Technical Data Sheet

# *Sigma Series DS Meter*




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.

## Special Features

- Linear scale.
- Glass filled polycarbonate housing (UL 94-V-0)
- Knife edge pointer.
- Easily replaceble glass and bezel.

# 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.

# 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 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 < 5 A Ammeters > 5A | Hexagon studs, M4 screws and wire clamps E3 (DIN 46282) Threaded studs M6 with nuts |
| Ammeters > 60A | Threaded studs M8 with nuts |

# Electrical Data

| | |
|---|---|
| **Measured Quantity** | AC voltage or current |
| **Overload capacity acc. to IEC 51** | 1.2 times rated voltage /current Continuously |

**Short Duration**

| | |
|---|---|
| Voltmeters | 2 times for 0.5 sec : 9 overloads 2 times for 5 sec : 1 overloads |
| 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<br>IP 00 for terminals without back<br>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 catagory | DS 48 300 V CAT III (IEC 1010)<br>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 Consumtion: 6mA Lead resistance: 0.06 W | +10% |
|---|---|---|
| 1A ... 60 A | Voltage drop : 60 mV | +10% |
| > 1V | 1000 W/V | +5% |

# Technical Specifications

## Applicable Standards

| | |
|---|---|
| **Nominal case and cutout dimensions for indicating Electrical instruments** | DIN IEC 61554 |
| **Scale and pointer for electrical measuring instruments** | DIN 43802 |
| **Connections and Terminal markings for panel meters** | DIN 43807 |
| **Terminal bolts/leads** | DIN 46200/46282 |
| **Safety requirements and protective measures for Electrical indicating. instruments and their accessories** | DIN 40050, VDE 0110, VDE 0410 IEC 529, IEC 1010 |
| **Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories** | IEC51/DINEN60051 DIN 43701 |
| **Environmental conditions** | VDE / VDI 3540 |
| **Front frames for indicating measuring instruments Principle dimensions** | DIN 43701 |
| **UL Compatibility** | UL 94 V-0 |
| **Technical conditions of delivery for electrical instruments** | DIN 43701 |

| | |
|---|---|
| **Mechanical strength (Free fall test,vibration test)** | 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.

## Reference Conditions

| | |
|---|---|
| **Accuracy class** | 1.5 according to IEC 51/DIN EN 60051 |
| **Ambient temperature** | 23° C ± 2°C |
| **Position of use** | Nominal position ±1° |
| **Input** | Rated value of measured quantity |
| **Other Conditions** | 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 |

### Scale and Pointer

| | | | | |
|---|---|---|---|---|
| **Pointer** | Knife - edge pointer | | | |
| **Pointer deflection** | 0...90° | | | |
| **Scale characteristics** | Linear*1 | | | |
| **Scale division** | Coarse - fine | | | |
| **Scale length** | DS 48 | DS 72 | DS 96 | DS 144 |
| | 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 | 15 g. for pulse duration 11ms |
| Vibration resistance | 10-55-10Hz for ampli. 0.15mm (1.5g at50Hz) |
| Pollution degree | 2 |

## Standard Measuring Ranges

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

# Options

| Case | |
|---|---|
| Front Facia | Antiglare glass |
| Color 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 |
| Color markings/bands | Red or green |
| Over range (Voltmeters) | Two, three and five times over range |
| Over range (Ammeters) | Six times over range |

| Others | |
|---|---|
| **Zero position** | Centre zero or off-set zero |
| **Increased sensitivity** | 4kohm/V for voltmeters 1...600V<br>10 kohm/V for Voltmeters |
| **Adjustment of Resistance (Sensitivity)** | 15..150V Within ± 1% at 23$^0$C |

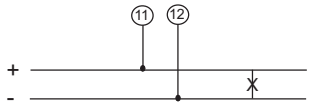
## Accessories

**Safety Terminal Protection**

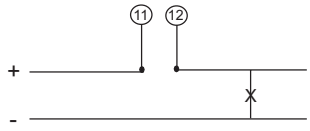
Full sized polycarbonate back cover to provide protection against accidental contact (hand and fingers)

# Electrical Connections

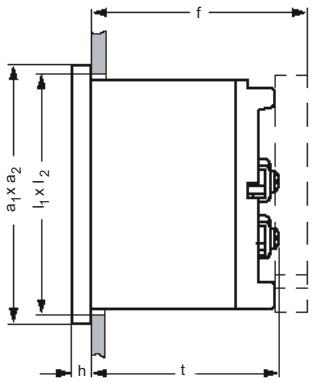
DC voltage




DC current




## Dimensions



| Front in mm | Nominal Dimensions, mm | | Cutout, mm | Installation Depth Including Terminal (t), mm | | | Installation Depth Incl. Full back Cover (f), mm | | |
|---|---|---|---|---|---|---|---|---|---|
| | $a_1$ x $a_2$ | h | $l_1$ x $l_2$ | ≤ 4A (M4) | 5...60A (M6) | 60..100A(M8) | ≤ 4A | 5...60A | 60...100A |
| 48 x 48 | 48 x 48 | 5.5 | $45^{+0.6}$ x $45^{+0.6}$ | 54 | 72 | – | 62.5 | 75 | – |
| 72 x 72 | 72 x 72 | 5.5 | $68^{+0.7}$ x $68^{+0.7}$ | 54 | 67 | 67 | 62.5 | 70 | 70 |
| 96 x 96 | 96 x 96 | 5.5 | $92^{+0.8}$ x $92^{+0.8}$ | 54 | 67 | 67 | 62.5 | 70 | 70 |
| 144 x 144 | 144 x 144 | 5.5 | $138^{+1}$ x $138^{+1}$ | 54 | 67 | 67 | 62.5 | 70 | 70 |

# Ordering Information- Only For Representative Products

Size: 48 x 48 Ammeter

| Part No. | Description | Class |
|---|---|---|
| PQ44-I12L2N1CAW0ST | 1mA DC indicator | CL-1 |
| PQ44-I13L2N1CAW0ST | 1.5mA DC indicator | CL-1 |
| PQ44-I14L2N1CAW0ST | 2.5mA DC indicator | CL-1 |
| PQ44-I16L2N1CAW0ST | 5mA DC indicator | CL-1 |
| PQ44-I17L2N1CAW0ST | 6mA DC indicator | CL-1 |
| PQ44-I18L2N1CAW0ST | 10mA DC indicator | CL-1 |
| PQ44-I19L2N1CAW0ST | 15mA DC indicator | CL-1 |
| PQ44-I20L2N1CAW0ST | 20mA DC indicator | CL-1 |
| PQ44-I22L2N1CAW0ST | 40mA DC indicator | CL-1 |
| PQ44-I23L2N1CAW0ST | 60mA DC indicator | CL-1 |
| PQ44-I42L2N1CAW0ST | 4-20mA DC indicator | CL-1 |

Size: 72 x 72 Ammeter

| Part No. | Description | Class |
|---|---|---|
| PQ74-I12L2N1CAW0ST | 1mA DC indicator | CL-1 |
| PQ74-I13L2N1CAW0ST | 1.5mA DC indicator | CL-1 |
| PQ74-I14L2N1CAW0ST | 2.5mA DC indicator | CL-1 |
| PQ74-I16L2N1CAW0ST | 5mA DC indicator | CL-1 |
| PQ74-I17L2N1CAW0ST | 6mA DC indicator | CL-1 |
| PQ74-I18L2N1CAW0ST | 10mA DC indicator | CL-1 |
| PQ74-I19L2N1CAW0ST | 15mA DC indicator | CL-1 |
| PQ74-I20L2N1CAW0ST | 20mA DC indicator | CL-1 |
| PQ74-I22L2N1CAW0ST | 40mA DC indicator | CL-1 |
| PQ74-I23L2N1CAW0ST | 60mA DC indicator | CL-1 |
| PQ74-I42L2N1CAW0ST | 4-20mA DC indicator | CL-1 |

Size: 96 x 96 Ammeter

| Part No. | Description | Class |
|---|---|---|
| PQ94-I12L2N1CAW0ST | 1mA DC indicator | CL-1 |
| PQ94-I13L2N1CAW0ST | 1.5mA DC indicator | CL-1 |
| PQ94-I14L2N1CAW0ST | 2.5mA DC indicator | CL-1 |
| PQ94-I16L2N1CAW0ST | 5mA DC indicator | CL-1 |
| PQ94-I17L2N1CAW0ST | 6mA DC indicator | CL-1 |
| PQ94-I18L2N1CAW0ST | 10mA DC indicator | CL-1 |
| PQ94-I19L2N1CAW0ST | 15mA DC indicator | CL-1 |
| PQ94-I20L2N1CAW0ST | 20mA DC indicator | CL-1 |
| PQ94-I22L2N1CAW0ST | 40mA DC indicator | CL-1 |
| PQ94-I23L2N1CAW0ST | 60mA DC indicator | CL-1 |
| PQ94-I42L2N1CAW0ST | 4-20mA DC indicator | CL-1 |

Size: 48 x 48 Voltmeter

| Part No. | Description | Class |
|---|---|---|
| PQ44-VOSL2N1CAW0ST | 0-10V DC Voltmeter | CL-1 |
| PQ44-VOTL2N1CAW0ST | 0-15V DC Voltmeter | CL-1 |
| PQ44-VOVL2N1CAW0ST | 0-30V DC Voltmeter | CL-1 |
| PQ44-VOXL2N1CAW0ST | 0-50V DC Voltmeter | CL-1 |
| PQ44-VOYL2N1CAW0ST | 0-60V DC Voltmeter | CL-1 |
| PQ44-VOZL2N1CAW0ST | 0-100V DC Voltmeter | CL-1 |
| PQ44-V1AL2N1CAW0ST | 0-150V DC Voltmeter | CL-1 |

Size: 72 x 72 Voltmeter

| Part No. | Description | Class |
|---|---|---|
| PQ74-VOSL2N1CAW0ST | 0-10V DC Voltmeter | CL-1 |
| PQ74-VOTL2N1CAW0ST | 0-15V DC Voltmeter | CL-1 |
| PQ74-VOVL2N1CAW0ST | 0-30V DC Voltmeter | CL-1 |
| PQ74-VOXL2N1CAW0ST | 0-50V DC Voltmeter | CL-1 |
| PQ74-VOYL2N1CAW0ST | 0-60V DC Voltmeter | CL-1 |
| PQ74-VOZL2N1CAW0ST | 0-100V DC Voltmeter | CL-1 |
| PQ74-V1AL2N1CAW0ST | 0-150V DC Voltmeter | CL-1 |

Size: 96 x 96 Voltmeter

| Part No. | Description | Class |
|---|---|---|
| PQ94-VOSL2N1CAW0ST | 0-10V DC Voltmeter | CL-1 |
| PQ94-VOTL2N1CAW0ST | 0-15V DC Voltmeter | CL-1 |
| PQ94-VOVL2N1CAW0ST | 0-30V DC Voltmeter | CL-1 |
| PQ94-VOXL2N1CAW0ST | 0-50V DC Voltmeter | CL-1 |
| PQ94-VOYL2N1CAW0ST | 0-60V DC Voltmeter | CL-1 |
| PQ94-VOZL2N1CAW0ST | 0-100V DC Voltmeter | CL-1 |
| PQ94-V1AL2N1CAW0ST | 0-150V DC Voltmeter | CL-1 |

**For more details and product codes, please contact our local office**

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