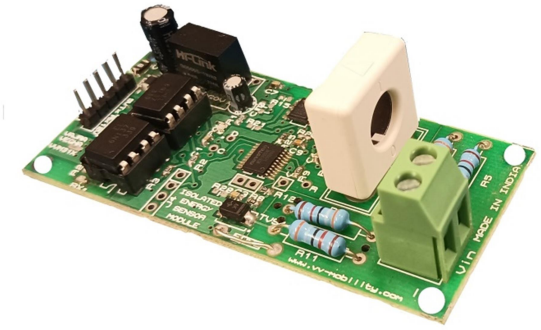
Vajravegha VVM312 400V 100A DC Isolated Voltage and Current Sensor Module with Serial UART Communication MODBUS Compatible

Product ID: VVM312
Version: v1.2

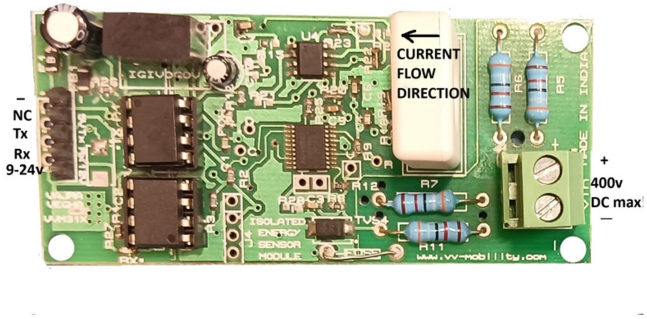
Features:

- Precise isolated DC Voltage measurement. Galvanic isolation protects sensitive systems from hazardous voltage measurement, DC voltage measurement range: 0-400V
- Hall Effect based non-invasive current measurement, no shunt resistor or wire break required, based on WCS1600 sensor, DC current measurement upto 100A
- 1.5kV DC Isolation between measured voltage and communication lines
- 9-24v DC Input Power Supply
- Measured voltage data is available on TTL UART Serial Interface. Programmable Baud Rate, default is 9600
- Can be configured as MODBUS RTU slave by connecting it to a TTL to RS485 Converter, programmable Slave ID, default value is 1
- Compact PCB size 80x36mm
- Typical Applications include Test and Measurement Systems, Instrumentation and Control Systems, Motor Control, Industrial Automation, Solar Systems, Battery Chargers, Electric Vehicles, etc.



Description: VVM312 Digital Voltage Current Sensor Module provides economical and precise isolated DC voltage and current measurement solution for industrial and commercial applications. It allows system designers to safely monitor line voltage and current. Measured voltage is digitally available on Serial UART TTL interface. This interface can also be connected to RS232/RS485 systems

Connection:



- **9-24vDC:** Operating supply voltage
- **_** : Supply negative
- **Rx:** Measured voltage is available here in UART TTL. Connect this pin to Rx of host controller or USB TTL Converter. Default baud 9600
- **Tx:** Host controller/PC can send data to module for configuration. Connect this pin to Tx of host controller or USB TTL Converter
- **NC:** Not Connected

Power the board with 9-24v DC supply on minus and 9-24v pins. Connect the voltage to be measured at the 2pin screw terminal on bottom right of the above image. Ensure correct polarity! Pass the current load wire through the sensor with current flow direction from right to left as per the diagram. Measured voltage and current data will be available on Rx pin at 9600 Baud
Format of Serial Data on Rx pin is as shown:

V350.89DC32.64D\n

where V: Voltage 350.89 measured voltage value, D for DC, can be used as delimiter,
C: Current 32.64 measured current value, \n is for new line.

Data is transmitted at rate of 3 values per second.

Changing Baud rate: Default Baud rate is 9600. To change this value, send command **BAU** followed by any single digital number from 1 to 2 through the Serial Port via the Tx pin. For example, to change baud to 19200, send command **BAU2**

Following are the numbers and their respective Baud rates
1-9600; 2-19200;

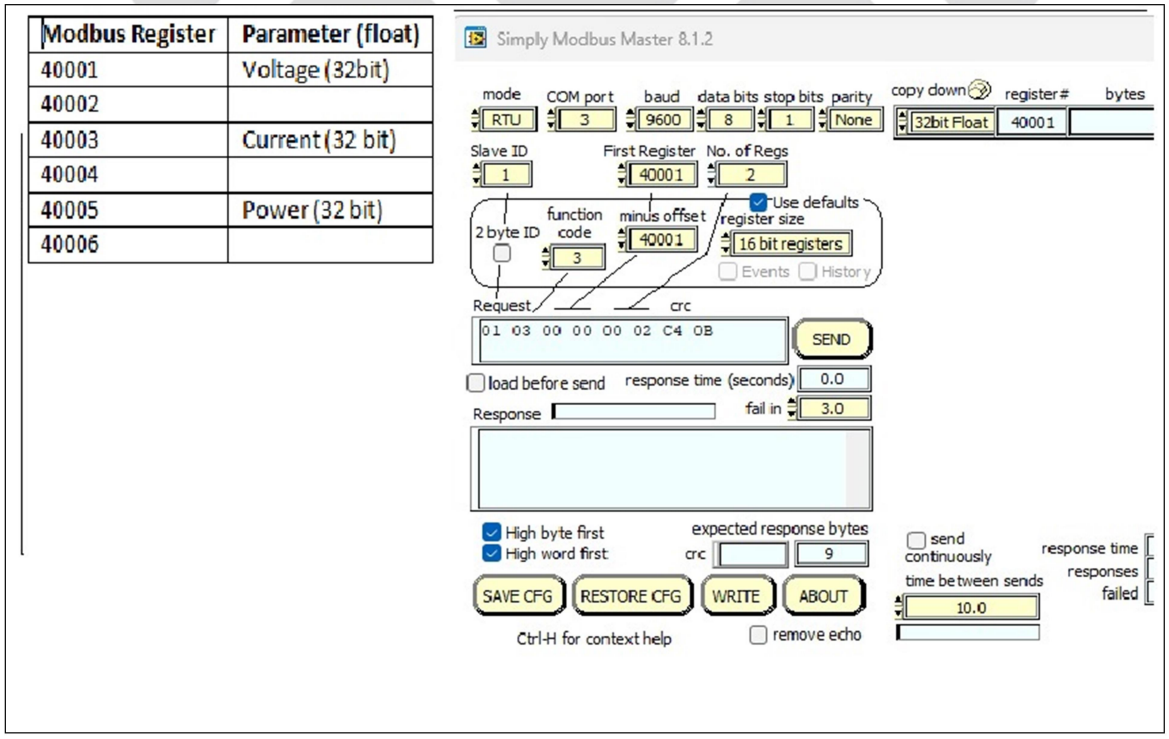
On entering a valid command, new Baud is set and device prompts to reset, else **Invalid Baud** will be displayed on the Console.

Connect the device to a TTL to USB converter or TTL to RS485 converter, depending on the application.

USB to TTL	RS485 to TTL
-ve to -ve	-ve to –ve
Tx to Tx	Tx to Rx
Rx to Rx	Rx to Tx

MODBUS: The device can be configured as a Modbus slave. Default Slave ID is 1. To change this value, send command **SLVXXX** through the Serial Port, where XXX denotes Slave ID from 001 to 247. Only valid slave IDs from 001 to 247 are permitted. For example to set Slave ID as 5, send **SLV005.** To enter Modbus slave mode, send **MOD** through the Serial Port. "Modbus Mode Selected" message appears and device restarts into Modbus Mode. Register format is as follows:

Modbus Register	Parameter (float)
40001	Voltage (32bit)
40002	
40003	Current (32 bit)
40004	
40005	Power (32 bit)
40006	



In Modbus slave Mode, regular Serial UART communication will not be available, because the data will be communicated via Modbus protocol. To exit Modbus slave mode, send **SERIALON** message via the Serial Port. "Serial Mode Selected" message appears and device restarts into regular Serial mode.

Voltage Calibration: The module can be calibrated in-case of voltage variation beyond the tolerance band. To calibrate the sensor, connect the voltage source to Vin connector and observe the measured voltage on the Serial port. In-case of variation, send command in the following format, **CALXXX.XX** For example, if the actual voltage is 54.6v DC and voltage measured by the sensor and displayed is incorrect, then send **CAL054.60** New calibration factor will be automatically stored in the sensor. **Note:** Calibrate with high voltage values for better accuracy.

Current Calibration: To calibrate the Hall sensor, pass sufficient current through the Hall sensor and observe the reading. In-case of variation, send command in the following format, **CLIXXX.XX** For example if the actual current is 25A and the sensor reading is different, then send **CLI025.00** New calibration factor will be automatically stored in the sensor. **Note:** Calibrate with high current values for better accuracy.

Zero Current Calibration: As Hall effect principle is used for current measurement, the sensor might output small current value even while no current is flowing through the sensor. This can be due to stray magnetic fields and other phenomenon. To remove this offset, send **ZER** through the Serial port. This will remove the zero current offset.