

## EM 3490 SS

EM 3490 SS Kilowatt Hour Energy Meter With Rs485

### Application :

**Master 3490 SS** is a 96mm x 96mm panel mounted kilowatt hour meter it measures active energy with class 1.0 accuracy having auto-resetting 8 digit seven segment LED counter. The unit provides LED indication for healthy phase, load reverse current. The EM 3490SS is available in two version 3phase 4 wire / 3 wire unbalanced load and single phase and is ideal for secondary metering in industrial applications.

### Product Features:

- Ø class 1.0 Accuracy
- Ø Available in 3 phase 4 wire , 3 phase 3 wire and single phase version
- Ø Indication: Healthy phase, Reverse Current
- Ø Applicable to Standards IEC 62053-21
- Ø 8 Digit auto-ranging auto-resettable seven segment LED display counte
- Ø True RMS measurement
- Ø Fully programmable CT ratios
- Ø Fully programmable PT ratios
- Ø On site programmable 3 phase 4 wire or 3phase 3 wire
- Ø Fully isolated current input
- Ø Built in transient protection
- Ø State of art SMD technology
- Ø Pulse output: one potential free relay contact
- Ø Remote data reading through modbus (Rs485)
- Ø Programmable Energy format & Energy rollover count

### Indication:

#### 3 phase voltage status:

Three indications are provided, one for each voltage phase. Three illuminated indication indicate active monitoring of each of the three phases. In case if any one phase voltage is missing the appropriate indication will switch 'OFF' .However the meter will continue to accurately measure energy for the available voltage phases. In case of phase sequence error all three indication will start blinking.

#### Reverse connected current transformer :

Three indications are provided for each of three phases. Illumination of the indication indicates a reverse connected CT. The meter will continue to register the energy consumption even if the CT's are reverse connected.

### Pulse Indication:

The unit features a red LED pulse indicator which flashes at rate proportional to measured power (3600 impulses / kWh). This is used for verifying calibration of the meter on site.



#### 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.

#### 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 depending on the energy format, after which the energy will roll back to zero.

#### 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 mode.

**Configuration of the Instrument via MODBUS:** The instrument settings can be configured locally via front panel keys by entering into Programming mode or remotely via MODBUS (RS485).  
Note: The MODBUS

communication parameters can only be set locally via front panel keys in the Programming mode.

**User Assignable Registers for MODBUS:** Customer can assign MODBUS register address as per his need for faster response time.

#### 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

#### Enclosure Protection for dust and water:

conforms to IP 54 (front face)

#### Compliance to International Safety standards

Compliance to International Safety standard IEC 61010-1- 2001

## Technical Specifications:

### Input Voltage:

Input Voltage	PT Secondary Settable Range
110V L-L (63.5V L-N)	100V – 120V L-L (57V – 69V L-N)
230V L-L (133V L-N)	121V – 239V L-L (70V – 139V L-N)
415V L-L (239.6V L-N)	240V – 480V L-L (140V – 277V L-N)

### Input Current:

Nominal input current	1 or 5A AC RMS (To be specified while ordering)
System CT primary values	Std. values up to 4kA (1 or 5 Amp )
Starting Current	0.4% of nominal

### Auxiliary Supply:

ACDC Auxiliary Supply	100V... 250 VAC DC
DC Auxiliary Supply	12.....48 VDC
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
AC Supply burden	4 VA

### 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... 0.8 Lead

### Reference conditions for Accuracy:

Reference temperature	23 C +/- 2 C
Input waveform	Sinusoidal (distortion factor 0.005)
Input frequency	50 or 60 Hz $\pm 2\%$
Auxiliary supply voltage	Rated Value $\pm 1\%$
Auxiliary supply frequency	Rated Value $\pm 1\%$
Voltage Range	50... 100% of Nominal Value.
Current Range	10... 100% of Nominal Value.
Power Factor	0.5 lag....1....0.8 lead
Power	10... 100% of Nominal Current & 50... 100% of Nominal Voltage.

### Accuracy:

Active energy (kWh)	1 % (IEC 62053-21) Active P.F. 0.5 lag... 1...0.5 lead
Voltage	$\pm 0.5\%$ of Nominal value
Current	$\pm 0.5\%$ of Nominal value
Frequency	0.15% of mid frequency
Active Power	$\pm 0.5\%$ of Nominal value
Reactive Power	$\pm 0.5\%$ of Nominal value
Apparent Power	$\pm 0.5\%$ of Nominal value
Power Factor	1 % of Unity
Phase angle	1 % of range

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

## Technical Specifications:

### Counter:

Counter: 8 digit seven segment LED display  
 Reading resolution: Auto ranging

### Indication:

Indicator display: 3 : Voltage phase monitoring  
 3 : Reverse connected CT warning.  
 Pulse indicator: Red LED flashing at a rate proportional to measured power.

### Enclosure style:

Enclosure style: 96 X 96 DIN Quadratic  
 Enclosure material: Polycarbonate (Self extinguish & non dripping as per UL 94 V-0)  
 Terminals: M4 Screw Type  
 Fixing: 4 side clamps

### Dimension:

Dimension: 96mm high x 96mm wide x 80mm deep  
 Panel cutout: 92mm x 92mm  
 Weight: 320-400 gm

### 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: CAT III 300V ac rms  
 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)

### Pulse output

Relay contact: 1 NO  
 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 kW)  
 100 1 per 100Wh (up to 3600W), 1 per 100kWh (up to 3600kW), 1 per 100MWh (above 3600 kW)  
 1000 1 per 1000Wh (up to 3600W), 1 per 1000kWh (up to 3600kW), 1 per 1000MWh (above 3600 kW)  
 Pulse duration: 60 ms, 100 ms or 200 ms

**Displayed Parameters:**

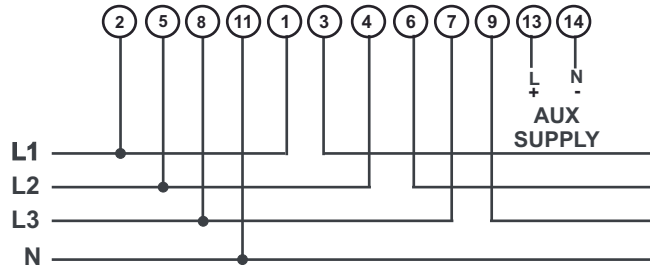
Sr No	Parameters	3 Phase 4 Wire	3 Phase 3 Wire	1 Phase 2 Wire
1.	Active Energy (kWh) (8 digit resolution)	✓	✓	✓

**Parameters Through MODBUS (Optional) :**

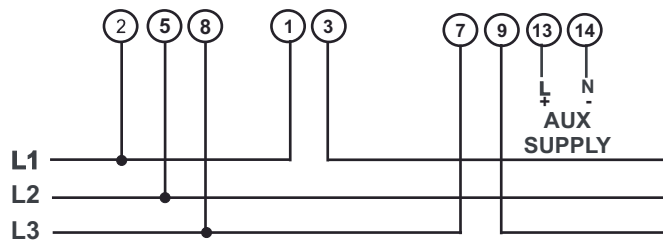
Sr No	Parameters	3 Phase 4 Wire	3 Phase 3 Wire	1 Phase 2 Wire
1.	Active Energy (Wh)	✓	✓	✓
2.	System Volts	✓	✓	✓
3.	System Current	✓	✓	✓
4.	Volts L1 – N	✓	x	x
5.	Volts L2 – N	✓	x	x
6.	Volts L3 – N	✓	x	x
7.	Volts L1 – L2	✓	✓	x
8.	Volts L2 – L3	✓	✓	x
9.	Volts L3 – L1	✓	✓	x
10.	Current L1	✓	✓	x
11.	Current L2	✓	✓	x
12.	Current L3	✓	✓	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.	System Phase Angle	✓	✓	✓
31.	Phase Angle L1	✓	x	✓
32.	Phase Angle L2	✓	x	x
33.	Phase Angle L3	✓	x	x
34.	Apparent Energy (VAh)	✓	✓	✓

## Electrical Connections:

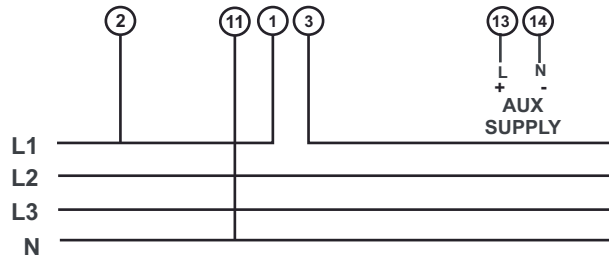
For 3 Phase 4 Wire Unbalanced Load



For 3 Phase 3 Wire Unbalanced Load



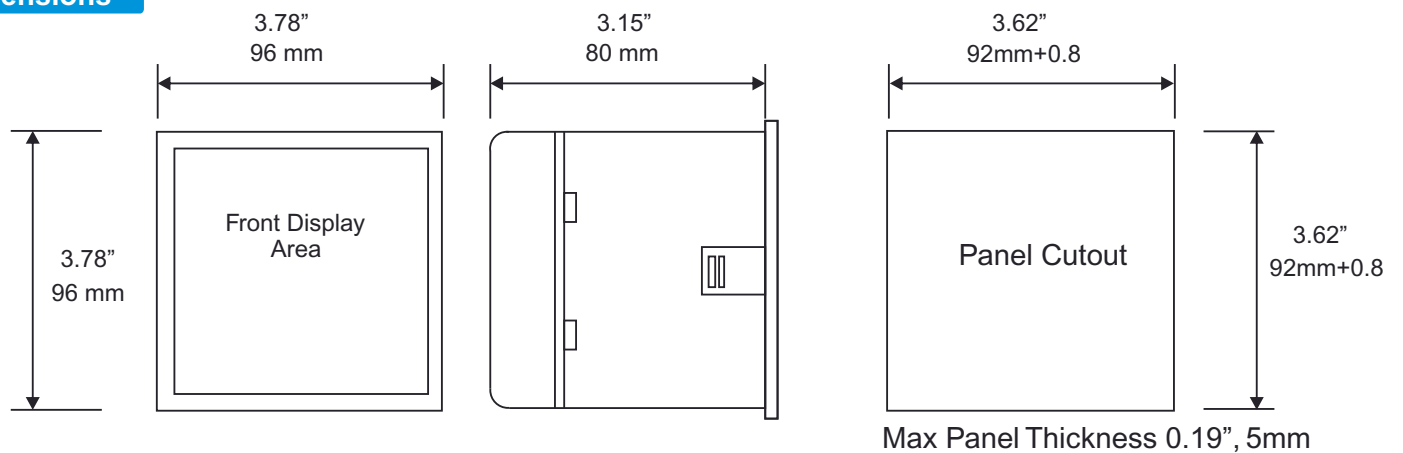
For Single Phase



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  $2.5 \text{ mm}^2$  fine wire.

## Dimensions



Ordering information	Ordering Code
	EM 3490 SS
<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>Input Current</b>	
5 Amps	5
1 Amps	1
<b>AC Auxiliary Voltage</b>	
100V... 250 V AC DC -10% / +10 %	AD
12V... 48V V DC -10% / +10 %	D
<b>Optional:</b>	
MODBUS (RS485) output	R
MODBUS Option not used	Z
<b>Optional: Pulse Output for energy measurement</b>	
Pulse output used	P
Pulse Output option not used	Z

### Order Code Example:

Master 3490SS – 3– 415-AD-R-P

Master 3490SS, 3 phase( programmable onsite as 4 wire or 3 Wire), 415L-L nominal voltage, 5Amps nominal current, 100 – 250V AC DC Auxiliary supply, with MODBUS (RS485),with pulse output

Types	100...250VACDC Aux	12...48 VDC Aux
3490 SS	✓	✓
3490 SS + 1 pulse	✓	✓
3490 SS + Rs485	✓	✓
3490 SS + 1 pulse + Rs485	✓	✓

## ZIEGLER INSTRUMENTS

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