VoltEdge

Three-phase multifunction energy meter

VE-EM43-DT-BI Series User Guide V1.0

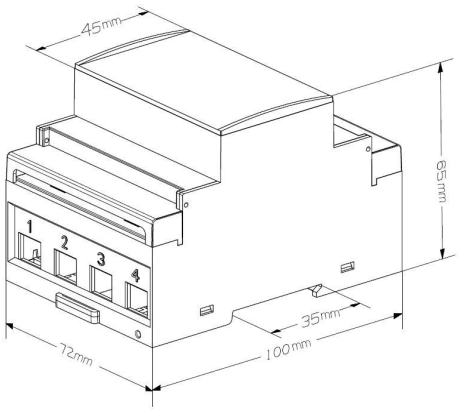
1.1. Introduction

VE-EM43 series products are three phase DIN rail installation mutil-function energy meter. This series products can support wireless communication way WIFI. Carrying Tuya platform can realize the remote access of mobile APP terminal. This series of products also can support the analysis of electric power parameter measurement in 1P2W,3P4W,3P3W grid environment, is suitable for power monitoring for photovoltaic inverter, new energy electricity consumption statistic analysis,real time power monitoring and a variety of other environments, has the multi-function, high stability and long life characteristics.

1.2. Characteristics

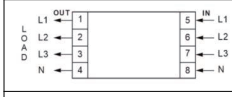
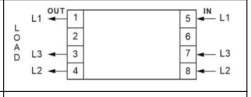
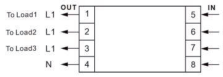
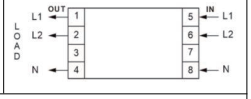
- Maximum current 100A direct access.
- DIN Rail mounting, standard 4 modulus width.
- Touch button design improves button operability and reduces button failure rate
- Multi-function parameter measurement, providing voltage, current, active power, reactive power, apparent power, power factor, phase Angle, etc.
- To provide the analytical data of the total harmonic contents of voltages and currents
- Provide a variety of statistical data and local storage functions, such as two-way power, demand and other statistical data. Provide monthly electricity consumption statistics for the last 12 months and daily electricity consumption statistics for the last 31 days
- supports the access of a 2-tariff switching signal for metering at 2-tariff energy.
- Support RS485 communication function, baud rate up to 38400bps, support Modbus RTU. Mbus(Option) protocol.
- Support WIFI wireless communication.

2.1. Installation dimensions

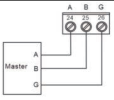
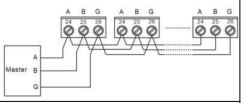


2.2. Wiring Diagrams

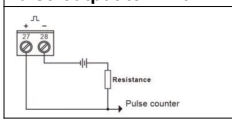
Measurement input wiring

3P4W	3P3W
	
1P2W	**2P3W**
	

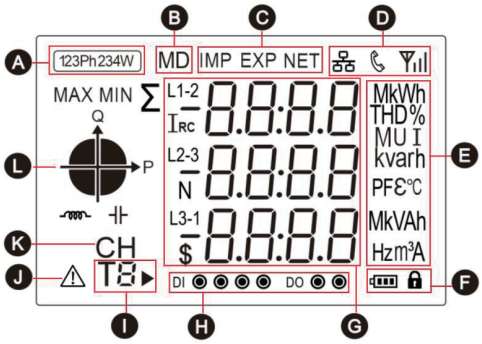
Communication terminal wiring

Single meter wiring	Multiple meters wiring
	

Pulse output terminal wiring



3.1. LCD display area description



A: The power grid type icon represents the current measurement type of the meter.
B: Maximum demand icon.
C: Direction icon for import and export energy.
D: A status indicator icon for the meter.
E: An icon of a unit of measurement data.
F: Battery status Icon and lock icon, displays the battery status and dicates that the device is locked.
G: Measured values.
H: An icon of digital I/O status for the meter.
I: Multi tariff icon indicating the tariff segment to which the current energy. ▶ represents the tariff number displayed as the running tariff segment. For example: T2▶ The figure on the left represents that the tariff 2 (T2) segment is running, and the accumulated energy will be counted into the corresponding energy area of tariff 2 (T2).
J: Warning Status icon.
K: Channel indicator icon for multiple measurement channels.
L: Quadrant indicator icon indicating the quadrant of the current load.

3.2. Network config operation

Step 1: After completing the wiring according to the wiring diagram of the meter, then power on the meter.

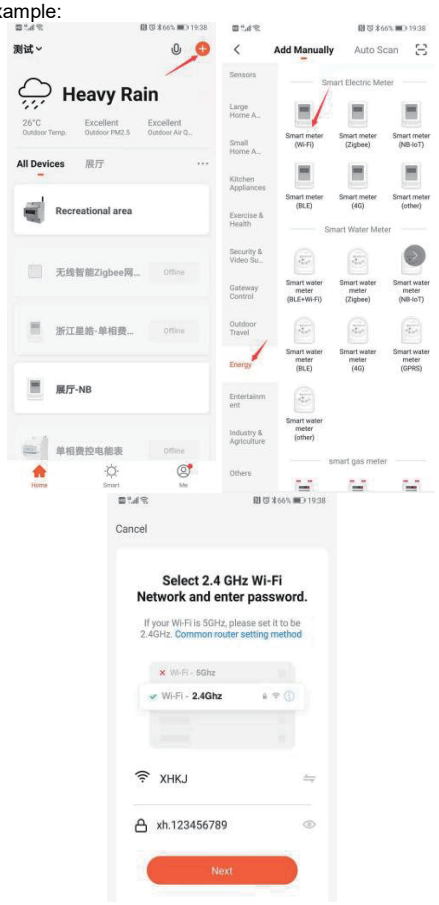
Step 2: Connect the phone's WIFI to the router that the meter needs to connect (make sure 2.4G WIFI, will otherwise cause subsequent config network failure).

Step 3: Open the Tuya smart APP, and click the Add Device button to select "Smart Meter (WIFI)" in the "Energy" category.

Step 4: Verify whether the name and password of the WIFI hotspot prompted on the mobile phone interface belong to the target router needing to be connected. After confirming the information, click the "Next" button to operate according to the prompts to complete the operation of the distribution network.

Note: During network config, you are advised to enable bluetooth for your mobile phone to improve the smooth network config.

Example:



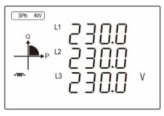
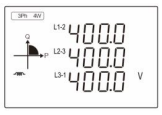
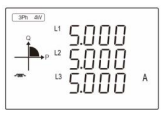
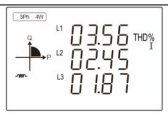
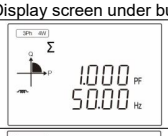
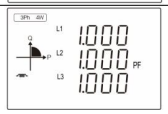
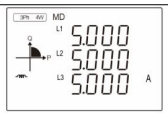
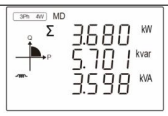
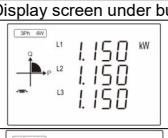
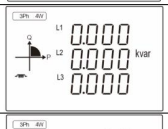
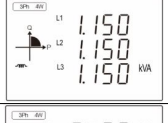
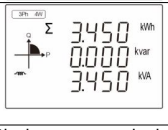
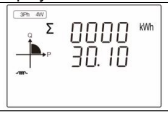
3.3. Button definition descripti

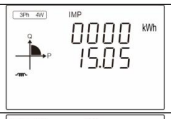
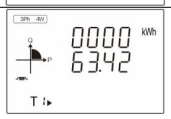
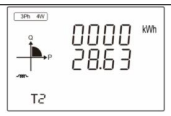
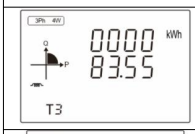
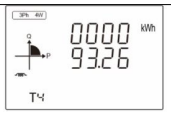
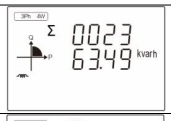
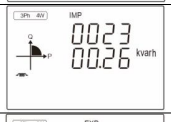
Button	Definition	Click	Press 3 second
U/I Esc	Button 1: Escape key (Esc)	1. In the setting screen or auxiliary screen: exit or return to the previous screen. 2. In the main display screen: page scroll for parameters such as voltage and current.	Under the main display screen: enter the auxiliary display screen.
PF/HZ ▲	Button 2: Up key (Up)	1. In the main display screen: view the power factor, maximum demand. 2. In the setting screen or auxiliary screen: scroll up to display the page or the increasing number.	Null
P ▼	Button 3: Down key (Dn)	1. In the main display screen: veiw the power information. 2. In the setting screen or auxiliary screen: scroll down to display the page or the decreasing number.	Null
E ↵	Button 4: Enter key (Et)	1. In the main display screen: veiw energy data and system time. 2. In the setting screen: right move the setting cursor.	1. In the main display screen: enter the setting mode. 2. In the setting screen: enter the setting state or carry out confirmation operation.

3.4. Description of display screen

3.4.1. Main display screen

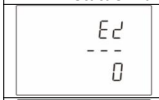
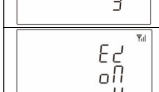
After the meter is powered on and passes the self-test process, the interface entered is defined as the main display interface, which is used to display the main measurement parameters, electric quantity data, instrument information and other data of the product. Users can scroll the display page by pressing the button 1 to button 4.

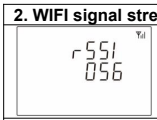
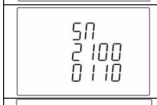
LCD display	Description
Display screen under button 1	
	A display screen for three-phase L-N voltage. Example: L1-N voltage = 230.0V L2-N voltage = 230.0V L3-N voltage = 230.0V Note: In 3P3W mode, this screen is not displayed
	A display screen for three-phase L-L voltage. Example: L1-2 voltage = 400.0V L2-3 voltage = 400.0V L3-1 voltage = 400.0V Note: In 1P2W mode, this screen is not displayed
	A display screen for three-phase current. Example: L1 current = 5.001A L2 current = 5.002A L3 current = 5.000A
	A display screen for three-phase L-N voltage THD. Example: L1 voltage THD = 3.06% L2 voltage THD = 2.78% L3 voltage THD = 4.35%
	A display screen for three-phase L-L voltage THD. Example: L1-2 voltage THD = 2.74% L2-3 voltage THD = 3.80% L3-1 voltage THD = 0.00% Note: This screen is displayed only in 3P3W mode.
	A display screen for three-phase current THD. Example: L1 current THD = 3.56% L2 current THD = 2.45% L3 current THD = 1.87%
Display screen under button 2	
	Total power factor and frequency display screen Example: Total power factor = 1.000 Frequency = 50.00Hz
	Three - phase power factor display screen Example: L1 power factor = 1.000 L2 power factor = 1.000 L3 power factor = 1.000
	Max.demand of three-phase display screen Example: Max.Demand of L1 current = 5.000A Max.Demand of L2 current = 5.000A Max.Demand of L3 current = 5.000A
	Max.demand of total active/reactive/ apparent power display screen Example: Max.Demand of total active power = 3.680 kW Max.Demand of total reactive power = 5.701 kvar Max.Demand of total apparent power = 3.598 kVA
Display screen under button 3	
	Per phase active power display screen Example: L1 active power = 1.150 kW L2 active power = 1.150 kW L3 active power = 1.150 kW
	Per phase reactive power display screen Example: L1 reactive power = 0 kvar L2 reactive power = 0 kvar L3 reactive power = 0 kvar
	Per phase apparent power display screen Example: L1 apparent power = 1.150 kVA L2 apparent power = 1.150 kVA L3 apparent power = 1.150 kVA
	Total active/reactive/apparent power display screen Example: Total active power = 3.450 kW Total reactive power = 0 kvar Total apparent power = 3.450 kVA
Display screen under button 4	
	Total active energy Example: Total active energy = 30.10 kWh

	Import active energy Example: Import active energy = 15.05 kWh
	Export active energy Example: Export active energy = 15.05 kWh
	Tariff 1 active energy Example: Tariff 1 active energy = 63.42kWh Note: Only mulit-tariff meter and 2T meter show this page
	Tariff 2 active energy Example: Tariff 2 active energy = 28.63kWh Note: Only mulit-tariff meter and 2T meter show this page
	Tariff 3 active energy Example: Tariff 3 active energy = 83.55kWh Note: Only mulit-tariff meter show this page
	Tariff 4 active energy Example: Tariff 4 active energy = 93.26kWh Note: Only mulit-tariff meter show this page
	Total reactive energy Example: Total reactive energy = 2363.49kvarh
	Import reactive energy Example: Import reactive energy = 2300.26kvarh
	Export reactive energy Example: Export reactive energy = 63.23kvarh
	Displaying the current date of the system real-time clock. Example: The current date is June 4, 2021 Note: Only mulit-tariff meter show this page
	Displaying the current time of the system real-time clock. Example: The current time is 14:32.38 Note: Only mulit-tariff meter show this page
Icon description of the load nature:  is mean : The load is an inductive load ,  is mean : The load is a capacitive load.	

3.4.2. Auxiliary display screen

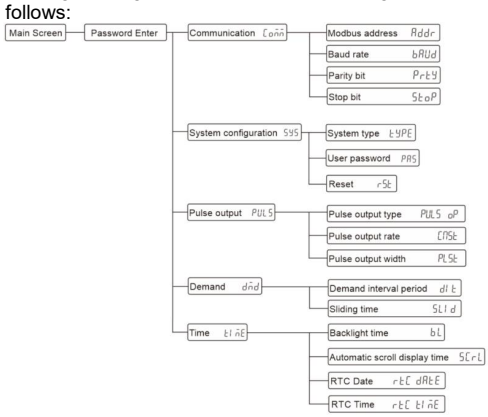
Under the main display screen, press button 1 for 3 second to enter the screen of auxiliary display. At this point, click button 2 or button 3 can be scroll the page needs to be viewed. Under the screen of auxiliary display, can click button 1 to return to the main display screen. If there is no button operation in more than 1 minute under the screen of auxiliary display, the meter will automatically return to the main display screen.

LCD display	Description
1. WIFI status indicator interface	
	Indicates that the current WIFI is in Smartconfig state.
	Indicates that the current WIFI is configured but not connected to the route.
	Indicates that the current WIFI is configured and connected to the router, but not connected to the cloud.
	WIFI connects to a router and connects to the cloud.
Note: On this screen, press button 4 for 3 seconds, WIFI will be reset, and the meter will enter the network configuration mode.	

2. WIFI signal strength indicator interface	
	WIFI signal strength indicator.
3. The meter auxiliary information interface	
	Modbus address Example: The modbus address is 1.
	Baud rate Example: The baud rate is 9600bps.
	Parity bit Example: The Parity bit is None.
	The serial number of meter Example: The serial number is 21000110.
	Software version number

4.1. Setting-up

The logical diagram of the parameter setting menu is as follows:



How to enter the "Parameter setting Menu" screen:

Step 1: In the main display screen, press button 4 for 3 second to enter the user password input mode.
Note: The user password input screen is shown in the figure on the right.

Step 2: Enter the correct user password and press button 4 for 3 second to confirm.

How to enter a password:

A: Click button 2 and button 3 to increase or decrease the number of flashing bits.
B: Click button 4 to move the flashing position to the right.
C: After entering the correct password, press button 4 for 3 second for confirmation. If the password is verified correctly, the power meter will enter the screen of "Parameter Setting menu".

Note: Under the user password input screen, can click button 1 to return to the main display screen. If there is no button operation in more than 1 minute under this screen, the power meter will automatically return to the main display screen.

Appendix B – Failure code reference table

No.	LCD display	Fault description
1	Err-01	The battery voltage is too low
2	Err-02	The WIFI module fault
3	Err-03	1. The battery voltage is too low 2. The WIFI module fault

Appendix C – Alarm prompt comparison table

No.	The action of the meter	Alarm definition
1	LCD display alarm icon ⚠	Occurs over voltage, over current or power exceeds the limit