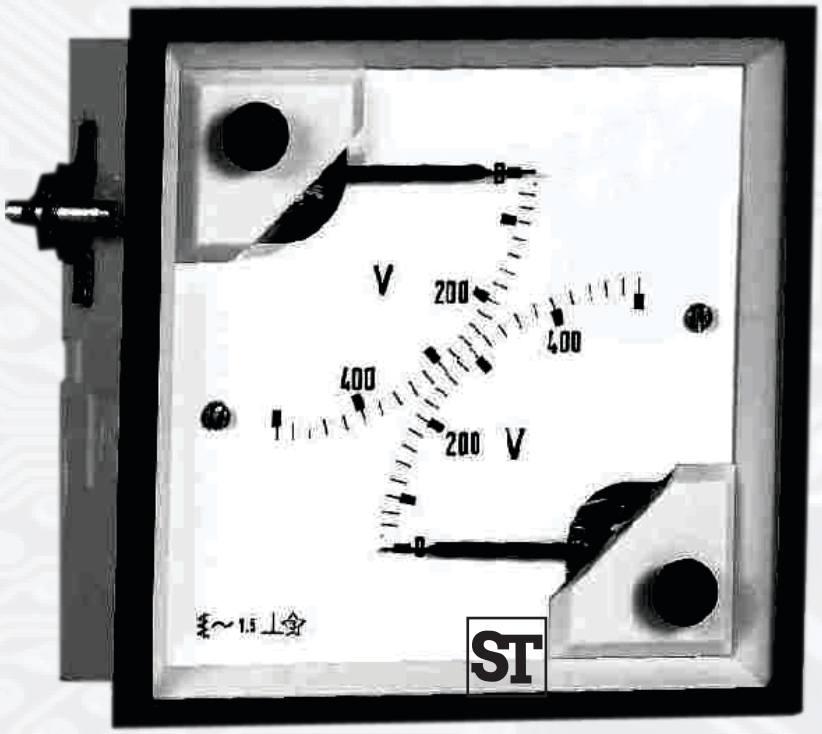
Technical Data Sheet

# *DS 2 in1*




***DS 2 in 1*** The moving iron panel meters, 2-in-1 housed in moulded polycarbonate cases are suitable for the measurement of AC currents for frequency range of 15...400Hz and voltages in the frequency range of 15...100Hz.

## Special Features

- Two different meters in one case.
- Linear scale.
- Glass filled polycarbonate housing(UL 94 V-0).
- Knife edge pointer
- Easily replacable glass & bezel.

# Application

*DS 2 in 1* The moving coil panel meters, 2 in 1 DS 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.

# 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.

# Specifications

## Accuracy at Reference Conditions

| | |
|---|---|
| Accuracy class | 1.5 according to (IEC 51/ DIN EN 60051) |

## Terminals

| | |
|---|---|
| Voltmeters and ammeters < 5A | Hexagon studs, M4 screws and wire clamps E3 |
| Ammeters ≥ 5A | Threaded studs M6 with nuts |

## Electrical Data

| | |
|---|---|
| Measured quantity | DC voltage or current |
| Overload capacity | acc. to IEC 51 |
| Continuously | 1.2 times rated voltage / current |
| Short duration Voltmeters | 2 times for 0.5 sec : 9 overloads<br>2 times for 5 sec : 1 overloads |
| Ammeters | 10 times for 0.5 sec : 9 overloads<br>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 96 : 1000V |
| Proof Voltage | 3KV |
| Installation catagory | 600V CAT III (IEC 1010) |
| Insulation resistance | > 50 Mohm at 500 V d.c. |

## 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 bazel | Black |
| Position of use | Vertical |
| Panel fixing | Mounting Clamps |
| Mounting | Stackable in a single cutout |
| Panel thickness | 25 mm |

## Burden

| | | |
|---|---|---|
| Connection to shunt | Power Consumtion : 6 mA<br>Lead resistance : 0.06 | ± 10% |
| 1A ... 40 A | Voltage drop : 60 mV | ± 10% |
| ≥ 1V | 1000 /V | ± 5% |

## Reference conditions

| | |
|---|---|
| Ambient temperature | 23 C ± $2^0$ C |
| Position of use | Nominal position ± $2^0$ C |
| Input | Rated value of measured quantity |
| Other conditions | IEC 51/ DIN EN 60051 |

## Nominal range of use

| | |
|---|---|
| Ambient temperature | 0...$50^0$ C |
| Position of use | Vertical ± $5^0$ C |
| External magnetic field | At 0.4KA/m |

## Scale and Pointer

| | |
|---|---|
| Pointer | Knife - edge pointer |
| Pointer deflection | 0...90 $^0$ |
| Scale characteristics | linear |
| Scale division | Coarse - fine |
| Scale length | 54mm |

## Environmental Conditions

| | |
|---|---|
| Climatic suitability | Climate category II as per IS : 1248 (climatic class 3 according to VDE/VDI 3540) |
| Operating temperature | - 10...+ $55^0$ C |
| Storage temperature | - 25...+ $65^0$ C |
| Relative humidity | ≤ 75% annual average, non-condensing |
| Shock resistance | $15g_n$ for pulse duration 11 ms |
| Vibration resistance | 10-55-10Hz for ampli. 0.15mm (1.5 g at 50Hz) |
| Pollution degree | 2 |

# Specifications

## Standard Measuring Ranges

| D. C. Current | | D. C. Voltage | |
|---|---|---|---|
| **Rated Value** | **Approx Voltage drop** | **Rated Value** | **Sensitivity (± 10%)** |
| 100 uA | 400 mV | 40 mV | 3.33kohm/V |
| 150 uA | 600 mV | 50 mV | 3.33kohm/V |
| 250 uA | 140 mV | 60 mV | 1 kohm/V |
| 400 uA | 540 mV | 75 mV | 1 kohm/V |
| 500 uA | 540 mV | 100 mV | 1 kohm/V |
| 600 uA | 540 mV | 150 mV | 1 kohm/V |
| 1 mA | 37 mV | 250 mV | 1 kohm/V |
| 1.5 mA | 196 mV | 400 mV | 1 kohm/V |
| 2.5 mA | 196 mV | 600 mV | 1 kohm/V |
| 4 mA | 196 mV | 1 V | 1 kohm/V |
| 5 mA | 196 mV | 1.5 V | 1 kohm/V |
| 6 mA | 196 mV | 2.5 V | 1 kohm/V |
| 10 mA | 196 mV | 4 V | 1 kohm/V |
| 15 mA | 11 mV | 6 V | 1 kohm/V |
| 20 mA | 60 mV | 10 V | 1 kohm/V |
| 25 mA | 60 mV | 15 V | 1 kohm/V |
| 40 mA | 60 mV | 25 V | 1 kohm/V |
| 60 mA | 60 mV | 30 V | 1 kohm/V |
| 100 mA | 60 mV | 40 V | 1 Kohm/V |
| 150 mA | 60 mV | 50 V | 1 kohm/V |
| 250 mA | 60 mV | 60 V | 1 kohm/V |
| 400 mA | 60 mV | 100 V | 1 kohm/V |
| 600 mA | 60 mV | 150 V | 1 kohm/V |
| 1 A | 60 mV | 200 V | 1 kohm/V |
| 1.5 A | 60 mV | 250 V | 1 kohm/V |
| 2. 5 A | 60 mV | 300 V | 1 kohm/V |
| 4 A | 60 mV | 400 V | 1 kohm/V |
| 5 A | 60 mV | 500 V | 1 kohm/V |
| 6 A | 72 mV | 600 V | 1 kohm/V |
| 10 A | 60 mV | 1000 V | 1 kohm/V |
| 15 A | 60 mV | For use on | |
| 20 A | 60 mV | externalshunt | |
| 25 A | 60 mV | 60 mV | 1 kohm/V |
| 30 A | 60 mV | 75 mV | 1 kohm/V |
| For use on transducer | | 150 mV | 1 kohm/V |
| 4-20 mA | 60 mV | | |

Any combination — Ammeter / Ammeter; Voltmeter / Voltmeter; Ammeter / Voltmeter

In case of Ammeter / Ammeter 1 meter could be upto 30A but 2nd one will be only upto 1A

## 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 $0^0$ ....$180^0$ |
| **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<br>10 kohm/V for Voltmeters 15..150V |
| Adjustment of Resistance (Sensitivity) | Within ± 1% at 23 $^0$C |

## 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 |
| **Clamp straps for connections** | DIN 46282 |
| **Safety requirements and protective measures for Electrical indicating. instruments and their accessories. ,** | DIN 40050<br>VDE 0110<br>VDE 0410<br>IEC 529, IEC 1010 |
| **Performance specifications for direct acting indicating analogue electrical** | IEC 51/DIN<br>EN 60051<br>DIN 43701 |
| **measuring instruments & their accessories Environmental condition** | VDE / VDI 3540 |
| **Front frames for indicating measuring instruments Principle dimensions** | DIN 43718 |
| **UL Combustibility Class** | UL 94 V-0 |
| **Technical conditions of delivery for electrical instruments** | DIN 43701 |
| **Mechanical strength (Free fall test, vibration test)** | VDE 0411<br>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.

# Specifications

## 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.

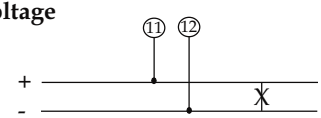
5) Instruments to be used in grounded panel.

## Accessories

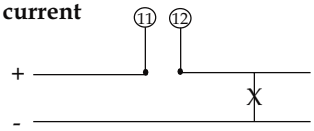
Safety Terminal protection
Full sized polycarbonate back cover to provide protection
against accidental contact (hand and fingers)

# Connection

**DC voltage**

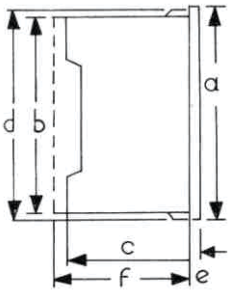



**DC current**

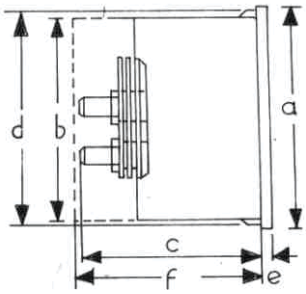



# Dimensions

For Voltmeter & Ammeter < 5A




For Ammeter 5 - 60 A




| Dimensions (in mm) | DS 96 |
|---|---|
| Bezel a | 96 |
| Case b | 90 |
| Depth c* | 53 |
| d | 91.5 |
| e | 5.5 |
| cutout size | $92^{+0.8}$ |
| Weight appro. | 0.26 kg |
| Depth with back cover f ** | 64<br>c = 68mm, for I= 6 to 30 A<br>**f = 70mm, for I= 6 to 30 A |

# Ordering Information- Only For Representative Products

| Part No. | Description | Class |
|---|---|---|
| PQ9T-B042JL2ACABST | DS 10A , DS 500V | CL-1 |
| PQ9T-V2B2DL2ACABST | DS 75mV, DS 10V | CL-1 |
| PQ9T-I0203L2ACABST | DS 1mA, DS 4-20mA | CL-1 |

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

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