

# Analogue Meters with Moving - Coil Movement 240° Scale

PL 48  
PL 72  
PL 96  
PL 144

## Data Sheet

DC Ammeters , Voltmeters - PL



## Application

The moving coil panel meters, PL 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

- Better resolution.
- 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

### Scale and Pointer

Pointer	: Knife - edge pointer
Pointer deflection	: 0 ... 240°
Scale characteristics	: Linear
Scale division	: Coarse - fine
Scale length	: PL48 PL72 PL96 PL144 70mm 106mm 142mm 230mm
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 fascia	: 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
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 2 times for 0.5 sec : 9 overloads

Ammeters	10times for 5 sec : 1 overload 10times for 0.5 sec : 9 overloads
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
	PL48 PL 72/96/144
Rated insulation voltage	660 V 1000V
Proof voltage	2kV 3kV
Installation category	300V CAT III 660V CAT III
Insulation resistance	> 50 Mohmat 500 V d.c.

### 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	-10 ... + 55°C
Storage temperature	-25 .... + 65°C
Relative humidity	≤ 75% annual average, non-condensing
Shock resistance	15g. 11ms
Vibration resistance	10-55-10 Hz / 0.15 mm 1.5 g at about 50 Hz.

## Options

Case	
Front fascia	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 and end values marked.
Special markings	Numbering /Lettering.
Division dials	Basic divisions without numbering.
Colour markings/bands	Red or green.
Others	
Zero position	Center zero or off-set zero
Increased sensitivity	4kohm/V for voltmeters 1...600V 10 kohm/V for Voltmeters 15..150V
Adjustment of Resistance (Sensitivity)	Within ± 1% at 23°C

## Standard Measuring Ranges

D. C. Current		D. C. Voltage	
Rated Value	Approx Voltage drop	Rated Value	Sensitivity (± 10%)
50 $\mu$ A <sup>74</sup>	540 mV	60 mV <sup>77</sup>	200 ohm/V
60 $\mu$ A <sup>74</sup>	540 mV	75 mV <sup>77</sup>	200 ohm/V
75 mA	540 mV	100 mV <sup>77</sup>	200 ohm/V
100 $\mu$ A <sup>77</sup>	970 mV	150 mV <sup>77</sup>	200 ohm/V
150 $\mu$ A	970 mV	250 mV <sup>77</sup>	200 ohm/V
250 $\mu$ A	810 mV	400 mV <sup>77</sup>	1 kohm/V
400 $\mu$ A	900 mV	600 mV <sup>77</sup>	1 kohm/V
600 $\mu$ A	900 mV	750 mV <sup>77</sup>	1 kohm/V
1 mA <sup>77</sup>	500 mV	1 V <sup>77</sup>	1 kohm/V
1.5 mA	500 mV	1.5 V <sup>77</sup>	1 kohm/V
2.5 mA	500 mV	2.5 V <sup>77</sup>	1 kohm/V
4 mA	500 mV	4 V <sup>77</sup>	1 kohm/V
5 mA <sup>77</sup>	40 mV	6 V <sup>77</sup>	1 kohm/V
6 mA	40 mV	10 V <sup>77</sup>	1 kohm/V
10 mA	75 mV	15 V <sup>77</sup>	1 Kohm/V
15 mA	60 mV	25 V <sup>77</sup>	1 kohm/V
20 mA	60 mV	30 V <sup>77</sup>	1 kohm/V
25 mA	60 mV	40 V <sup>77</sup>	1 kohm/V
40 mA	60 mV	60 V <sup>77</sup>	1 kohm/V
60 mA	60 mV	100 V <sup>77</sup>	1 kohm/V
100 mA	60 mV	150 V <sup>77</sup>	1 kohm/V
150 mA	60 mV	200 V <sup>77</sup>	1 kohm/V
200 mA	60 mV	250 V <sup>77</sup>	1 kohm/V
250 mA	60 mV	300 V <sup>77</sup>	1 kohm/V
300 mA	60 mV	400 V <sup>77</sup>	1 kohm/V
400 mA	60 mV	500 V <sup>77</sup>	1 kohm/V
500 mA	60 mV	600 V <sup>77</sup>	1 kohm/V
600 mA	60 mV		
750 mA	60 mV		
1 A	60 mV		
1.5 A	60 mV		
2.5 A	60 mV		
4 A	60 mV		
5 A	60 mV		
6 A	60 mV		
10 A	60 mV		
15 A	60 mV		
20 A	60 mV		
25 A	60 mV		
30 A	60 mV		
40 A <sup>75</sup>	60 mV		
60 A <sup>75</sup>	60 mV		
		For use on external shunt	200 ohm/V
		50 mV <sup>76</sup>	200 ohm/V
		60 mV <sup>76</sup>	200 ohm/V
		75 mV <sup>76</sup>	200 ohm/V
		150 mV <sup>76</sup>	200 ohm/V

<sup>74</sup> Accuracy class 2.5

<sup>75</sup> Not applicable for PL 72

<sup>76</sup> Total lead resistance of 0.035 ohm is considered for mV ranges while calibration.

<sup>77</sup> Applicable for PL 48

## Applicable Standards

Nominal case and cutout dimensions for indicating measuring 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
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 specifications for direct acting indicating analogue electrical measuring instruments & their accessories : IS 1248  
IEC 51/DIN EN 60051  
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-O

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 I,  
Sec.43/44.IEC 1010

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

## Safety Precautions

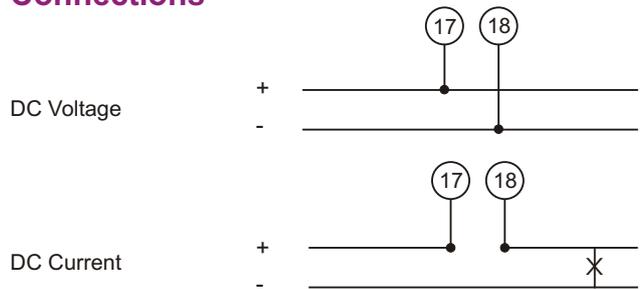
- Instruments with damaged bezels or window glasses must be disconnected from mains.
- Adequate safety clearance must be maintained to control panel fasteners and to sheet metal housing, if non - insulated connector wires are used.
- The back cover must be snapped into place after the connector wires 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  
Specifications are subject to change without notice(02/09)

## Accessories

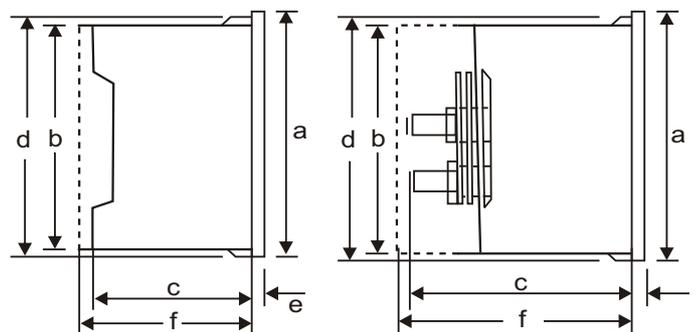
### Safety Terminal protection

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

## Connections



## Dimensions



Dimensions (in mm)		PL48	PL72	PL96	PL144
Bezel	a	<input type="checkbox"/> 48	<input type="checkbox"/> 72	<input type="checkbox"/> 96	<input type="checkbox"/> 144
Case	b	<input type="checkbox"/> 43.5	<input type="checkbox"/> 66	<input type="checkbox"/> 90	<input type="checkbox"/> 136
Depth	c*	<input type="checkbox"/> 53	<input type="checkbox"/> 53	<input type="checkbox"/> 53	<input type="checkbox"/> 53
	d	<input type="checkbox"/> 44.5	<input type="checkbox"/> 67.5	<input type="checkbox"/> 91.5	<input type="checkbox"/> 137.5
	e	5.5	5.5	5.5	5.5
Cutout Size		<input type="checkbox"/> 45 <sup>+0.6</sup>	<input type="checkbox"/> 68 <sup>+0.7</sup>	<input type="checkbox"/> 92 <sup>+0.8</sup>	<input type="checkbox"/> 138 <sup>+1</sup>
Weight (approx.)		0.13 kg.	0.25 kg.	0.30 kg.	0.43 kg.
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

## Ordering Information

Type :-	PL	Moving-coil panel meter 240° scale
Front dimension :-	48 96 72 144	48 mm x 48 mm 96 mm x 96 mm 72 mm x 72 mm 144 mm x 144 mm
Measuring ranges		refer to table inside
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 0....180° <sup>*3</sup>
Terminal protection		Full sized polycarbonate back cover
Zero position		Centre <sup>*1</sup> , Off-set zero <sup>*3</sup>
Increased sensitivity		4 kohm/V for voltmeters 1...600 V <sup>*3</sup> 10 kohm/V for voltmeters 15 ...150 V <sup>*3</sup>
Adjustment Resistance (Sensitivity)		Within ± 1 % at 23°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> , for Indian Sales C.G. <sup>*1</sup> , for export through Crompton Greaves. I.D. Others <sup>*3</sup>

<sup>\*1</sup> standard

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

## Ordering example

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

Specifications are subjects to change without notice (11/11)



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