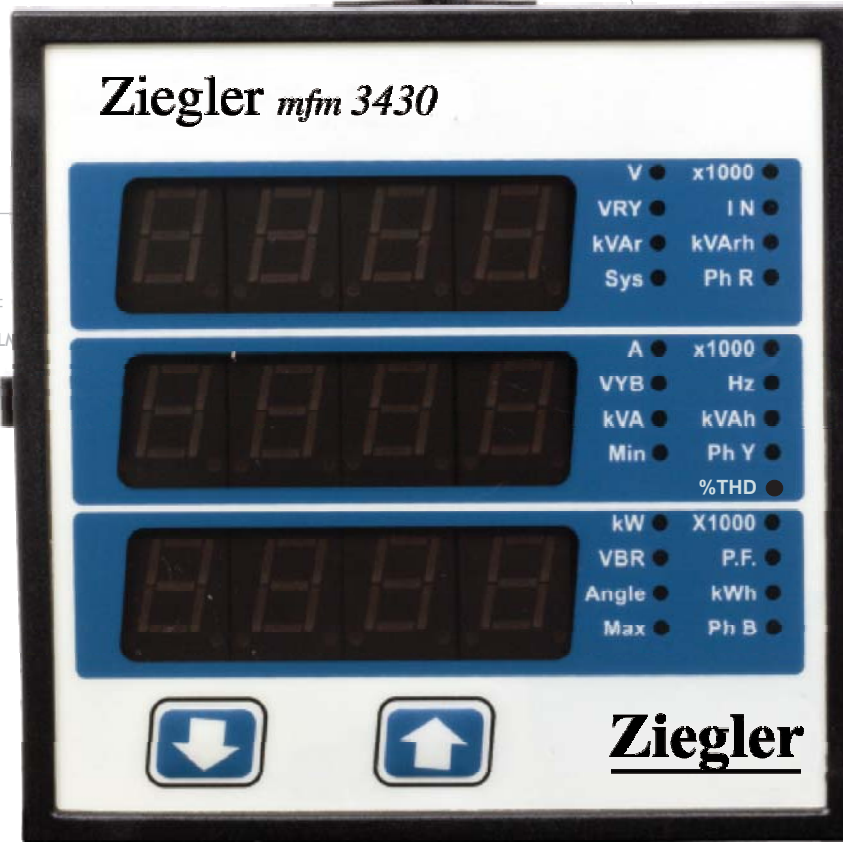
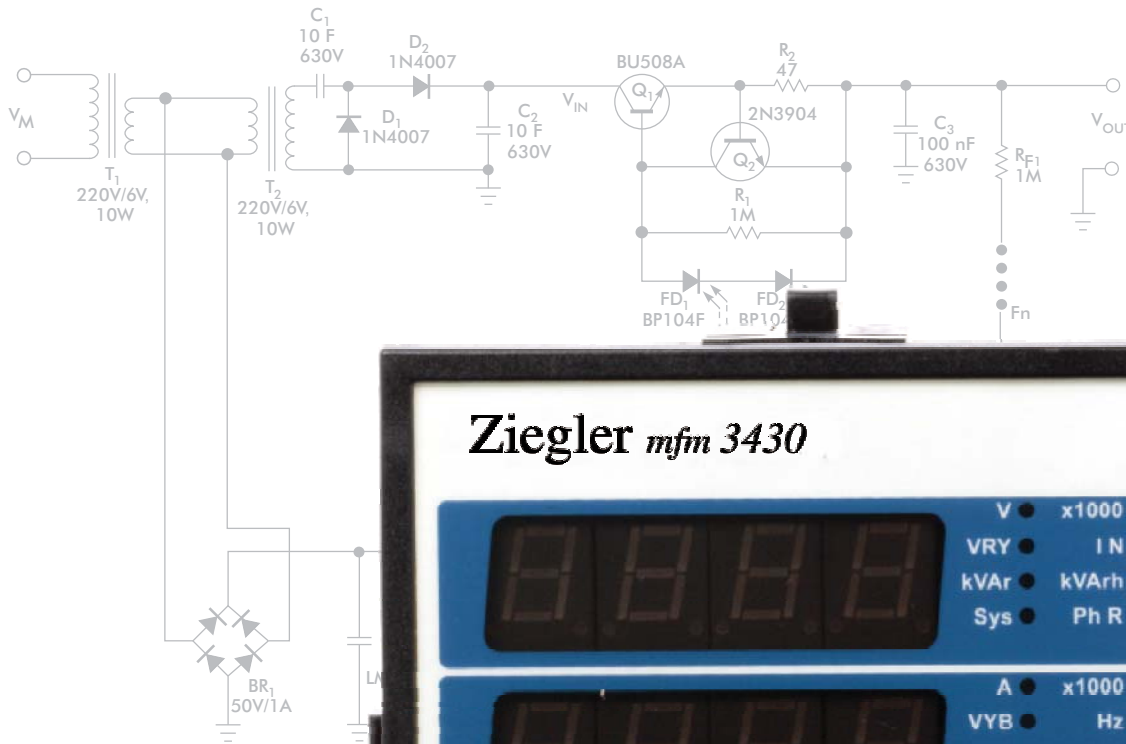


## ZIEGLER mfm 3430

Digital Multifunction Instrument With Onsite Pluggable Output Options



© Ziegler Instruments Order No. Ziegler mfm 3420 Data sheet-E1.R0-920330-25-2013-EN

**Application :**

**Ziegler mfm 3430** measures important electrical parameters in 3 phase and single phase Network & replaces the multiple analog panel meters. It measures electrical parameters like AC current, Voltage, frequency, Power, Energy (Active/Reactive/Apparent), Harmonic Distortion. The instrument has optional output as one pulse output or two pulse output for energy measurement.

**Product Features:****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. For single phase applications, single phase version is available.

**Low back depth:**

The instrument has very low back depth (behind the panel) of less than 80 mm in spite of optional features like pulse output

**Onsite selection of Auto scroll / Fixed Screen**

User can set the display in auto scrolling mode or fixed screen mode using front panel keys.

**Energy measurement (Import and Export):**

Active energy (kWhr), Reactive energy (kVAhr) and Apparent energy (kVAhr). Any of the parameters can be freely assigned to 2 optional pulse outputs.

**Energy Update Rate ( 3 Phase only):**

This updates the energy values in the registers depending on the energy rate selected by the user. Energy update rate can be set from 1 min. to 60 min.

**True RMS measurement**

The instrument measures distorted waveform up to 15<sup>th</sup> Harmonic.

**High brightness 3 line 4 digits LED display:**

Simultaneous display of 3 Parameters

**Number of parameters measured: up to 48**

The instrument measures 48 electrical parameters of 3 Phase network.

**Parameter Screen recall:**

In case of power failure, the instrument memorizes the last displayed screen. The displayed screen will get memorized only if user keeps this screen for minimum 40 sec duration before power failure for fixed screen mod.

**User selectable Low Current suppression (below 30 mA)**

User can suppress the readings below 30 mA in the current measurement by onsite programming if required.

**Total Harmonic Distortion (THD):**

The instrument can measure per phase THD of voltage and THD of current.

**Programmable Energy format & Energy rollover count:**

Customer can assign the format for energy display on MODBUS (RS485) in terms of W, kW or MW. Additional to this, customer can also set a rollover count from 7 to 14 digits (for W), 7 to 12 digits (for kW) & 7 to 9 digits (for MW), after which the energy will roll back to zero. The above settings are applicable for all types of energy.

**Energy Count storage:**

In case of power failure, the instrument memorizes the last energy count. Every 40 sec, the instrument updates the energy counter in the non-volatile memory.

**Min Max storage of parameters possible**

The instrument stores minimum and maximum values for System Voltage and System Current. Every 40 sec minimum and maximum readings are updated.

**Optional MODBUS (RS485) Output (With Optical Isolation)**

The optional ModBus output enables the instrument to transmit all the measured parameters over standard MODBUS (RS485).

**Optional Pulse Output ( 1 or 2 Relay output)**

The optional pulse output is a potential free, very fast acting relay contact which can be used to drive an external mechanical counter for energy measurement.

**Optional Analog Outputs**

(2 Outputs – 4-20mA or 0 -1 mA): 2 Analog outputs can be programmed from a list of input parameters.

Enclosure Protection for dust and water:

conforms to IP 54 (front face) as per IEC60529

**Compliance to International Safety standards**

Compliance to International Safety standard IEC 61010-1- 2001

**EMC Compatibility**

Compliance to International standard IEC 61326

### Technical Specifications:

#### Input Voltage:

Nominal input voltage (AC RMS)	Phase –Neutral	63.5 / 133 / 239.6 / 254V <sub>L-N</sub>
	Line-Line	110 / 230 / 415 / 440 V <sub>L-L</sub>
System PT primary values	100VLL to 692kVLL programmable on site.	
Max continuous input voltage	120% of rated value	

#### Input Current:

Nominal input current	5A AC RMS.
System CT secondary values	1A & 5A programmable on site.
System CT primary values	From 1A up to 9999A (for 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 V AC -15% / +20
AC /DC Auxiliary Supply	100 – 250 VAC /DC +/- 10%
DC Auxiliary Supply	12.....48 VDC +/- 10%
AC Auxiliary supply frequency range	45 to 66 Hz

#### VA Burden:

Nominal input voltage burden	< 0.2 VA approx. per phase
Nominal input current burden	< 0.6 VA approx. per phase
Auxiliary Supply burden	< 4 VA approx OR < 5VA approx with 4-20mA analog output option

#### Overload Withstand:

Voltage	2 x rated value for 1 second, repeated 10 times at 10 second intervals
Current	20x 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
Power Factor	0.5 Lag ... 1... 0.5 Lead

#### 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%
Voltage Range	50... 100% of Nominal Value. 60... 100% of Nominal Value for THD.
Current Range	10... 100% of Nominal Value. 20... 100% of Nominal Value for THD.
Power	Cos phi / sin phi = 1 for Active / Reactive Power & Energy. 10... 100% of Nominal Current & 50... 100% of Nominal Voltage.
Power Factor / Phase Angle	40... 100% of Nominal Current & 50... 100% of Nominal Voltage.



### Technical Specifications:

#### Accuracy:

	Accuracy 1.0 (Standard)	Accuracy 0.5 (on request)	Accuracy 0.2 (on request)
Voltage	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Current	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Frequency	± 0.15% of mid frequency	± 0.15% of mid frequency	± 0.15% of mid frequency
Active Power	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Re-Active Power	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Apparent Power	± 0.5% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Active energy (kWh)	± 1.0% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Re Active energy (kVAh)	± 1.0% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Apparent energy (kVAh)	± 1.0% of Nominal value	± 0.5% of Nominal value	± 0.2% of Nominal value
Accuracy of Analog Output	1 % of Output end value	1 % of Output end value	1 % of Output end value
Power Factor	±1% of Unity	±1% of Unity	±1.0% of Unity
Angle	±1% of range	±1% of range	±1% of range
Total Harmonic Distortion	±1%	±1%	±1%

Measurement error is normally much less than the error specified above. Variation due to influence quantity is less than twice the error allowed for reference condition

#### Influence of Variations:

Temperature coefficient :(for rated value range of use (0...50°C))  
 0.025%/°C for Voltage (50... 120% of rated value) and  
 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  
 Safety IEC 61010-1-2001 , Permanently connected use  
 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)

#### Energy Pulsed Output Option :

Relay contact 1 NO + 1 NC  
 Switching Voltage & Current for Relay 240 VDC ,5 A  
 Default pulse rate divisor 1 per Wh (up to 3600W), 1 per kWh (up to 3600kW), 1 per MWh (above 3600 kWh)  
 Other Pulse rate divisors (applicable only when Energy on RS485 is in **W**)  
 10 1 per 10 Wh (up to 3600W), 1 per 10kWh (up to 3600kW), 1 per 10MWh (above 3600 kWh)  
 100 1 per 100Wh (up to 3600W), 1 per 100kWh (up to 3600kW), 1 per 100MWh (above 3600 kWh)  
 1000 1 per 1000Wh (up to 3600W), 1 per 1000kWh (up to 3600kW), 1 per 1000MWh (above 3600 kWh)  
 Pulse duration 60 ms, 100 ms or 200 ms

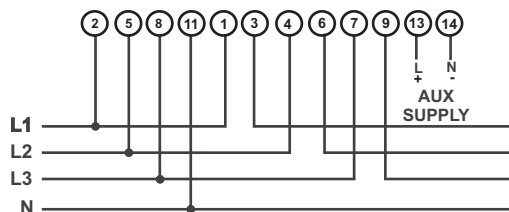
**Note : Above conditions are also applicable for Reactive and Apparent Energy .**

### Parameter Measurement and Display:

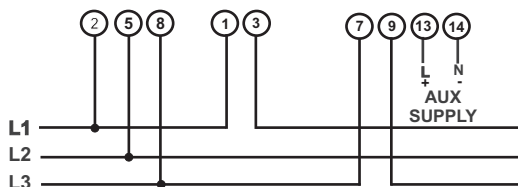
Sr No	Parameter	3 PH 4W	3PH 3W	1PH 2W
1.	System Volts	✓	✓	✓
2.	System Current	✓	✓	✓
3.	Volts L1 – N	✓	x	x
4.	Volts L2 – N	✓	x	x
5.	Volts L3 – N	✓	x	x
6.	Volts L1 – L2	✓	✓	x
7.	Volts L2 – L3	✓	✓	x
8.	Volts L3 – L1	✓	✓	x
9.	Current L1	✓	✓	x
10.	Current L2	✓	✓	x
11.	Current L3	✓	✓	x
12.	Neutral Current	✓	x	x
13.	Frequency	✓	✓	✓
14.	System Active Power (kW)	✓	✓	✓
15.	Active Power L1 (kW)	✓	x	x
16.	Active Power L2 (kW)	✓	x	x
17.	Active Power L3 (kW)	✓	x	x
18.	System Re-active Power (kVAr)	✓	✓	✓
19.	Re-active Power L1 (kVAr)	✓	x	x
20.	Re-active Power L2 (kVAr)	✓	x	x
21.	Re-active Power L3 (kVAr)	✓	x	x
22.	System Apparent Power (kVA)	✓	✓	✓
23.	Apparent Power L1 (kVA)	✓	x	x
24.	Apparent Power L2 (kVA)	✓	x	x
25.	Apparent Power L3 (kVA)	✓	x	x
26.	System Power Factor	✓	✓	✓
27.	Power Factor L1	✓	x	x
28.	Power Factor L2	✓	x	x
29.	Power Factor L3	✓	x	x
30.	Phase Angle L1	✓	x	✓
31.	Phase Angle L2	✓	x	x
32.	Phase Angle L3	✓	x	x
33.	Import kWh (8 digit resolution)	✓	✓	✓
34.	Export kWh (8 digit resolution)	✓	✓	✓
35.	Import kVArh (8 digit resolution)	✓	✓	✓
36.	Export kVArh (8 digit resolution)	✓	✓	✓
37.	kVAh (8 digit resolution)	✓	✓	✓
38.	THD Volts L1-N	✓	x	x
39.	THD Volts L2-N	✓	x	x
40.	THD Volts L3-N	✓	x	x
41.	THD Volts L1-L2	x	✓	x
42.	THD Volts L2-L3	x	✓	x
43.	THD Volts L3-L1	x	✓	x
44.	THD Current L1	✓	✓	x
45.	THD Current L2	✓	✓	x
46.	THD Current L3	✓	✓	x
47.	THD Voltage Mean	✓	✓	✓
48.	THD Current Mean	✓	✓	✓

### Electrical Connections:

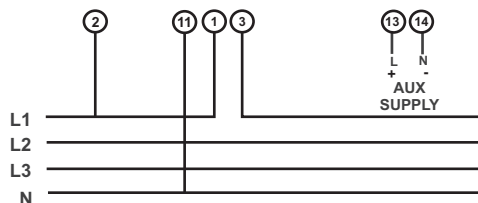
For 3 Phase 4 Wire Unbalanced Load



For 3 Phase 3 Wire Unbalanced Load

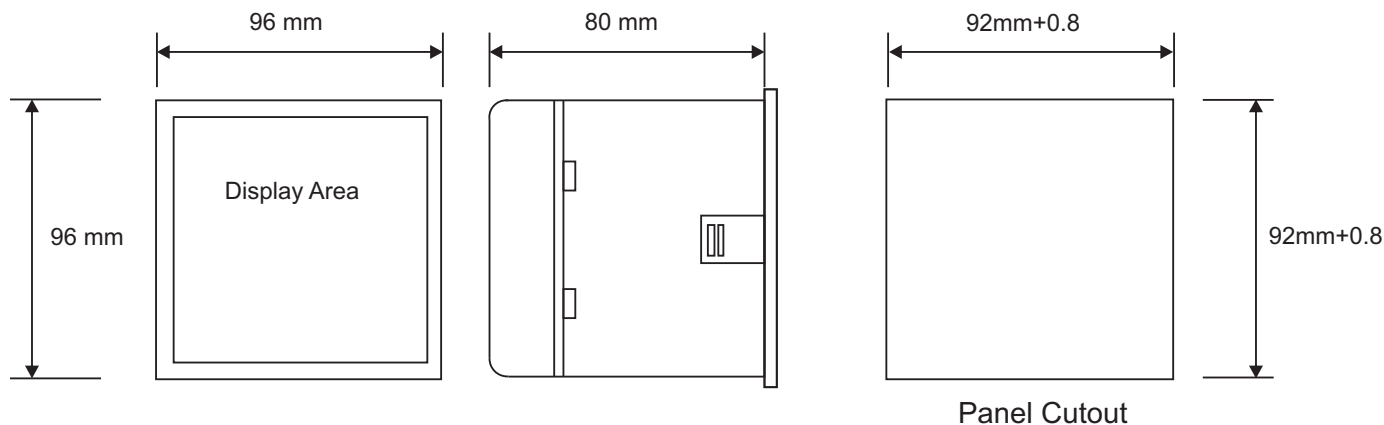


For Single Phase



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



### Order Code:

Ordering information	Ordering Code Ziegler <i>mfm</i> 3430
<b>Accuracy Class</b>	
Accuracy 1.0% (Standard)	1.0
Accuracy 0.5% (on request)	0.5
Accuracy 0.2% (on request)	0.2
<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 Voltage</b>	
110 V AC -15% / +20%	L
230 V AC -15% / +20%	M
380 VAC-15% / +20 %	H
<b>AC/DC Auxiliary Supply Voltage</b>	
100 – 250V AC/DC +/- 10%	AD
12V... 48V V DC +/- 10 %	D
<b>Optional:</b>	
MODBUS (RS485) output	R
MODBUS Option not used	Z
<b>Optional: Pulse Output for energy measurement</b>	
1 Pulse output	S
2 Pulse output	D
Pulse Output option not used	Z
<b>Optional: Analog Outputs</b>	
2 outputs ( 0 – 1mA )	1
2 outputs ( 4 – 20 mA )	2
Analog Outputs option not used	Z

### Order Code Example:

Ziegler *mfm* 3430 0.2 – 3– 415-AD-R-S-2

Ziegler *mfm* 3430, Accuracy 0.2% , 3 phase (programmable onsite as 4 wire or 3 Wire), 415L-L nominal voltage, 100-250V AC/DC Auxiliary supply, with ModBus (RS485),with 1 pulse output and 2 Analog Outputs ( 4 -20 mA ) . (No need to specify CT secondary as 5 A or 1 A is programmable on site.)

Types	AC Aux (110V, 230V, 380V)	100...250VACDC Aux	12...48 VDC Aux
3430			
3430 + 1pulse (1 Limit)	✓	✓	✓
3430 + 2pulse (2 Limit)	✓	✓	✓
3430 + Rs485	✓	✓	✓
3430 + 2 Analog Output	✓	✓	✓
3430 + 1pulse (1 Limit) +Rs485	✗	✓	✓
3430 + 1pulse (1 Limit)+ 2 Analog Output	✗	✓	✓
3430 + 2pulse (2 Limit)+ Rs485	✗	✓	✓
3430 + RS485+ 2 Analog Output	✗	✓	✓
3430 + RS485+1pulse (1 Limit) + 2 Analog Output	✗	✓	✓

Ziegler Instruments always tries for improvement and therefore product specifications are subject to change without notice

## ZIEGLER INSTRUMENTS

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