



## Technical Data Sheet

# *Sigma Series FML Meter*



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.

### Special Features

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

## 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.

## 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
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
ULCompatibility	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
measuring instruments & their accessories Environmental conditions	VDE / VDI 3540

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

## 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

## Electrical Data

Measured Quantity	Frequency
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

## 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
Voltage	Rated voltage ± 2%
Other Conditions	IEC 51/ DIN EN 60051
Preheating time	> 5 min

## 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%

## 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	15 g. for pulse duration 11ms
Vibration resistance	10-55-10Hz for ampli. 0.15mm (1.5g at50Hz)

## Options

### Case

Front Facia	Antiglare glass
Color 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
Color markings/bands	Red or green

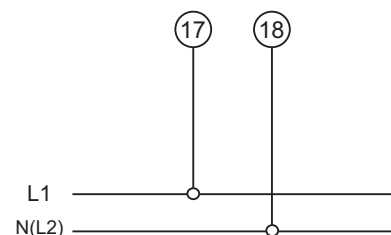
## Standard Measuring Ranges

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

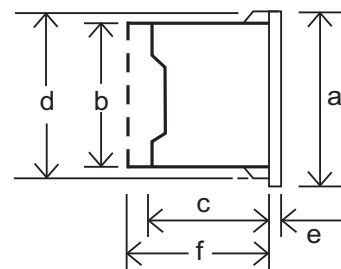
## Functional Principal

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 <sup>0.8</sup>	138 <sup>1</sup>
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\*

Part No.	Description
ZL94-2E082P1CA W0ST	50-60-70Hz, 120V ACC 1% WITH PC GLASS
ZL94-56083P1CA W0ST	55-60-65Hz, 120V WITH PC GLASS for ST

\* Only For Representative Products



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