

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

RISHABH INSTRUMENTS PVT.LTD.

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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 100kHz. waveforms (e.g. phase gating controls) and for frequencies above 100kHz.

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

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

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	EQ 48 EQ72 EQ96 EQ144 41 mm 61mm 97mm 146 mm
over range:	
Ammeters	2 times nominal current
voltmeters for use on	1.2 times nominal voltage
Voltage transformer	
Scale Interchangeability	Interchangeable

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-0.
Front facia	Glass
Colour of bezel	Black
Position of use	Vertical
Panel fixing	Swivel screws
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	< 4.5VA
Ammeters < 15A	< 0.5VA
Ammeters > 15A	< 0.8 VA
Overload capacity	(acc. to IS: 1248 / IEC 51)
Continuously	:1.2 times rated voltage /current
Short duration Voltmeters	:2 times rated voltage max 1000V , upto max 5 seconds.
Ammeters	EQ 48 EQ72/96/144
5 s max.	10 times(200 A max). 10 times
1 s max	-- 40 times(250 A max.)
Enclosure 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 0110
Rated insulation voltage	EQ48: 660V EQ72/96/144: 1000V
Proof voltage	EQ48: 2kV EQ72/96/144: 3kV
Installation category	600 V CAT III (IEC 1010)
Insulation resistance	> 50 Mohm at 500 V d.c

Reference Conditions

Accuracy class	1.5 according to IS: 1248 (IEC 51/ DIN EN 60051)
Reference conditions	
Ambient temperature	23°C ± 2
Position of use	Nominal position ± 1°
Input	Rated value of measured quantity
Waveform	sine wave, distortion factor <= 5 %
Frequency:	45...65HZ
Other conditions	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, less than 6 % of fiducial-value (not as a percentage class index)

Environmental Conditions

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

Standard Measuring Ranges

A. C. Voltage	A. C. Current
6V	100mA
10V	150mA
15V	250mA
25 V	400mA
40 V	600mA
60 V	1A
100V	1.5A
120 V	2.5A
132 V	3A
150 V	4A
200 V	5A
250 V	6A
300 V	10A
400V	15A
500 V	20A
600 V	25A
750 V (except EQ 48)	30A
	40A
For use on voltage transformer	50A
	60A
.../100V secondary	100A (except EQ 48)
.../110 V 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 on request 15....165
Position of use	
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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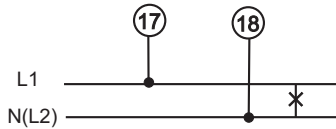
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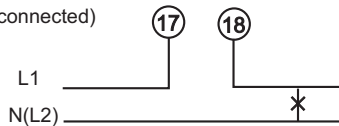
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Connections

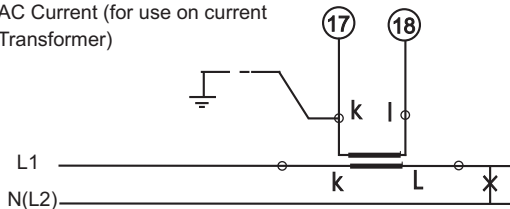
AC Voltage (Direct connected)



AC Current (Direct connected)

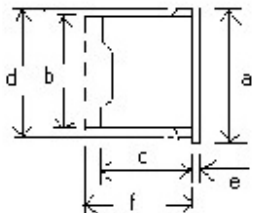


AC Current (for use on current Transformer)

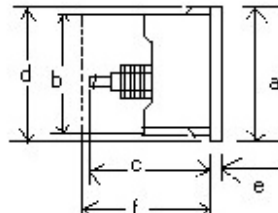


Dimensions

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 ^x	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 ⁺¹
Depth with Back cover	f ^{xx}	64	64	64	64
	^x	c=62mm,for I > 30A & up to 60A			
	^x	c = 67 mm, for I > 60 A			
	^{xx}	f=69.5mm, for I> 60 A			
	^{xx}	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 * 3 2 times nominal current* 1, 6 times nominal current *3
Measuring Ranges	Refer to table inside
Terminal protection	full sized polycarbonate backcover
Panel Fixing	Swivel Screw
Red Index Pointer	None * 1
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}
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}
Logo	RISHABH ^{*1} , for Indian sales C.G. ^{*1} , for export through Crompton Greaves I.D. Others ^{*3}

*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(02/09)



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