

# Analogue Meter With Moving Coil Movement - DS

DS 48  
DS 72  
DS 96  
DS 144

## Data Sheet

Analogue Meters with  
Moving Coil Movement



## Application

The moving coil panel meters, DS 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 Panel 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.

## Movement

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

## Mechanical Data

Case details	Moulded square case suitable for mounting in Control / Switchgear panels, Machinery consoles.
Case material	Polycarbonate, flame retardant & drip proof as per UL 94 V-0.
Front facia	Glass
Colour of bazel	Black
Position of use	Vertical
Panel fixing	Mounting Clamps
Mounting	Stackable in a single cutout
Panel thickness	≤25 mm
<b>Terminals</b>	
Voltmeters and ammeters <5A	Hexagon studs, M4 screws and wire clamps E3
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 0.5 sec : 9 overloads 2 times for 5 sec : 1 overloads
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Ammeters	DS 48, 72, 96 10 times for 0.5 sec : 9 overloads 10 times for 5 sec : 1 overload
Enclosure code (IEC 529)	IP 52 case cover 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	DS 48 : 660V DS 72/96 : 1KV
Proof Voltage	DS 48 : 2KV DS72/96 : 3KV
Installation category	DS 48 300 V CAT III (IEC 1010) DS 72/96 600V CAT III(IEC 1010)

Insulation resistance > 50 Mohm at 500 V d.c.

\*4 Accuracy class 2.5

\*5 Total lead resistance of 0.035 ohm or less considered for mV ranges while calibration.

\*6 Not applicable for DS 48

## Burden

Connection to shunt	Power Consumption : 6 mA Lead resistance : 0.06 W	± 10%
1A ... 60 A	Voltage drop : 60 mV	± 10%
≥ 1V	1000 W/V	± 5%

## Standard Measuring Ranges

D. C. Current		D. C. Voltage	
Rated Value	Approx Voltage drop	Rated Value	Sensitivity (± 10%)
15uA <sup>*4</sup>	140 mV	15 mV <sup>*4*5</sup>	3.33kohm/V
25uA <sup>*4</sup>	240 mV	25 mV <sup>*4*5</sup>	3.33kohm/V
40 uA <sup>*4</sup>	374 mV	40 mV <sup>*4*5</sup>	3.33kohm/V
50 uA <sup>*4</sup>	424 mV	50 mV <sup>*5</sup>	3.33kohm/V
60 uA <sup>*4</sup>	600 mV	60 mV <sup>*5</sup>	1 kohm/V
100 uA	400 mV	75 mV <sup>*5</sup>	1 kohm/V
150 uA	600 mV	100 mV <sup>*5</sup>	1 kohm/V
250 uA	140 mV	150 mV <sup>*5</sup>	1 kohm/V
400 uA	540 mV	250 mV <sup>*5</sup>	1 kohm/V
500 uA	540 mV	400 mV <sup>*5</sup>	1 kohm/V
600 uA	540 mV	600 mV <sup>*5</sup>	1 kohm/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	For use on external shunt	
6 A	72 mV		
10 A	60 mV		
15 A	60 mV	60 mV <sup>*5</sup>	1 kohm/V
20 A	60 mV	75 mV <sup>*5</sup>	1 kohm/V
25 A	60 mV	150 mV <sup>*5</sup>	1 kohm/V
30 A	60 mV		
40 A	60 mV		
60 A	72 mV		
100 A <sup>*6</sup>	60 mV		
For use on transducer			
4-20 mA	60 mV		

Non-Standard ranges available on request.

## Accuracy at Reference Conditions

Accuracy class	1.5 according to IS: 1248 (IEC 51/ DIN EN 60051)
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### 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 0.4KA/m

## Scale and Pointer

Pointer	Knife - edge pointer
Pointer deflection	0...90°
Scale characteristics	linear
Scale division	Coarse - fine
Scale length	DS 96 DS 48 DS 72 DS144 41 mm 63 mm 97mm 146mm
Scale Interchangeability	Interchangeable

## 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, for pulse duration 11 ms
Vibration resistance	10-55-10Hz for ampli. 0.15mm (1.5 g at 50Hz)
Pollution degree	2

## Applicable Standards

Nominal case and cutout dimensions for indicating Electrical instruments	IS 2419 DIN IEC 61554
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 VDE 0110 VDE 0410 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 condition : IS 1248

IS: 9000

VDE / VDI 3540

Front frames for indicating measuring instruments Principle dimensions

UL Combustibility Class

Technical conditions of delivery for electrical instruments

Mechanical strength (Free fall test, vibration test)

IS 1248

IS 9000

VDE 0411

IEC 61010

Comply with following European directives: : 2004 / 108 / EC

(EMC directive ), 2006 / 95 /EC (low voltage directive) &

amendment 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 on request 0°....180°
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

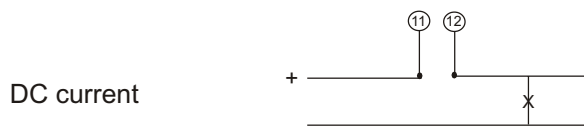
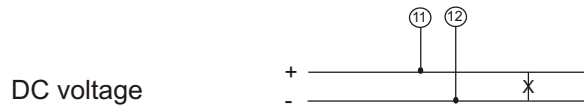
### Others

Zero position	Centre 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

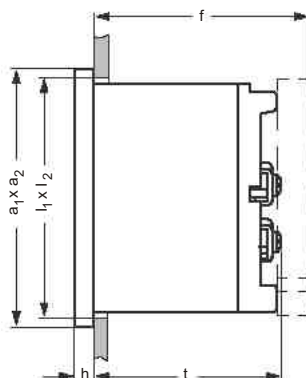
## Accessories

Safety Terminal protection  
Full sized polycarbonate back cover to provide protection against accidental contact (hand and fingers)

## Connections



## Dimensions



Front in mm	Nominal Dimensions, mm		Cutout, mm l <sub>1</sub> x l <sub>2</sub>	Installation Depth Including Terminal (t), mm			Installation Depth Incl. Full back Cover (f), mm		
	a <sub>1</sub> x a <sub>2</sub>	h		≤ 4A (M4)	5...60A (M6)	60...100A(M8)	≤ 4A	5...60A	60...100A
48 x 48	48 x 48	5.5	45 <sup>+0.6</sup> x 45 <sup>+0.6</sup>	54	72	—	62.5	75	—
72 x 72	72 x 72	5.5	68 <sup>+0.7</sup> x 68 <sup>+0.7</sup>	54	67	67	62.5	70	70
96 x 96	96 x 96	5.5	92 <sup>+0.8</sup> x 92 <sup>+0.8</sup>	54	67	67	62.5	70	70
144 x 144	144 x 144	5.5	138 <sup>+1</sup> x 138 <sup>+1</sup>	54	67	67	62.5	70	70

## Ordering Information

Type DS	Moving-coil panel meter
Front Dimension 48 72 96 144	48mm x 48mm 72mm x 72mm 96mm x 96mm 144mm x 144mm
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>o*3</sup>
Terminal Protection	Full sized polycarbonate back cover
zero position	Left, <sup>*1</sup> Off-set zero <sup>*3</sup> Centre <sup>*1</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 $\pm 1\%$ 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>

<sup>\*1</sup>Standard

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

## Safety Precautions

- 1) Instruments with damaged bezel or 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) Bezel, Scale and Glass may only be replaced under voltage free conditions.
- 5) Instruments to be used in grounded panel.

## Ordering example

DS 72 measuring range 0 ... 20 mA, dial with 0...100<sup>o</sup> C, red mark at 37<sup>o</sup> C.

Specifications are subject to change without notice (04/10)



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