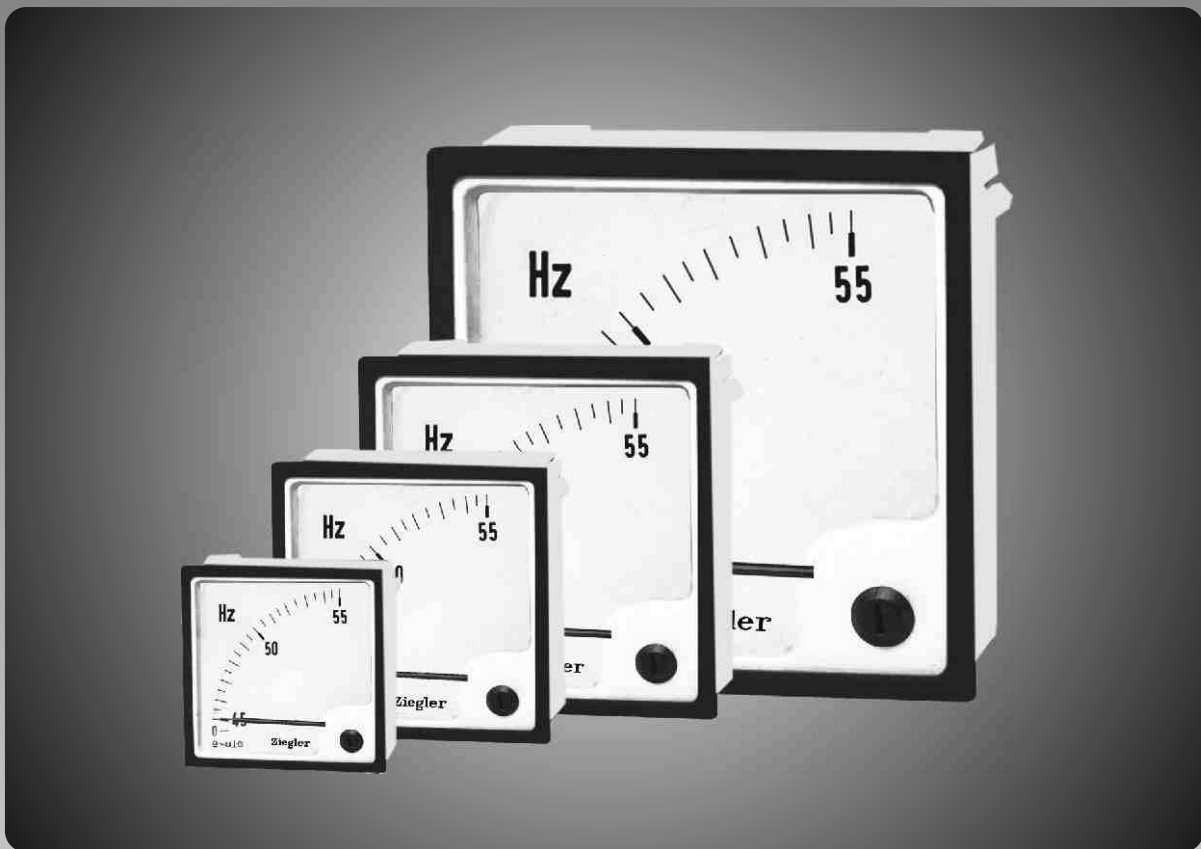


| | |
|-----------|------------|
| FM | 48 |
| FM | 72 |
| FM | 96 |
| FM | 144 |

Data Sheet

Analogue Pointer - Type
Frequency Meters



Application

The Pointer type Frequency Meters ZQ 48/72/96/144 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 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 single cut out (mosaic mounting). Front window glass, Bezel & Dial can be easily replaced.

Functional principle

Frequencies are measured with a built in electronic transducer and a moving-coil indicator.

Moving-coil movements 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 | Glass filled polycarbonate, flame retardant and drip proof as per UL 94 V-O |
| Front facia | Glass |
| Colour of bezel | Black |
| Position of use | Vertical |
| Panel fixing | Swivel screw |
| Mounting | Stackable in a single cutout |
| Panel thickness | ≤ 40 mm |
| Terminals | Hexagon studs, M4 screws and wire clamps E3 |

Electrical Data

| | |
|---------------------------|---|
| Measured quantity | Frequency |
| Input quantity | Alternating Voltage in Sinusoidal waveform |
| Overload capacity | (acc. to IEC 51) |
| Continuously | : 1.2 times rated voltage |
| Short duration | : 2 times rated input voltage, 5 sec |
| Power consumption | ≤ 7 VA |
| Enclosures 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 insulating voltage | 660 V |
| Proof Voltage | 2 kV |
| Installation category | 600 V CAT III (IEC 1010) |
| Insulation resistance | > 50 Mohm at 500 V d.c. |

Standard Measuring Ranges

Frequency range

| |
|------------------------|
| 45.....50.....55 Hz |
| 48.....50.....52 Hz |
| 45.....55.....65 Hz |
| 55.....60.....65 Hz |
| 58.....60.....62 Hz |
| 180.....200.....220 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 |
| 250 V |
| 289 V |
| 380 V |
| 400 V |
| 415 V |
| 440 V |
| 500 V |

Scale and pointer

| | |
|-----------------------|--|
| Pointer | Knife-edge pointer |
| Pointer deflection | 0 90° |
| Scale characteristics | Linear |
| Scale division | Coarse-fine |
| Scale length | FM 48 FM 72 FM 96 FM 144 41mm 63mm 97mm 146mm |

Accuracy at Reference Conditions

| | |
|----------------|--|
| Accuracy class | 0.5 according to IEC 51 / DIN EN 60051 |
|----------------|--|

Reference conditions

| | |
|---------------------|----------------------------------|
| Ambient temperature | 23°C ± 2°C |
| Position of use | Nominal position ± 1° |
| Input | Rated value of measured quantity |
| Voltage | Rated Voltage ± 2% |
| Others | IEC 51 / DIN EN 60051 |
| Preheating time | ≥ 5 Minutes |

Nominal range of use

| | |
|-------------------------|-----------------------|
| Ambient temperature | 0...50°C |
| Position of use | Nominal position ± 5° |
| External magnetic field | 0.5 mT |
| Voltage | Rated Voltage ± 20% |

Environmental conditions

| | |
|-----------------------|--|
| Climatic suitability | 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, 11 ms |
| Vibration resistance | 10-150-10 Hz / 0.15 mm 1.5 g at about 50 Hz |

Applicable standards

| | |
|---|---|
| Nominal case & cutout dimensions for indicating measuring instruments | : DIN 43700 |
| Scales and pointer for electrical measuring instruments | : DIN 43802 |
| Connections and Terminal markings for meters | : DIN 43807 |
| Terminal bolts / leads | : DIN 46200/46282 |
| Clamp straps for connections | : DIN 46282 |
| Safety requirements and protective measures for Electrical indicating. | : DIN 40050 / 8-70 VDE 0110 / 11-72 VDE 0410 / 10-76 IEC 529, IEC 1010 |
| Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories | : IEC 51/ DIN EN 60051 DIN 43701 |
| Environmental conditions | : VDE / VDI 3540 |
| Front frames for indicating measuring instruments Principle dimensions | : DIN 43718 |
| UL Combustibility class | : UL 94 V-O |
| Technical conditions of delivery for electrical instruments | : DIN 43701 |
| Mechanical strength (Free fall test, vibration test) | : VDE 0411, part 1, Sec.43/44, IEC 1010 / IEC 51 |
| Electro Magnetic Compatibility(EMC) compliance as per following standards : | EN 50081-2, EN 50082-2, N 55011/CISPR 11, EN 60555-2, IEC 555-2, EN 61000-4-4 / IEC 1000-4-4, EN 61000-4-2 / IEC 1000-4-2, EN 61000-4-5 / IEC 1000-4-5, ENV 50140 |

Comply with following European directives : 89/336/EEC (EMC directive), 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for **CE** marking.

Accessories

Safety Terminal Protection

Full sized polycarbonate back cover to provide protection against accidental contact (hand and fingers) acc. to VDE 0410.

Data Sheet

Analogue Pointer - Type Frequency Meters

Options

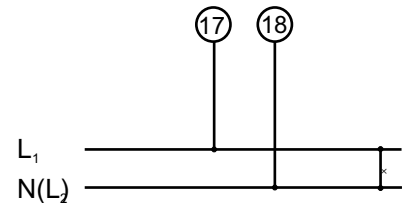
Case

| | |
|-------------------|--------------------------|
| 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° |

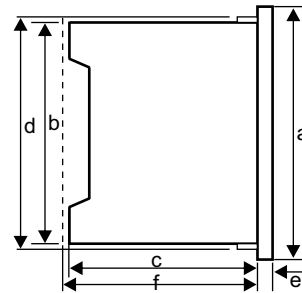
Dial

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

Connections



Dimensions



| Dimensions (in mm) | FM48 | FM72 | FM96 | FM144 |
|-------------------------|----------------------|----------------------|----------------------|---------------------|
| Bezel a | □ 48 | □ 72 | □ 96 | □ 144 |
| Case b | □ 43.5 | □ 66 | □ 90 | □ 136 |
| Depth c* | 53 | 53 | 53 | 53 |
| d | □ 44.5 | □ 67.5 | □ 91.5 | □ 137.5 |
| e | 5.5 | 5.5 | 5.5 | 5.5 |
| cutout size | □ 45 ^{+0.6} | □ 68 ^{+0.7} | □ 92 ^{+0.8} | □ 138 ⁺¹ |
| Depth with back cover f | 64 | 64 | 64 | 64 |
| Wt. (approx.) | 0.15 kg | 0.21 kg | 0.28 kg | 0.49 kg |

Ordering Information

| | |
|---|---|
| Type FM | Pointer - type frequency meter |
| Front dimension 48 72 96 144 | 48 mm x 48 mm 72 mm x 72 mm 96 mm x 96 mm 144 mm x 144 mm |
| Measuring ranges | Refer to table inside |
| Rated Voltage | 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 |
| 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, Green or Blue ^{*3} coloured sector Red, Green or Blue ^{*3} |
| logo | Without ^{*3} OEM logo ^{*3} |

^{*1} standard

^{*3} please clearly add the desired specifications while ordering.

Safety precautions

- Instruments with damaged bezels or window glasses must be disconnected from the mains.
- Adequate safety clearance must be maintained to control panel fasteners and to sheet metal housing, if non-insulated connector wires are used.
- The back cover must be snapped into place after the connector wires have been clamped for protection against accidental contact.
- Scales should be replaced under voltage-free conditions.
- Bezels and window glasses should be replaced under voltage-free conditions.

Ordering example

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

Specifications are subject to change without notice (07/02)

Ziegler

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