



# Data Sheet

## Moving Coil Meter DC Ammeters & Voltmeters 90°

PQ



Measure



Control



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## Application

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

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

- Linear Scale.
- 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

### 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 single cut out                                                                 |
| Panel thickness             | : | ≤ 25 mm                                                                                     |
| Terminals                   | : |                                                                                             |
| Voltmeters and ammeters <5A | : | Hexagon studs, M4 screws And wire clamps E3 (DIN 46282)                                     |
| ammeters >5A                | : | Threaded studs M6 with nuts                                                                 |
| ammeters >60A               | : | Threaded studs M8 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<br>2 times for 0.5 sec : 9 overloads   |
| Ammeters          | : | 10 times for 5 sec : 1 overload<br>10 times for 0.5 sec : 9 overloads |

|                           |   |                                                                                              |
|---------------------------|---|----------------------------------------------------------------------------------------------|
| Enclosures code (IEC 529) | : | IP 52 case<br>IP 00 for terminals without back - cover<br>IP 20 for terminals with backcover |
| Insulation class          | : | Group A according to VDE 0110<br>PQ48 PQ 72/96/144                                           |
| Rated insulation voltage  | : | 660V 1000 V                                                                                  |
| Proof voltage             | : | 2 kV 3kV                                                                                     |
| installation category     | : | 300 V CAT III 600 V CAT III                                                                  |
| Insulation resistance     | : | > 50 Mohm at 500 V d.c.                                                                      |

<sup>\*3</sup> Accuracy class 5

<sup>\*4</sup> Accuracy class 2.5

<sup>\*5</sup> Not applicable for PQ 144

<sup>\*6</sup> Total lead resistance of 0.035 ohm is considered for mV ranges while calibration.

<sup>\*7</sup> Not applicable for PQ 48

## Standard Measuring Ranges

| D. C. Current          |                     | D. C. Voltage             |                    |
|------------------------|---------------------|---------------------------|--------------------|
| Rated Value            | Approx Voltage drop | Rated Value               | Sensitivity (±10%) |
| 15uA <sup>*3, *5</sup> | 140 mV              | 15 mV <sup>*4, *5</sup>   | 0.16kohm/V         |
| 25uA <sup>*3, *5</sup> | 240 mV              | 25 mV <sup>*4, *5</sup>   | 0.16kohm/V         |
| 40 uA <sup>*3</sup>    | 374 mV              | 40 mV <sup>*4, *5</sup>   | 0.16kohm/V         |
| 50 uA <sup>*4</sup>    | 424 mV              | 50 mV                     | 0.16kohm/V         |
| 60 uA <sup>*4</sup>    | 600 mV              | 60 mV                     | 0.16kohm/V         |
| 100 uA                 | 400 mV              | 75 mV                     | 0.16kohm/V         |
| 150 uA                 | 600 mV              | 100 mV                    | 0.16kohm/V         |
| 250 uA                 | 140 mV              | 150 mV                    | 0.16kohm/V         |
| 400 uA                 | 540 mV              | 250 mV                    | 0.16kohm/V         |
| 500 uA                 | 540 mV              | 400 mV                    | 0.16kohm/V         |
| 600 uA                 | 540 mV              | 600 mV                    | 0.16kohm/V         |
| 1 mA                   | 37 mV               | 1 V                       | 1 kohm/V           |
| 1.5 mA                 | 196 mV              | 1.5 V                     | 1 kohm/V           |
| 2.5 mA                 | 196 mV              | 2.5 V                     | 1 kohm/V           |
| 4 mA                   | 196 mV              | 4 V                       | 1 kohm/V           |
| 5 mA                   | 196 mV              | 6 V                       | 1 kohm/V           |
| 6 mA                   | 196 mV              | 10 V                      | 1 kohm/V           |
| 10 mA                  | 196 mV              | 15 V                      | 1 kohm/V           |
| 15 mA                  | 11 mV               | 25 V                      | 1 kohm/V           |
| 20 mA                  | 60 mV               | 30 V                      | 1 kohm/V           |
| 25 mA                  | 60 mV               | 40 V                      | 1 Kohm/V           |
| 40 mA                  | 60 mV               | 50 V                      | 1 kohm/V           |
| 60 mA                  | 60 mV               | 60 V                      | 1 kohm/V           |
| 100 mA                 | 60 mV               | 100 V                     | 1 kohm/V           |
| 150 mA                 | 60 mV               | 150 V                     | 1 kohm/V           |
| 250 mA                 | 60 mV               | 200 V                     | 1 kohm/V           |
| 400 mA                 | 60 mV               | 250 V                     | 1 kohm/V           |
| 600 mA                 | 60 mV               | 300 V                     | 1 kohm/V           |
| 1 A                    | 60 mV               | 400 V                     | 1 kohm/V           |
| 1.5 A                  | 60 mV               | 500 V                     | 1 kohm/V           |
| 2.5 A                  | 60 mV               | 600 V                     | 1 kohm/V           |
| 4 A                    | 60 mV               | 1000 V                    | 1 kohm/V           |
| 5 A                    | 60 mV               | 1-5 V                     | 1 kohm/V           |
| 6 A                    | 72 mV               | For use on external shunt | 1 kohm/V           |
| 10 A                   | 60 mV               |                           |                    |
| 15 A                   | 60 mV               |                           |                    |
| 20 A                   | 60 mV               |                           |                    |
| 25 A                   | 60 mV               |                           |                    |
| 30 A                   | 60 mV               |                           |                    |
| 40 A                   | 60 mV               |                           |                    |
| 60 A                   | 72 mV               | For use on transducer     | 1 kohm/V           |
| 100 A <sup>*7</sup>    | 60 mV               |                           |                    |
| 4-20 mA                | 60 mV               |                           |                    |



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### Scale and Pointer

|                          |                                                        |
|--------------------------|--------------------------------------------------------|
| Pointer                  | : Knife - edge pointer                                 |
| Pointer deflection       | : 0 ... 90°                                            |
| Scale characteristics    | : Linear                                               |
| Scale division           | : Coarse - fine                                        |
| Scale length             | : PQ 48 PQ 72 PQ 96 PQ 144<br>41 mm 61 mm 97 mm 146 mm |
| Scale Interchangeability | : Interchangeable                                      |

### Accuracy at Reference Conditions

|                             |                                                      |
|-----------------------------|------------------------------------------------------|
| Accuracy class              | : 1.5 according to IS:1248<br>(IEC 51/ DIN EN 60051) |
| <b>Reference conditions</b> |                                                      |
| 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     | : -5 ... 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 :<br>1248 (climatic class 3 according to<br>VDE/VDI 3540) |
| Operating temperature | : -5... + 50°C                                                                            |
| Storage temperature   | : -40... + 70°C                                                                           |
| Relative humidity     | : ≤75% annual average, non<br>condensing                                                  |
| Shock resistor        | : 15g, 11 ms                                                                              |
| Vibration resistor    | : 10-55-10Hz / 0.15mm<br>1.5 g at about 50 Hz.                                            |

## Applicable Standards

|                                                                                                                              |                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Nominal case and cutout dimensions for<br>indicating Electrical instruments.                                                 | : IS 2419<br>DIN 43700                                                                   |
| Scale and pointer for electrical measuring<br>instruments                                                                    | : IS 1248<br>DIN 43802                                                                   |
| Connections and Terminal markings for<br>panel meters                                                                        | : IS 1248<br>DIN 43807                                                                   |
| Terminal bolts / leads                                                                                                       | : DIN 46200/46282                                                                        |
| Clamp straps for connections.                                                                                                | : DIN 46282                                                                              |
| Safety requirements and protective<br>measures for Electrical indicating<br>instruments and their accessories.               | : IS 9249<br>DIN 40050 / 8-70<br>VDE 0110 /11-72<br>VDE 0410 /10-76<br>IEC 529, IEC 1010 |
| Performance specifications for direct<br>acting indicating analogue electrical<br>measuring instruments & their accessories: | : IS 1248, IEC 51<br>IEC 51/DIN EN<br>60051DIN 43701                                     |

|                                                                                                                                                       |                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Environmental conditions                                                                                                                              | : IS 1248, IEC 51<br>IS: 9000, Part 5, 7,<br>8,VDE / VDI 3540           |
| Front frames for indicating measuring<br>instruments principle dimensions.                                                                            | : DIN 43718                                                             |
| UL Combustibility class.                                                                                                                              | : UL 94 V0                                                              |
| Technical conditions of delivery for<br>electrical instruments.                                                                                       | : DIN 43701                                                             |
| Mechanical strength (Free fall test,<br>vibration test)                                                                                               | : IS 1248, IEC 51<br>IS 9000VDE 0411,<br>part I, Sec.43/44.<br>IEC 1010 |
| Comply with following European directives: 89 / 336/ EEC<br>(EMC directive),73/23/EEC(low voltage directive)& amendment<br>93/68/EEC, for CE marking. |                                                                         |

## 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°    |

### Dial

|                       |                                      |
|-----------------------|--------------------------------------|
| Blank dial            | : With initial & end values marked.  |
| Special markings      | : Numbering /Lettering.              |
| Division dials        | : Basic divisions without numbering. |
| Colour markings/bands | : Red or green.                      |

### Others

|                       |                                                                           |
|-----------------------|---------------------------------------------------------------------------|
| Zero position         | : Centre zero or off-set zero                                             |
| Increased sensitivity | : 4kohm/V for voltmeters 1...600V<br>10 kohm/V for Voltmeters<br>15..150V |

|                                           |                        |
|-------------------------------------------|------------------------|
| Adjustment of<br>Resistance (Sensitivity) | : Within ± 1% at 23° C |
|-------------------------------------------|------------------------|

## Accessories

### Safety Terminal protection

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



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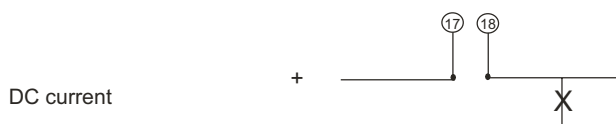
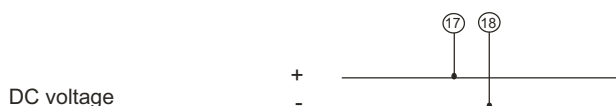


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### Safety Precautions

- 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.
- Bezels and window glasses should be replaced under Voltage free conditions.

### Connections



| Dimensions<br>(in mm)     | PQ 48                | PQ 72                | PQ 96                | PQ 144              |
|---------------------------|----------------------|----------------------|----------------------|---------------------|
| 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 <sup>+0.6</sup> | □ 68 <sup>+0.7</sup> | □ 92 <sup>+0.8</sup> | □ 138 <sup>+1</sup> |
| weight(Approx)            | 0.13kg               | 0.18kg               | 0.22kg               | 0.43kg              |
| Depth with back cover f** | 64                   | 64                   | 64                   | 64                  |

\* c = 68mm, for I= 6 to 60 A

\* c = 78mm, for I> 60 A

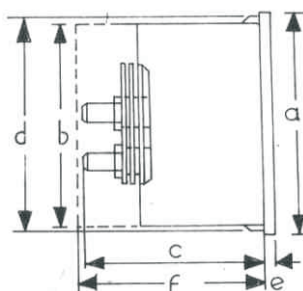
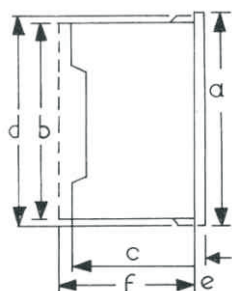
\*\*f = 70mm, for I= 6 to 60 A

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

### Dimensions

For Voltmeter & Ammeter < 5A

For Ammeter 5 - 100 A



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## Ordering Information

| Type : PQ                                  | Moving-coil panel meter                                                                                                                                                                                                                                                                       |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Front dimension :<br>48<br>72<br>96<br>144 | 48 mm x 48 mm<br>72 mm x 72 mm<br>96 mm x 96 mm<br>144 mm x 144 mm                                                                                                                                                                                                                            |
| Measuring ranges                           | refer to table inside                                                                                                                                                                                                                                                                         |
| Front facia                                | Normal glass <sup>*1</sup> , PC glass <sup>*3</sup><br>Antiglare glass <sup>*3</sup>                                                                                                                                                                                                          |
| Colour of bezel                            | Black <sup>*1</sup><br>Red, Blue, Yellow, White <sup>*3</sup>                                                                                                                                                                                                                                 |
| Position of use                            | Vertical <sup>*1</sup><br>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> , Supp. zero <sup>*3</sup>                                                                                                                                                                                                                  |
| Increased sensitivity                      | 4 kohm/V for voltmeters 1...600 V <sup>*3</sup><br>10 kohm /V for voltmeters 15 ...150 V <sup>*3</sup>                                                                                                                                                                                        |
| Adjustment Resistance<br>(Sensitivity)     | Within $\pm 1\%$ at 23°C <sup>*3</sup>                                                                                                                                                                                                                                                        |
| Dial                                       | Standard scale same as measuring range <sup>*1</sup><br>Blank dial with division <sup>*3</sup><br>Additional lettering on request <sup>*3</sup><br>Additional numbering on request <sup>*3</sup><br>Coloured marking red or green <sup>*3</sup><br>Coloured sector red or green <sup>*3</sup> |
| Logo                                       | RISHABH <sup>*1</sup> , Others <sup>*3</sup>                                                                                                                                                                                                                                                  |

<sup>\*1</sup> standard

<sup>\*3</sup> Please clearly add the desired specifications while ordering

## Ordering Example

PQ 72 measuring range 0 ... 20mA,dial  
with 0...100° C, red mark at 37°C.

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



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Specifications may change without prior notice



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