sifam tinsley
PRECISION INSTRUMENTATION



Multifunction Meters

Transducers & Isolators

Temperature Controllers

Converters & Recorders

Digital Panel Meters

Current Transformers

Analogue Panel Meters

Shunts

Digital Multimeters

Clamp Meters

Insulation Testers

SIGMA SERIES FM METER
ANALOGUE PANEL METER

User Manual - Issue 1.0

SUBJECT TO CHANGE WITHOUT NOTICE
This manual superseded all previous versions – please keep for future reference

Sigma Series FM Meter

Features

- Linear Scale
- Glass filled polycarbonate Lousing
- Knife edge pointer
- Easily replicable glass and bezel.

The pointer type frequency meters, FM 48/ 72 / 96 / 144 housed in moulded polycarbonate cases are suitable for the measurement of frequencies in the range of 45 to 450 Hz.

1. Application

The pointer type frequency meters, FM 48/ 72 / 96 / 144 housed in moulded polycarbonate cases are suitable for the measurement of frequencies in the range of 45 to 450 Hz. For maximum accuracy, the essential measuring range is obtained by supressing the unwanted frequency span. These instruments offer several advantages in switchboard 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.

2. Functional Principal

Frequencies are measured with a built in electronic transducer & moving coil indicator. Moving coil movement has pivots of very high hardness. Movement is suspended between spring loaded saphire jewels. Movement is properly shielded & critically damped by eddy currents induced in coil former.

3. 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	Hexagon studs, M4 screws and wire clamps E3

4. Electrical Data

Measured Quantity	Frequency
Input quantity	Alternative voltage in sine waveform
Overload capacity	acc to IEC 51/ DIN EN 60051
Continuously	1.2 times rated current
Short duration	2 times rated voltage, 5 Sec:1 overload 2
	times rated voltage,0.5 Sec:9 overload
Input quantity	Alternating voltage in sine waveform
Enclosure code	IP 52 case
(IEC 529)	IP 00 for terminals
Insulation class	Group A according to VDE 0110
Rated insulation voltage	660 V
Proof voltage	2 kV
Installation category	300 V CAT III
Power consumption	< 7VA
Insulation resistance	> 50 Mohm at 500V DC

5. Standard Measuring Ranges

Frequency Range	45.....50.....55Hz 45.....55.....65Hz 55.....60.....65Hz 360...400...440Hz 380...400...420Hz			
Rated input voltage	57.7 V 63.5V 100 V 110 V 115 V 120 V 127V 208 V 220 V 230 V 240 V 289 V 380 V 400 V 415 V 440 V 500 V			
Scale and Pointer				
Pointer	Knife - edge pointer			
Pointer detection	0...90°			
Scale characteristics	Linear			
Scale division	Coarse - fine			
Scale length	FM 48	FM 72	FM 96	FM144
	41mm	63 mm	97mm	146mm

6. Accuracy at 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 voltage of measured quantity
Other Conditions	IEC 51/ DIN EN 60051
Preheating time	> 5 min

7. Nominal Range of use

Ambient Temperature	0...50 °C
Position of use	Nominal position Vertical ± 5°
External Magnetic Field	At 0.4 kA/m
Voltage Rated voltage	> 15%

8. Environmental Conditions

Climatic Suitability	Climate category || 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 at 50Hz)
Pollution degree	2

9. 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, 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
Front frames for indicating measuring instruments Principle dimensions	DIN 43718
Measuring instruments & their accessories Environmental conditions	VDE / VDI 3540
ULCombustibility UL 94 V-0	
Technical conditions of delivery for electrical instruments	DIN 43701
Mechanical strength (Free fall test, vibration test)	IEC 51, 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.

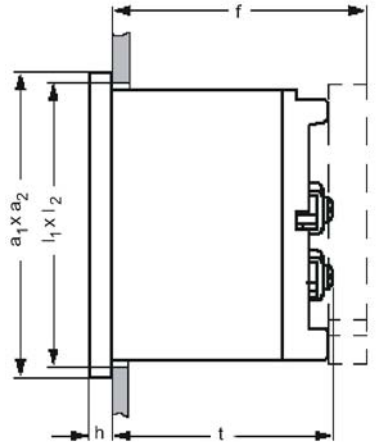
10. Options

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	Basic divisions without numbering
Colour markings /bands	Red or green

11. Safety Terminal Protection

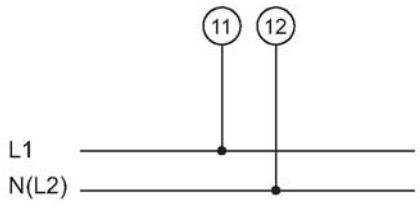
Full sized polycarbonate back cover to provide protection against accidental contact (hand and fingers).

12. Dimensions



Front in mm	Nominal Dimensions mm $a_1 \times a_2$	$l_1 \times l_2$, h	Cutout	Installation Depth Incl. Terminal (t) mm	Installation Depth Incl. Full back Cover (f) mm
48 x 48	48 x 48	5.5	$45^{+0.6} \times 45^{+0.06}$	54	62.5
72 x 72	72 x 72	5.5	$68^{+0.7} \times 68^{+0.07}$	54	62.5
96 x 96	96 x 96	5.5	$92^{+0.8} \times 92^{+0.08}$	54	62.5

13. Connection



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.

14. Ordering Information*

Size: 48 x 48

Part No.	Description	Class
ZQ44-46053N1CAW0ST	45-55-65 Hz, 100V	CL-0.5
ZQ44-46083N1CAW0ST	45-55-65 Hz, 120V	CL-0.5
ZQ44-46123N1CAW0ST	45-55-65 Hz, 220V	CL-0.5
ZQ44-46143N1CAW0ST	45-55-65 Hz, 240V	CL-0.5
ZQ44-46263N1CAW0ST	45-55-65 Hz, 100-125V	CL-0.5
ZQ44-46243N1CAW0ST	45-55-65 Hz, 200-250V	CL-0.5
Part No.	**Description**	**Class**
ZQ44-56053N1CAW0ST	55-60-65 Hz, 100V	CL-0.5
ZQ44-56083N1CAW0ST	55-60-65 Hz, 120V	CL-0.5
ZQ44-56123N1CAW0ST	55-60-65 Hz, 220V	CL-0.5
ZQ44-56143N1CAW0ST	55-60-65 Hz, 240V	CL-0.5
ZQ44-56263N1CAW0ST	55-60-65 Hz, 100-125V	CL-0.5
ZQ44-56243N1CAW0ST	55-60-65 Hz, 200-250V	CL-0.5

Size: 96 x 96

Part No.	Description	Class
ZQ94-46053N1CAW0ST	45-55-65 Hz, 100V	CL-0.5
ZQ94-46083N1CAW0ST	45-55-65 Hz, 120V	CL-0.5
ZQ94-46123N1CAW0ST	45-55-65 Hz, 220V	CL-0.5
ZQ94-46143N1CAW0ST	45-55-65 Hz, 240V	CL-0.5
ZQ94-46263N1CAW0ST	45-55-65 Hz, 100-125V	CL-0.5
ZQ94-46243N1CAW0ST	45-55-65 Hz, 200-250V	CL-0.5
Part No.	**Description**	**Class**
ZQ94-56053N1CAW0ST	55-60-65 Hz, 100V	CL-0.5
ZQ94-56083N1CAW0ST	55-60-65 Hz, 120V	CL-0.5
ZQ94-56123N1CAW0ST	55-60-65 Hz, 220V	CL-0.5
ZQ94-56143N1CAW0ST	55-60-65 Hz, 240V	CL-0.5
ZQ94-56263N1CAW0ST	55-60-65 Hz, 100-125V	CL-0.5
ZQ94-56243N1CAW0ST	55-60-65 Hz, 200-250V	CL-0.5

Size: 72 x 72

Part No.	Description	Class
ZQ74-46053N1CAW0ST	45-55-65 Hz, 100V	CL-0.5
ZQ74-46083N1CAW0ST	45-55-65 Hz, 120V	CL-0.5
ZQ74-46123N1CAW0ST	45-55-65 Hz, 220V	CL-0.5
ZQ74-46143N1CAW0ST	45-55-65 Hz, 240V	CL-0.5
ZQ74-46263N1CAW0ST	45-55-65 Hz, 100-125V	CL-0.5
ZQ74-46243N1CAW0ST	45-55-65 Hz, 200-250V	CL-0.5
Part No.	**Description**	**Class**
ZQ74-56053N1CAW0ST	55-60-65 Hz, 100V	CL-0.5
ZQ74-56083N1CAW0ST	55-60-65 Hz, 120V	CL-0.5
ZQ74-56123N1CAW0ST	55-60-65 Hz, 220V	CL-0.5
ZQ74-56143N1CAW0ST	55-60-65 Hz, 240V	CL-0.5
ZQ74-56263N1CAW0ST	55-60-65 Hz, 100-125V	CL-0.5
ZQ74-56243N1CAW0ST	55-60-65 Hz, 200-250V	CL-0.5

Contact

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