

# Ziegler

Redefine Innovative Metering

## ZIEGLER mfm 3410 Digital Multifunction Instrument



© Ziegler Instruments Order No. Ziegler mfm 3410 Data sheet-E1.R0-920313-23-2013-EN



### Application :

Ziegler *mfm* 3410 measures important electrical parameters in single phase, 3 phase 4 Wire and 3 phase 3 Wire Network & replaces the multiple analog panel meters. It measures electrical parameters like AC Voltage, AC Current, Frequency, kVA, Neutral Current (for 4 Wire only), Total System Current Demand, Total System Maximum Current Demand, Total System kVA Demand and Maximum Total System kVA Demand.

### Product Features:

#### Number of parameters measured: up to 18

The instrument measures 18 electrical parameters of 3 Phase network.

#### High Accuracy

Better than 0.5 % for Voltage ,Current and kVA

#### On site programmable PT/CT ratios

It is possible to program primary of external potential Transformer (PT), primary of external Current Transformer (CT) on site via front panel keys by entering into Programming mode.

#### User selectable CT Secondary 5A/1A

The secondary of external Current Transformer (CT) can be programmed on site to either 5A or 1A using front panel keys.

#### User selectable 3 phase 3W or 4W

User can program on site the network connection as either 3 Phase 3 Wire or 4 Wire using front panel keys.

#### Low back depth

The instrument has very low back depth (behind the panel) of less than 80 mm.

#### True RMS measurement

The instrument measures distorted waveform up to 15th Harmonic.

#### Neutral Current Measurement (for 4 Wire only)

The instrument measures neutral current in 3 Phase 4 wire unbalanced load network.

#### Total System Current Demand & Total System Maximum Current Demand

The instrument measures system current demand and Maximum System Current demand. The demand time can be programmed on site from 8, 15, 20 and 30 minutes using front panel keys.

#### Total System kVA Demand & Maximum Total System kVA Demand

The instrument measures system kVA Demand and Maximum System kVA demand. The demand time can be programmed on site from 8, 15,20 and 30 minutes using front panel keys.

#### System kVA

The instrument measures the system kVA of a single phase ,3 Phase 3 wire or 4 Wire system.

#### High brightness 3 line 4 digits LED display

Simultaneous display of 3 Parameters. The 4th additional digit for each parameter gives better resolution and high accuracy.

#### Simple operation with easy to use front keys

There are two push button keys (Up & down) on front panel for easy operation

#### Back scrolling of Parameter screens

Using the "down" key, it is possible to scroll back to the previous screen while searching the desired parameter screen.

#### Enclosure Protection for dust & water

conforms to IP 54 (for front face) as per IEC60529

#### EMC Compatibility

Compliance to International standard IEC 61326

### Technical Specifications

#### Input Voltage

|                                |  |
|--------------------------------|--|
| Nominal input voltage (AC RMS) | Phase –Neutral 57.7 - 277V L-N ,<br>Line-Line 100 - 480V L-L |
| Max continuous input voltage   | 120% of rated value  |

#### Input Current

|                              |                                       |
|------------------------------|---------------------------------------|
| Nominal input current        | 1 or 5A AC RMS (programmable on site) |
| System CT primary values     | Std. values up to 4kA (1 or 5 Amp )   |
| Max continuous input current | 120% of rated value                   |

#### Auxiliary Supply

|                                     |   |
|-------------------------------------|---|
| AC Auxiliary Supply                 | 110 V AC -15% / +20% / 230 V AC -15% / +20% / 380 VAC-15% / +20 |
| AC Auxiliary supply frequency range | 45 to 66 Hz   |
| AC /DC Auxiliary Supply             | 100 – 250 VAC /DC +/- 10%                                       |
| DC Auxiliary Supply                 | 12 – 48 V DC +/- 10%  |

#### VA Burden

|                              |                            |
|------------------------------|----------------------------|
| Nominal input voltage burden | < 0.2 VA approx. per phase |
| Nominal input current burden | < 0.6 VA approx. per phase |
| AC Supply burden             | 4 VA                       |

#### Overload Withstand

|         |  |
|---------|--|
| Voltage | 2 x rated value for 1 second, repeated 10 times at 10 second intervals |
| Current | 20x rated value for 1 second, repeated 5 times at 5 min                |

#### Operating Measuring Ranges

|           |                           |
|-----------|---------------------------|
| Voltage   | 5... 120% of rated value  |
| Current   | 5 ... 120% of rated value |
| Frequency | 40...70 Hz                |

### Reference conditions for Accuracy

|                            |                                      |
|----------------------------|--------------------------------------|
| Reference temperature      | 23°C +/- 2°C                         |
| Input waveform             | Sinusoidal (distortion factor 0.005) |
| Input frequency            | 50 or 60 Hz ±2%                      |
| Auxiliary supply voltage   | Rated Value ±1%                      |
| Auxiliary supply frequency | Rated Value ±1%                      |

### Accuracy

|                                   |  |
|-----------------------------------|--|
| Voltage                           | ±0.5% of range (50... 100% of rated value) |
| Current                           | ±0.5% of range (10... 100% of rated value) |
| Frequency                         | 0.15% of mid frequency                     |
| System Apparent Power (VA)        | ±0.5% of range (10... 100% of rated value) |
| Neutral Current (for 4 Wire only) | ±4% of range (10... 100% of rated value)   |

### Influence of Variations

|  |   |
|--|---|
| Temperature coefficient : (for ratedvalue range of use (0...50°C)) | 0.025%/°C for Voltage (50... 120% of rated value) and<br>0.05%/°C for Current (10... 120% of rated value) |
|--|---|

### Display update rate

Response time to step input 1 sec approx.

### Applicable Standards

|          |   |
|----------|---|
| EMC      | IEC 61326   |
| Immunity | IEC 61000-4-3. 10V/m min – Level 3 industrial low level |
|          | IEC 61010-1-2001 , Permanently connected use            |

### Safety

|                        |  |
|------------------------|--|
| IP for water & dust    | IEC60529   |
| Pollution degree:      | 2  |
| Installation category: | III  |
| High Voltage Test      | 2.2 kV AC, 50Hz for 1 minute between all electrical circuits |

### Environmental

|                       |                               |
|-----------------------|-------------------------------|
| Operating temperature | -10 to +55°C                  |
| Storage temperature   | -20 to +65°C                  |
| Relative humidity     | 0... 90% non condensing       |
| Warm up time          | Minimum 3 minute              |
| Shock                 | 15g in 3 planes               |
| Vibration             | 10... 55 Hz, 0.15mm amplitude |
| Enclosure             | IP54 (front face only)        |

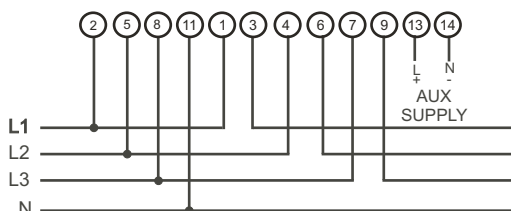
## Parameter Measurement and Display

✓- Available    ✗- Not available

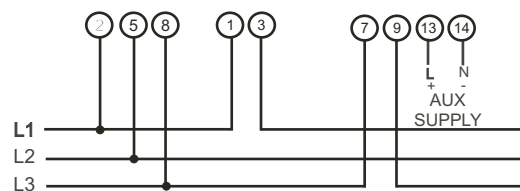
| Sr No | Parameter                           | 3 Phase 3 Wire | 3 Phase 4 Wire | 1 Phase 2 Wire |
|-------|-------------------------------------|----------------|----------------|----------------|
| 1     | System Volts                        | ✓              | ✓              | ✓              |
| 2     | System Current                      | ✓              | ✓              | ✓              |
| 3     | Frequency                           | ✓              | ✓              | ✓              |
| 4     | Volts L1 – N                        | ✗              | ✓              | ✗              |
| 5     | Volts L2 – N                        | ✗              | ✓              | ✗              |
| 6     | Volts L3 – N                        | ✗              | ✓              | ✗              |
| 7     | Volts L1 – L2                       | ✓              | ✓              | ✗              |
| 8     | Volts L2 – L3                       | ✓              | ✓              | ✗              |
| 9     | Volts L3 – L1                       | ✓              | ✓              | ✗              |
| 10    | Current L1                          | ✓              | ✓              | ✗              |
| 11    | Current L2                          | ✓              | ✓              | ✗              |
| 12    | Current L3                          | ✓              | ✓              | ✗              |
| 13    | Neutral Current                     | ✗              | ✓              | ✗              |
| 14    | System Apparent Power               | ✓              | ✓              | ✓              |
| 15    | Total System Current Demand         | ✓              | ✓              | ✓              |
| 16    | Total System Maximum current Demand | ✓              | ✓              | ✓              |
| 17    | Total System kVA Demand             | ✓              | ✓              | ✓              |
| 18    | Total System Maximum kVA Demand     | ✓              | ✓              | ✓              |

## Electrical Connections

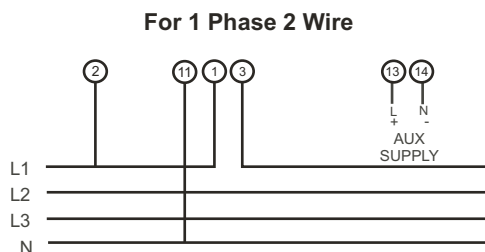
For 3 Phase 4 Wire Unbalanced Load



For 3 Phase 3 Wire Unbalanced Load

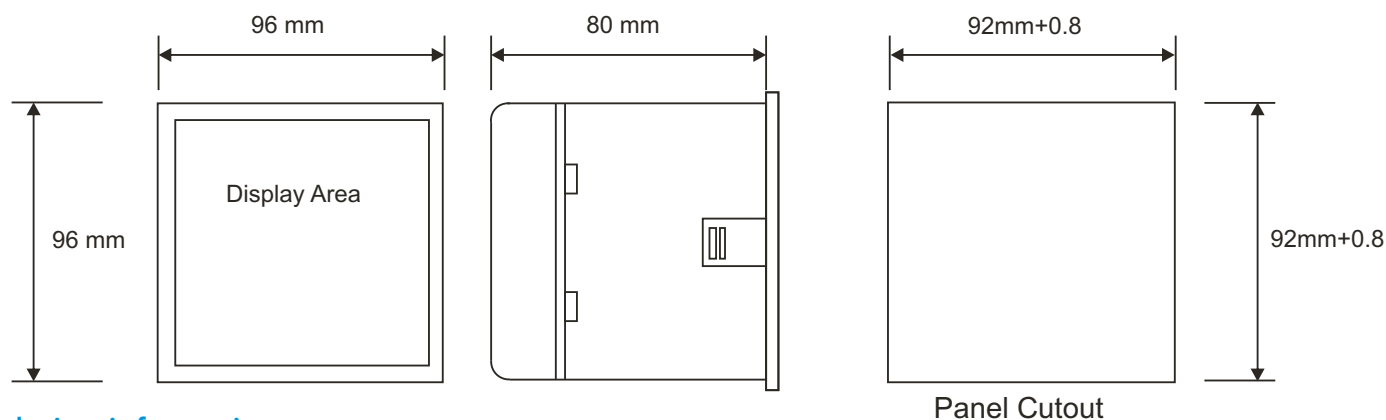


### Electrical Connections



It is recommended that the wires used for connections to the instrument should have lugs soldered at the end. That is, the connections should be made with Lugged wires for secure connections. The Maximum diameter of the lug should be 7.0 mm and maximum thickness 3.5 mm. Permissible cross section of the connection wires:  $\leq 4.0 \text{ mm}^2$  single wire or  $2 \times 2.5 \text{ mm}^2$  fine wire

### Dimensions



### Ordering information

|  | Ordering Code<br>Ziegler <i>mfm</i> 3410 |
|--|--|
| <b>System Type (Connection network)</b>            |  |
| 3 Phase (programmable as 4 Wire or 3 Wire on site) | 3  |
| 1 Phase  | 1  |
| <b>Input Voltage</b>                               |  |
| 110V L-L (63.5V L-N)                               | 110                                      |
| 230V L-L (133V L-N)                                | 230                                      |
| 415V L-L (239.6V L-N)                              | 415                                      |
| 440V L-L (254V L-N)                                | 440                                      |
| <b>AC Auxiliary Supply Voltage</b>                 |  |
| 110 V AC -15% / +20%                               | L  |
| 230 V AC -15% / +20%                               | M  |
| 380 V AC -15% / +20 %                              | H  |
| <b>AC/DC Auxiliary Supply Voltage</b>              |  |
| 100 – 250V AC/Dc +/- 10%                           | AD                                       |
| 12 – 48V DC +/- 10%                                | D  |

### Order Code Example

**Ziegler *mfm* 3410 – 3– 230 – M**

Ziegler *mfm* 3410, 3 phase (programmable onsite as 4 wire or 3 Wire), 230L-L nominal voltage, 230 V AC auxiliary supply. (No need to specify CT secondary as 5 A. or 1 A. is programmable on site.)

## ZIEGLER INSTRUMENTS

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