

Analogue Pointer - Type Frequency Meter



FM	48
FM	72
FM	96
FM	144

Data Sheet

Analogue Pointer - Type
Frequency Meter



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 suppressing 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.

Features

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

Functional Principle

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 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
Front fascia	Glass
Colour of bezel	Black
Position of use	Vertical
Panel fixing	Mounting Clamps
Mounting	Stackable in a single cutout
Panel thickness	≤ 25 mm
Terminals	Hexagon studs, M4 screws And wire clamps E3

Electrical Data

Measured quantity	Frequency
Input quantity	Alternating voltage in sine waveform
Overload capacity	(acc. to IS : 1248 / IEC 51)
Continuously	1.2 times rated voltage
Short duration	2 times rated voltage, 0.5 sec : 9 overloads 2 times rated voltage, 5 sec : 1 overload
Enclosure code (IEC 529)	IP 52 case IP 00 for terminals without back cover IP 20 for terminals with back cover
Insulation class	Group A according to VDE 0110
Rated insulation voltage	660V
Proof voltage	2KV
Insulation resistance	> 50 Mohm at 500V d.c
Power consumption	< 7VA

Standard Measuring Ranges

Frequency Range	45.....50.....55 Hz 45.....55.....65 Hz
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Rated input voltage	110 V 220 V 230 V 240 V 440 V
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Non-Standard ranges available on request.

Scale and Pointer

Pointer	Knife - edge pointer
Pointer deflection	0...90°
Scale characteristics	linear
Scale Division	Coarse - fine
Scale length	FM 48 41mm FM 72 63 mm FM 96 97mm FM144 146mm

Accuracy at Reference Conditions

Accuracy class	0.5 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)
Preheating time	> 3 min

Nominal range of use

Ambient temperature	0...50°C
Position of use	Nominal position+ 5
External magnetic field	At 0.4 kA/m
Voltage	Rated Voltage + 15%

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 _n for pulse duration 11 ms
Vibration resistance	10-55-10Hz for ampli. 0.15mm (1.5 g at 50Hz)
Pollution degree	2

Applicable Standards

Nominal case and cutout dimensions for indicating Electrical 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
Safety requirements and protective measures for Electrical indicating instruments and their accessories.

DIN 46282
IS 9249
DIN 40050
VDE 0110
VDE 0410
IEC 529 , IEC 1010
IS 1248
IEC51/DINEN60051
DIN 43701

Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories
Environmental conditions

IS 1248
IS: 9000,
VDE / VDI 3540
DIN 43718

Front frames for indicating measuring instruments Principle dimensions

Technical conditions of delivery for electrical instruments
Mechanical strength (Free fall test, vibration test)

DIN 43701
IS 1248 / IEC 51
IS 9000
VDE 0411,
IEC 61010

Comply with following European directives : 2004/108/EC (EMC directive), 2006/ 9 5 /EC (low voltage directive) & amendment 93/68/EEC, For CE Marking.

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°C...180°C

Dial

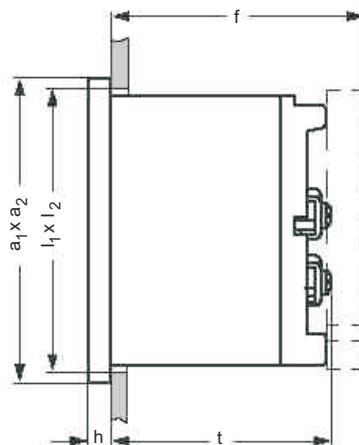
Blank dial	With initial & end values marked
Special markings	Numbering / Lettering.
Division dials	Basic divisions without numbering
Colour markings/bands	Red or green

Accessories

Safety Terminal Protection

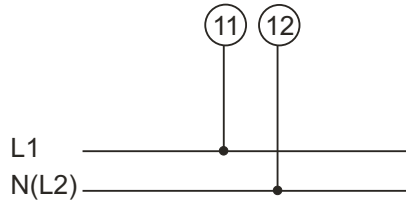
Full sized polycarbonate back cover to provide protection against accidental contact (hand and fingers).

Dimensions



Front in mm	Nominal Dimensions, mm		Cutout, mm $l_1 \times l_2$	Installation Depth Including Terminal (t), mm	Installation Depth Incl. Full back Cover (f), mm
	$a_1 \times a_2$	h			
48 x 48	48 x 48	5.5	$45^{+0.6} \times 45^{+0.6}$	54	62.5
72 x 72	72 x 72	5.5	$68^{+0.7} \times 68^{+0.7}$	54	62.5
96 x 96	96 x 96	5.5	$92^{+0.8} \times 92^{+0.8}$	54	62.5
144 x 144	144 x 144	5.5	$138^{+1} \times 138^{+1}$	54	62.5

Connections



Safety Precautions

- 1) Instruments with damaged bezel or 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	ZQ	Pointer type frequency meter
Front Dimension	48	48mm x 48mm
	72	72mm x 72mm
	96	96mm x 96mm
	144	144mm x 144mm
Measuring Ranges	Refer to table inside	
Terminal Protection	Full sized polycarbonate back cover	
Front facia	Normal glass Antiglare glass	
Colour of Bezel	Black Red, Blue, Yellow, White	
Position of use	Vertical on request 0.... 180C	
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	SHANTI ^{*1}	

*1 Standard

*3 Please clearly add the desired specifications while ordering

Ordering example

FM 72 Measuring range 45....50....55 Hz, rated voltage AC 230V

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