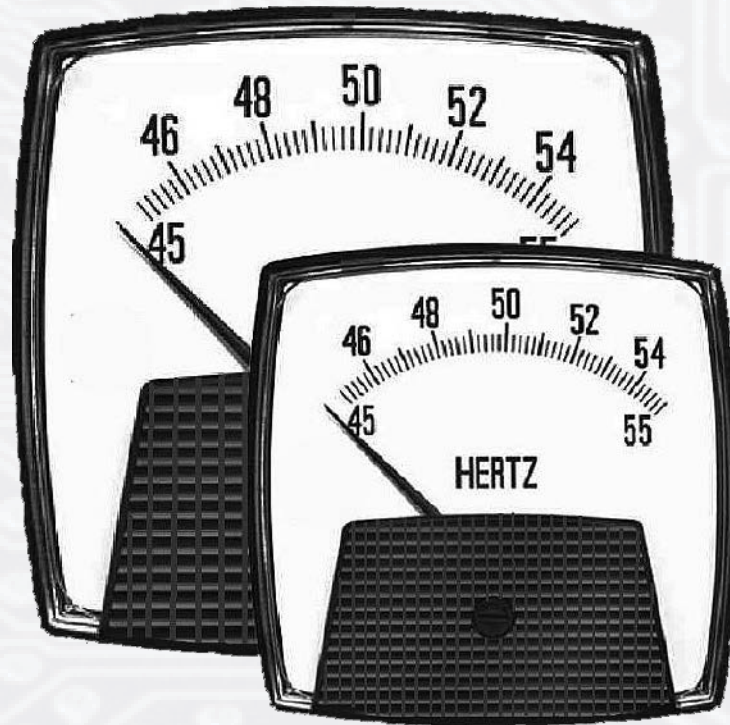


Technical Data Sheet

Smart Look Series Meter



The moving iron & moving coil panel meters sizes 2 1/2" & 3 1/2" are housed in moulded polycarbonate cases which are suitable for the measurement of AC & DC ammeters, voltmeter & frequency meters utilizing a high torque pivot and jewel movement and elapsed time meters.

Special Features

- Surface mounting.
- Near linear scale.
- Glass filled polycarbonate housing (UL 94 V-0).
- Compact case sizes.

Application

The smart look range of analog panel meters offers accurate measurement and indication of most electrical & electronics parameters in industry standard 2^{1/2}" , 3^{1/2}" case sizes.

A range of short scale panel meters that comply with Internationally recognised specifications. Their rugged design will suit demanding environmental applications.

Functional Areas

- Switchgear
- Distribution systems
- Control panels
- Generator sets
- Energy management
- Building management
- Utility power management
- Process control
- Motor monitoring

Features

- Two case sizes available : 2^{1/2}" , 3^{1/2}" inches
- Dust and water jet protected to IP54 (NEMA 4)
- Withstands high levels of shock, vibration, dirt and humidity.
- UL approved.
- Instruments comply with EN61010-1 and meets IEC414 Dielectric Test.
- Complies with international standards : IEC51 (EN60051) or ANSI-C39.1

Benefits

- AC moving iron and moving coil mechanisms.
- ANSI standard case sizes.
- Elapsed time movement mechanism.

Operation

Moving Coil Meter

These meters offers a centre cored, self shielding moving coil movements using pivots, hairspring and spring jewels. Variations in movement are limited by design. All DC voltmeters are 1000 ohms per volt, moving coil rectified products run at 900 ohms per volt. Milivolt meter use the 5 miliamps/50mV resistance.

Moving Iron Meter

This clapper type repulsion design utilizes a pivot, hairspring and jewel movement. The bottom jewel is oil filled to provide damping while th top is spring for resilience. All voltmeters are manufactured with internal voltage dropper resistor.

Frequency Meter

Frequency meters use a 90µA movement driven by an EMC hard frequency conversion circuit.

Dials, Pointers and Scales

Standard dials are matt white black printed scales and a tubular knife- edge black are balanced within 1% of scale length and feature a highly repeatable flattened are scale shape, ensuring consistently accurate measurement reading. Dials are interchangeable between the contendor range of products using the same input within the published specification of the meter. Options for non standard customer specific dials are available upon request.

Technical Specifications

Applicable Standards

Terminal bolts/leads	DIN 46200/46282
Safety requirements and protective measures for Electrical indicating instruments and their accessories	IEC 529, IEC 61010-1
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IS 1248 IEC 51 ANSI C39.1 1981
UL Compatibility	UL 94 V-0

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	Spear	
Pointer deflection	90°	
Scale characteristics	(A) Near Linear above 10% of nominal full Scale value for moving iron (B) Linear scale for moving coil , frequency, moving coil with rectifier	
Scale division	Coarse - fine	
Scale length	212	312
	50.61 mm	64.76 mm

Mechanical Data

Case details	Moulded 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 window	Polycarbonate (transparent)
Colour of case	Black
Position of use	Vertical
Panel fixing	Fixing Stud
Panel thickness	≤ 10 mm

Terminals

Voltmeters and Ammeters & Frequency meters	Terminal 10-32 UNF, Washer 10-32 UNF
Fixing	Surface mounting with 2 studs/3 studs /4 studs by 4-40 UNC studs.

Reference Conditions

Accuracy	According to IEC 51/DIN EN 60051
DC Ammeters & Voltmeters	1.5% 0 to 100% of full scale deflection
AC Ammeters & Voltmeters	Moving iron: 1.5% 10 to 100% of full scale deflection Moving coil: 1.5% 0 to 100% of full scale deflection
Frequency Meters	0.5% of end scale value
Ambient temperature	23 C ± 2°C
Position of use	Nominal position ±1°
Input Waveform	Rated value of measured quantity sine wave, distortion factor ≤ 5%
Frequency	45 - 65Hz
Other Conditions	IEC 51/DIN EN 60051

Nominal Range of use

Ambient Temperature	0 ...40 °C
Position of use	Vertical ± 5°
Frequency	FN ± 10%
External Magnetic Field	At 0.4 kA/m

Electrical Data

Elapsed Time Meter and Frequency Meter	
Voltage	100/125V 200/250V
Frequency Meters	45 or 55Hz 55 or 65Hz 45 or 65 Hz
Burden	4 VA Maximum
Moving Iron A.C. Ammeters & Voltmeters	
Accuracy Class	1.5
Rating	
Ammeters	1 to 30 A
Voltmeters	10V to 600V
Overload	
Ammeters	x 1.2 for 2 Hours x 10 for 5 Sec
Voltmeters	x 1.2 for 2 Hours x 2 for 5 Sec
Burden	
Ammeters	0.5 VA
Voltmeters	4.5 VA
Moving Coil D.C. Ammeters & Voltmeters	
Accuracy Class	1.5
Rating	
Ammeters	100mA to 30A
Voltmeters	50mV to 600V

Options

Case	
Front Window	Polycarbonate (Transparent)
Color of Case	Black
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 (Moving Iron Ammeter)	Two, three and five times over range

Environmental Conditions

Climatic Suitability	Climate category II as per IEC 60051 (climatic class 3 according to VDE/VDI 3540)
Operating Temperature	0°C... + 40°C
Storage temperature	- 20°C ...+55°C
Relative humidity	25% to 80% nominal range of use
Shock resistance	15 g, for pulse duration 11ms
Vibration resistance	ANSI C39.1 cl. 5. 13

Standard Measuring Ranges

DC moving coil Ammeters (PQ)	50 mA to 50 A
DC moving coil Voltmeters (PQ)	50 mV to 600 V
AC moving coil Ammeters (VQ)	1 mA to 100 mA
AC moving coil Voltmeters (VQ)	6 V to 600 V
AC moving iron Ammeters (EQ)	100 mA to 30 A
AC moving coil Voltmeters (EQ)	6 V to 600 V
Frequency Meters	45-50-55Hz, 55-60-65Hz, 45-55-65Hz, 360-440 Hz
Elapsed Time Meters (ETM)	110/130 V, 60 Hz

Safety Precautions

- 1) Instruments with damaged window 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) Instruments to be used in grounded panel.

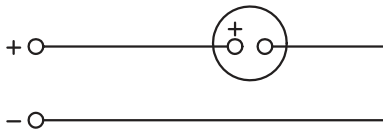
Specifications

A.C. AMMETERS - TRUE RMS READING (EQ)	
Rating	Scale
5A	0-5A
10A	0-10A
15A	0-15A
20A	0-20A
30A	0-30A
60A	0-60A
1A	Transformer Rated
5A	Transformer Rated
A.C. VOLTMETERS - TRUE RMS READING (EQ)	
Rating	Scale
150V	0-150V
300V	0-300V
600V	0-600V
750V	Transformer Rated
D.C. AMMETERS (PQ)	
Rating	Scale
0-1 mA	--
0-5 mA	0-5 mA
0-10 mA	0-10 mA
0-20 mA	0-20 mA
0-50 mA	0-50 mA
0-100 mA	0-100 mA
0-200 mA	0-200 mA
0-500 mA	0-500 mA
0-600 mA	0-600 mA
0-1A	0-1A
0-2A	0-2A
0-4A	0-4A
0-5A	0-5A
0-6A	0-6A
0-10A	0-10A
0-20A	0-20A
0-30A	0-30A
MILLIAMMETERS - SUPRESSED ZERO (PQ)	
Rating	Scale
4-20 mA	--

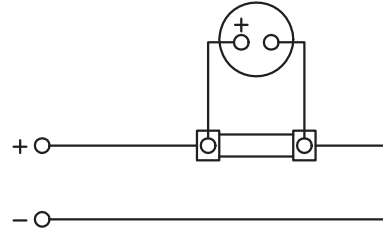
D.C. Voltmeters (PQ)	
Rating	Scale
0-50 mV	--
0-100 mV	--
0-15 V	0-15 V
0-30 V	0-30 V
0-50 V	0-50 V
0-150 V	0-150 V
0-300 V	0-300 V
0-600 V	0-600 V
FREQUENCY METERS, 120V (Self Contained)	
Rating	Scale
50 Hz	45-55 Hz
55 Hz	45-65 Hz
60 Hz	55-65 Hz
400 Hz	360-440 Hz
ELAPSED TIME METERS (99999.99 HOURS) (ETM)	
110/130 V, 50 Hz	--
200/250 V, 50 Hz	--
480 V, 50 Hz	--
110/130 V, 60 Hz	--
200/250 V, 60 Hz	--
480 V, 60 Hz	--
AC Moving Coil Ammeter (VQ)	
Rating	Scale
1 mA	--
1.5 mA	0 - 1.5 mA
10 mA	0 - 10 mA
15 mA	0 - 15 mA
20 mA	0 - 20 mA
40 mA	0 - 40 mA
60 mA	0 - 60 mA
100 mA	0 - 100 mA
AC Moving Coil Voltmeter (VQ)	
Rating	Scale
100 V	0 - 100 V
150 V	0 - 150 V
250 V	0 - 250 V
400 V	0 - 400 V
500 V	0 - 500 V
600 V	0 - 600 V

Electrical Connections

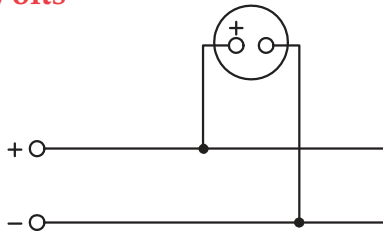
DC Amps - Self Contained



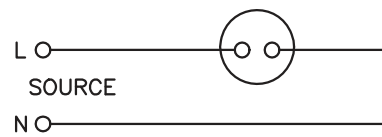
DC Amps - For use with external shunt



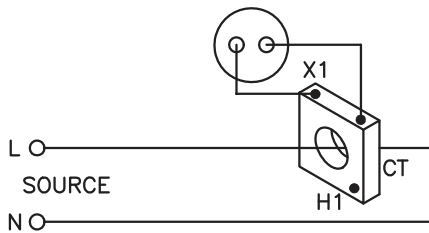
DC Volts



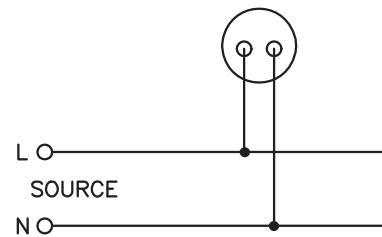
AC Amps - Self Contained



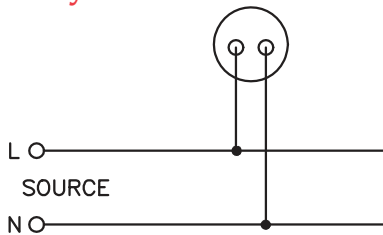
AC Amps - For use with Current Transformer



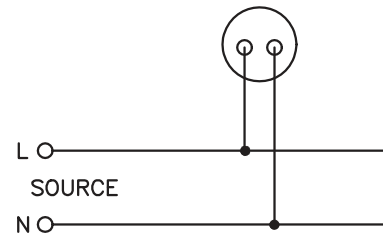
AC Volts



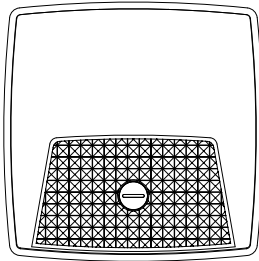
Frequency Meter



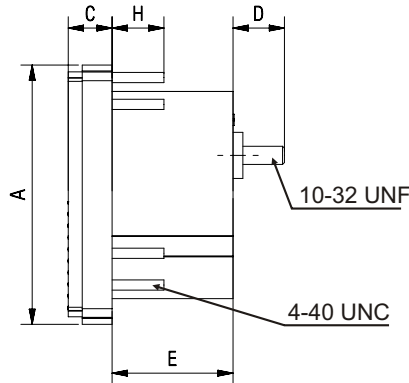
Elapsed Time Meter



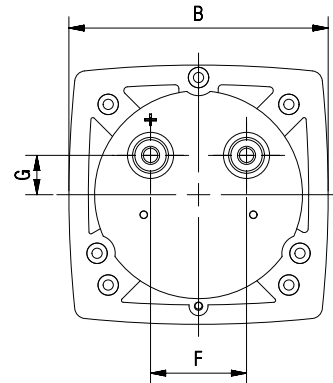
Dimensions



FRONT VIEW



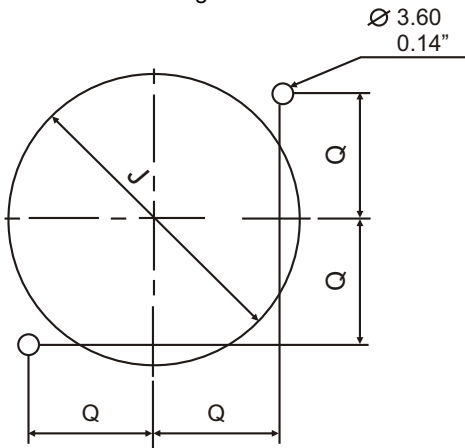
SIDE VIEW



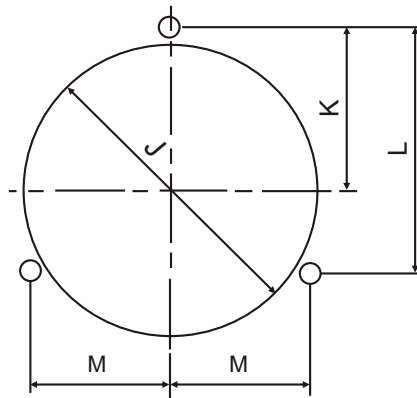
BOTTOM VIEW

PANEL CUT-OUT :-

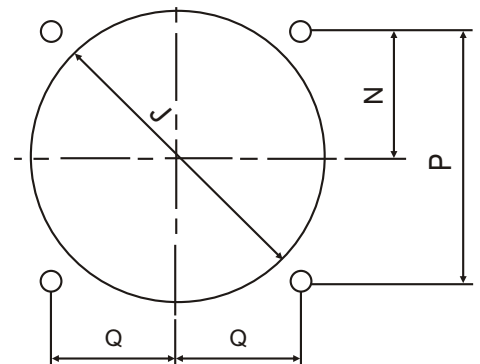
Specify the No. of fixing studs while ordering



STUD POSITION FOR TWO FIXING STUDS



STUD POSITION FOR THREE FIXING STUDS



STUD POSITION FOR FOUR FIXING STUDS

	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
2 ½ mm	68.6	68.6	11.6	14.6	32.0	25.4	10.4	13.72	55	31	46.5	26.9	23.9	47.8	23.9
Inch	2.70	2.70	0.46	0.58	1.26	1.00	0.41	0.54	2.16	1.22	1.83	1.06	0.94	1.88	0.94
3 ½ mm	88.9	88.9	11.6	14.6	35.7	25.4	10.4	13.72	69	40.2	60.3	34.8	28.5	57.0	28.5
Inch	3.5	3.5	0.46	0.58	1.4	1.00	0.41	0.54	2.71	1.58	2.37	1.37	1.12	2.24	1.12