

Multifunction Energy Analyser SMART VEN485



Product Overview

The Smartcontroller multifunction panel meter SMART VEN485 is a state of the art 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 Smartcontroller SMART VEN485. The unit measures and displays the characteristics of single phase two wires and three phase four wires supplies, including voltage, frequency, current, power and active and reactive energy, imported or exported. Energy is measured in terms of kWh, kVarh. Maximum demand current can be measured over preset periods of up to 60minutes. 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 (CT).

The SMART VEN485 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.

LCD Display is available in both blue and green colour. Default setting is green display

Unit Characteristics

The SMART VEN485 can measure and display:

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

The unit has password-protected set-up screens for:

- ↳ Changing password
- ↳ Supply system selection 1 phase 2 wire, 3 phase 4 wires
- ↳ CT Ratio and secondary current
- ↳ PT Ratio and secondary voltage
- ↳ Demand Interval time
- ↳ Reset for demand measurements
- ↳ Pulse output duration

A pulse output indicates real-time energy measurement. An RS485 output allows remote monitoring from another display or a computer.

Current Transformer Current ratio

The unit can be configured to operate with CT ratio between primary and secondary current is 1 and 2000. Maximum CT primary current corresponds to a maximum input current to the unit of 1/5A.

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 VEN485. Set-up screens are provided for setting up the RS485 port.

Pulse output

This Unit provides 2 pulse outputs. One pulse output is configurable, which can be set from the SETUP menu to refer to active or reactive energy (total, import, export). While, another pulse output is fixed to total active energy, the constant is 3200imp/kWh.

SPECIFICATIONS

Measured Parameters

The unit can monitor and display the following parameters of a single phase, 3-phase 3-wire or 3-phase 4-wire supply.

Voltage and Current

Phase to neutral voltages 100 to 289V A.C. (not for 3p3w supplies)

Voltages between phases 173 to 500V A.C. (3p supplies only)

Percentage total voltage harmonic distortion (THD%) for each phase to N (not for 3p3w supplies)

Percentage voltage THD% between phases (three phase supplies only)

Current on each phase – 1 to 9999A range, set by external current transformer(s) (CTs)

Current THD% for each phase

Power Factor, Frequency and Max. Demand

Frequency in Hz

Instantaneous power:

Power 0 to 999MW

Reactive Power 0 to 999MVA_r

Volt-amps 0 to 999 MVA

Maximum demanded power since last Demand reset Power factor

Maximum neutral demand current, since the last Demand reset (three phase supplies only)

Energy Measurements

Imported active energy 0 to 99999999.9 kWh

Exported active energy 0 to 99999999.9 kWh

Imported reactive energy 0 to 99999999.9 kVArh

Exported reactive energy 0 to 99999999.9 kVArh

Total active energy 0 to 99999999.9 kWh

Total reactive energy 0 to 99999999.9 kVArh

Measured Inputs

Voltage inputs through 4-way fixed connector with 2..5mm² stranded wire capacity. 3-Phase 3- and 4-wire and Single-phase 2-wire unbalanced. Line frequency measured from L1 voltage or L3 voltage. Three current inputs (six physical terminals) with 2..5mm² stranded wire capacity for connection of external CTs. Nominal rated input current 5A or 1A A.C.Rms.

Accuracy

Voltage	0..5% of range maximum
Current	0..5% of nominal
Frequency	0..2% of mid-frequency
Power Factor	1% of unity (0.01)
Active power (W)	±1% of range maximum
Reactive power (VAr)	±2% of range maximum
Apparent power (VA)	±1% of range maximum
Active energy (Wh)	Class 1 IEC 62053-21
Reactive energy (VARh)	±2% of range maximum
Temperature co-efficient	Voltage and current= 0.013%/°C typical Active energy= 0..018%/°C, typical
Response time to step input	1s, typical, to >99% of final reading, at 50 Hz.

RS485 Output for Modbus RTU

For Modbus RTU, the following RS485 communication parameters can be configured from the Set-up menu:

Baud rate	2400,4800,9600,19200,38400
Parity	none/odd/even
Stop bits	1 or 2
RS485 network address	nnn – 3-digit number, 1 to 247
Modbus™ Word order	Hi/Lo byte order is set automatically to normal or reverse. It cannot be configured from the set-up menu.

Reference Conditions of Influence Quantities

Influence Quantities are variables that affect measurement errors to a minor degree. Accuracy is verified under nominal value (within the specified tolerance) of these conditions.

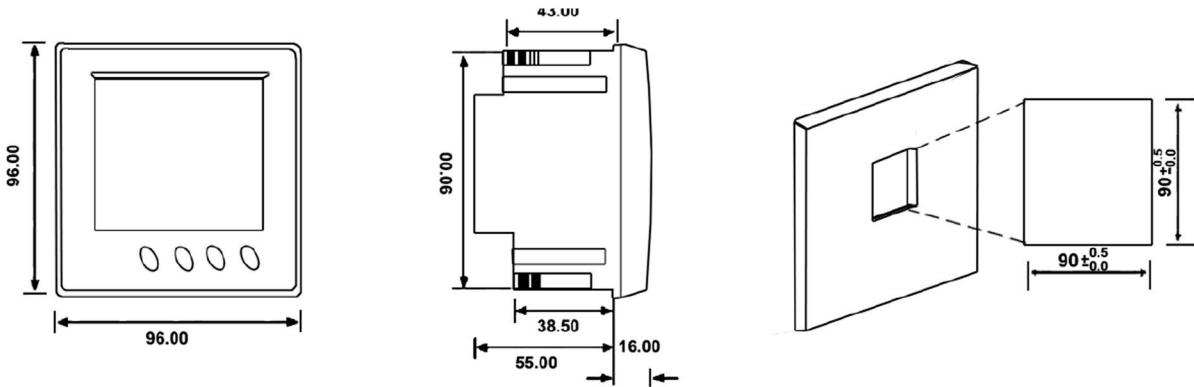
Ambient temperature	23°C ±1°C
Input waveform	50 or 60Hz ±2%
Input waveform	Sinusoidal (distortion factor < 0.005)
Auxiliary supply voltage	Nominal ±1%
Auxiliary supply frequency	Nominal ±1%
Auxiliary supply waveform (if AC)	Sinusoidal (distortion factor < 0.05)
Magnetic field of external origin	Terrestrial flux

Environment

Operating temperature	-25°C to +55°C*
Storage temperature	-40°C to +70°C*
Relative humidity	0 to 90%, non-condensing
Altitude	Upto 2000m
Warm up time	1 minute
Vibration	10Hz to 50Hz, IEC 60068-2-6, 2g
Shock	30g in 3 planes

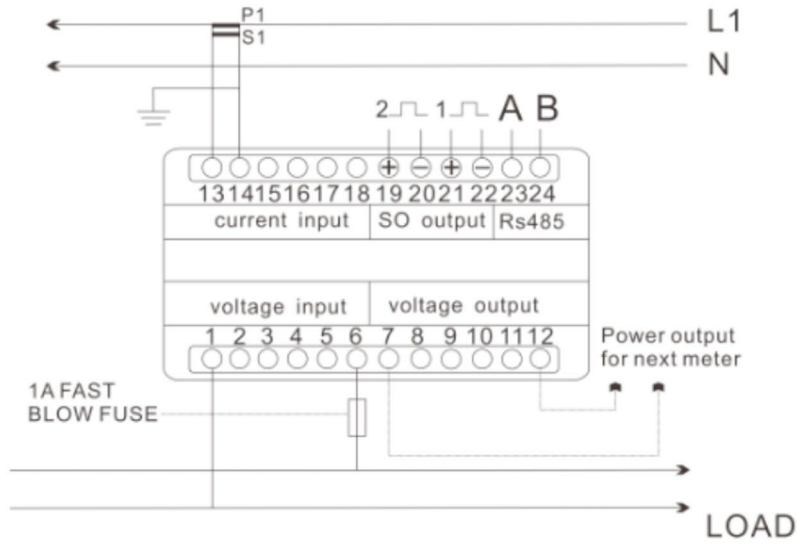
**Maximum operating and storage temperatures are in the context of typical daily and seasonal variation.*

Dimensions

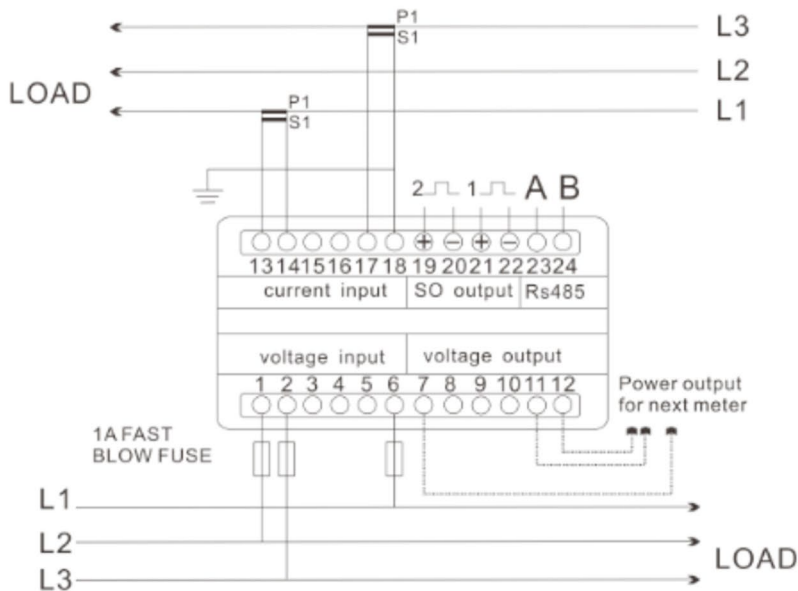


Wiring diagram

Single phase two wire



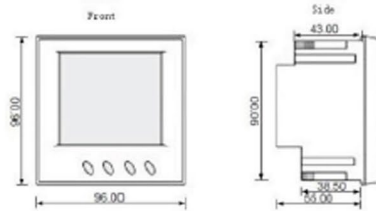
Three phase three wires



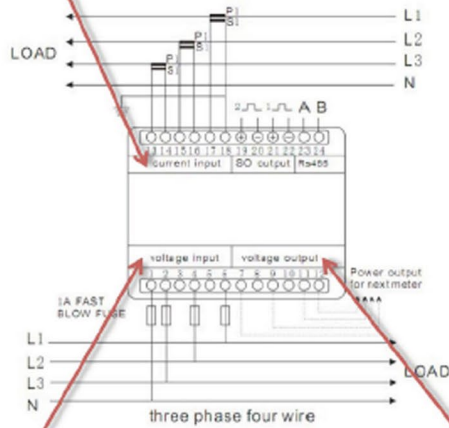
Three phase four wires

Plug in metering solution :

Dimensions:



1. Current Transformer Input



2. Fuse Voltage input



3. Voltage Output to power the next meters (up to 16)



Terminal Kit Option :

Optional Terminal kit for customers who want to pre-manufacture their own wiring looms. Also the terminal kit can be used for any standard single phase or split core Current Transformer with a 1A or 5A Secondary. No requirement for additional converters or hardware

Parameters:

- Phase to Phase Voltage
- Phase to Neutral Voltage
- Frequency
- Voltage Total Harmonic Distortion (THD)
- Current
- Neutral Current (Calculated Modbus only)
- Current Max Demand (Modbus Only)
- Current Total Harmonic Distortion (THD)
- kW
- KVAr
- kW Max Demand
- Power Factor
- Import kWh
- Export kWh
- Import kVArh
- Export kVArh