

## Analogue Meters With Moving - Iron Movement

EQ 48  
EQ 72  
EQ 96  
EQ 144

### Data Sheet

Analogue Meters with  
Moving - Iron Movement



Rishabh Instruments

**RISHABH**  
**INSTRUMENTS**  
Measure, Control & Record with a Difference

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# Analogue Meters With Moving - Iron Movement

## 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

## Application

The moving iron, panel meters, EQ 48/ 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...100Hz.

Moving iron meters indicate rms-values practically independent of waveform even of high harmonic. Error of indication may occur for extreme waveforms (e.g. phase gating controls) & for frequencies above 100Hz.

These meters offer several advantages in switchboards and Generating Set Panels. Number of meters can be mounted in a single Cut out (Mosaic mounting). For CT operated ammeters, dials can be fitted based on CT ratio. Front window glass and bezel can be easily replaced.

## Applicable Standards

<b>Nominal case and cutout dimensions for indicating Electrical instruments</b>	: IS 2419 DIN 43700
<b>Scale and pointer for electrical measuring instruments</b>	: IS 1248 DIN 43802
<b>Connections and Terminal markings for panel meters</b>	: IS 1248 DIN 43807
<b>Terminal bolts / leads.</b>	: DIN 46200/46282
<b>Safety requirements and protective measures for Electrical indications instruments and their accessories.</b>	: IS 9249-1979 DIN 40050/8-70, VDE 0110/ 11-72 VDE 0410/ 10-76 IEC 529, IEC 1010
<b>Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories</b>	: IS 1248 IEC51/DINEN60051 DIN 43701
<b>Environmental conditions</b>	: IS 1248 IS: 9000, Part 5, 7, 8, VDE / VDI 3540
<b>Front frames for indicating measuring instruments Principle dimensions</b>	: DIN 43718
<b>UL Combustibility Class</b>	: UL 94 V-0
<b>Comply with following European directives</b>	: 89/336/EEC (EMC Directive), 73/23/EEC (low voltage directive) & ammendment 93/68/EEC, for CE Marking

## Scale and Pointer

<b>Pointer</b>	Knife - edge pointer
<b>Pointer deflection</b>	0...90°
<b>Scale characteristics</b>	Near Linear above 10% of nominal full Scale value
<b>Scale division</b>	Coarse - fine
<b>Scale length</b>	EQ48   EQ72   EQ96   EQ144 41 mm   61mm   97mm   146 mm
<b>Over range:</b>	
<b>Ammeters</b>	2 times nominal current
<b>voltmeters for use on voltage transformer</b>	1.2 times nominal voltage
<b>scale Interchangeability</b>	Interchangeable

## 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 facia</b>	Glass
<b>Colour of bezel</b>	Black
<b>Position of use</b>	Vertical
<b>Panel fixing</b>	Swivel screws
<b>Mounting</b>	Stackable in a single cutout
<b>Panel thickness</b>	≤ 25 mm
<b>Terminals</b>	
<b>Voltmeters and ammeters ≤ 30A</b>	Hexagon studs, M4 screws and wire clamps E3 (DIN 46282)
<b>Ammeters &gt; 30A</b>	Threaded studs M6 with nuts
<b>Ammeters &gt; 60A</b>	Threaded Studs M8 with Nuts.

## Electrical Data

<b>Measured quantity</b>	:AC voltage or current
<b>Power consumption: voltmeters</b>	< 4.5VA
<b>Ammeters &lt; 15A</b>	< 0.5VA
<b>Ammeters &gt; 15A</b>	< 0.8 VA
<b>Overload capacity</b>	(acc. to IS: 1248 / IEC 51)
<b>Continuously</b>	:1.2 times rated voltage /current
<b>Short duration Voltmeters</b>	:2 times rated voltage max 1000V ,upto max 5 seconds.
<b>Ammeters</b>	EQ 48                      EQ72/96/144
<b>5 s max.</b>	10 times(200 A max). 10 times
<b>1 s max</b>	--                              40 times(250 A max.)
<b>Enclosure code (IEC 529)</b>	IP 52 case IP 00 for terminals without back cover IP 20 for terminals with back cover Group A according to VDE 0110
<b>Insulation class</b>	
<b>Rated insulation voltage</b>	EQ48: 660V   EQ72/96/144: 1000V
<b>Proof voltage</b>	EQ48: 2kV   EQ72/96/144: 3kV
<b>Installation category</b>	EQ48: 300V CAT III EQ72/96/144: 600V CAT III
<b>Insulation resistance</b>	> 50 Mohm at 500 V d.c

## Reference Conditions

<b>Accuracy class</b>	1.5 according to IS: 1248 (IEC 51/ DIN EN 60051)
<b>Reference conditions</b>	
<b>Ambient temperature</b>	23°C ± 2
<b>Position of use</b>	Nominal position ± 1°
<b>Input</b>	Rated value of measured quantity
<b>Waveform</b>	sine wave, distortion factor ≤ 5 %
<b>Frequency:</b>	45...65HZ
<b>Other conditions</b>	IS : 1248 (IEC 51/ DIN EN 60051)



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## Nominal Range of Use

Ambient Temperature	0...50°C
Position of use	Vertical $\pm 5^\circ$
Frequency	15 ...100Hz (Voltage) 15...400Hz (current)
External magnetic field :	At 0.4 kA/m

## Environmental Conditions

Climatic suitability	Climate category II as per IS : 1248 (climatic class 3 according to VDE/VDI 3540)
Operating temperature	- 0... + 50°C
Storage temperature	- 25... + 65°C
Relative humidity	$\leq 75\%$ annual average, non-condensing
Shock resistance	15g <sub>n</sub> , 11 ms
Vibration resistance	10-55-10 Hz/0.15 mm 1.5 g <sub>n</sub> at about 50 Hz.

## Standard Measuring Ranges

A. C. Voltage	A. C. Current
6V	100mA
10V	150mA
15V	250mA
25V	400mA
40V	600mA
60V	1A
100V	1.5A
120V	2.5A
132V	3A
150V	4A
200V	5A
250V	6A
300V	10A
400V	15A
500V	20A
600V	25A
750V (except EQ 48)	30A
1000V (except EQ 48)	40A
For use on voltage transformer	50A 60A
.../100V secondary	100A (except EQ 48)
.../110V secondary	for use on current transformer .../1A secondary or .../5A secondary

## 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 markings	Numbering / Lettering.
Division dials	Basic divisions without numbering.
Colour markings/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 IS 9249, VDE 0410.

## Safety Precautions

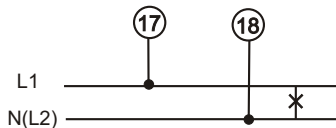
- 1) Instruments with damaged bezels or window glasses must be disconnected from the mains.
- 2) Adequate safety clearance must be maintained to control panel fasteners and to sheet metal housing. If non - insulated connector wires are used.
- 3) The back cover must be snapped into place after connector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



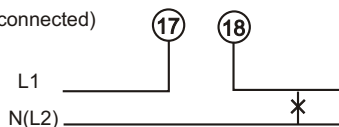
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## Connections

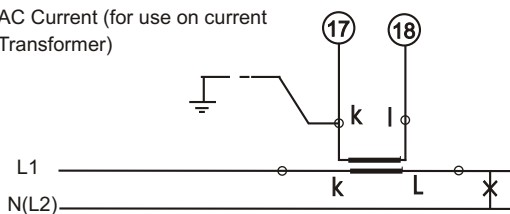
AC Voltage (Direct connected)



AC Current (Direct connected)

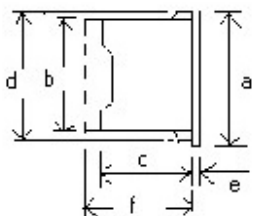


AC Current (for use on current Transformer)

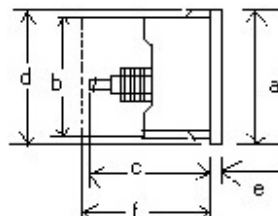


## Dimensions

For Voltmeters & ammeters upto 30 A



For ammeters > 30 A



Dimensions (in mm)		EQ 48	EQ 72	EQ 96	EQ 144
Bezel	a	48	72	96	144
Case	b	43.5	66	90	136
Depth	c <sup>x</sup>	53	53	53	53
	d	44.5	67.5	91.5	137.5
	e	5.5	5.5	5.5	5.5
Cotout Size		45+0.6	68 +0.7	92 +0.8	138 <sup>+1</sup>
Depth with Back cover	f <sup>xx</sup>	64	64	64	64
	<sup>x</sup>	c=62mm,for I > 30A & up to 60A			
	<sup>x</sup>	c = 67 mm, for I > 60 A			
	<sup>xx</sup>	f = 69.5mm, for I > 60 A			
	<sup>xx</sup>	f = 75mm, for EQ 48 I > 30 A			
Weight (approx.)		0.1 kg.	0.16 kg.	0.2 kg.	0.4 kg.

## 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
Over range (ammeters)	no over range <sup>*3</sup> 2 times nominal current <sup>*1</sup> 6 times nominal current <sup>*3</sup>
Measuring Ranges	Refer to table inside
Terminal protection	full sized polycarbonate backcover
Panel Fixing	Swivel Screw
Red Index Pointer	None <sup>*1</sup>
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 15° .... 165° <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	RISHABH <sup>*1</sup> , for Indian sales C.G. <sup>*1</sup> , for export through Crompton Greaves I.D. Others <sup>*3</sup>

\*1 standard

\*3 Please clearly add the desired specifications while ordering

## Ordering example

EQ 72 Measuring range 150 V, dial 0 - 100%

Specifications are subject to change without notice (06/10)



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