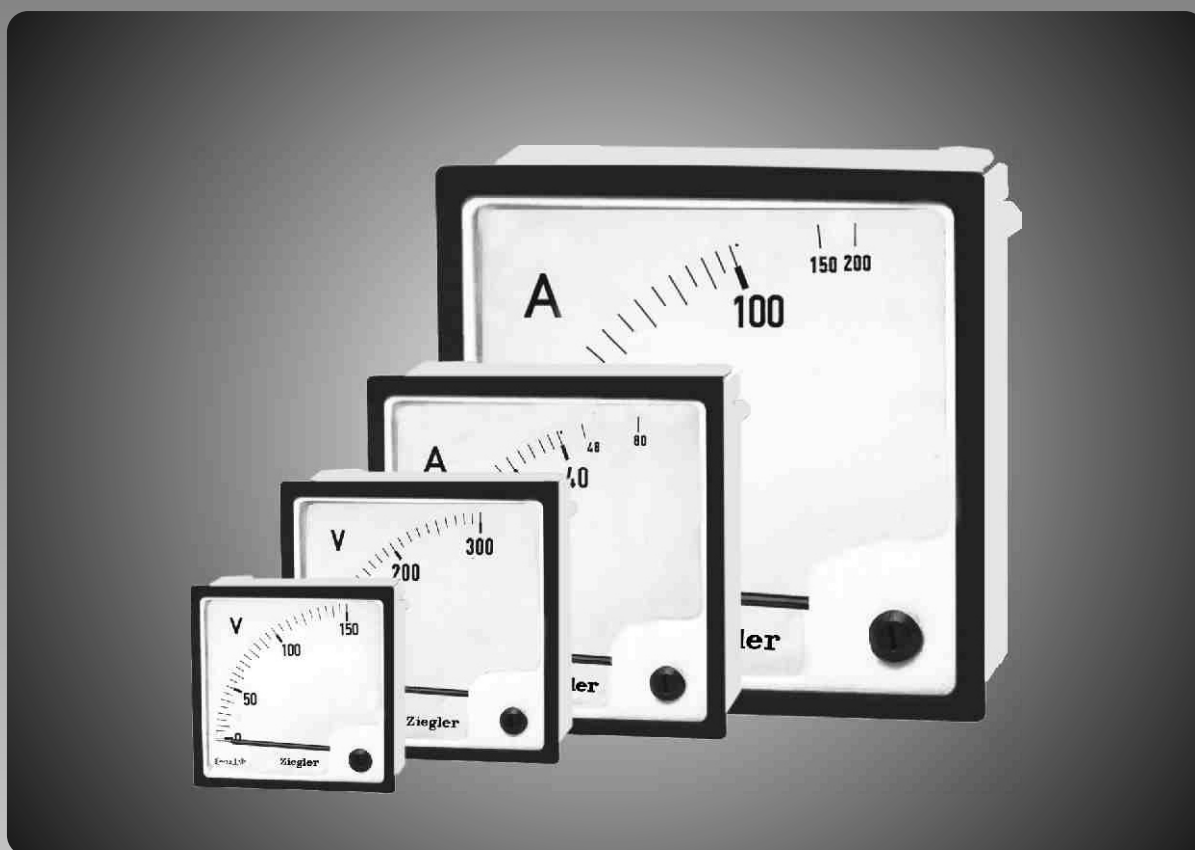


DE 48
DE 72
DE 96
DE 144



Data Sheet

Analogue Meters with
Moving - Iron Meter



Application

The moving-iron panel meters EQ48/72/96/144 housed in moulded polycarbonate cases are suitable for the measurement of AC currents and voltages in the usual frequency range of 15 ... 100 Hz

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

These meters offer several advantages in switchboard and generating set panels. Number of meters can be mounted in a single cut out (mosaic mounting). For CT operated Ammeters dials can be field fitted based on CT ratio. Front window glass and Bezel can be easily replaced.

Movement

Moving-iron movement has pivots of very high hardness. Movement is suspended between spring loaded sapphire jewels. Movement is critically damped by use of silicon oil.

Mechanical Data

Case details	Moulded square case suitable for mounting in control / switchgear panels, machinery consoles.
Case material	Glass filled polycarbonate, Flame retardant and drip proof as per UL 94 V-O.
Front facia	Glass
Colour of bezel	Black
Position of use	Vertical
Panel fixing	Swivel screw
Mounting	Stackable in a single cutout
Panel thickness	≤ 40 mm

Terminals

Voltmeters and Ammeters ≤ 30A	Hexagon studs, M4 screws and wire clamps E3 (DIN 46282)
Ammeters > 30A	Threaded studs M6 with nuts
Ammeters > 60A	Threaded studs M8 with nuts

Electrical Data

Measured quantity	AC voltage or current	
Power consumption		
Voltmeters	< 4.5 VA	
Ammeters ≤ 15 A	< 0.5 VA	
Ammeters > 15 A	< 0.8 VA	
Overload capacity	Acc. To IEC 51	
Continuously	1.2 times rated voltage / current	
Short duration		
Voltmeters	2 times the rated voltage Max 1000 V upto max 5 seconds	
Ammeters	EQ48	EQ72/96/144
5 s max	10 times(200 A max.)	10 times
1 s max	--	40 times (250A max.)
Enclosures code (IEC 529)	IP 52 case IP 00 for terminals without back cover IP 20 for terminals with back cover	
Insulation class	Group A according to VDE 0410	
Rated insulating voltage	EQ48	EQ72/96/144
	660 V	1000 V
Proof Voltage Testing	2 kV	3 kV
Installation category	600 V CAT III (IEC 1010)	
Insulation resistance	> 50 Mohm at 500 V d.c.	

Standard Measuring Ranges

AC Voltage	AC current
6 V	100 mA
10 V	150 mA
15 V	250 mA
25 V	400 mA
40 V	600 mA
60 V	1 A
100 V	1.5 A
120 V	2.5 A
132 V	3 A
150 V	4 A
200 V	5 A
250 V	6 A
300 V	10 A
400 V	15 A
500 V	20 A
600 V	25 A
750 V (except EQ 48)	30 A
	40 A
For use on voltage transformer	50 A
	60 A
.../ 100 V secondary	100 A
.../ 110 V secondary	For use on current transformer .../ 1A secondary or .../ 5A secondary

Scale and pointer

Pointer	Knife-edge pointer			
Pointer deflection	0 90°			
Scale characteristics	Near-linear Above 10% of nominal full-scale value			
Scale division	Coarse-fine			
Scale length	DE 48	DE 72	DE 96	DE 144
	41mm	63mm	97mm	146mm
Over range				
Ammeters	2 times nominal current			
Voltmeters for use on Voltage transformer	1.2 times nominal voltage			
interchangeability	Scales are interchangeable			

Accuracy at Reference Conditions

Accuracy class	1.5 according to IEC 51 / DIN EN 60051
Reference conditions :	
Ambient temperature	23°C ± 2°C
Position of use	Nominal position ± 1°
Input	Rated value of measured quantity
Wave form	Sine wave, distortion factor < 5%
frequency	45 ... 65 Hz
Other conditions	As per IEC 51 / DIN EN 60051

Nominal range of use

Ambient temperature	0 ... 50°C
Position of use	Vertical ± 5°
Frequency	15 ... 100 Hz (voltage) 15 ... 400 Hz (current)
External magnetic field	At 0.4 kA/m, less than 6% of fiducial value (not as a percentage class index)

Environmental conditions

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

Applicable standards

Nominal case & cutout dimensions for : DIN 43700
indicating electrical instruments.

Scale and pointer for electrical measuring instruments : DIN 43802

Connections and terminal marking for Panel meters : DIN 43807

Terminal bolts / leads : DIN 46200/46282

Safety requirement and protective measures for electrical indicating instruments and their accessories : DIN 40050/8-70
VDE 0110 / 11-72
VDE 0410 / 10-76
IEC 529, IEC 1010

Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories : IEC 51/
DIN EN 60051
: DIN 43701

Environmental conditions : VDE/VDI 3540

Front frame for indicating measuring instruments, principle dimensions : DIN 43718

UL Combustibility class : UL 94 V-O

Comply with following European directives : 89/336/EEC (EMC directive), 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE marking.

Data Sheet

Analogue Meters with Moving - Iron Movement

Options

Case

Front facia	Antiglare glass
Colour of bezel	Red, Yellow, Blue, White
Red index pointer	Front adjustable on site
Position of use	On request 15° ... 165°

Dial

Blank dial	With initial and end values marked
Special marking	Numbering / Lettering
Division dials	Basic divisions without numbering
Colour marking/bands	Red or Green
Over range (Ammeters)	No over range or 6 times over range over nominal current

Accessories

Safety Terminal protection

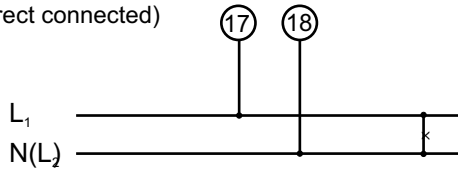
Full sized polycarbonate back cover to provide protection against accidental contact (hand and fingers) acc. to VDE 0410

Safety precautions

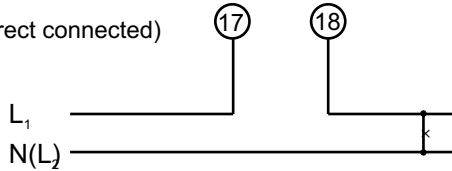
- Instruments with damaged bezels or window glasses must be disconnected from the mains.
- Adequate safety clearance must be maintained to control panel fasteners and to sheet metal housing, if non-insulated connector wires are used.
- The back cover must be snapped into place after the connector wires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

Connections

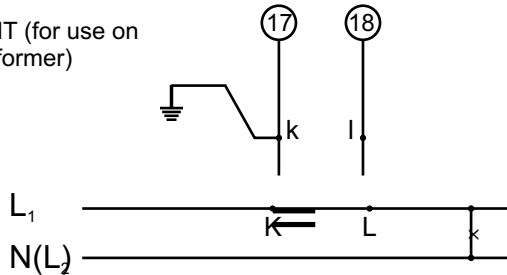
AC VOLTAGE (direct connected)



AC CURRENT (direct connected)

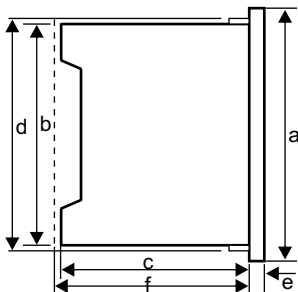


AC CURRENT (for use on current transformer)

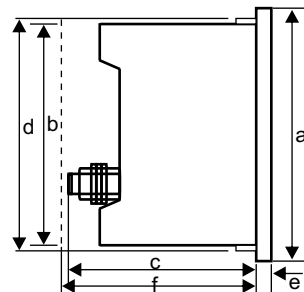


Dimensions

For Voltmeters & Ammeters upto 30A



For Ammeters > 30A



Dimensions (in mm)	DE48	DE72	DE96	DE144
Bezel a	48	72	96	144
Case b	43.5	66	90	136
Depth c*	53	53	53	53
d	44.5	67.5	91.5	137.5
e	5.5	5.5	5.5	5.5
cutout size	45 ^{+0.6}	68 ^{+0.7}	92 ^{+0.8}	138 ⁺¹
Depth with back cover f**	64	64	64	64
Weight approx.	0.1 kg	0.16 kg	0.2 kg	0.4 kg

* c = 62 mm, for I > 30A & upto 60A

* c = 67 mm, for I > 60A

** f = 69.5 mm, for I > 60A

** f = 75 mm, for EQ 48, I > 30A

Ziegler

Ordering Information

Type EQ	Moving - iron panel meter
Front dimension	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 ^{*1} antiglare glass ^{*3}
Colour of Bezel	Black ^{*1} Red, Blue, Yellow, White ^{*3}
Position of use	Vertical ^{*1} on request 15...165° ^{*3}
Panel fixing	Swivel screw
Terminal protection	full sized polycarbonate back cover
Red index pointer	None ^{*1}
Dial	Standard scale same as measuring range ^{*1} Blank dial with division ^{*3} additional lettering on request ^{*3} additional numbering on request ^{*3} coloured marking Red or Green ^{*3} coloured sector Red or Green ^{*3}
Over range (ammeters)	No overrange ^{*3} 2 times nominal current ^{*1} 6 times nominal current ^{*3}
logo	Without ^{*3} OEM logo ^{*3}

^{*1} standard

^{*3} please clearly add the desired specifications while ordering

Ordering example

DE 72 measuring range 150 V, dial 0 - 100%.

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

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