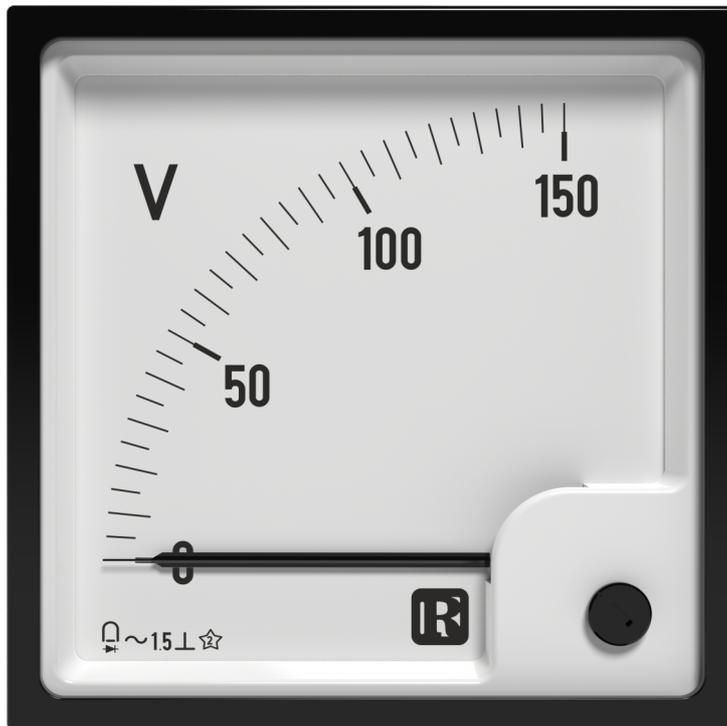




# Data Sheet

## 90° Moving Coil Rectifier Meter VQ



Measure



Control



Record



Analyze



Optimize

## Application

The moving coil, rectifier meters, VQ48/72/96/144 housed in moulded polycarbonate cases are suitable for the measurement of AC currents and voltages.

Moving coil rectifier instruments measure average values & are calibrated to indicate RMS values, 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.

## Features

- Less VA burden.
- Linear scale.
- Fully range indication.
- Glass filled polycarbonate housing ( UL 94-V-0 ).
- Knife edge pointer.
- Easily replaceable glass and bezel.
- Easy installation with swivel screws.

## Movement

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

## Specifications

### Scale and Pointer

Pointer	Knife - edge pointer
Pointer deflection	0...90°
Scale characteristics	linear*1
Scale division	Coarse - fine
Scale length	VQ 48 VQ72 VQ96 VQ144
	41 mm 61mm 97mm 146 mm
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	≤ 25 mm
Terminals	
Voltmeters and ammeters <6A	Hexagon studs, M4 screws and wire clamps E3 (DIN 46282)
Ammeters ≤6A	Threaded studs M6 with nuts

### Electrical Data

Measured quantity	DC voltage or current
Overload capacity	(acc. to IS: 1248 / IEC 51)
Continuously	1.2 times rated voltage / current
Short duration :	
Voltmeters	2 times for 5 sec : 1 overload 2 times for 0.5 sec : 9 overloads
Ammeters	10 times for 5 sec : 1 overload

Enclosures code (IEC 529)	IP 52 case IP 00 for terminals without backcover IP 20 for terminals with backcover
Insulation class	Group A according to VDE 0110 VQ 48 VQ 72/96/144
Rated insulation voltage	660 V 1000V
Proof voltage	2kV 2kV
Installation category	300V CAT III 300V CAT III
Insulation resistance	> 50 Mohm at 500 V d.c.

\*scale are nonlinear & not interchangeable for ammeters>750 mA

### Accuracy at Reference Conditions

Accuracy class	1.5 according to IS: 1248 (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
Other conditions	IS : 1248 (IEC 51/ DIN EN 60051)
Nominal range of use	
Ambient temperature	0...50 °C
Position of use	Vertical ± 5°
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	≤ 75% annual average, non-condensing
Shock resistance	15g <sub>s</sub> 11ms
Vibration resistance	10-55-10 Hz / 0.15mm 1.5 g <sub>r</sub> at about 50 Hz.

## Standard Measuring Ranges

A. C. Current		A. C. Voltage	
Rated Value	Approx Voltage drop	Rated value	Sensitivity (?10%)
1 mA	2.4 V	40 V <sup>*3</sup>	900 ohm/ V
1.5 mA	1.4 V	60 V <sup>*4</sup>	900 ohm/ V
2.5 mA	1.4 V	100 V	900 ohm/ V
4 mA	1.4 V	150 V	900 ohm/ V
6 mA	1.4 V	250 V	900 ohm/ V
10 mA	1.4 V	400 V	900 ohm/ V
15 mA	1.7 V	500 V	900 ohm/ V
25 mA	1.7 V	600 V	900 ohm/ V
40 mA	1.7 V		
60 mA	1.7 V		
100 mA	1.7 V		
150 mA	1.33V		
250 mA	0.80V		
400 mA	0.50V		
600 mA	0.33V		
750 mA	0.27V		
1A <sup>*1</sup>	0.20V		
1.5A <sup>*1</sup>	0.14V		
2.5A <sup>*1</sup>	0.80V		
4A <sup>*1</sup>	0.50V		
5A <sup>*1</sup>	0.40V		
6A <sup>*2</sup>	0.03V		
10A <sup>*2</sup>	0.02V		

\* Scales are non-linear & not interchangeable for ammeters > 750mA

\*1 Possible in 72 and above size

\*2 Possible in 96 and above size

\*3 Accuracy class 5

\*4 Accuracy class 2.5

## 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 0° ....180°
Accuracy class	1

### Dial

Blank dial	With initial and endvalues marked.
Special markings	Numbering / Lettering.
Division dials	Basic divisions without numbering.
Colour markings/bands others	Red or green

### Others

Increased sensitivity	4 k ohm/V forvoltmeters 1...600V
Adjustment of Resistance (Sensitivity)	Within 1% at 23°C

## Applicable Standards

Nominal case and cutout dimensions for indicating Electrical instruments	: IS 2419 DIN 43700
Scale and pointer for electrical measuring instruments	: IS 1248 ,IEC51 DIN 43802
Connections and Terminal markings for panel meters	: IS 1248 , IEC51 DIN 43807
Terminal bolts / leads.	: DIN 46200/46282
Clamp straps for connections	: DIN 46282
Safety requirements and protective measures for Electrical indicating instruments and their accessories.	: IS 9249 DIN 40050/8-70, VDE 0110/ 11-72 VDE 0410/ 10-76 IEC 529 , IEC 1010
Performance specification for direct acting indicating analogue electrical measuring instruments and their accessories	: IS 1248 IEC51/DINEN60051 DIN 43701
Environmental conditions	: IS 1248 , IEC51 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
Technical conditions of delivery for electrical instruments	: DIN 43701
Mechanical strength (Free fall test, vibration test)	: IS 1248, IEC 51 IS 9000 VDE 0411, part 1, Sec. 43/44, IEC 1010

## Accessories

### Safety Terminal Protection

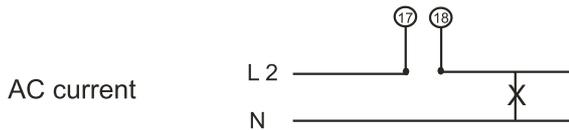
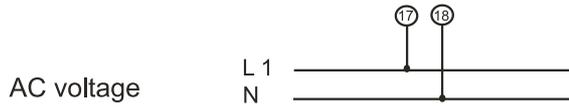
Full sized polycarbonate back cover to provide protection against accidental contact (hand and fingers) acc to IS 9249, VDE 0410.

## Safety Precautions

- Instruments with damaged bezels or window glasses must be disconnected from 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.

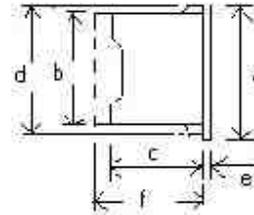
- Scales should be replaced under Voltage- free conditions.
- Be zels and window glasses should be replaced under Voltage - free conditions.

## Connections



## Dimensions

For Voltmeters & ammeters upto 10 A



Dimensions (in mm)	VQ 48	VQ 72	VQ 96	VQ 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 <sup>+1</sup>
Cotout Size	45+0.6	68 +0.7	92 +0.8	138
Depth with Back cover f <sup>xx</sup>	64	64	64	64
Weight (approx.)	0.2 kg.	0.25 kg.	0.3 kg.	0.58 kg.

## Ordering Information

Type VQ	Moving coil with rectifier panel meter
Front dimension	48 --- 48mm x 48mm 72 ---72 mm x 72 mm 96 ----96 mm x 96 mm 144 --- 144mm x 144mm
Measuring ranges	refer to table inside
Front facia	Normal glass <sup>*1</sup> , PC glass <sup>*3</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>0</sup> <sup>*3</sup>
Terminal protection	Full sized polycarbonate back cover
Increased sensitivity	4 kohm/V for voltmeters 1...600 V <sup>*3</sup>
Adjustment Resistance (Sensitivity)	Within $\pm 1\%$ at 23 <sup>0</sup> 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	RISHABH <sup>*1</sup> Others <sup>*3</sup>

\*1 standard

\*3 Please clearly add the desired specification while ordering

## Ordering example

VQ 72 measuring range 0 ... 100mA,dial  
with 0...100<sup>0</sup>C, red mark at 37<sup>0</sup>C.

Specifications are subjects to change without notice ( 03/18 )



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