

DSL 48
DSL 72
DSL 96
DSL 144

Data Sheet

Analogue Meters with
Moving Coil Movement
240° Scale



Application

The moving coil panel meters, DSL 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

- Better resolution.
- 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 spring loaded sapphire jewels. Movement is properly shielded & critically damped by eddy currents induced in coil former.

Applicable Standards

Nominal case and cutout dimensions for indicating measuring 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 conditions	IS 1248 IS: 9000 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 IS 9000 VDE 0411 IEC 1010

Comply with following European directives:

2004 / 108 / EC (EMC directive) , 2006 / 95 /EC (low voltage directive) & amendment 93/68/EEC, For (CE) Marking.

Scale and Pointer

Pointer	Knife - edge pointer
Pointer deflection	0 ... 240°
Scale characteristics	Linear
Scale division	Coarse - fine
Scale length	DSL48 70mm DSL72 106mm DSL96 142mm DSL144 230mm
Scale Interchangeability	Interchangeable.

Mechanical Data

Case details	Moulded square case suitable for mounting in Control / Switchgear panels, Machinery consoles.
Case material	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	Mounting Clamp.
Mounting	Stackable in a single cutout
Panel thickness	≤ 25 mm

Terminals

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	
Ammeters	10 times for 5 sec : 1 overload 10 times for 0.5 sec : 9 overloads
Voltmeters	2 times for 5 sec : 1 overload 2 times for 0.5 sec : 9 overloads
Enclosures code	IP 52 case
IEC 529)	IP 00 for terminals without backcover IP 20 for terminals with backcover
Insulation class	Group A according to VDE 0110
Rated insulation voltage	1000 V
Proof voltage testing	3 kV
Installation category	600 VCAT III (IEC 1010)
Insulation resistance	> 50 Mohm at 500V DC

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	0.5 mT

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 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 and end values marked.
Special markings	Numbering /Lettering.
Division dials numbering.	Basic divisions without
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 $\pm 1\%$ at 23 °C

Standard Measuring Ranges

D. C. Current		D. C. Voltage	
Rated Value	Approx Voltage drop	Rated Value	Sensitivity (+ 10%)
50 μA ⁻⁴	540 mV	60 mV ⁻⁷	200 ohm/V
60 μA ⁻⁴	540 mV	75 mV ⁻⁷	200 ohm/V
75 mA	540 mV	100 mV ⁻⁷	200 ohm/V
100 μA ⁻⁷	970 mV	150 mV ⁻⁷	200 ohm/V
150 μA	970 mV	250 mV ⁻⁷	200 ohm/V
250 μA	810 mV	400 mV ⁻⁷	1 kohm/V
400 μA	900 mV	600 mV ⁻⁷	1 kohm/V
600 μA	900 mV	750 mV ⁻⁷	1 kohm/V
1 mA ⁻⁷	500 mV	1 V ⁻⁷	1 kohm/V
1.5 mA	500 mV	1.5 V ⁻⁷	1 kohm/V
2.5 mA	500 mV	2.5 V ⁻⁷	1 kohm/V
4 mA	500 mV	4 V ⁻⁷	1 kohm/V
5 mA ⁻⁷	40 mV	6 V ⁻⁷	1 kohm/V
6 mA	40 mV	10 V ⁻⁷	1 kohm/V
10 mA	75 mV	15 V ⁻⁷	1 Kohm/V
15 mA	60 mV	25 V ⁻⁷	1 kohm/V
20 mA	60 mV	30 V ⁻⁷	1 kohm/V
25 mA	60 mV	40 V ⁻⁷	1 kohm/V
40 mA	60 mV	60 V ⁻⁷	1 kohm/V
60 mA	60 mV	100 V ⁻⁷	1 kohm/V
100 mA	60 mV	150 V ⁻⁷	1 kohm/V
150 mA	60 mV	200 V ⁻⁷	1 kohm/V
200 mA	60 mV	250 V ⁻⁷	1 kohm/V
250 mA	60 mV	300 V ⁻⁷	1 kohm/V
300 mA	60 mV	400 V ⁻⁷	1 kohm/V
400 mA	60 mV	500 V ⁻⁷	1 kohm/V
500 mA	60 mV	600 V ⁻⁷	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	For use on external shunt	200 ohm/V
6 A	60 mV		200 ohm/V
10 A	60 mV		200 ohm/V
15 A	60 mV	50 mV ⁻⁶	
20 A	60 mV	60 mV ⁻⁶	
25 A	60 mV	75 mV ⁻⁶	
30 A	60 mV	150 mV ⁻⁶	
40 A ⁻⁵	60 mV		
60 A ⁻⁵	60 mV		
100 A ⁻⁵	60 mV		

⁻⁴ Accuracy class 2.5

⁻⁵ Not applicable for DSL 72

⁻⁶ Total lead resistance of 0.035 ohm is considered for mV ranges while calibration.

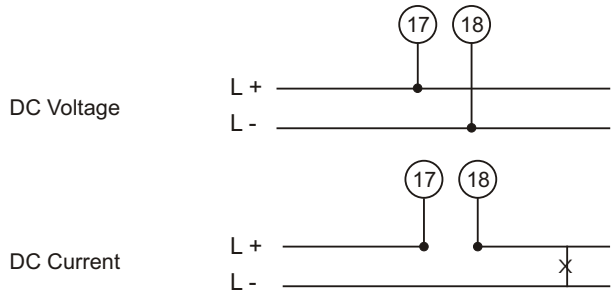
⁻⁷ Applicable for DSL 48

Accessories

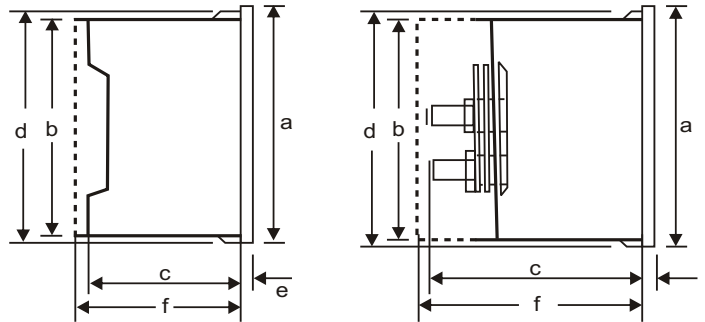
Safety Terminal protection

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)	DSL48	DSL72	DSL96	
Bezel	a	□48	□72	□96
Case	b	□43.5	□66	□90
Depth	c*	□53	□53	□53
	d	□44.5	□67.5	□91.5
	e	5.5	5.5	5.5
Cutout Size		□45 ^{+0.6}	□68 ^{+0.7}	□92 ^{+0.8}
Weight (approx.)		0.13 kg.	0.25 kg.	0.30 kg.
Depth with Back cover	f**	64	64	64
* c =	68mm,	for I= 5 to 60 A		
* c =	78mm,	for I> 60 A		
** f =	70mm,	for I= 5 to 60 A		

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 Information

Type	DSL	Moving-coil panel meter 240° scale
Front Dimension	48 96 72 144	48mm x 48mm 96mm x 96mm 72mm x 72mm 144mm x 144mm
Measuring Ranges		Refer to table inside
Front facia		Normal glass ¹ Antiglare glass ³ Polycarbonate glass ³
Colour of Bezel		Black ¹ Red, Blue, Yellow, White ³
Position of use		Vertical ¹ on request 0... 180° ³
Terminal Protection		Full sized polycarbonate back cover
zero position		Centre ¹ , Off-set zero ³
Increased sensitivity		4 kohm/V for voltmeters 15... 150 V ³
Adjustment Resistance (Sensitivity)		Within $\pm 1\%$ at 23 °C 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

¹Standard

³Please clearly add the desired specifications while ordering

Ordering example

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

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



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