VOLTARIS METERING

User Manual

VDT45M

Three Phase CT Operated Energy Meter



CLASS C (±0.5%)
High accuracy measurement

MID APPROVED
Suitable for billing applications

RS485 MODBUS
BMS & Energy Management

PULSE OUTPUT
For active or reactive energy

BI-DIRECTIONAL
Import & export energy

Version 1.0 Sep-26

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1. Safety Information

- Installation must only be carried out by suitably qualified electrical personnel.
- Isolate all power sources before installation or maintenance.
- Always follow local wiring regulations and applicable electrical standards.
- Never disconnect a current transformer (CT) secondary whilst energised.
- Verify all wiring before energising the meter.
- Do not exceed the specified voltage or current ratings.
- This meter is intended for installation within an electrical enclosure providing appropriate environmental protection.

Voltaris Metering accepts no responsibility for damage or injury resulting from incorrect installation or operation.

WARNING

Failure to follow these instructions may result in equipment damage, serious injury or death.

2. Quick Installation Guide

	Isolate all supplies before installation	
	Mount meter on DIN rail (35mm Top Hat)	
	Connect CTs as per wiring diagram	Page 7
	Connect voltage cables as per wiring diagram	Page 7
	Connect auxiliary supply as per wiring diagram	Page 7
	Configure CT ratio, PT ratio and system type	Page 16
	Verify voltage and current readings	Page 11
	Verify import / export direction	Page 14
	Set communication parameters e.g. Modbus address / Pulse width	Page 16
	Commissioning complete	

3. Overview

3.1 Introduction

The Voltaris VDT45M is a high-performance, three-phase multifunction energy meter designed for DIN rail installation, providing accurate and reliable electrical measurements for commercial, industrial and renewable energy applications.

The VDT45M continuously monitors and displays a comprehensive range of electrical parameters, including voltage, current, frequency, active and reactive power, apparent power, power factor and imported/exported energy. Designed to deliver precise performance in demanding environments, it enables users to monitor energy consumption, identify inefficiencies and support effective energy management.

Suitable for three-phase four-wire (3P4W)**,** three-phase three-wire (3P3W), two-phase three-wire (2P3W) and single-phase (1P2W), the VDT45M is ideal for sub-metering, distribution boards, control panels, renewable energy installations and general power monitoring applications. Its high accuracy and dependable operation make it suitable for both operational monitoring and energy management systems.

The meter is equipped with a clear, backlit LCD display and intuitive front-panel controls, allowing quick access to real-time measurements and configuration settings. An integrated RS485 communication interface supports the Modbus RTU protocol, enabling seamless integration with Building Management Systems (BMS), SCADA platforms and other energy monitoring solutions for remote data acquisition and analysis.

Designed for long-term reliability, the VDT45M incorporates password-protected configuration settings to help prevent unauthorised changes, ensuring the integrity of recorded data and system parameters.

Combining robust construction, straightforward installation and comprehensive monitoring capabilities, the Voltaris VDT45M provides a dependable and cost-effective solution for modern electrical energy measurement and management.

3.2 Characteristics

- Compatible with current transformers (CTs) with a 1A or 5A secondary, for indirect energy measurement with configurable CT ratios to suit a wide range of applications.
- Supports voltage transformer (VT/PT) connections for higher voltage metering applications, allowing installation across a broad range of electrical systems.
- Compact DIN rail mounting design occupying 4 standard DIN modules, providing simple installation within distribution boards and control panels.
- Comprehensive measurement of key electrical parameters, including voltage, current, frequency, active power (kW), reactive power (kVAr), apparent power (kVA), power factor and phase angle.
- Displays imported and exported active energy, together with reactive energy values, making the meter suitable for energy monitoring and renewable energy applications.
- Provides voltage and current total harmonic distortion (THD) measurements to assist with power quality analysis and fault diagnosis.
- Integrated RS485 communication interface supporting the Modbus RTU protocol, with baud rates up to 38,400 bps, allowing straightforward integration with Building Management Systems (BMS), SCADA platforms and energy management software.

- Equipped with a programmable opto-isolated pulse output, allowing the output parameter to be configured for integration with external monitoring, data acquisition and building management systems.
- Password-protected configuration settings help prevent unauthorised parameter changes and maintain the integrity of recorded data.
- High-contrast backlit LCD display with intuitive front-panel navigation for convenient viewing of measurements and configuration settings.
- Features a fast 1-second LCD refresh rate with selectable manual or automatic display scrolling, providing clear, real-time visibility of measured electrical parameters.

3.3 Parameters

Display Parameters

Instantaneous RMS Values	
Current	Per phase, neutral
Voltage	L-L, L-N
Frequency	45 to 65 Hz
Active power	Total and per phase
Reactive power	Total and per phase
Apparent power	Total and per phase
Power factor	Total and per phase
Energy Values (includes import, export & import + export)	
Active energy	0 to 99999999.999 kWh
Reactive energy	0 to 99999999.999 kvarh
Maximum Demand Values	
Max.Demand of current	Per phase
Max.Demand of active power	Total
Max.Demand of reactive power	Total
Max.Demand of apparent power	Total

Communication Parameters

Energy Values	
Apparent Energy (total)	0 to 99999999.999 kVAh
Per phase energy	Active energy and reactive energy, including import, export & import + export Range: 0 to 999999.999 kWh/kvarh

Settable Parameters

Communication class	Modbus address, baud rate, parity bit, stop bit
Current transformer (CT) class	CT1 (Primary), range from 1 to 9999 CT2 (Secondary), 1 or 5
Voltage transformer (PT) class	PT1 (Primary), range from 30 to 500000 PT2 (Secondary), range from 30 to 500

System configuration class	User password (HMI), Power system type
Demand class	Demand interval period, Slide time
Pulse output class	Pulse output type, Pulse output width, Pulse output rate
Time class	Automatic scroll display time, Backlit time

4. Technical Data

4.1 Specification

Electrical Characteristics

Type of measurement		RMS measurements including harmonic content, supports 3P4W, 3P3W, 2P3W, 1P2W
Measurement accuracy	Voltage, Current	Class 0.5, according to IEC 61557-12
	Active power	Class 0.5, according to IEC 61557-12
	Reactive power	Class 2, according to IEC 61557-12
	Apparent power	Class 1, according to IEC 61557-12
	Active energy	Class 0.5, according to IEC 62053-22, IEC 61557-12
	Reactive energy	Class 2, according to IEC 62053-23, IEC 61557-12
	Power factor	Class 1, according to IEC 61557-12
	Frequency	Class 0.2, according to IEC 61557-12
	Harmonic distortion	Class 2, according to IEC 61557-12
Data update rate		1 second
Input-Voltage	Rated voltage (Un)	230 Vac (L-N) / 400 Vac (L-L)
	Measured range (Direct connection)	30 to 300 Vac (L-N), 30 to 500 Vac (L-L)
	PT primary	30 to 500000
	Impedance	1 MΩ
	Frequency range	45 to 65 Hz
	Overload capacity	2 x Un for 1 second
Input-Current	CT2 (Secondary)	1 A or 5 A
	CT1 (Primary)	1 to 9999 A
	Measured range	0.003 to 6 A, basic current (Ib) is 5 A
	Impedance	< 0.01 ohm
	Overload capacity	120 A for 0.5 second
Auxiliary power supply	Operating range	80 - 300 Vac / 100 - 420 Vdc
	Frequency	45 - 65 Hz
	Power consumption	< 4 VA/0.5 W
Pulse output	Interface type	Open collector optocoupler
	Pulse constant	Per pulse equal 0.001 / 0.01 / 0.1 / 1 / 10 / 100 kWh/kvarh (configurable)
	Pulse width	60 / 100 / 200 milliseconds (configurable), default is 100 milliseconds
	Pulse output type	Import / export / total active energy, Import / export / total reactive energy (configurable)

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	Class	Class A, according to IEC 62053-31
	Input voltage	5 - 27 Vdc
Pulse indicator light on the panel		Pulse constant is 5000 imp/kWh, which represents the total active energy of the secondary side
Real-time clock accuracy		0.5 s/d

Mechanical Characteristics

IP Degree of Protection (IEC 60529)	Designed to IP51 front display, IP30 meter body
Dimensions (W X H X D)	72 x 100 x 66 mm
Mounting Position	DIN Rail mounting
Material of meter case	UL 94 V-0

Environmental Characteristics

Operating Temperature	-25 to +55℃
Storage Temperature	-40 to +80℃
Humidity	< 90%, non-condensing
Pollution Degree	2
Altitude	Up to 2000m
Vibration	10 Hz to 150Hz, IEC 60068-2-6

Electromagnetic Characteristics

Electrostatic Discharge	Level 4, according to IEC 61000-4-2(1)
Immunity to Radiated Fields	Level 3, according to IEC 61000-4-3(1)
Immunity to Electrical Fast Transients	Level 4, according to IEC 61000-4-4(1)
Immunity to Surges	Level 4, according to IEC 61000-4-5(1)
Immunity to Conducted Disturbances	Level 3, according to IEC 61000-4-6(1)
Immunity to Magnetic Fields	IEC 61000-4-8(1)
Immunity to Voltage Dips	IEC 61000-4-11(1)
Radiated Emissions	Class B, according EN55011
Conducted Emissions	Class B, according EN55011
Harmonics	IEC 61000-3-2(1)

(1): The experimental test is carried out according to the grade requirements of industrial grade products in IEC61326-1

Safety

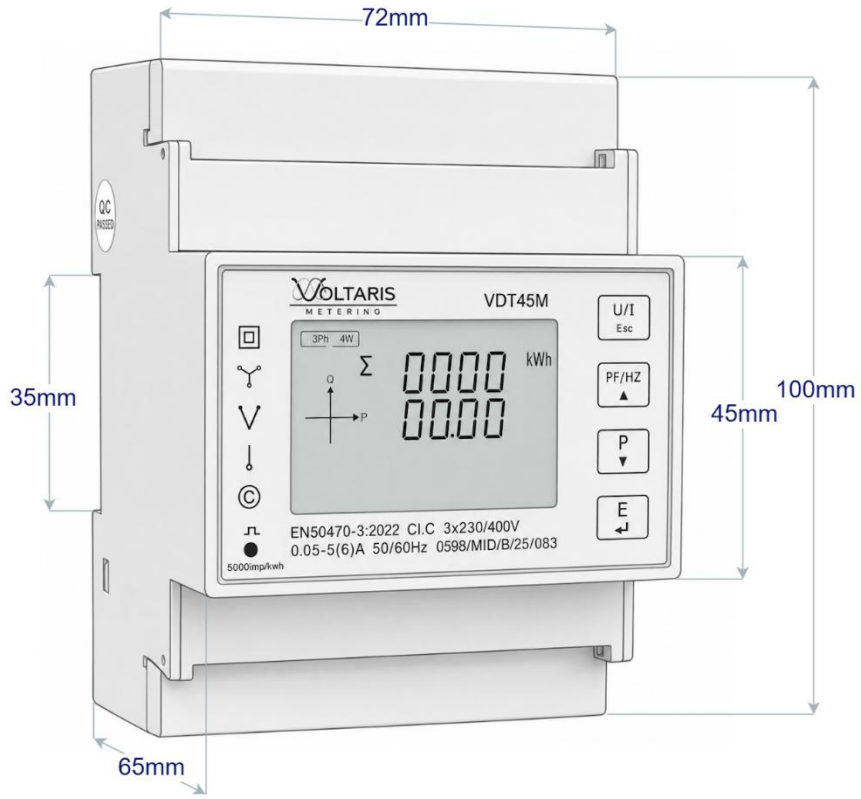
Measurement Category	CAT III, according to IEC 61010-1
Overvoltage Category	CAT III, according to IEC 61010-1
Insulation	AC Voltage Test: 4kV for 1 minute Impulse Voltage Test: 6kV - 1.2/50μS waveform
Protective Class	II, according to IEC61010-1

Communications

Interfaces standard and protocols	2-wire RS485, Modbus RTU
Baud rate	1200 to 38400 bps, default is 9600 bps
Parity bit	None, Even, Odd, default is None
Stop bit	1 or 2, default is 1

Response time	< 100ms
Transmission mode	half-duplex
Transmission distance	Up to 1000m
Max. Bus loading	64 pcs

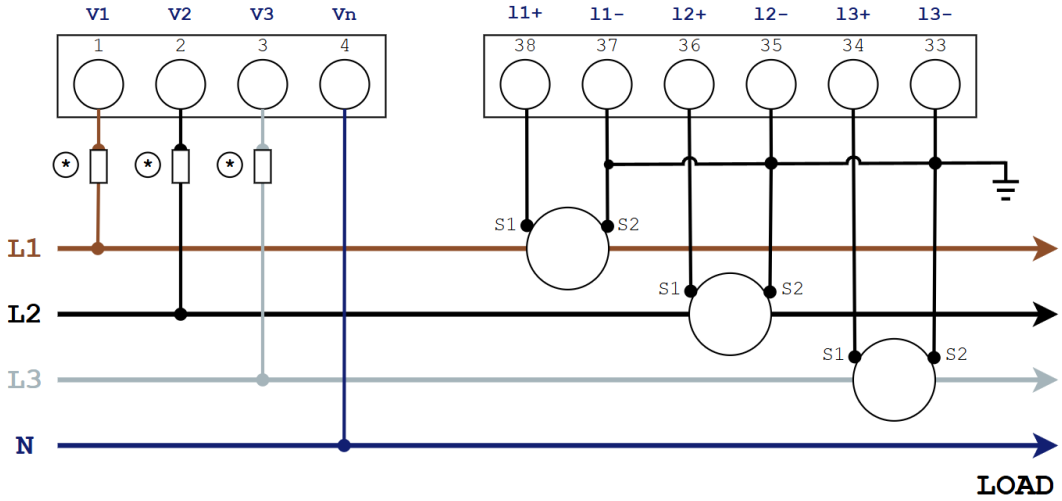
4.2 Dimensions



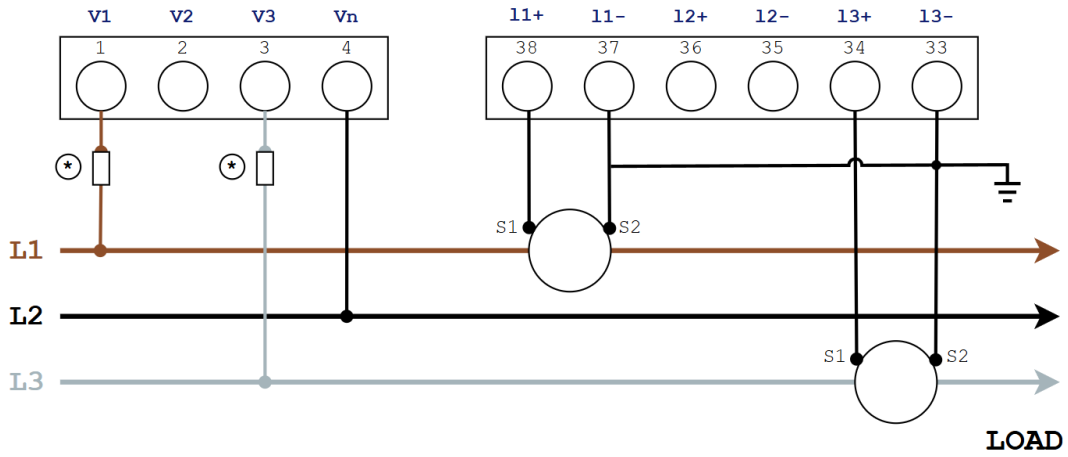
4.3 Wiring Diagrams

4.3.1. Direct Voltage Connection Wiring Diagrams

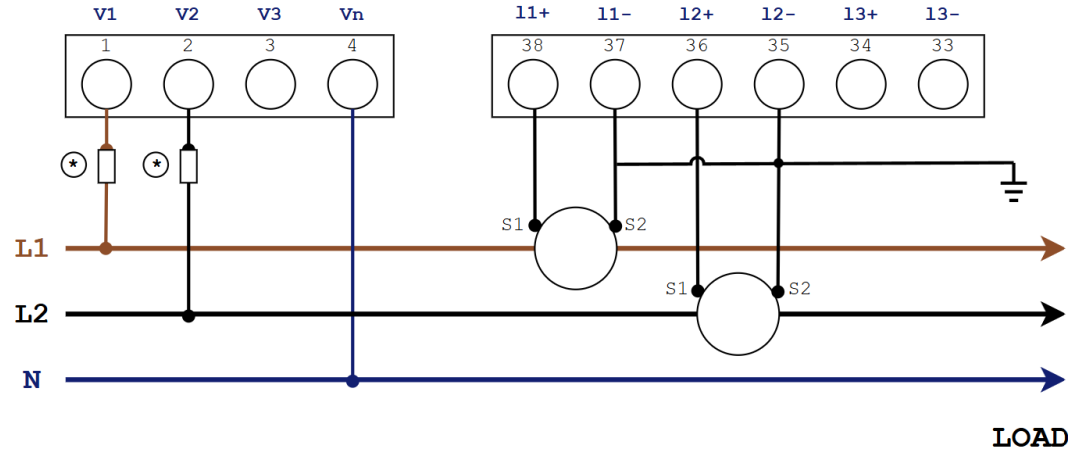
Three Phase Four Wire (3P4W)



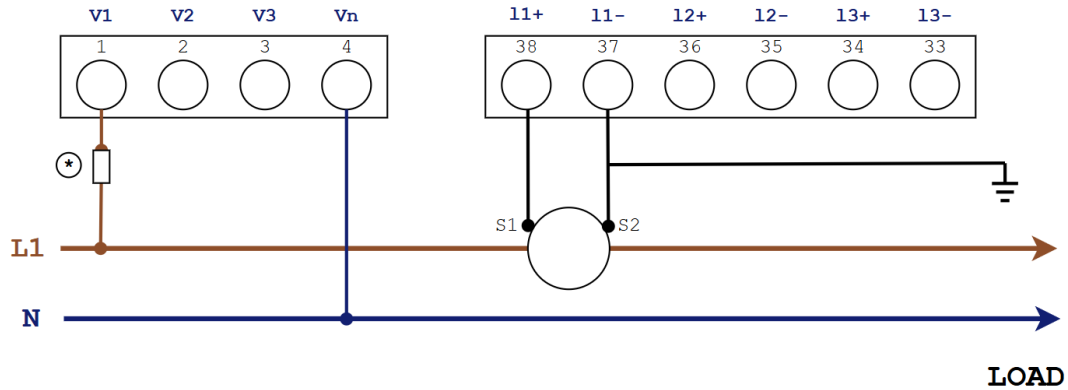
Three Phase Three Wire (3P3W)



Two Phase Three Wire (2P3W)

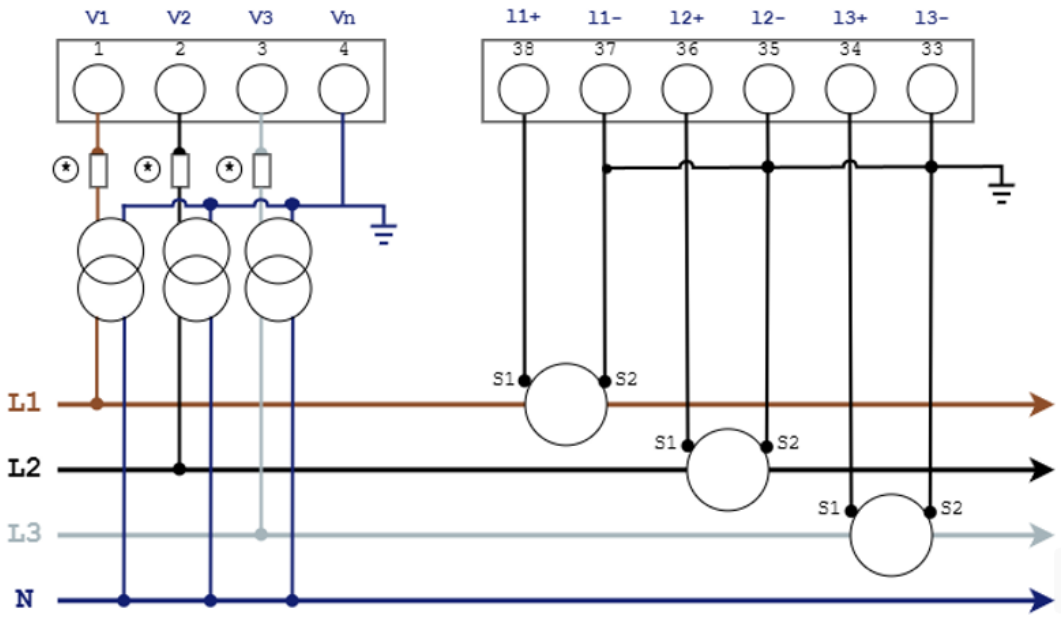


Single Phase Two Wire (1P2W)

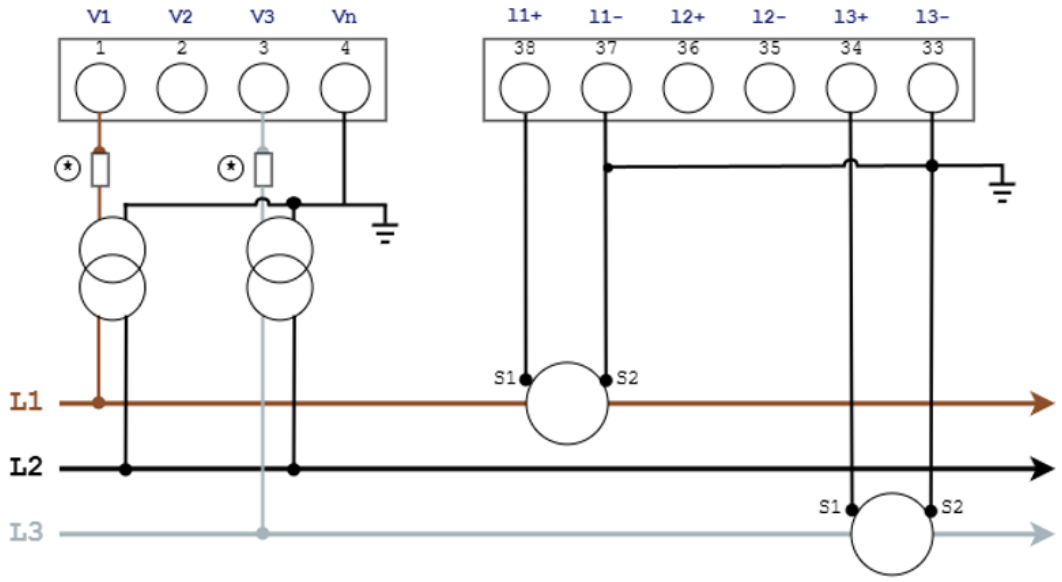


4.3.2. Voltage Transformer (VT/PT) Connection Wiring Diagrams

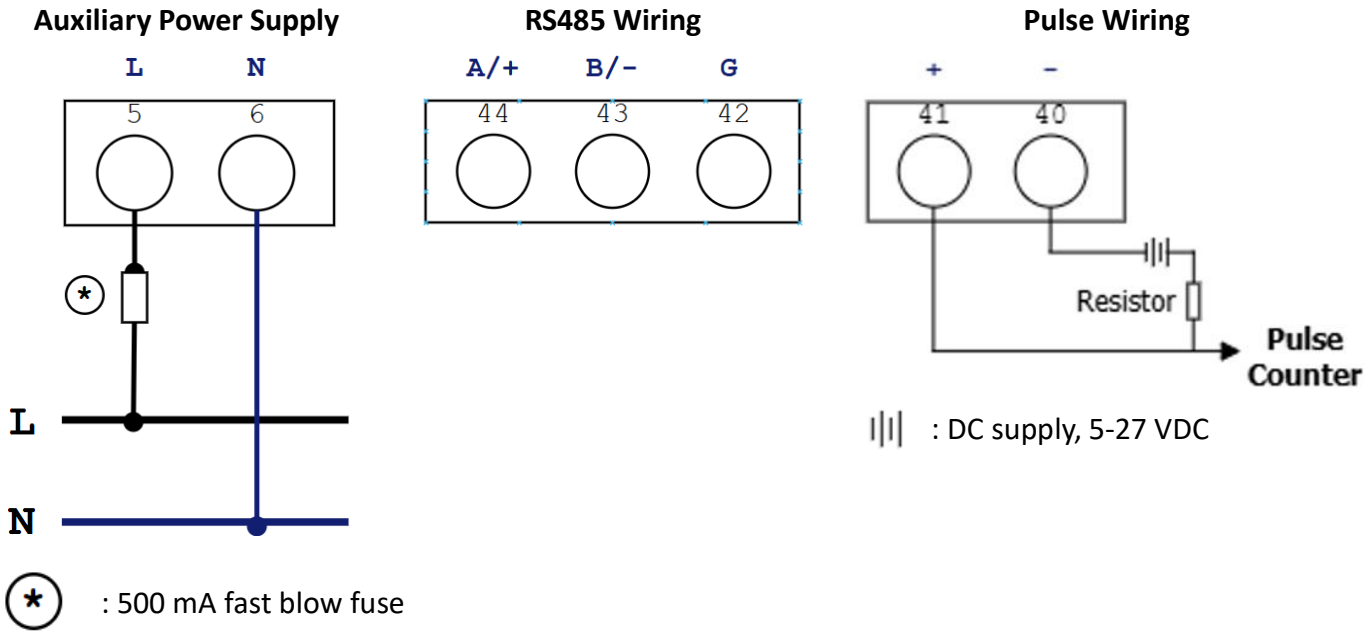
Three Phase Four Wire (3P4W)



Three Phase Three Wire (3P3W)



4.3.3. Auxiliary Connection & Outputs Wiring Diagrams



The RS485 Modbus communication terminals may be connected in a daisy-chain configuration, allowing multiple VDT45M meters to be connected to the same communication bus. The recommended maximum bus loading is 64 devices, although the actual number of devices supported is dependent on the total cable length, cable characteristics and number of meters. Longer communication runs may require fewer devices to maintain reliable communication. A 120 Ω termination resistor should be fitted across the Modbus terminals of the last device to minimise signal reflections and ensure reliable communication. The resistor should not be fitted across every meter; intermediate meters should be connected directly to the RS485 bus.

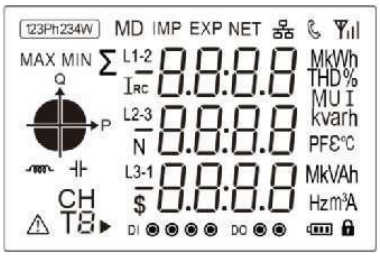
4.4 Terminals & Cable Specification

Voltage terminals	Wire size: 0.82 - 3.31 mm^2 (18 - 12 AWG) Torque: 0.5 - 0.6 N.m Wire Type: PVC-insulated copper cable
Auxiliary terminals	Wire size: 0.82 - 3.31 mm^2 (18 - 12 AWG) Torque: 0.5 - 0.6 N.m Wire Type: PVC-insulated copper cable
Current Transformer terminals	Wire size: 1.318 - 3.31 mm^2 (16 - 12 AWG) Torque: 0.5 - 0.6 N.m Wire Type: Twisted-pair copper cable, (2.5mm^2 industry standard)
Communication terminals	Wire size: 0.82 - 3.31 mm^2 (18 - 12 AWG) Torque: 0.5 - 0.6 N.m Wire Type: shielded, twisted-pair 120 Ω RS-485/Modbus cable
Pulse output terminals	Wire size: 0.82 - 3.31 mm^2 (18 - 12 AWG) Torque: 0.5 - 0.6 N.m Wire Type: Twisted-pair copper cable. For long runs, screened twisted pair is preferable, particularly where it runs near mains or other electrically noisy wiring.

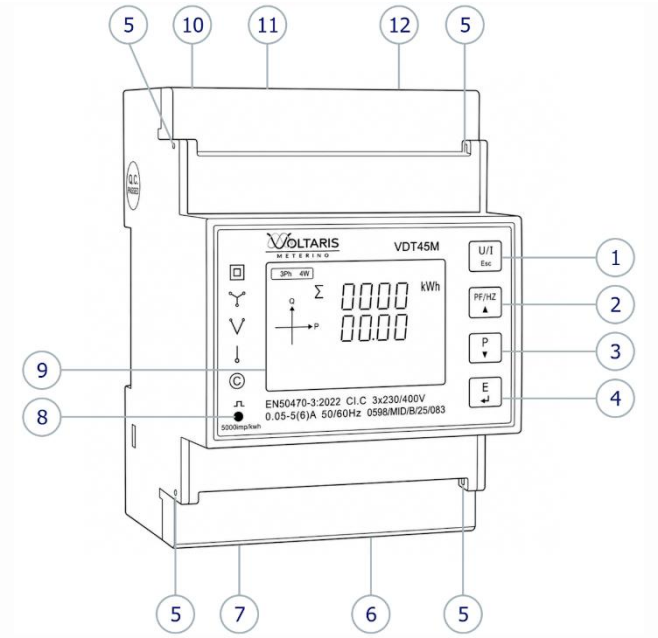
5. Operation

5.1. Meter Startup Instructions

On powering up the VDT45M, it will first enter the self-test process, during which the LCD screen display sequence is shown as follows:

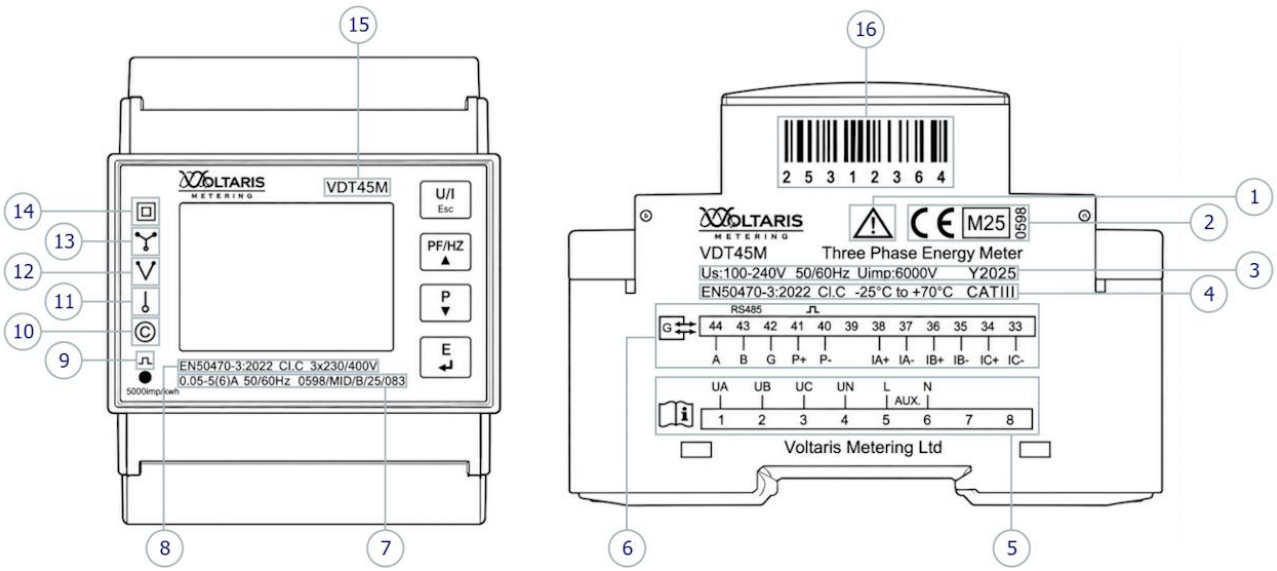
First screen display	Displays all LCD segments.	
Second screen display	Displays the software version number of the power meter	
Three screen display	Display the results of the self-test	

5.2. Meter Overview



Identifier	Description
1	Button to view Voltage & Current parameters / Escape button
2	Button to view Power Factor, Frequency and Maximum Demand parameters / Up button
3	Button to view Power parameters / Down button
4	Button to view energy parameters / Enter button
5	Sealing point
6	Auxiliary power supply terminals
7	Voltage reference terminals
8	LED pulse indicator light.
9	LCD display screen
10	Communication terminals
11	Pulse output terminals
12	Current transformer terminals

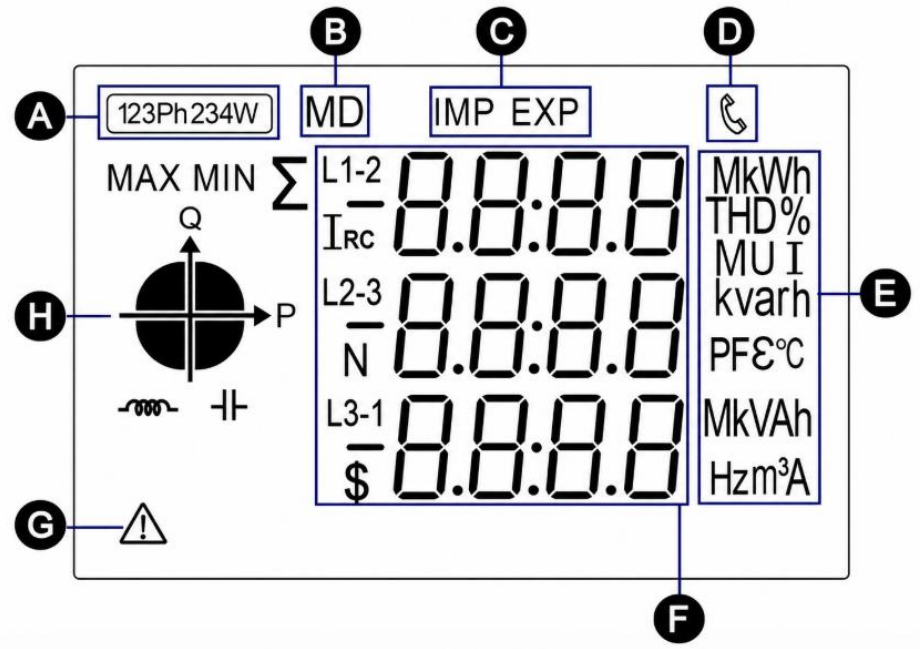
5.3. Meter Body Labels



Identifier	Description
1	**Warning / Caution** — Indicates important safety information. Refer to the installation and operating instructions before installing, connecting or operating the meter.
2	**MID Conformity Marking** — Indicates conformity with the applicable MID requirements. CE denotes conformity, M25 identifies the supplementary metrology marking and year (2025), and 0598 identifies the notified body responsible for the conformity assessment.
3	**Auxiliary Supply Voltage** — Specifies the meter's auxiliary AC supply voltage range of 100–240 V. **Rated Frequency** — Indicates operation with a nominal supply frequency of 50 Hz or 60 Hz. **Rated Impulse Withstand Voltage** — Specifies a rated impulse withstand voltage of 6 kV under the applicable test conditions. **Year of Manufacture** — Indicates that the meter was manufactured in 2025.

4	**Applicable Product Standard** — Indicates compliance with the requirements of EN 50470-3:2022 for static AC active-energy meters. **Accuracy Class C** — Indicates the meter's specified active-energy accuracy class. **Operating Temperature Range** — Specifies the ambient temperature range within which the meter is designed to operate. **Measurement Category III** — Indicates suitability for connection to circuits within fixed electrical installations subject to transient overvoltages.
5	**Voltage Reference Inputs** — Voltage connections for Phase A (L1), Phase B (L2), Phase C (L3) and Neutral, providing the voltage references required for measurement. **Auxiliary Power Supply** — Live and Neutral connections for the meter's auxiliary power supply.
6	**RS485 Communication** — Terminals for the RS485 Modbus communication interface. **Pulse Output** — Positive and negative terminals for the energy pulse output. **CT Inputs** — Positive and negative current-transformer connections for Phase A (L1), Phase B (L2) and Phase C (L3). The polarity of each CT connection must be observed during installation to ensure correct energy measurement.
7	**Rated Current Range** — Minimum current 0.05 A, nominal current 5 A and maximum current 6 A. **Rated Frequency** — Suitable for electrical systems operating at 50 Hz or 60 Hz. **MID Certification** — Identifies the notified body, conformity-assessment module, year and associated MID type-examination reference.
8	**Applicable Product Standard** — Indicates compliance with the requirements of EN 50470-3:2022 for static AC active-energy meters. **Accuracy Class C** — Indicates the meter's specified active-energy accuracy class. **Rated System Voltage** — Three-phase, four-wire system with 230 V phase-to-neutral and 400 V phase-to-phase voltage.
9	**Energy Pulse Indicator** — LED flashes in proportion to measured energy consumption. The pulse constant indicates the number of flashes per kWh.
10	**Accuracy Class C** — Indicates that the meter is an Accuracy Class C active-energy meter, designed to meet the applicable accuracy requirements of EN 50470-3.
11	**Single-Phase Two-Wire System** — For single-phase systems with Live and Neutral.
12	**Three-Phase Three-Wire System** — For three-phase systems without a Neutral.
13	**Three-Phase Four-Wire System** — For three-phase systems with L1, L2, L3 and Neutral.
14	**Class II / Double Insulation** — Equipment protected by double or reinforced insulation and does not require a protective earth connection for electrical safety.
15	**Meter Type** — Identifies the specific model and type of meter.
16	**Serial Number** — Provides the meter's unique identification number for traceability, identification and record keeping.

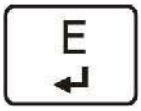
5.4. LCD Display



A. Supply type icon.
B. Maximum demand icon.
C. Direction of measured value.
D. Communication icon, (displays for 2 seconds upon successful communication).
E. Unit of measurement.
F. Measured values.
G. Warning status icon, (indicates over voltage, over current or power exceeds the limit)
H. Quadrant indicator, (= inductive | = capacitive).

5.5. Button Definition Description

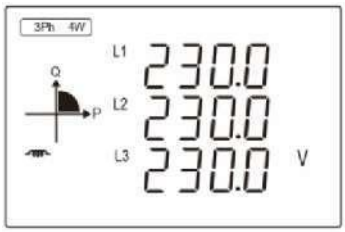
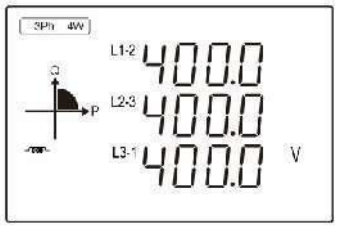
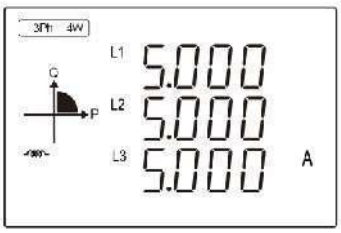
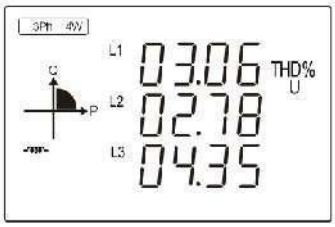
Button	Definition	Quick Press	3 Second Press
U/I Esc	Button 1: Escape key (Esc)	**In the main display screen:** View the voltage and current parameters. **In the setting or auxiliary screen:** Exit or return to the previous screen.	**In the main display screen:** Enter the auxiliary display screen.
PF/HZ ▲	Button 2: Up key (Up)	**In the main display screen:** View the power factor, frequency and maximum demand. **In the setting or auxiliary screen:** Scroll up to display the page or the increasing number.	n/a
P ▼	Button 3: Down key (Dn)	**In the main display screen:** View the power information. **In the setting or auxiliary screen:** Scroll down to display the page or the decreasing number.	n/a

	Button 4: Enter key (Et)	**In the main display screen:** View energy data. **In the setting screen:** Right move the setting cursor.	**In the main display screen:** Enter the setting mode. **In the setting screen:** Enter the setting or confirm setting.

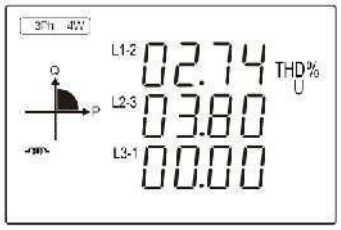
5.6. Description of Display Screens

5.6.1. Main Display Screen

After the meter is powered and passes the self-test process, the interface entered is defined as the main display interface. This is used to display the main measurement parameters, electrical data, instrument information and other data of the VDT45M. The default screen on the Main Display is Total Active Energy.

LCD Display	Description
U/I Esc	**Voltage & Current Parameters**
	**Three-phase L-N voltage.** Example: L1-N voltage = 230.0 V L2-N voltage = 230.0 V L3-N voltage = 230.0 V Note: In 3P3W mode, this screen is not displayed
	**Three-phase L-L voltage.** Example: L1-2 voltage = 400.0 V L2-3 voltage = 400.0 V L3-1 voltage = 400.0 V Note: In 1P2W mode, this screen is not displayed
	**Three-phase current.** Example: L1 current = 5.000 A L2 current = 5.000 A L3 current = 5.000 A
	**Three-phase L-N voltage THD.** Example: L1 voltage THD = 3.06% L2 voltage THD = 2.78% L3 voltage THD = 4.35%

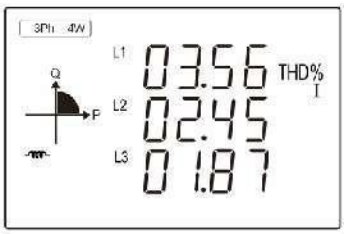
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Three-phase L-L voltage THD.

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.

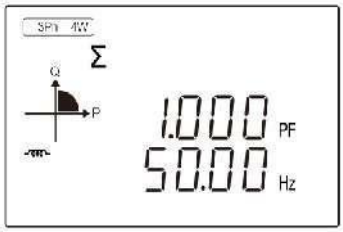


Three-phase current THD.

Example:
L1 current THD = 3.56%
L2 current THD = 2.45%
L3 current THD = 1.87%

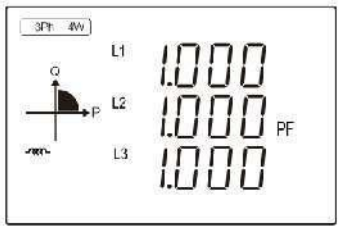
PF/HZ ▲

Power Factor, Max. Demand & Frequency Parameters



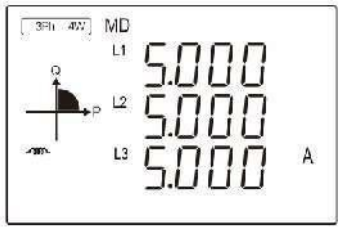
Total power factor and frequency display screen

Example:
Total power factor = 1.000
Frequency = 50.00 Hz



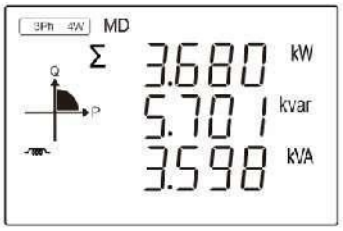
Three-phase power factor display screen

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 = 5.000 A
Max.Demand of L2 current = 5.000 A
Max.Demand of L3 current = 5.000 A

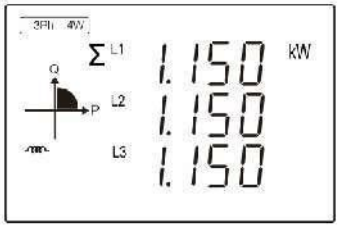


Max. demand of total active/reactive/apparent power display screen

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

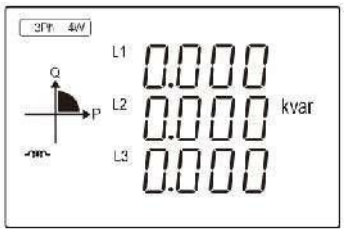
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P ▼ Power Parameters



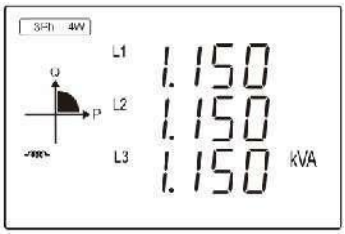
Per phase active power display screen

Example:
L1 active power = 1.150 kW
L2 active power = 1.150 kW
L3 active power = 1.150 kW



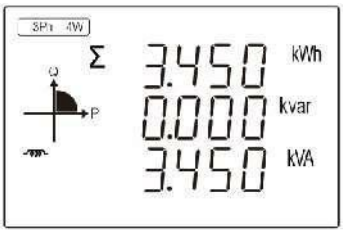
Per phase reactive power display screen

Example:
L1 reactive power = 0 kvar
L2 reactive power = 0 kvar
L3 reactive power = 0 kvar



Per phase apparent power display screen

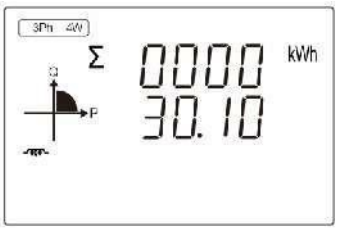
Example:
L1 apparent power = 1.150 kVA
L2 apparent power = 1.150 kVA
L3 apparent power = 1.150 kVA



Total active/reactive/apparent power display screen

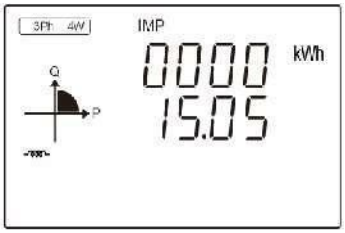
Example:
Total active power = 3.450 kW
Total reactive power = 0 kvar
Total apparent power = 3.450 kVA

E ↵ Energy Parameters



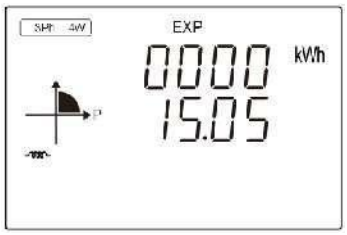
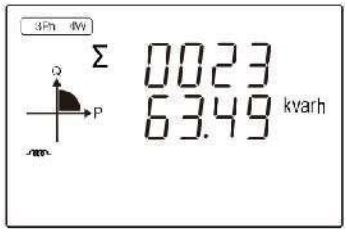
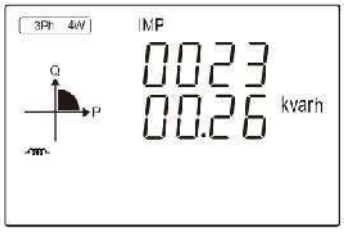
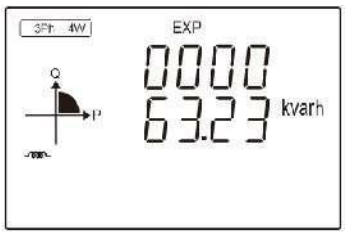
Total active energy

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
	**Total reactive energy** Example: Total reactive energy = 2363.49 kvarh
	**Import reactive energy** Example: Import reactive energy = 2300.26 kvarh
	**Export reactive energy** Example: Export reactive energy = 63.23 kvarh

Icon description of the load nature:

The load is an inductive load.

The load is a capacitive load.

5.6.2. Auxiliary display screen

Under the main display screen, “3 Sec. Press” button 1 to enter the screen of auxiliary display. “Quick Press” button 2 or button 3 to scroll through the values.

“Quick Press” button 1 to return to the main display screen. If there is no button press for more than 1 minute, the meter will automatically return to the main display screen.

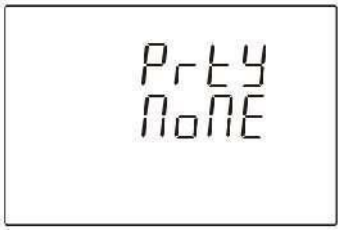
LCD display	Description
	**Modbus address** Example: The modbus address is 1.

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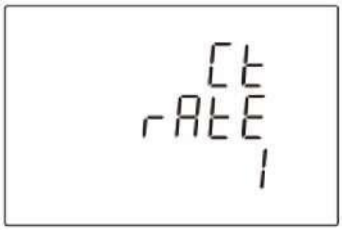
Baud rate

Example: The baud rate is 9600bps.



Parity bit

Example: The Parity bit is None.



Ratio of current transformer (CT)

Example: The CT rate is 1.



Ratio of voltage transformer (PT)

Example: The PT rate is 1.



The serial number of the meter

Example: The serial number is 21000110.



Software version number

Example: The serial number is 0101.00.

5.7. Set-up

To enter the set-up menu, “3 Sec. Press” the E button to enter the password screen, (default password is 0000). “Quick Press” the E button to move cursor between values and “Quick Press” the PF/HZ or P buttons to change them up or down. “3 Sec. Press” the E button confirm the password.

To navigate the set-up menu, “Quick Press” the PF/HZ or P buttons to scroll through the settings. “3 Sec. Press” the E button to enter setting or sub-setting. “Quick Press” the E button to move cursor between

values and “Quick Press” the PF/HZ ▲ or P ▼ buttons button to change them. “3 Sec. Press” the E ↵ button when complete.

“Quick Press” the U/I button to exit or return to previous menus.

5.7.1. Set-up Menu Structure

Setting		Values	Default
Communication			
Modbus Address		From 1 – 247	001
Baud Rate		1200, 2400, 4800, 9600, 19200, 38400	9600
Parity Bit		N (None), e (Even), o (Odd)	n
Stop Bit		1, 2	1
System Configuration			
CT Configuration	CT1	1 – 9,999 A	5 A
	CT2	1, 5A	5 A
PT Configuration	PT1	30 – 500,000 V	230 V
	PT2	30 – 500 V	230 V
CT Direction Correction	L1	Forward, Reverse	Forward
	L2	Forward, Reverse	Forward
	L3	Forward, Reverse	Forward
System Type		1P2W, 2P3W, 3P3W, 3P4W	3P4W
User Password		Four digit combination from 0-9	0000
Reset		Reset Max. Demand	
Pulse Output			
Pulse Output Type		Active Energy (Sum, Imp. or Exp.) or Reactive Energy (Sum, Imp. or Exp.)	Active Energy (Sum)
Pulse Output Rate		1, 10, 100, 400 imp.	400 imp.
Pulse Output Width		60, 100, 200 ms	100 ms
Demand			
Demand Interval Period		0 – 60 min.	60 min.
Sliding Time		0 – Demand Interval Period	1 min.
Time			
Backlight Time		On, Off, 5, 10, 30, 60, 120	60 min.
Auto-scroll Display Time		0 – 60 sec.	0 sec. (off)

6. Measured Parameters

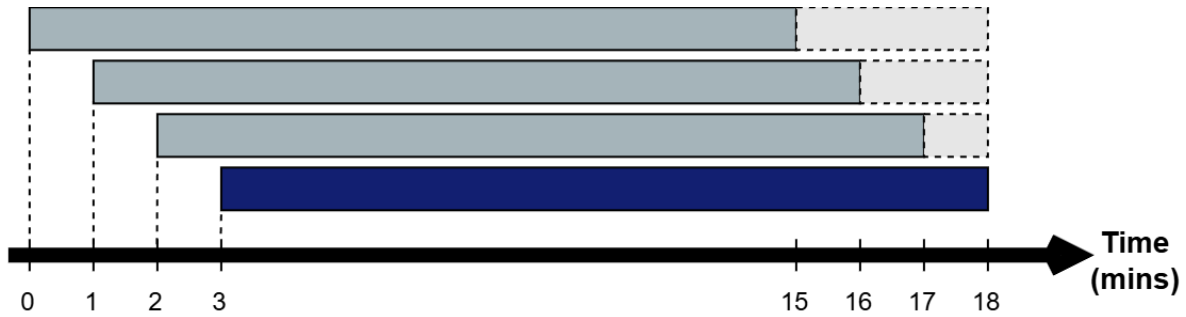
Measurement	Definition	Unit of Measurement
Energy		
Total Active Energy	Active Energy is a measure of the Active Power consumed over a period of time. e.g. A 2 kW load running for 3 hours consumes 6 kWh of active energy. Total Active Energy is the sum of Imported & Exported Active Energy.	Kilowatt hours (kWh)

Import Active Energy	Displays the amount of imported Active Energy, usually referring to electricity that is pulled from the grid. e.g. the consumption that your energy company charges you for.	Kilowatt hours (kWh)
Export Active Energy	Displays the amount of exported Active Energy, usually referring to electricity that is pushed back into the grid, e.g. when there is a surplus of solar energy generated.	Kilowatt hours (kWh)
Total Reactive Energy	Reactive Energy is a measure of the Reactive Power consumed over a period of time. Total Reactive Energy is the sum of Imported & Exported Reactive Energy.	Kilovolt-ampere reactive hours (kVArh)
Import Reactive Energy	Displays the amount of imported Reactive Energy	Kilovolt-ampere reactive hours (kVArh)
Export Reactive Energy	Displays the amount of exported Reactive Energy	Kilovolt-ampere reactive hours (kVArh)
Voltage		
Live to Neutral Voltage (L-N)	Voltage is the potential difference that pushes charge (current) through a circuit. In the UK, Live to Neutral voltage should typically read around 230V.	Volts (V)
Live to Live Voltage (L-L)	In the UK, Live to Live voltage should typically read around 400V.	Volts (V)
Current		
Current per Phase	Current is the flow of electrical charge through a circuit. Higher current generally means more power is being consumed.	Amps (A)
Power		
Total Active Power	Active Power is the useful power that actually does work, such as producing heat, light or movement. Total Active Power is the sum of Active Power over all phases.	Kilowatts, (kW)
Total Reactive Power	Reactive Power is the power that moves back and forth between the supply and the load, needed by equipment such as motors and transformers but which does not do useful work itself. Total Reactive Power is the sum of Reactive Power over all phases.	Kilovolt-amperes reactive (kVAr)
Total Apparent Power	Total Apparent Power is the total electrical power being supplied, combining active and reactive power. Total Apparent Power is the sum of Apparent Power over all phases.	Kilovolt-amperes (kVA)
Active Power per Phase	Displays the Active Power for each measured phase.	Kilowatts (kW)
Reactive Power per Phase	Displays the Reactive Power for each measured phase.	Kilovolt-amperes reactive (kVAr)
Apparent Power per Phase	Displays the Apparent Power for each measured phase.	Kilovolt-amperes (kVA)
Power Quality		
Total Harmonic Distortion (Live to Neutral Voltage)	THD L-N Voltage is a measure of how much the Live-to-Neutral voltage waveform is distorted by harmonic frequencies, expressed as a percentage.	%

Total Harmonic Distortion (Live to Live Voltage)	THD L-L Voltage is a measure of how much the Live-to-Live voltage waveform is distorted by harmonic frequencies, expressed as a percentage.	%
Total Harmonic Distortion (Current per Phase)	THD Current per Phase is a measure of how much the current waveform on each phase is distorted by harmonic frequencies, expressed as a percentage.	%
Power Factor	Power Factor is a measure of how efficiently an electrical system converts incoming apparent power to useful active power. It is the ratio of active to apparent power and ranges from 0.00 to 1.00.	
Power Factor per Phase	Power Factor measures how effectively electrical power is being used by a load. A value close to 1.00 indicates efficient operation.	
Frequency	Frequency displays the number of times the AC electrical supply completes a cycle each second. In the UK the mains frequency should be close to 50Hz.	Hertz (Hz)
Maximum Demand		
Maximum Demand of Current per Phase	The maximum Current recorded over a defined period of time.	Amps (A)
Maximum Demand of Total Active Power	The maximum Total Active Power recorded over a defined period of time.	Kilowatts (kW)
Maximum Demand of Total Reactive Power	The maximum Total Reactive Power recorded over a defined period of time.	Kilovolt-amperes reactive (kVAr)
Maximum Demand of Total Apparent Power	The maximum Total Apparent Power recorded over a defined period of time.	Kilovolt-amperes (kVA)

7. Demand Calculation Method

The diagram below gives a visal represtation of the maximum demand calculation. The example shows a Display Interval Period of 15 minutes, and a Sliding Time of 1 minute.



The above diagram indicates that the first demand calculation is made at the 15th minute, and the demand calculation data is between the 0 and the 15th minute.

At the 16th minute, the second demand calculation is made, and the demand calculation data is between the 1st and the 16th minute.

At the 17th minute, the third demand calculation is made, and the demand calculation data is between the 2nd and the 17th minute.

8. Troubleshooting

Symptom	Possible Causes	Suggested Checks
Meter does not power up	No voltage Incorrect wiring Blown fuse Incorrect supply voltage Loose terminal	Measure supply voltage Check wiring Inspect upstream protection Confirm supply within specification Tighten terminals
Voltage shown but no current	CT not connected Open CT circuit Wrong CT wiring Wrong system configuration	Check CT connections Verify continuity Confirm S1/S2 polarity Verify System Type setting
Current reading incorrect	Incorrect CT ratio Wrong polarity Faulty CT	Verify CT ratio Check CT orientation Compare with clamp meter
Negative power	CT reversed Voltage/current phase mismatch Expected export	Check CT direction Match CTs to phases Verify generation export
Phase voltages incorrect	Missing phase Incorrect wiring Blown fuse Loose neutral	Measure all phases Check all wiring Inspect fuses Check all wiring
Energy not increasing	No load CT disconnected Wrong CT ratio	Confirm current flow Check all wiring Verify settings
No Modbus communication	Wrong address A/B reversed Duplicate address	Verify settings Check A/B polarity Confirm unique address
Intermittent communications	Loose connections Poor routing Noise	Inspect terminals Separate power/comms cables Check shield
Pulse output not working	Wrong pulse constant Wiring fault	Check pulse width Check all wiring

9. Additional Literature

Description	Link	QR Code
Installation Guide	Click Here	
Modbus Protocol	Click Here	
MID Certificate	Click Here	
Data Sheet	Click Here	