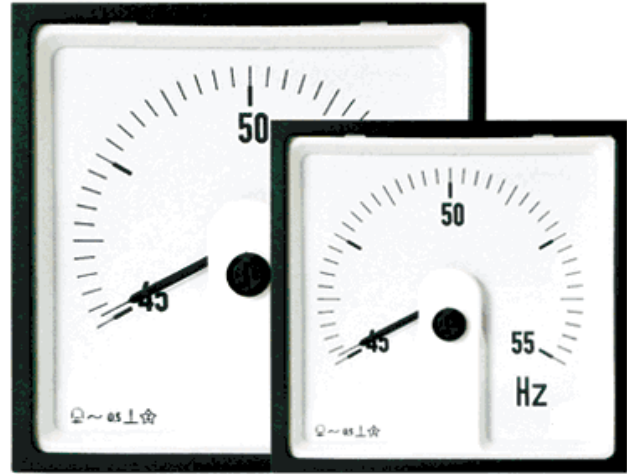


Jewell Frequency Meters - FML

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 panel cut out. A number of meters can be mounted in a panel cut-out (mosaic mounting). Front glass, bezel and dial can be easily replaced.



Features:

- Better Resolution
- Linear Scale
- Glass Filled Polycarbonate (UL 94-V-0)
- Knife Edge Pointer
- Easily Replaceable 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
Performance specifications for direct acting indicating analog electrical measuring instruments & their accessories environmental conditions	IS 1248, IEC 51/DIN, EN 60051 DIN 43701, IS 1248, IS: 9000 VDE/VDI 3540
Front frames for indicating measuring instruments principle dimensions	DIN 43718
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

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Application Standard Cont.:

Comply with the 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 FML 144 142 mm 230 mm
Scale Interchangeability	Scales are interchangeable

Mechanical Data:

Panel Thickness	≤ 25 mm
Case Details	Molded square case suitable for mounting in control/switchgear panels, consoles.
Case Material	Polycarbonate, flame retardant and drip proof as per UL 94 V-0.
Front Fascia	Glass
Color of Bezel	Black
Position of Use	Vertical
Panel Fixings	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	IP 52 Case
(IEC 529)	IP 00 for terminals
Insulation Class	Group A according to VDE 0110
Rated Insulation Voltage	660 V

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Electrical Data Cont.:

Proof Voltage	2 kV
Installation Category	300 V CAT III
Power Consumption	$\leq 7\text{VA}$
Insulation Resistance	$> 50\text{ Mohm at } 500\text{V DC}$

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	$23^{\circ}\text{C} + 2^{\circ}\text{C}$
Position of Use	Nominal position + 1
Input	Rated voltage of measured quantity
Voltage	Rated Voltage $\pm 2\%$
Other Conditions	IS: 1248 (IEC 51/DIN EN 60051)
Preheating Time	$\geq 5\text{ min}$

Nominal Range of Use

Ambient Temperature	$0\ldots 50^{\circ}\text{C}$
Position of Use	Normal position ± 5
External Magnetic Field	At 0.4 kA/m
Voltage	Rated Voltage $\pm 15\%$

Environmental Conditions:

Climatic Suitability	Climatic category II as per IS: 1248 (climatic class 3 according to VDE/VDI 3540)
Operating Temperature	$-10\ldots +55^{\circ}\text{C}$
Storage Temperature	$-25\ldots +65^{\circ}\text{C}$
Relative Humidity	$\leq 75\%$ 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 50 Hz)

Options:

Case

Front Fascia	Antiglare glass
Color of Bezel	Red, Yellow, Blue, White

Options Cont.:

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

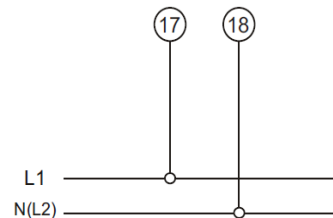
Rated Input Voltage

57.7 V
63.5 V
100 V
110 V
115 V
120 V
127 V
208 V
220 V
230 V
240 V
289 V
380 V
400 V
415 V
440 V
500 V

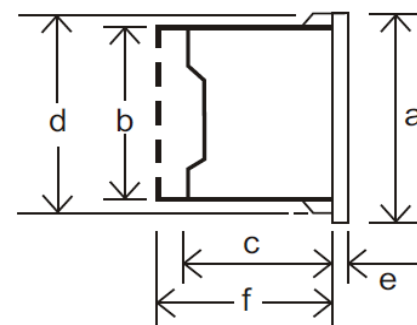
Functional Principal:

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 Cont.:

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 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 in to 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	96 mm x 96 mm
144	144 mm x 144 mm
Measuring Ranges	Refer to table inside
Front Fascia	Normal glass* ¹ Antiglare glass* ³
Color 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* ¹ Blank dial with division* ³ Additional lettering on request* ³

Jewell Frequency Meters - FML



BEST IN CLASS

Dial	Additional numbering on request* ³ Colored marking red or green* ³ Colored sector red or green* ³
Logo	Jewell* ¹

*¹ Standard

*³ Please clearly add the desired specifications while ordering

Ordering Example:

FML 96 measuring range 45...50...55 Hz, rated voltage AC 230 V.

Specifications are subject to change without notice (01/14)

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