# Smart Meter Type
# POWER ANALYZER
## EM835 SERIES


## 1. Introduction

The multifunction panel meter SMART EM835 series is a top new-generation intelligent panel meter, used not only in the electricity transmission and power distribution system but also in the power consumption measurement and analysis in high voltage intelligent power grid.

This document provides operating, maintenance and installation instructions for the SMART EM835 series. The unit measures and displays the characteristics of single phase two wires, three phase three wires and three phase four wires supplies, including voltage, frequency, current, power and active and reactive energy, imported or exported, Harmonic, Power factor, Max. Demand etc. Energy is measured in terms of kWh, kVArh. Maximum demand current can be measured over preset periods of up to 60 minutes.

In order to measure energy, the unit requires voltage and current inputs in addition to the supply required to power the product. The requisite current input(s) are obtained via current transformers

The SMART EM835 can be configured to work with a wide range of CTs, giving the unit a wide range of operation. Built-in interfaces provide pulse and RS485 Modbus RTU outputs. Configuration is password protected.

## 2. Features

- Measures kWh, Kvarh, KW, Kvar, KVA, PF, Hz, dmd, V, A, etc.
- Bi-directional measurement IMP & EXP
- Plug-in solution saves 80% labor
- 3-in-1 CTs
- Easy “clip-in”panel mounting
- User programmable system configuration
- Self powered,no need auxiliary supply
- Programmable CT/PT ratio
- Pulse output/RS485 Modbus RTU

## 3. Unit Characteristic

- **Measurement and display parameters**

  Line voltage and THD% (total harmonic distortion) of all phases

  Key factor and Crest factor

  Line Frequency

  Currents, Current demands and current THD% of all phases

  Power, maximum power demand and power factor

  Active energy imported and exported

  Reactive energy imported and exported
  Real time date and time

- **Password protected set-up**
  Changing password

  CT Ratio and secondary current

  PT Ratio and secondary voltage

  Pulse output setting

  Demand Interval time

  Supply system selection 1phase2wire,

- **Current Transformer Current ratio**

  The unit can be configured to operate with CT ratio between primary and secondary current is 1 and 2000.

  There are two options of secondary current input: 1A or 5A

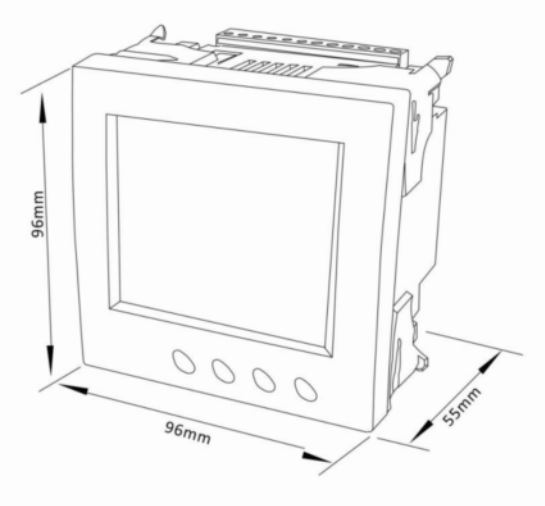
- **RS485 Serial – Modbus RTU**

  This uses an RS485 serial port with Modbus RTU protocol to provide a means of remotely monitoring and controlling the SMART EM835 series.
  Set-up screens are provided for setting up the RS485 port.

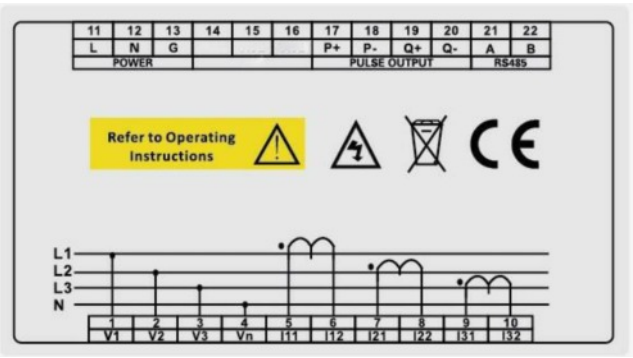
- **Pulse output**

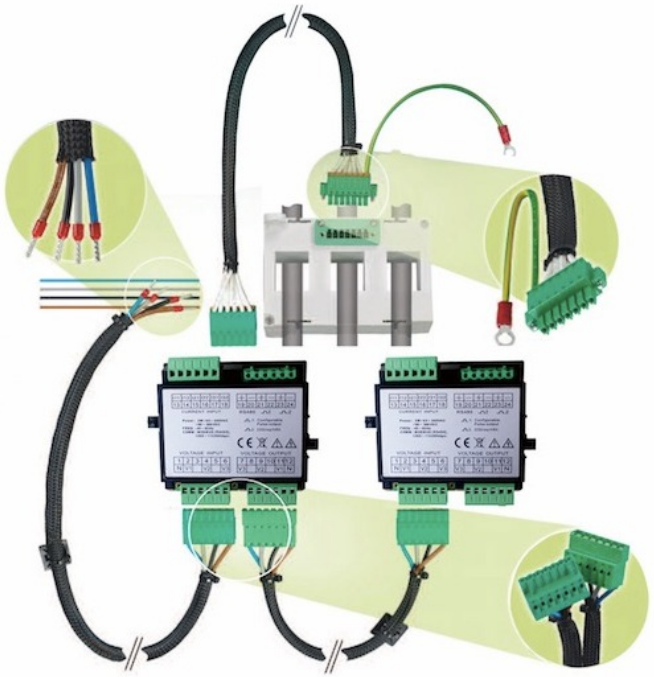
  This provides 2 pulse outputs those clocks up measured active and reactive energy. The constant for both output are configurable.

## 4. Dimensions




## 5. Wiring Diagram



## 6. Technical Specification

| Measured Parameters | Single phase, 3-phase-3 wire, or 3-phase-4 wire |
|---|---|
| Voltage and Current | - Phase to neutral voltages 100 to 289V.a.c<br>- Voltage between phases 173 to 500V.a.c (3p supplies only)<br>- Percentage total voltage harmonic distortion (THD%) got each phase to N<br>- Percentage voltage THD% between phases ( three phase supplies only)<br>- Current on each phase - 1 to 9999A rang, set by external current transformer (Cts)<br>- Current THD% for each phase |
| Power factor and Frequency and Max. Demand | - Frequency in Hz<br>- Power 0 to 999MW<br>- Reactive power 0 to 999MVar<br>- Volt-amps 0 to 999MVA<br>- Maximum demanded power since last demand power factor<br>- Maximum neutral demand current, since the last demand reset (three phases supplier only) |
| Energy Measurements | - Imported active energy 0 to 9999999.9 kWh<br>- Exported active energy 0 to 9999999.9 kWh<br>- Imported reactive energy 0 to 9999999.9 kVArh<br>- Exported reactive energy 0 to 9999999.9 kVarh<br>- Total active energy 0 to 9999999. 9 kWh<br>- Total reactive energy 0 to 9999999.9 kVArh |
| Measured Inputs | Voltage inputs through 4-way fixed connector with 2·5mm2 stranded wire capacity. 3-Phase 3-and4-wire and Single-phase 2-wire unbalanced. Line frequency measured from L1 voltage or L3voltage. Three current inputs (six physical terminals) with 2·5mm2 stranded wire capacity for connection ofexternal CTs. Nominal rated input current 5Aor 1A a.c. Rms. |
| Accuracy | - Voltage 0.5% of range maximum<br>- Current 0.5% of nominal<br>- Frequency 0.2% of mid-frequency<br>- Power factor 1% of unity (0.01)<br>-Active power (W) ±1% of range maximum<br>- Reactive power (Var) ±2% of range maximum<br>- Apparent power (VA) ±1% of range maximum<br>- Active energy (Wh) Class 1 IEC 62053-21<br>- Reactive energy (Varh) ±2% of range maximum<br>- Total harmonic distortion 1% up to 31$^{st}$ harmonic |
| Interfaces for External Monitoring | - RS485 Modbus RTU<br>- Relay output for real-time measured energy (configurable)<br>- Pulse output 5000imp/kWh (not configurable)<br>Note: The modbus configuration (Baudrate etc.) and the pulse relay output assignments (kW/kVArh, import export etc.) are configured through the set-up screens. |

| | |
|---|---|
| Pulse Relay Output | The pulse relay output can be set to generate pulses to represent kWh or kVAr.<br>Rate can set to generate 1 pulse per:<br>- 0.001=1Wh/VArh<br>- 0.01 = 10 Wh/VArh<br>- 0.1 = 100 Wh/VArh<br>- 1 = 1 kWh/kVArh<br>- 10 = 10 kWh/kVArh<br>- 100 = 100 kWh/kVArh<br>*Pulse width 200/100/60 MS.<br>*Relay Rating 240V ac 50mA |
| RS485 Modbus RTU | For ModbusRTU, the following RS485 communication parameters can be configured from the Set-upmenu:<br>**Baud rate** 2400,4800,9600,19200,38400<br>**Parity** none/odd/even<br>**Stop bits** 1 or 2<br>**RS485 network address** *nnn*–3-digit number, 1 to 247<br>***Modbus™ Word order** Hi/Lo byte order is set automatically to normal or reverse. It cannotbe configured |
| Operating Temperature | -25°C to +55°C |
| Storage Temperature | -40°C to +70°C |
| Relative humidity | 0 to 90% non-condensing |
| Altitude | Up to 2000m |
| Warm up time | 1 minute |
| Vibration | 10Hz ti 50Hz, IEC 60068-2-6, 2g |
| Shock | 30g in 3 planes |

* Maximum operating and storage temperature are in the context of typical daily and seasonal variation.

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