

Ziegler

Redefine Innovative Metering

FML 96 | 144

Analogue Pointer - Type Frequency Meter 240° Scale



© Ziegler Instruments Order No. FML_240_Deg Data sheet-E1.R0-200806-43-2013-EN



Application

The pointer type frequency meters, FML 96 and FML 144 housed in moulded polycarbonate cases are used 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 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.

Features

- Better resolution.
- Linear Scale
- Glass filled polycarbonate (UL 94-V-0)
- Knife edge pointer.
- Easily replicable glass and bezel.

Application Standard

Nominal case and cutout dimensions for indicating measuring instruments.	IS 2419 DIN IEC 61544
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.	DIN 46282
Safety requirements and protective measures for Electrical indicating instruments and their accessories.	IS 9249 DIN 40050 VDE 0110 VDE 0410 IEC 529,IEC 1010
Performance specifications for direct acting indicating analogue electrical measuring instruments & their accessories	IS 1248 IEC 51/DIN EN 60051 DIN 43701
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.	DIN 43701
UL Combustibility class.	UL 94 V-O
Mechanical strength (Free fall test, vibration test)	IS 1248 IS 9000 VDE 0411 IEC 1010

Comply with following European directives :
2004 / 108 / EC (EMCdirective), 2006/95/EC (low voltage directive) & amendment 93/68 EEC, for CE Marking.

Scale and Pointer

Pointer	Knife -edge pointer
Pointer deflection	0 ... 240°
Scale characteristics	Linear
Scale division	Coarse - fine
Scale length	FML 96 FML 144 142 mm 230 mm
Scale Interchangeability	Scales are interchangeable.

Mechanical Data

Panel thickness	≤ 25 mm
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
Terminals	Hexagon studs, M4 screws and wire clamps E3

Electrical Data

Measured quantity	Frequency
Overload capacity	(acc to IS : 1248/ IEC 51)
Continuously	1.2 times rated voltage
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 (IEC 529)	IP 52 case 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

Accuracy at Reference Conditions

Accuracy class	0.5 according to IS:1248 (IEC 51/ DIN EN 60051)
----------------	---

Reference conditions

Ambient temperature	23°C + 2°C
Position of use	Nominal position + 1
Input	Rated voltage of measured quantity
Voltage	Rated voltage ± 2%
Other conditions	IS : 1248 (IEC 51/DIN EN 60051)
Preheating time	>=5 min

Nominal range of use

Ambient temperature	0 ... 50°C
Position of use	Normal 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,for pulse duration 11 ms
Vibration resistance	10-55-10Hz for ampli. 0.15mm (1.5 g at 50Hz)

Options

Case

Front facia	Antiglare glass
Colour of bezel	Red, Yellow, Blue, White
Red index pointer	Front adjustable on site on request 0180°
Position of use	

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.

Standard Measuring Ranges

Frequency Range

45.....50.....55Hz
 45.....55.....65Hz
 55.....60.....65Hz
 360...400...440Hz
 380...400...420Hz

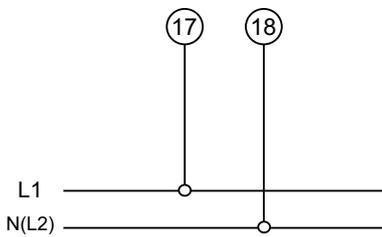
Rated input voltage

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

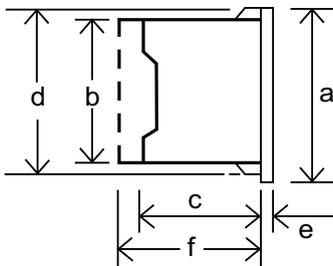
Functional Principal

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 sapphire jewels. Movement is properly shielded & critically damped by eddy currents induced in coil former.

Connections



Dimensions



Dimensions	(in mm)	FML 96	FML 144
Bezel	a	96	144
Case	b	90	136
Depth	c	53	53
	d	91.5	137.5
	e	5.5	5.5
Cutout Size		92 ^{+0.8}	138 ⁺¹
Weight (approx.)		0.45 kg	0.6 kg

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.

Ordering Information

Type	FML	Pointer type frequency meter, 240° scale
Front Dimension	96	96mm x 96mm
	144	144mm x 144mm
Measuring Ranges	Refer to table inside	
Front facia	Normal glass ¹ Antiglare glass ³	
Colour of Bezel	Black ¹ Red, Blue, Yellow, White ³	
Position of use	Vertical ¹ on request 0...180° ³	
Terminal Protection	Full sized polycarbonate back cover	
Rated voltages	Refer to table inside	
Dial	Standard scale same as measuring range ³ 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	ZIEGLER ¹	

¹Standard

³Please clearly add the desired specifications while ordering

Ordering example

FML 96 measuring range 45 ... 50 ... 55Hz, rated voltage AC 230V.
Specifications are subject to change without notice (04/10)

ZIEGLER INSTRUMENTS

Schnepfenreuther Weg 6, D-90425 Nürnberg, Germany.

TEL. | (+49)(911) 38 492 45 | E-MAIL | info@ziegler-instruments.com
 FAX. | (+49)(911) 32 26 212 | WEBSITE | www.ziegler-instruments.com



Ziegler

Redefine Innovative Metering