SMART VEN680 CT-2T

DIN Rail Smart Energy Meter for Single and Three Phase Electrical Systems

Important Safety Information is contained in the Maintenance section. Familiarize yourself with this information before attempting installation or other procedures.

Symbols used in this document:

Risk of Danger: These instructions contain important safety information, Read them before starting installation or servicing of the equipment

Caution: Risk of Electric Shock

Introduction

This document provides operating, maintenance and installation instructions. The unit measures and displays the characteristics of single phase two wires (1p 2w), three phase three wires (3p 3w) and three phase four wires (3p 4w) supplies, including KWh, kVarh, KW, KVar, KVA, PF, Frequency, Voltage, Current, dmd. THD etc. Energy is measured in terms of kWh, kVArh. Maximum demand current can be measured over preset periods of up to 60minutes. The requisite current input(s) are obtained via current transformers (CT).

This meter 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.

This unit has 2 Source Powers and can show T1 energy and T2 energy. If you want to shift T1 to T2, as far as there is 230V load between terminal 7 and 8, the meter will count up to T2. When T1 is working, you can get Pulse1 output 2 from pin 9 & 10. When T2 is working, you can get Pulse 2 output from pin 11 & 12. Both Pulse 1 output and Pulse 2 output Rate are configurable.

Unit Characteristics

The Unit 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 1p2w, 3p3w, 3p4w
- Demand Interval time
- Reset for demand measurements
- Pulse output duration

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

Current Transformer Primary Current

The unit can be configured to operate with CT ratio between primary current and secondary current. The secondary CT has two options: 1A/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 Unit
Set-up screens are provided for setting up the RS485 port. Refers to section 4.8

Pulse output

This provides two pulse outputs that clock up measured T1 active energy and T2 active energy. The default constant for active energy is 3200imp/kWh. The pulse width for active energy can be set from the set-up menu.

SPECIFICATIONS

Measured Parameters

The unit can monitor and display the following parameters of a single phase two wire (1p2w), three phase three wire (3p3w) or four phase four wire(3p4w) 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 THD% for each phase

Power factor and Frequency and Max. Demand

Frequency in Hz
Instantaneous power:
Power 0 to 3600 MW
Reactive Power 0 to 3600 MVAr
Volt-amps 0 to 3600 MVA

Maximum demanded power since last Demand reset Power factor
Maximum neutral demand current, since the last Demand reset (for three phase supplies only)

Energy Measurements

Imported/Exported active energy	0 to 9999999.9 kWh
Imported/Exported reactive energy	0 to 9999999.9 kVArh
Total active energy	0 to 9999999.9 kWh
Total reactive energy	0 to 9999999.9 kVArh

Measured Inputs

Voltage inputs through 4-way fixed connector with 2.5mm^2 stranded wire capacity. single phase two wire(1p2w), three phase three wire(3p3w) or four phase four wire(3p4w) unbalanced. Line frequency measured from L1 voltage or L3 voltage.
Three current inputs (six physical terminals) with 2.5mm^2 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
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
Total harmonic distortion	1% up to 31st harmonic
Temperature co-efficient Active energy	Voltage and current = 0.013%/°C typical = 0•018%/°C, typical
Response time to step input	1s, typical, to >99% of final reading, at 50 Hz.
	0•2% of mid-frequency

Interfaces for External Monitoring

Three interfaces are provided:

- An RS485 communication channel that can be programmed for Modbus RTU protocol
- An relay output indicating real-time measured energy.(configurable)
- An pulse output 3200imp/kWh (not configurable)

The Modbus configuration (Baud rate etc.) and the pulse relay output assignments (kW/kVArh, import/export etc.) are configured through the Set-up screens.

Pulse Output

The pulse output can be set to generate pulses to represent kWh.
Rate can be set to generate 1 pulse per:
0.01 = 10 Wh/VArh
0.1 = 100 Wh/VArh
1 = 1 kWh/kVArh
10 = 10 kWh/kVArh
100 = 100 kWh/kVArh

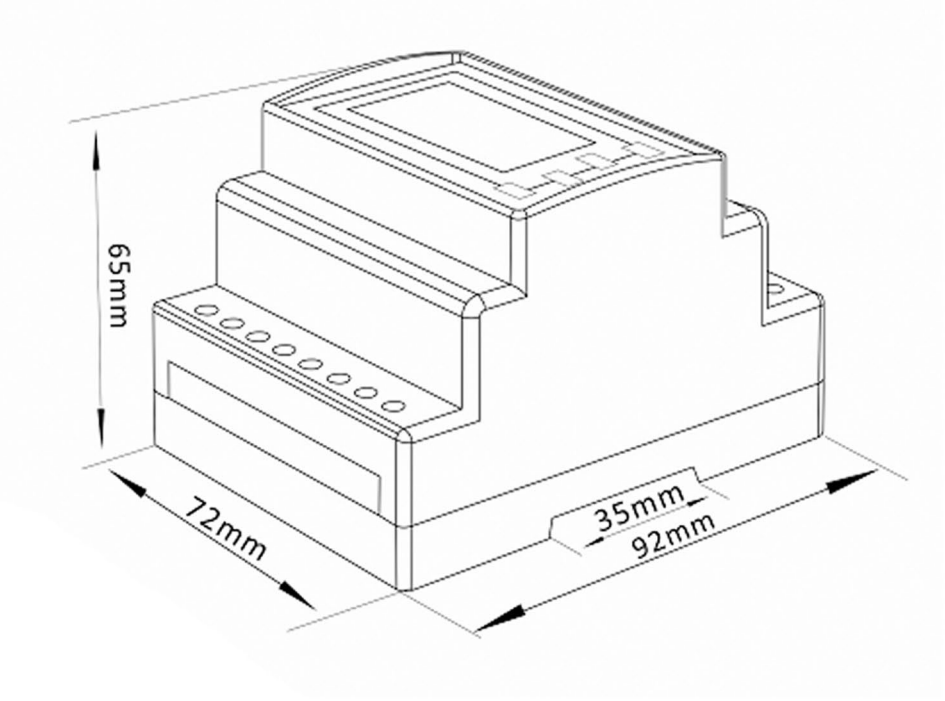
Pulse width 200/100/60 ms.
Relay Rating 240V ac 50mA

RS485 Output for Modbus RTU

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

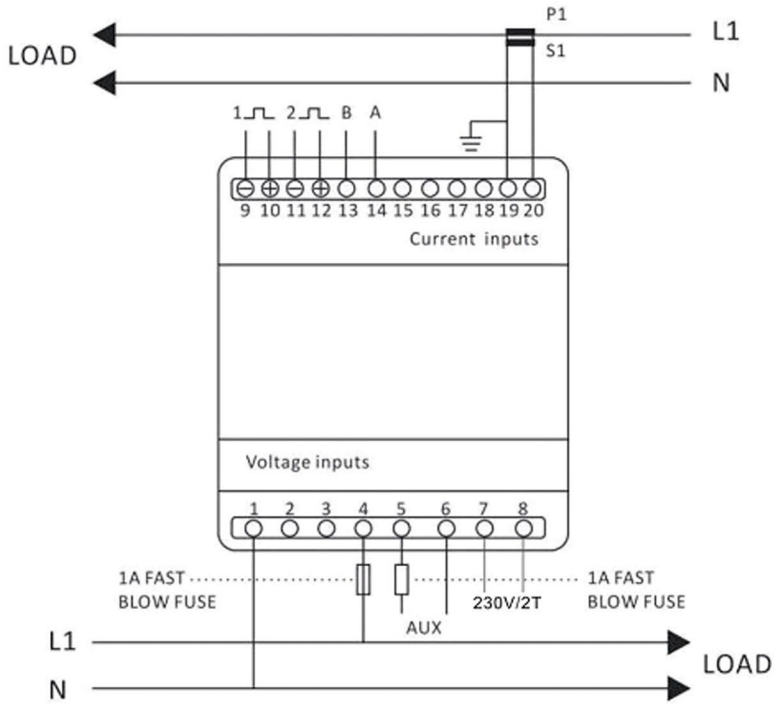
Baud rate 2400, 4800, 9600, 19200, 38400
Parity none/odd/even
Stop bits 1 or 2
RS485 network address nnn – 3-digit number, 1 to 247
Modbus™ Word order Hi/Lo byte order is set automatically to normal or reverse. It cannot be configured from the set-up menu.

Dimensions

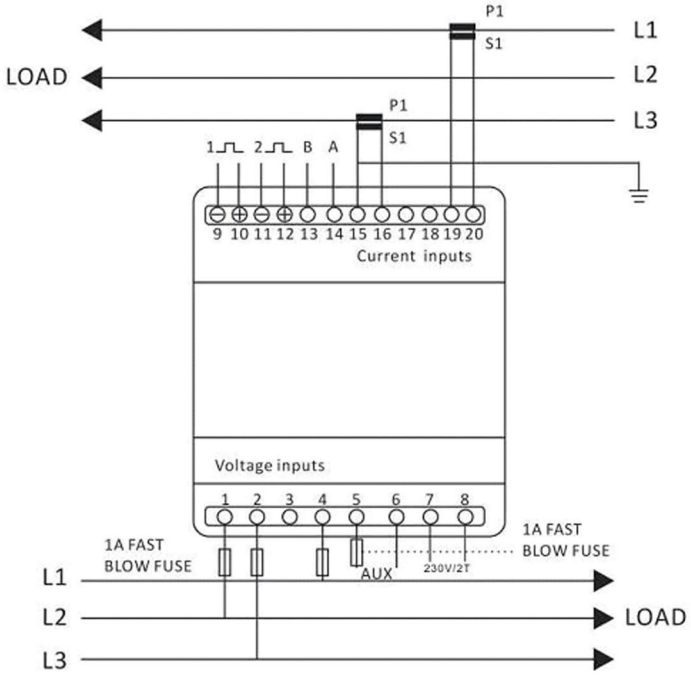


Installation

Single Phase Two Wires



Three Phase Three Wires



Three Phase Four Wires