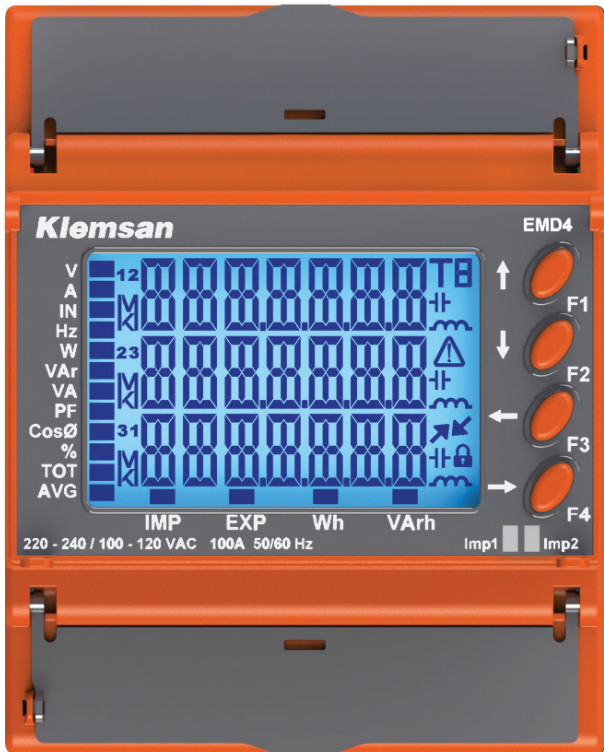


Klemsan

MED 4 User Manual



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MED 4

SECTION 1
GENERAL
INFORMATION

1.1 Device Features and Model Selection

Klemsan MED 4 series devices are MID-approved energy meters designed to measure and record basic electrical parameters for monitoring three-phase electrical systems. Optionally, the devices offer the following features:

- RS485 (Modbus RTU)
- Direct connection up to 100x3 amperes in addition to CT connection option
- Measurement of electrical parameters in addition to kWh
- 4 Quadrant Energy Measurement Addresses
- 2 Mani Tariffs / 4 Sub Tariffs
- Ability to store minimum, maximum, and demand values
- On hour, run hour and power interruption counters
- Digital Input
- Pulse Output
- THDV, THD THDV, THDI

Order Number		606800	606801	606802	
Product Name		C100-1M-V4	C100-1M-V2	B100-0M-V3	
Current Connection		Direct Connection up to 100 A	Direct Connection up to 100 A	Direct Connection up to 100 A	
Mounting Types		Rail Mount	Rail Mount	Rail Mount	
Connection Types		3P4W	3P4W	3P4W	
MEASUREMENT	CLASS (EN 50470)		Class C	Class C	
	CLASS (62053-21)		-	-	
	Power Values	Active Power	√	√	√
		Reactive Power	√	√	√
		Apparent Power	√	√	√
	Electrical Values	Current	√	√	√
		Voltage	√	√	√
		Frequency	√	√	√
	Quality Parameters	THDV-THDI	THD	THD	THD
	Demand		√	√	√
Alarm		-	-	-	
Communication	Modbus RS 485	√	√	-	
Digital Input		2	-	2	
Pulse Output		2 (1 Fixed, 1 Adjustable)	-	2 (1 Fixed, 1 Adjustable)	
LED (Impulse)		2	2	2	
Energy Measurement Type		√	√	√	
4 Quadrant Reactive Energy		-	-	-	
Partial Counter		√	√	√	
Energy Balance		√	√	√	
Real Time Clock		√	-	-	
Tariff		4	1	2	
Protection Degree		IP51	IP51	IP51	

Order Number		606803	606812	606814	
Product Name		B100-0M-V1	B100-0W-01	C100-1Q-V3	
Current Connection		Direct Connection up to 100 A	Direct Connection up to 100 A	Direct Connection up to 100 A	
Mounting Types		Rail Mount	Rail Mount	Rail Mount	
Connection Types		3P4W	3P4W	3P4W	
MEASUREMENT	CLASS (EN 50470)		Class B	Class B	
	CLASS (62053-21)		-	-	
	Power Values	Active Power	√	-	√
		Reactive Power	√	-	√
		Apparent Power	√	-	√
	Electrical Values	Current	√	-	√
		Voltage	√	-	√
		Frequency	√	-	√
Quality Parameters	THDV-THDI	THD	-	THD	
Demand		√ (Fixed)	-	√	
Alarm		-	-	-	
Communication	Modbus RS 485	-	-	√	
Digital Input		-	-	2	
Pulse Output		2(Fixed)	1(Fixed)	2(1 Fixed, 1 Adjustable)	
LED (Impulse)		2	1(kWh)	2	
Energy Measurement Type		√	Only Imp kWh	√	
4 Quadrant Reactive Energy		-	-	√	
Partial Counter		-	-	-	
Energy Balance		-	-	√	
Real Time Clock		-	-	-	
Tariff		1	1	2	
Protection Degree		IP51	IP51	IP51	

Order Number		606815	606804	606805	
Product Name		B100-1Q-V2	C100-1M-V4CT	C100-1M-V2CT	
Current Connection		Direct Connection up to 100 A	CT Connection (10mA .. 6A AC)	CT Connection (10mA .. 6A AC)	
Mounting Types		Rail Mount	Rail Mount	Rail Mount	
Connection Types		3P4W	3P4W	3P4W	
MEASUREMENT	CLASS (EN 50470)		Class B	Class C	
	CLASS (62053-21)		-	-	
	Power Values	Active Power	√	√	√
		Reactive Power	√	√	√
		Apparent Power	√	√	√
	Electrical Values	Current	√	√	√
		Voltage	√	√	√
		Frequency	√	√	√
Quality Parameters	THDV-THDI	THD	THD	THD	
Demand		√	√	√	
Alarm		-	-	-	
Communication	Modbus RS 485	√	√	√	
Digital Input		-	2	-	
Pulse Output		-	2(1 Fixed, 1 Adjustable)	-	
LED (Impulse)		2	2	2	
Energy Measurement Type		√	√	√	
4 Quadrant Reactive Energy		√	-	-	
Partial Counter		-	√	√	
Energy Balance		√	√	√	
Real Time Clock		-	√	-	
Tariff		1	4	1	
Protection Degree		IP51	IP51	IP51	

Order Number		606806	606807	606816	
Product Name		B100-0M-V3CT	B100-0M-V1CT	C100-1Q-V3CT	
Current Connection		CT Connection (10mA .. 6A AC)	CT Connection (10mA .. 6A AC)	CT Connection (10mA .. 6A AC)	
Mounting Types		Rail Mount	Rail Mount	Rail Mount	
Connection Types		3P4W	3P4W	3P4W	
MEASUREMENT	CLASS (EN 50470)	Class B	Class B	Class C	
	CLASS (62053-21)	-	-	-	
	Power Values	Active Power	√	√	√
		Reactive Power	√	√	√
		Apparent Power	√	√	√
	Electrical Values	Current	√	√	√
		Voltage	√	√	√
		Frequency	√	√	√
	Quality Parameters	THDV-THDI	THD	THD	THD
	Demand	√	√ (Fixed)	√	
Alarm		-	-	-	
Communication	Modbus RS 485	-	-	√	
Digital Input		2	-	2	
Pulse Output		2(1 Fixed, 1 Adjustable)	2(Fixed)	2(1 Fixed, 1 Adjustable)	
LED (Impulse)		2	2	2	
Energy Measurement Type		√	√	√	
4 Quadrant Reactive Energy		-	-	√	
Partial Counter		√	-	-	
Energy Balance		√	-	√	
Real Time Clock		-	-	-	
Tariff		2	1	2	
Protection Degree		IP51	IP51	IP51	

MED 4

SECTION 2
INSTALLATION

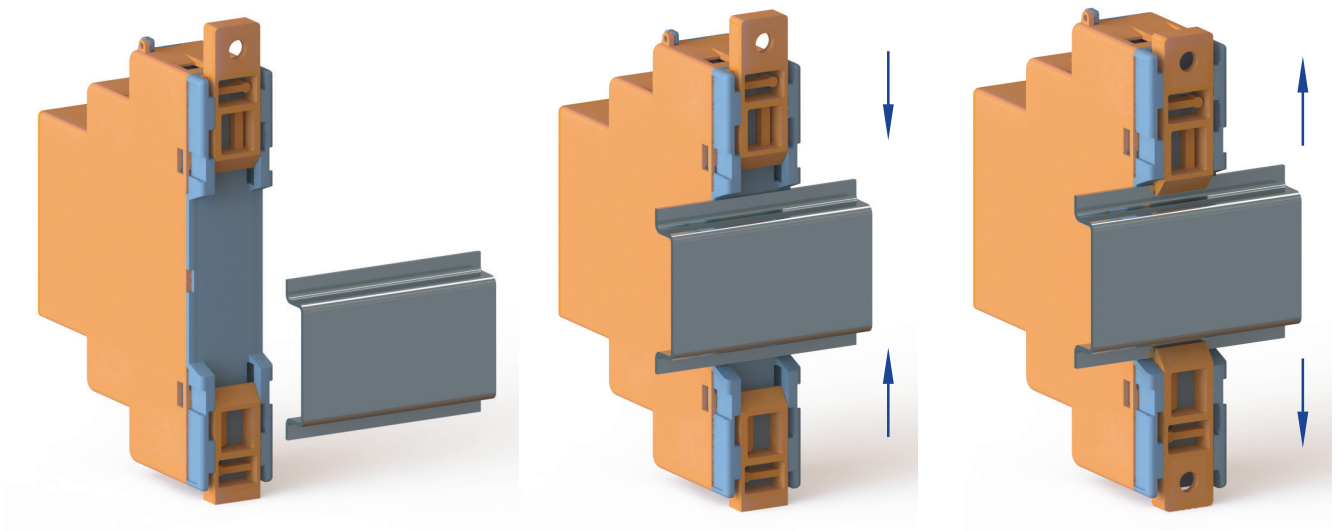
2.12.1 Preparation for Installation

- Installation and connections of MED 4 series devices must be done under the instructions provided in the user manual by authorized personnel. The device should not be operated before connections are made correctly.
- Before connecting the device to the grid, ensure that the power is disconnected.
- Use a dry cloth to clean the device and remove dust. Do not use alcohol, thinner, or abrasive substances.
- The device should only be powered on after all connections have been made.
- Do not open the device. There are no parts inside that users can manipulate.
- Keep the device away from humid, wet, vibrating, and dusty environments.

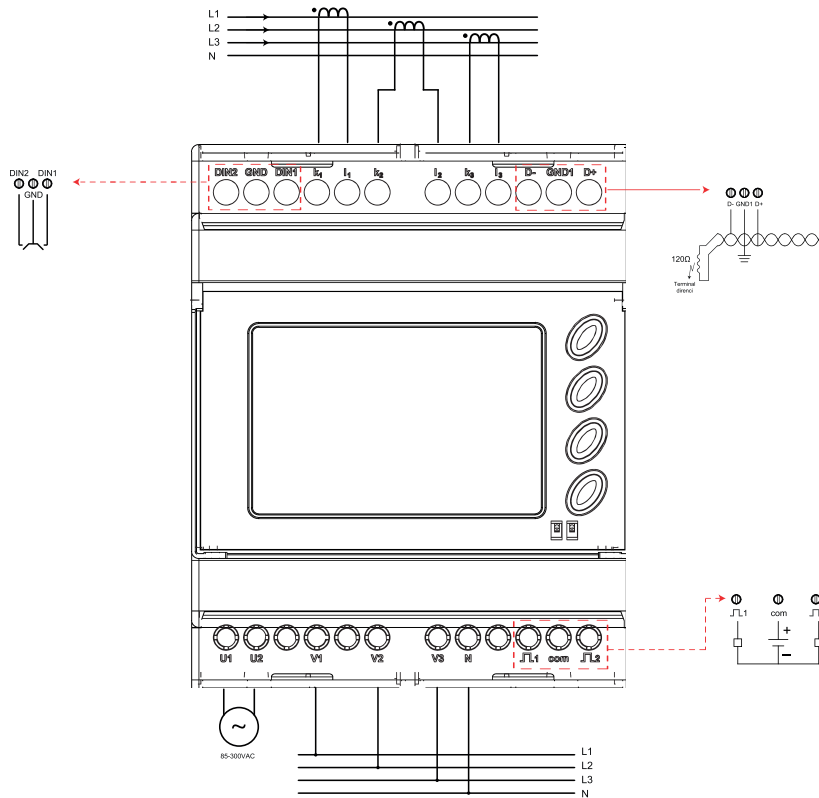


The manufacturer is not responsible for any unwanted situations arising from failure to implement the above precautions.

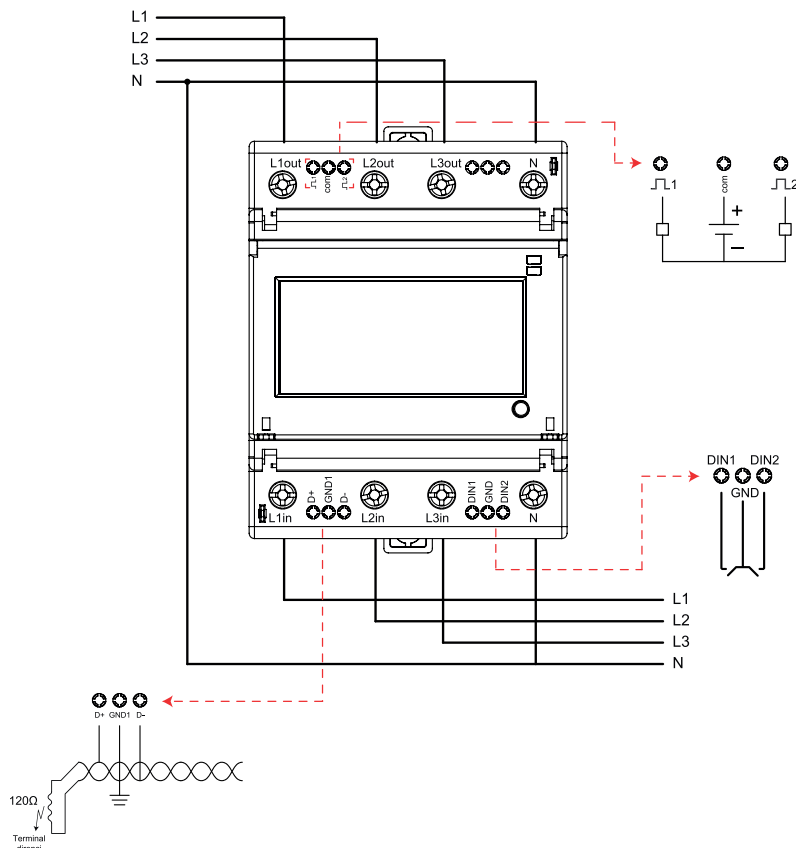
2.2 Mounting



2.3 Terminals and Cable Connections



The connection diagram above is general for transformer connection devices and varies depending on the model.



The connection diagram above is general for transformer connection devices and varies depending on the model.

2.3.1. Devices with Current Transformer Connection

L1 - L2 - L3 Terminals: These are the phase inputs of the three-phase alternating voltage being measured.

N Terminal: This is the neutral input of the three-phase alternating voltage being measured.

k1 - k2 - k3 Terminals: These are the inputs for the three-phase alternating current being measured.

I1 - I2 - I3 Terminals: It is the output connection of the 3-phase alternating current being measured.

U1-U2 Terminals: These are the terminals where the supply voltage of the device is applied.


2.3.2 Devices with Direct Connection


L1in - L2in - L3in Terminals: These are the inputs of the 3 phases being measured. Up to 100A connection can be made for each phase.

L1out - L2out - L3out Terminals: These are the inputs of the 3 phases being measured.

N Terminal: It is the entrance where the neutral connection of the line is made.

2.3.3 Common Connection

Pulse 1 Output (): This is the output terminal for the DC voltage applied to the "com" terminal when digital output 1 is active. Pulse 1 output is adjustable and provides 500 impulses (500 imp/kWh) for each kWh measured by default. Pulse duration is 50 ms.

Pulse 2 Output (): This is the output terminal for the DC voltage applied to the "com" terminal when digital output 2 is active. Pulse 2 output is adjustable and provides 500 impulses (500 imp/kVArh) for each kVArh measured by default. Pulse duration is 50 ms.

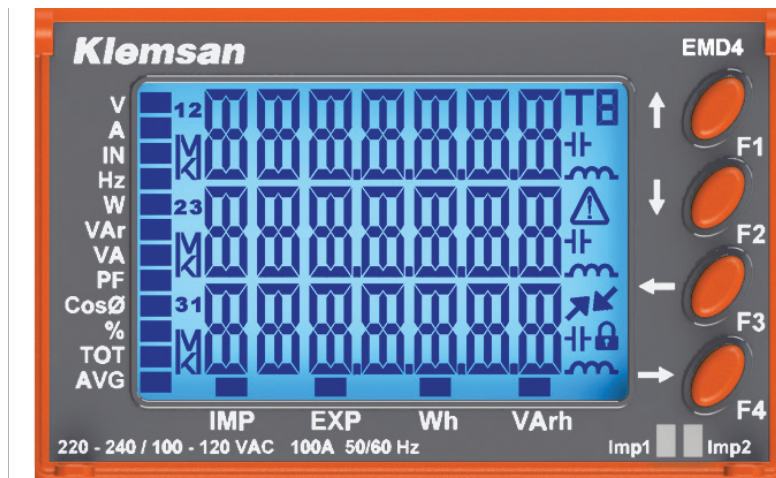
com: This is the terminal where the positive end of the DC voltage for digital switching will be connected (common).




D+: This is the data+ input of the RS-485 interface.

GND1: This is the input where the ground connection of the RS-485 interface is made.

D-: This is the data- input of the RS-485 interface.

2.4 Icons and LED Indications



-  ➔ An icon indicating a screen where adjustments are not allowed.
-  ➔ Communication status indicator. A downward arrow indicates that the query has been sent to the device, while an upward arrow indicates data transmission from the device.
-  ➔ Indicates an error condition of the device.
 - Only exclamation mark ➔ Current direction is reversed.
 - Only triangle frame ➔ Phase sequence
 - Exclamation mark + Frame ➔ Pulse Error

MED 4

SECTION 3
MENUS

There are 5 main menus in the devices. It may vary depending on the device model.

MAIN MENU	MEASUREMENTS (MEASURE)	↕ OK ↕ X
	↓	
	SETTINGS (SETTING)	↕ OK ↕ X
	↓	
	DATE - TIME (DATE - TIME)	↕ OK ↕ X
	↓	
	INFO (LOGN)	↕ OK ↕ X
↓		
	LOGIN (LOGIN)	↕ OK ↕ X



3.1 MEASUREMENTS (MEASURE)

Measured data on the device are shown in the measurements menu.

MEASUREMENTS (MEASURE)	Instant Measurements (INSTANT)	↕ OK ↕ X
	↓	
	Energy Values (ENERGY)	↕ OK ↕ X
	↓	
	Demand Values (DEMAND)	↕ OK ↕ X
↓		
	Input Counters (IN CNT)	↕ OK ↕ X

3.1.1 Instant Measurements (INSTANT)

The following parameters and the average and total values of these parameters (varies depending on the parameter) are also shown on the instant measurements page.

- Voltage (Phase-Neutral, Phase - Phase)
- Current
- Neutral Current
- Frequency
- Active Power
- Reactive Power
- Apparent Power
- Power Factor
- Cos ϕ
- Total Harmonic Distortion for Voltage (THDV)
- Total Harmonic Distortion for Current (THDI)

Switching between parameters are made with the \uparrow and \downarrow buttons. Switching between the instant, total, and average menus is done with the \rightarrow and \leftarrow buttons..

MEASUREMENTS (MEASURE)	Instant Measurements (INSTANT)	INSTANT VLN (VLN)	\rightarrow OK \leftarrow X	AVERAGE VLN (AVG)
		\updownarrow		
		INSTANT VLL (VLL)	\rightarrow OK \leftarrow X	AVERAGE VLL (AVG)
		\updownarrow		
		INSTANT CURRENT (I)	\rightarrow OK \leftarrow X	TOTAL (TOTAL)
		\updownarrow		
		INSTANT NEUTRAL CURRENT (IN)		
		\updownarrow		
		INSTANT FREQUENCY (F)		
		\updownarrow		
		INSTANT ACTIVE POWER (P)	\rightarrow OK \leftarrow X	TOTAL (TOTAL)
		\updownarrow		
		INSTANT REACTIVE POWER (Q)	\rightarrow OK \leftarrow X	TOTAL (TOTAL)
		\updownarrow		
		INSTANT APPARENT POWER (S)	\rightarrow OK \leftarrow X	TOTAL (TOTAL)
\updownarrow				
INSTANT POWER FACTOR (PF)	\rightarrow OK \leftarrow X	TOTAL (TOTAL)		
\updownarrow				
INSTANT COS ϕ (PF)				
\updownarrow				
INSTANT THDV (THDV)				
\updownarrow				
INSTANT THDI (THDI)				

! The menu structure above is general and varies depending on product features. The parameters and units displayed are indicated by the lines on the left side of the screen.



Phase 1, Phase 2, and Phase 3 values (V12, V23, and V31 for VLL voltage) are shown on the screen from top to bottom, respectively.

3.1.2 Energy Data (ENERGY)

The devices optionally include three different types of energy meters:

- Main Meters (METER)
- Partial Meters (PARTIAL)
- Energy Balance (BALANCE)

Under the Main Meters (METER) menu, meters are available for the following energy parameters:

- Import Active Energy
- Export Active Energy
- Import Reactive Energy
- Export Reactive Energy

The devices optionally include two tariffs, T1 and T2, along with four sub-tariffs under T1: T1-1, T1-2, T1-3, and T1-4. The above energy parameters are displayed separately for each tariff and sub-tariff.



Configurations for tariffs and sub-tariffs are explained under [Section 3.2.6: Tariff Settings \(TARIFF\)](#).

Partial meters (PARTIAL), are energy meters that can be started, stopped, and reset by users at any desired time. They are used to monitor energy consumption/production for a specific period.

Within the Values (VALUES) submenu, the following parameters are displayed both as totals and for each phase:

- Import Active Energy
- Export Active Energy
- Import Reactive Energy
- Export Reactive Energy

Through the Action (ACTION) submenu, the meter can be started, stopped, and reset.

MEASUREMENTS (MEASURE)	→OK ↵ X	Energy Values (ENERGY)	→OK ↵ X	Partial Cunter (PARTIAL)	→OK ↵ X	VALUES (VALUES)	→OK ↵ X	Import Active Energy (Total) (Wh)	→OK ↵ X	Import Active Energy (3 phase) (Wh)
								↓		
								Export Active Energy (Total) (Wh)	→OK ↵ X	Export Active Energy (3 phase) (Wh)
								↓		
								Import Reactive Energy (Total) (VARh)	→OK ↵ X	Import Reactive Energy (3 phase) (VARh)
	↓									
	Export Reactive Energy (Total) (VARh)	→OK ↵ X	Export Reactive Energy (3 phase) (VARh)							
	↓									
	ACTION (ACTION)	→OK ↵ X	Activate (ACTIVE)		→OK ↵ X	YES / NO				
			↓							
Clear (CLEAR)			→OK ↵ X	YES / NO						

The Energy Balance (BALANCE) displays the absolute difference between the consumed energy and the produced energy values.

	Formula
Active Energy Balance (kWh)	(Total Import Active Energy - (Total Export Active Energy)
Reactive Energy Balance (kVARh)	(Total Import Reactive Energy - (Total Export Reactive Energy)

MEASUREMENTS (MEASURE)				→OK ↕ X	Energy Values (ENERGY)	→OK ↕ X	Main Counters (COUNTER)	→OK ↕ X	TOTAL	→OK ↕ X	Import Active Energy (Total)(Wh)	↕OK ↕ X	Import Active Energy (3 phase)(Wh)											
											↕													
										T1	→OK ↕ X	Import Active Energy (Total)(Wh)	↕OK ↕ X	Import Active Energy (3 phase)(Wh)										
												↕												
												Export Active Energy (Total)(Wh)	↕OK ↕ X	Export Active Energy (3 phase)(Wh)										
												↕												
												Import Reactive Energy (Total)(VARh)	↕OK ↕ X	Import Reactive Energy (3 phase)(VARh)										
										↕														
										Export Reactive Energy (Total)(VARh)	↕OK ↕ X	Export Reactive Energy (3 phase)(VARh)												
										↕														
																				T1-1	→OK ↕ X	Import Active Energy (Total)(Wh)	↕OK ↕ X	Import Active Energy (3 phase)(Wh)
																						↕		
Export Active Energy (Total)(Wh)	↕OK ↕ X	Export Active Energy (3 phase)(Wh)																						
↕																								
Import Reactive Energy (Total)(VARh)	↕OK ↕ X	Import Reactive Energy (3 phase)(VARh)																						
↕																								
Export Reactive Energy (Total)(VARh)	↕OK ↕ X	Export Reactive Energy (3 phase)(VARh)																						
↕																								
																				T1-2	→OK ↕ X	Import Active Energy (Total)(Wh)	↕OK ↕ X	Import Active Energy (3 phase)(Wh)
																						↕		
										Export Active Energy (Total)(Wh)	↕OK ↕ X	Export Active Energy (3 phase)(Wh)												
										↕														
										Import Reactive Energy (Total)(VARh)	↕OK ↕ X	Import Reactive Energy (3 phase)(VARh)												
										↕														
										Export Reactive Energy (Total)(VARh)	↕OK ↕ X	Export Reactive Energy (3 phase)(VARh)												
										↕														
																				T1-3	→OK ↕ X	Import Active Energy (Total)(Wh)	↕OK ↕ X	Import Active Energy (3 phase)(Wh)
																						↕		
Export Active Energy (Total)(Wh)	↕OK ↕ X	Export Active Energy (3 phase)(Wh)																						
↕																								
Import Reactive Energy (Total)(VARh)	↕OK ↕ X	Import Reactive Energy (3 phase)(VARh)																						
↕																								
Export Reactive Energy (Total)(VARh)	↕OK ↕ X	Export Reactive Energy (3 phase)(VARh)																						
↕																								
																				T1-4	→OK ↕ X	Import Active Energy (Total)(Wh)	↕OK ↕ X	Import Active Energy (3 phase)(Wh)
																						↕		
										Export Active Energy (Total)(Wh)	↕OK ↕ X	Export Active Energy (3 phase)(Wh)												
										↕														
										Import Reactive Energy (Total)(VARh)	↕OK ↕ X	Import Reactive Energy (3 phase)(VARh)												
										↕														
										Export Reactive Energy (Total)(VARh)	↕OK ↕ X	Export Reactive Energy (3 phase)(VARh)												
										↕														
																				T2	→OK ↕ X	Import Active Energy (Total)(Wh)	↕OK ↕ X	Import Active Energy (3 phase)(Wh)
																						↕		
Export Active Energy (Total)(Wh)	↕OK ↕ X	Export Active Energy (3 phase)(Wh)																						
↕																								
Import Reactive Energy (Total)(VARh)	↕OK ↕ X	Import Reactive Energy (3 phase)(VARh)																						
↕																								
Export Reactive Energy (Total)(VARh)	↕OK ↕ X	Export Reactive Energy (3 phase)(VARh)																						
↕																								

MEASUREMENTS (MEASURE)	→OK ↵X	Energy Data (ENERGY)	→OK ↵X	Energy Balance (BALANCE)	→OK ↵X	VALUES (VALUE)	→OK ↵X	Active Energy (Total) (Wh)	→OK ↵X	Active Energy (3 phase) (Wh)
								↓		
								Reactive Energy (Total) (VARh)	→OK ↵X	Reactive Energy (3 phase) (VARh)

3.1.3 Demand Data

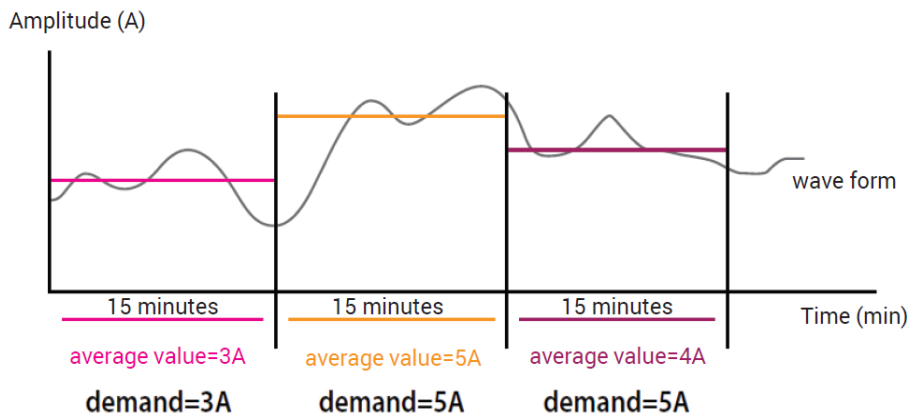
In the demand values menu, the average values of current and power values during the set demand period and the maximum values of these values are displayed.

MEASUREMENTS (MEASURE)	→OK ↵X	Demand Values (DEMAND)	→OK ↵X	Previous Demand (PREV)	→OK ↵X	Current Demand (Total)	→OK ↵X	Akım Demandı (3 faz)	
						↓			
						Import Active Power Demand (Total)			
						↓			
						Export Active Power Demand (Total)			
						↓			
						Import Reactive Power Demand (Total)			
						↓			
					Export Reactive Power Demand (Total)				
					↓				
					Apparent Power Demand (Total)				
					↓				
					Maximum Demand (MAX)	→OK ↵X	Current Demand (Total)	→OK ↵X	Current Demand (3 phase)
							↓		
			Import Active Power Demand (Total)						
			↓						
			Export Active Power Demand (Total)						
			↓						
			Import Reactive Power Demand (Total)						
			↓						
			Export Reactive Power Demand (Total)						
			↓						
			Apparent Power Demand (Total)						

In the PREV menu, previous demand values of the following parameters are calculated at the end of the previous demand period. In the MAX menu, the maximum demand values of the following parameters are calculated since the device was energized.

- Current Demand (Total and 3 phase)
- Import Active Power Demand (Total)
- Export Active Power Demand (Total)
- Import Reactive Power Demand (Total)
- Export Reactive Power Demand (Total)
- Apparent Power Demand (Total)

As an example, the graph below shows the averages (previous demand) and the max demand values of the current signal for the 15-minute demand period.



* demand period= 15 mins.

Switching between parameters is done with the “Λ” and “V” buttons.

3.1.4 Input Counter (IN CNT)

In devices with a Digital Input, the activation count of the relevant input and the time it remains active (its unit is hour) is shown under this menu.

To set the digital inputs as counter, see the [3.2.3 Digital Input Settings \(DI1 & DI2\)](#) menu.

When DI1 and DGND terminals are short-circuited for at least the set delay time, the "IN1 COUNT" increases by 1, and the active time is counted. The total active time unit is displayed in hours under the "IN1 HOUR" tab.

When DI2 and DGND terminals are short-circuited for at least the set delay time, the "IN2 NUMBER" increases by 1, and the active time is counted. The total active time unit is displayed in hours under the "IN2 HOUR" tab.

MEASUREMENTS (MEASURE)	→ OK ↵ X	Input Counter (IN SAY)	→ OK ↵ X	Input 1 Count (IN1 COUNT)	
				↕	Input 1 Hour (IN1 HOUR)
				↕	Input 2 Count (IN2 COUNT)
				↕	Input 2 Hour (IN2 HOUR)

3.2 SETTINGS (SETTING)

Device configurations are made under this tab.

SETTINGS (SETTING)	Serial Connection Settings (SERIAL)	→ OK ↵ X
	↕	
	PULSE 2	→ OK ↵ X
	↕	
	DI1	→ OK ↵ X
	↕	
	DI2	→ OK ↵ X
	↕	
	Network Settings (NETWORK)	→ OK ↵ X
	↕	
	Demand Settings (DEMAND)	→ OK ↵ X
	↕	
	Tariff Settings (TARIFF)	→ OK ↵ X
	↕	
Device Settings (DEVICE)	→ OK ↵ X	
↕		
Security Settings (SECURE)	→ OK ↵ X	
↕		
Clear (CLEAR)	→ OK ↵ X	



The menu structure above may vary in different models.

3.2.1 Serial Connection Settings (SERIAL)

Under this menu, the following communication parameters that will be required for MODBUS RTU communication are set.

- Baudrate (BAUD)
1200 – 57600 baudrates are supported.
- Parite (PARITY)
Odd parity, even parity and none parity options are supported.
- Stop Bit (STOP)
Stop bit 1 and Stop bit 2 options are supported.
- Data Type (DTATYP)
It is the menu where the bit order of the data to be sent is selected. The following sorting types are supported.
 - BE (Big Endian)
 - LE (Little Endian)
 - BE SWAP (Big Endian Byte Swap)
 - LE SWAP (Little Endian Byte Swap)

Settings (SETTING)	→OK ←X	Serial Connection Settings (SERIAL)	→OK ←X	Slave ID (ID)	↕	1..247
				Baudrate (BAUD)	↕	1200 / 2400 / 4800 / 9600 19200 / 38400 / 57600
				Parity (PARITY)	↕	None / Odd / Even
				Stop Bit (STOP)	↕	1 2
				Data Type (DATA TYP)	↕	BE (Big Endian) / LE (Little Endian) BESP (Big Endian Byte Swap) LESP (Little Endian Byte Swap)

3.2.2 Pulse 2 Settings (PULSE 2)

All MED 4 series devices have at least one pulse output, with some models featuring two pulse outputs.

The first pulse output is fixed and generates 500 pulses (500 imp/kWh) for every 1 kWh of Import Active Energy measured. The pulse duration is 60 ms.

The second pulse output is optional and adjustable. In models where it is fixed, the second pulse output generates 500 pulses (500 imp/kVArh) for every 1 kVArh of Import Reactive Energy measured. The pulse duration is also 60 ms.

For the adjustable pulse output configuration, the following parameters must be set:

- The energy source for which the pulses are to be generated (**SOURCE**)
- The amount of energy to be counted for one pulse (**VALUE x MULTIPLIER**)
- The pulse duration (**DURATION**)

SETTINGS (SETTING)	→OK ↵ X	PULSE 2	→OK ↵ X	Source (SOURCE)	↕	T1 Total Import Active (I AKT)
						↕
						T1 Total Export Active (E AKT)
						↕
						T1 Total Import Reactive (I REA)
						↕
						T1 Total Export Reactive (E REA)
				Value (VALUE)	↕	1 .. 9
				Multiplier (MULT)	↕	1 x10 (CAR10) x100 (CAR100) x1000 (CAR1000) /1000 (BOL1000) /100 (BOL100) /10 (BOL10)
				Duration (DUR)	↕	30 .. 2500 msec

In the configuration of the digital output, the energy source to get pulses, the amount of energy to be counted to get pulses and the duration of the signal must be entered.

Source (SOURCE): The source of the energy to get pulses is selected. 4 different energy sources can be selected.

- Import Active Energy (I ACT)
- Export Active Energy (E ACT)
- Import Reactive Energy (I REA)
- Export Reactive Energy (E REA)

Value (VALUE) ve Multiplier (MULT): An integer from 1 to 9 must be entered for “Value”. It is multiplied by the parameter selected from the “Multiplier” section and it is determined how much energy will be counted for a pulse.

Duration (DUR): The duration that the pulse will remain active is set.

For example, the configurations are as follows;

- Source (SOURCE) ➔ I Import Active Energy (I ACT)
- Value (VALUE) ➔ 5
- Multiplier (MULT) ➔ MUL10 (means multiply by 10)
- Duration (DUR) ➔ 1000 (unit is msec.)

The device will give 1 pulse output for every $5 \times 10 = 50$ Wh energy. The pulse will remain active for 1000 msec (1 second).

! These values are the total energy data of the 1st tariff. Energy units are Wh and VARh.

3.2.3 Digital Digital Settings (DI1 & DI2)

Operating mode (SOURCE), delay time (DELAY), and detection edge (EDGE) settings of the inputs are made under this tab.

SETTING (SETTING)	→OK ↵ X	DI1	→OK ↵ X	Source (SOURCE)	→OK ↵ X	Input Counter (IN CNT)	
						↓	
				Tariff (TARIFF)			
				Delay (DELAY)	→OK ↵ X	100 .. 2000 msec	
						↓	
	↵ X	→OK ↵ X	DI2	→OK ↵ X	Edge (EDGE)	→OK ↵ X	Rising Edge (RISE)
							↓
					Falling Edge (FALL)		
							↓
					Rising and Falling Edge (BOTH)		

Digital Input Source (SOURCE): The operating mode of the digital input is selected here. There are 2 different operating modes 2nd and 3rd tariff activation (TARIFF) and entry counter (IN CNT).

If the source is set as tariff activation for both inputs;

When DI1 is active, the device will start counting to the 2nd tariff, and when DI2 is active, the device will start counting to the 3rd tariff.

! 2 different tariffs cannot be active with devices at the same time. If one tariff is active and the other tariff is desired to be activated, the device will only count on the 1st tariff.

If the source is set to input counter (IN CNT), it counts with each state changing depending on the detection edge.

- If rising edge detection (RISE) is chosen for the detection edge, the counter will increase by 1 on each activation of the dry contact that is connected to the digital input.
- If falling edge detection (FALL) is chosen for the detection edge, the counter will increase by 1 on each deactivation of the dry contact that is connected to the digital input.
- If rising and falling edges detection (BOTH) is chosen for the detection edge, the counter will increase by 1 on each activation and deactivation of the dry contact that is connected to the digital input.

Delay (DELAY): It is the delay time used to determine the position of the digital input. If the input is still in the same position at the end of the set detection delay time, it is decided whether the related input is active or passive. The most important purpose of use is to filter out factors such as contact bounce or noise that may occur at the digital input.

Detection Edge (EDGE): This is the menu where you select the position in which the digital input will be detected as active or passive. This menu is valid for the "Input Counter (IN CNT)" option in digital input sources. For tariff activation, rising edge detection (RISE) always applies.

! When digital inputs are set as input counter, tariff configuration is done using commands over communication. Digital input is based on the dry contact detection principle. Never apply signal to inputs. Otherwise, there is a risk of damaging the device.

3.2.4 Network Settings (NETWORK)

In devices that support current transformer connections, network settings can only be configured during the initial setup. Once the settings are made, they cannot be changed again.

When the device is powered for the first time, the following settings must be configured in order:

SETTINGS (SETTING)	→OK ↵ X	Network Settings (NETWORK)	→OK ↵ X	CT Primary (CT PRIMARY)
				↓
				CT Secondary (CT SEC)
				↓
				VT Primary (VT PRI)
				↓
				VT Secondary (VT SEC)
				↓
				System Frequency (SYS FRQ)
				↓
Connection Typw (CON TYP)				

To change the value of a parameter, navigate to the desired parameter and press the → button. Then, use the ↑ and ↓ buttons to set the desired value, and press → again to save the changes. If you do not wish to save the changes, press the ← button.

After adjusting a parameter, press the ↓ button to move to the next parameter. Once all adjustments are completed, the screen will display "SAVE." Change this option to "YES." Subsequently, the device will operate with the configured network settings.

SETTINGS (SETTING)	→OK ↵ X	Network Settings (NETWORK)	→OK ↵ X	CT Primary (CT PRIMARY)	→OK ↵ X	5..9999
				↓		↓
				CT Secondary (CT SEC)	→OK ↵ X	1 / 5
				↓		↓
				VT Primary (VT PRI)	→OK ↵ X	100 .. 9999999
				↓		↓
				VT Secondary (VT SEC)	→OK ↵ X	VT Secondary (VT SEC)
				↓		↓
				System Frequency (SYS FRQ)	→OK ↵ X	100 .. 500
				↓		↓
Connection Typw (CON TYP)	→OK ↵ X					

CT Primary Setting (CT PRIMARY): This is the section where the primary value of the current transformers connected to the current inputs is entered. A value between 5 and 9999 can be entered.

CT Secondary Setting (CT SECONDARY): This is the section where the secondary value of the current transformers connected to the current inputs is entered. 1 or 5 can be selected.

! The current values measured from the current inputs are multiplied by the ratio of the CT Primary and CT Secondary values and shown in the displays and Modbus addresses.

VT Primary Setting (VT PRIMARY): This is the section where the primary value of the transformers connected to the voltage inputs is entered. A value between 100 and 9999 can be entered.

VT Secondary Setting (VT SECONDARY): This is the section where the secondary value of the transformers connected to the voltage inputs is entered. A value between 100 and 500 can be entered.

! The voltage values measured from the voltage inputs are multiplied by the ratio of the VT Primary and VT Secondary values and shown in the displays and Modbus addresses.

System Frequency (SYS FREQ): It is the section where the system frequency is selected. 50 and 60 Hz frequencies are supported on the devices.

Connection Type (CONNECTION): The connection type to the device is selected under this tab. 3P3W and 3P4W connection options are supported on the devices.

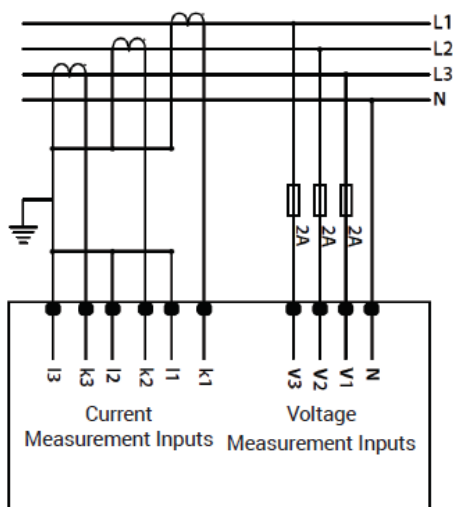


Figure 3 3P4W Connection

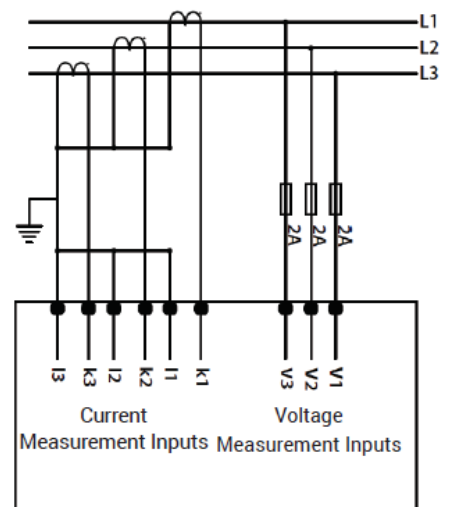


Figure 4 3P3W Connection

! In directly connected devices, connections can be made up to 100 A, and there are no network settings available. The only connection type supported by the devices is 3P4W.

3.2.5 Demand Settings (DEMAND)

Under this tab, the demand calculation method and period are entered. The device has 3 different demand calculation methods; fixed, sliding, and rolling.

SETTING (SETTING)	→OK ↵ X	Demand Settings (DEMAND)	→OK ↵ X	Method (METHOD)	→OK ↵ X	Sliding (SLIDIN)
				↓		
				Fixed (FIXED)		
				↓		
				Rolling (ROLLIN)		
				↓		
Period (PERIOD)	→OK ↵ X	1..60				
↓						
Sun Interval (SUBINT)	→OK ↵ X	1..60				

Fixed Method: It is calculated by taking the average of the power values during the set demand period.

Sliding Method: Demand values are calculated in blocks of time determined according to the set time. Time blocks are the value in seconds of demand time intervals set in minutes. In other words, the demand measurements of a device with a demand time of 15 minutes are updated with time blocks of each 15 seconds. The device updates the demand value at the end of the time interval.

Rolling Method: Demand values are calculated in blocks of time determined according to the set time. Time blocks are the value in seconds of demand time intervals set in minutes. In other words, the demand measurements of a device with a demand time of 15 minutes are updated with time blocks of each 15 seconds. The device updates the demand value at the end of the time interval..

The default values are as follows.

- Metot: Sliding
- Period: 15 mins.
- Sub-Interval: 1 min. (It is unimportant in demand calculation because method is “Sliding”)

3.2.6 Tariff Settings (TARIFF)

The devices optionally have two tariffs, T1 and T2, and also, optionally, there are four sub-tariffs under T1: T1-1, T1-2, T1-3, and T1-4..

Under this tab, the configuration of sub-tariffs for devices with sub-tariffs is made.

! The values calculated under the T1 tariff are the sum of the T1-1, T1-2, T1-3, and T1-4 tariffs. Let's assume that:

T1-1 = 10 kWh

T1-2 = 15 kWh

T1-3 = 20 kWh

T1-4 = 25 kWh olduğunu varsayalım.

The value displayed under the T1 tariff will be 70 kWh, as it is the sum of the four sub-tariffs.

For four-tariff products, changes in sub-tariffs can be made based on time, with 10 different settings available. According to these 10 different settings, the counter for the newly adjusted tariff will become active from the time when the tariff is set for that specific time period.

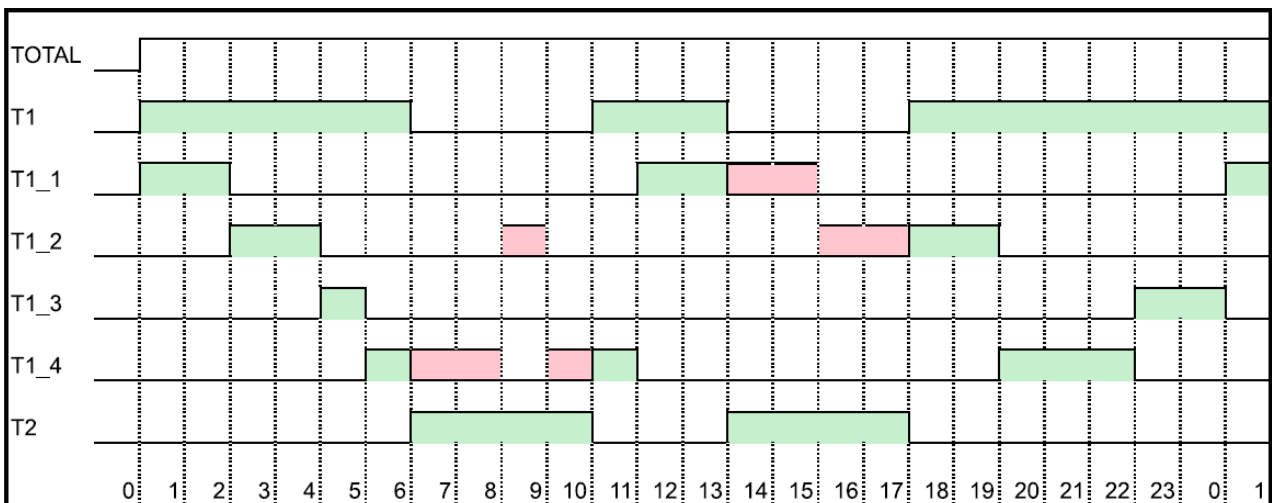
SETTING (SETTING)	→OK ↵ X	Tariff Settings (TARIFF)	→OK ↵ X	1st Tariff Setting (TRFF 1)	→OK ↵ X	Sub Tariff (SUB TRF)	→OK ↵ X	T1-1 / T1-2 T1-3 / T1-4
						↓		
						Hour (HOUR)	→OK ↵ X	0..23
				↓				
				MINUTE (MINUTE)	→OK ↵ X	0..59		
				↓				
				2nd Tariff Setting (TRFF 2)	→OK ↵ X	Sub Tariff (SUB TRF)	→OK ↵ X	Off / T1-1 / T1-2 T1-3 / T1-4
						↓		
						Hour (HOUR)	→OK ↵ X	0..23
				↓				
				MINUTE (MINUTE)	→OK ↵ X	0..59		
				↓				
				3rd Tariff Setting (TRFF 3)	→OK ↵ X			
				↓				
				4th Tariff Setting (TRFF 4)	→OK ↵ X			
				↓				
				5th Tariff Setting (TRFF 5)	→OK ↵ X			
				↓				
				6th Tariff Setting (TRFF 6)	→OK ↵ X			
				↓				
				7th Tariff Setting (TRFF 7)	→OK ↵ X			
				↓				
				8th Tariff Setting (TRFF 8)	→OK ↵ X			
				↓				
				9th Tariff Setting (TRFF 9)	→OK ↵ X			
				↓				
				10th Tariff Setting (TRFF 10)	→OK ↵ X	Sub Tariff (SUB TRF)	→OK ↵ X	Off / T1-1 / T1-2 T1-3 / T1-4
						↓		
						Hour (HOUR)	→OK ↵ X	0..23
				↓				
				Minute (MINUTE)	→OK ↵ X	0..59		

"If the following settings are made as an example:"

For example, if the following settings are made:

Settings	Tariff	Start Time
#1	T1-1	00:00
#2	T1-2	02:00
#3	T1-3	04:00
#4	T1-4	05:00
#5	T1-2	08:30
#6	T1-4	09:00
#7	T1-1	11:00
#8	T1-2	15:00
#9	T1-4	19:30
#10	T1-3	22:00

The activity of the tariffs will be as shown in the table below. The parts shaded in red represent the time-based activation of the T1 tariffs, while in areas where T2 tariffs are present, the T1 tariffs will not be active. In the areas shaded in green, the corresponding T1 tariffs will count.



3.2.7 Device Settings (DEVICE)

Under this tab, the language of the device and backlight status settings are made.

SETTINGS (SETTING)	→OK ↵ X	Device Settings (DEVICE)	→OK ↵ X	Language (DIL LANG)	↵ OK ↵ X	Türkçe (TUR) English (ENG)	Time Dependent (TIMDEP)	
				↕		↕		
				Backlight (BCKLGH)	↵ OK ↵ X	Backlight State (STATE)		↵ OK ↵ X
				↕		↕		
				Time (TIME)	↵ OK ↵ X	10..600		

The device supports 2 different language options, Turkish and English. The default language is English.

The backlight can be adjusted in 3 different options: continuously on (ON), continuously off (OFF), and time-dependent (TIMDEP). If it is selected time-dependent, how long it will remain active (TIME) should be selected.

3.2.8 Security Settings (SECURE)

Password protection activation configuration (ACTIVE) and password (PASS) can be adjusted under this tab.

SETTINGS (SETTING)	→OK ↵ X	Security Settings (SECURE)	→OK ↵ X	Activation (ACTIVE)	→OK ↵ X	OFF ON
				↓		
				Password (PASS)	→OK ↵ X	000000 .. 999999

3.2.9 Security Settings (SECURE)

6 different parameters can be cleared under this menu.

SETTINGS (SETTING)	→OK ↵ X	Clear (CLEAR)	→OK ↵ X	Settings (SETTING)	→OK ↵ X	NO YES
				↓		
				Demand (DEMAND)	→OK ↵ X	NO YES
				↓		
				Input counter (IN CNT)	→OK ↵ X	NO YES

The parameter to be cleared should be set to "YES". When exiting the settings menu, selecting "YES" for the "SAVE" question will delete the settings.

In order to save the settings made after the setting change, the "X" button must be pressed several times. The "NO" statement on the "SAVE" screen that appears on the screen should be changed to "YES" using the buttons. Afterward, the "OK" button should be pressed.

3.3 DATE - TIME (DATE-TIME)

This menu is available on devices with a real-time clock (RTC). Under this menu, the device's date and time are displayed.

DATE - TIME (DATE-TIME)	→OK ↵ X	Time (TIME)
		↓
		Date (DATE)

3.4 INFO (INFO)

Device information is shown under this tab.

INFO (INFO)	→OK ↵ X	Order Number (ORDER)
		↓
		Serial Number (SERIAL NO)
		↓
		Software Version (FIRMWARE)
		↓
		Modbus Version (MDDBUS)
		↓
		CRC

3.5 LOGIN (LOGIN)

This is the section where password entry is made. When the password is entered successfully, "OK" appears on the screen..

LOGIN (LOGIN)	→OK ↵ X	Succes Login (SUCCES)
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MED 4

SECTION 4

RS485

COMMUNICATION

The devices have an optional RS485 interface. Devices communicate with Modbus RTU protocol over the RS485 communication interface. The following functions are supported.

03H fonksiyonu: This function reads the readable addresses in the Modbus table.

10H fonksiyonu: This function writes the writable addresses in the Modbus table.

Definitions:

R / W: Can read and write the value in this address.

RO: Can only read the value in this address.

WO: Can only write to this address.

float: 32-bit floating number.

double: 64-bit double number

General Phase Values						
Address	Parameter	Data Type	W/R	Function	Description	Default
0	Average Phase Neutral Voltage	float	RO	03H	V	
2	Total Current	float	RO	03H	A	
4	Total Active Power	float	RO	03H	W	
6	Total Reactive Power	float	RO	03H	VAr	
8	Total Apparent Power	float	RO	03H	VA	
10	System Power Factor	float	RO	03H	-	
12	Frequency	float	RO	03H	Hz	
14	Neutral Current	float	RO	03H	A	
16	Phase-Phase Voltage V12	float	RO	03H	V	
18	Phase-Phase Voltage V23	float	RO	03H	V	
20	Phase-Phase Voltage V31	float	RO	03H	V	
22	Average Phase Phase Voltage	float	RO	03H	V	
24	Phase Sequence	int32t	RO	03H	-	

Phase Values (3Ph)						
Address	Parameter	Data Type	W/R	Function	Description	Default
100	Phase 1 Voltage	float	RO	03H	V	
102	Phase 2 Voltage	float	RO	03H	V	
104	Phase 3 Voltage	float	RO	03H	V	
106	Phase 1 Current	float	RO	03H	A	
108	Phase 2 Current	float	RO	03H	A	
110	Phase 3 Current	float	RO	03H	A	
112	Phase 1 Active Power	float	RO	03H	W	
114	Phase 2 Active Power	float	RO	03H	W	
116	Phase 3 Active Power	float	RO	03H	W	
118	Phase 1 Reactive Power	float	RO	03H	VAr	
120	Phase 2 Reactive Power	float	RO	03H	VAr	
122	Phase 3 Reactive Power	float	RO	03H	VAr	
124	Phase 1 Apparent Power	float	RO	03H	VA	
126	Phase 2 Apparent Power	float	RO	03H	VA	
128	Phase 3 Apparent Power	float	RO	03H	VA	
130	Phase 1 Power Factor	float	RO	03H	-	
132	Phase 2 Power Factor	float	RO	03H	-	
134	Phase 3 Power Factor	float	RO	03H	-	
136	Phase 1 Cos \emptyset	float	RO	03H	-	
138	Phase 2 Cos \emptyset	float	RO	03H	-	
140	Phase 3 Cos \emptyset	float	RO	03H	-	

THD Data						
Address	Parameter	Date /Type	W/R	Function	Description	Default
500	Total Harmonic Distortion Voltage Phase 1	float	RO	03H	%	
502	Total Harmonic Distortion Voltage Phase 2	float	RO	03H	%	
504	Total Harmonic Distortion Voltage Phase 3	float	RO	03H	%	
506	Total Harmonic Distortion Current Phase 1	float	RO	03H	%	
508	Total Harmonic Distortion Current Phase 2	float	RO	03H	%	
510	Total Harmonic Distortion Current Phase 3	float	RO	03H	%	

Energy Data						
Address	Parameter	Data Type	W/R	Function	Description	Default
1000	Total Import Active Energy	double	RO	03H	Wh	
1004	Total Phase 1 Import Active Energy	double	RO	03H	Wh	
1008	Total Phase 2 Import Active Energy	double	RO	03H	Wh	
1012	Total Phase 3 Import Active Energy	double	RO	03H	Wh	
1016	Total Export Active Energy	double	RO	03H	Wh	
1020	Total Phase 1 Export Active Energy	double	RO	03H	Wh	
1024	Total Phase 2 Export Active Energy	double	RO	03H	Wh	
1028	Total Phase 3 Export Active Energy	double	RO	03H	Wh	
1032	Total Import Reactive Energy	double	RO	03H	VArh	
1036	Total Phase 1 Import Reactive Energy	double	RO	03H	VArh	
1040	Total Phase 2 Import Reactive Energy	double	RO	03H	VArh	
1044	Total Phase 3 Import Reactive Energy	double	RO	03H	VArh	
1048	Total Export Reactive Energy	double	RO	03H	VArh	
1052	Total Phase 1 Export Reactive Energy	double	RO	03H	VArh	
1056	Total Phase 2 Export Reactive Energy	double	RO	03H	VArh	
1060	Total Phase 3 Export Reactive Energy	double	RO	03H	VArh	
1064	Total T1 Import Active Energy	double	RO	03H	Wh	
1068	Phase 1 T1 Import Active Energy	double	RO	03H	Wh	
1072	Phase 2 T1 Import Active Energy	double	RO	03H	Wh	
1076	Phase 3 T1 Import Active Energy	double	RO	03H	Wh	
1080	Total T1 Export Active Energy	double	RO	03H	Wh	
1084	Phase 1 T1 Export Active Energy	double	RO	03H	Wh	
1088	Phase 2 T1 Export Active Energy	double	RO	03H	Wh	
1092	Phase 3 T1 Export Active Energy	double	RO	03H	Wh	
1096	Total T1 Import Reactive Energy	double	RO	03H	VArh	
1100	Phase 1 T1 Import Reactive Energy	double	RO	03H	VArh	
1104	Phase 2 T1 Import Reactive Energy	double	RO	03H	VArh	
1108	Phase 3 T1 Import Reactive Energy	double	RO	03H	VArh	
1112	Total T1 Export Reactive Energy	double	RO	03H	VArh	
1116	Phase 1 T1 Export Reactive Energy	double	RO	03H	VArh	
1120	Phase 2 T1 Export Reactive Energy	double	RO	03H	VArh	
1124	Phase 3 T1 Export Reactive Energy	double	RO	03H	VArh	
1128	Total T2 Import Active Energy	double	RO	03H	Wh	
1132	Phase 1 T2 Import Active Energy	double	RO	03H	Wh	
1136	Phase 2 T2 Import Active Energy	double	RO	03H	Wh	
1140	Phase 3 T2 Import Active Energy	double	RO	03H	Wh	
1144	Total T2 Export Active Energy	double	RO	03H	Wh	
1148	Phase 1 T2 Export Active Energy	double	RO	03H	Wh	

Energy Data						
Address	Parameter	Data Type	W/R	Function	Description	Default
1152	Phase 2 T2 Export Active Energy	double	RO	03H	Wh	
1156	Phase 3 T2 Export Active Energy	double	RO	03H	Wh	
1160	Total T2 Import Reactive Energy	double	RO	03H	VArh	
1164	Phase 1 T2 Import Reactive Energy	double	RO	03H	VArh	
1168	Phase 2 T2 Import Reactive Energy	double	RO	03H	VArh	
1172	Phase 3 T2 Import Reactive Energy	double	RO	03H	VArh	
1176	Total T2 Export Reactive Energy	double	RO	03H	VArh	
1180	Phase 1 T2 Export Reactive Energy	double	RO	03H	VArh	
1184	Phase 2 T2 Export Reactive Energy	double	RO	03H	VArh	
1188	Phase 3 T2 Export Reactive Energy	double	RO	03H	VArh	
1192	Total T2 Import Active Energy	double	RO	03H	Wh	
1196	Phase 1 T1-1 Import Active Energy	double	RO	03H	Wh	
1200	Phase 2 T1-1 Import Active Energy	double	RO	03H	Wh	
1204	Phase 3 T1-1 Import Active Energy	double	RO	03H	Wh	
1208	Total T1-1 Export Active Energy	double	RO	03H	Wh	
1212	Phase 1 T1-1 Export Active Energy	double	RO	03H	Wh	
1216	Phase 2 T1-1 Export Active Energy	double	RO	03H	Wh	
1220	Phase 3 T1-1 Export Active Energy	double	RO	03H	Wh	
1224	Total T1-1 Import Reactive Energy	double	RO	03H	VArh	
1228	Phase 1 T1-1 Import Reactive Energy	double	RO	03H	VArh	
1232	Phase 2 T1-1 Import Reactive Energy	double	RO	03H	VArh	
1236	Phase 3 T1-1 Import Reactive Energy	double	RO	03H	VArh	
1240	Total T1-1 Export Reactive Energy	double	RO	03H	VArh	
1244	Phase 1 T1-1 Export Reactive Energy	double	RO	03H	VArh	
1248	Phase 2 T1-1 Export Reactive Energy	double	RO	03H	VArh	
1252	Phase 3 T1-1 Export Reactive Energy	double	RO	03H	VArh	
1196	Phase 1 T1-2 Import Active Energy	double	RO	03H	Wh	
1200	Phase 2 T1-2 Import Active Energy	double	RO	03H	Wh	
1204	Phase 3 T1-2 Import Active Energy	double	RO	03H	Wh	
1208	Total T1-2 Export Active Energy	double	RO	03H	Wh	
1212	Phase 1 T1-2 Export Active Energy	double	RO	03H	Wh	
1216	Phase 2 T1-2 Export Active Energy	double	RO	03H	Wh	
1220	Phase 3 T1-2 Export Active Energy	double	RO	03H	Wh	
1224	Total T1-2 Import Reactive Energy	double	RO	03H	VArh	
1228	Phase 1 T1-2 Import Reactive Energy	double	RO	03H	VArh	
1232	Phase 2 T1-2 Import Reactive Energy	double	RO	03H	VArh	
1236	Phase 3 T1-2 Import Reactive Energy	double	RO	03H	VArh	
1240	Total T1-2 Export Reactive Energy	double	RO	03H	VArh	
1244	Phase 1 T1-2 Export Reactive Energy	double	RO	03H	VArh	
1248	Phase 2 T1-2 Export Reactive Energy	double	RO	03H	VArh	
1252	Phase 3 T1-2 Export Reactive Energy	double	RO	03H	VArh	
1196	Phase 1 T1-3 Import Active Energy	double	RO	03H	Wh	
1200	Phase 2 T1-3 Import Active Energy	double	RO	03H	Wh	
1204	Phase 3 T1-3 Import Active Energy	double	RO	03H	Wh	
1208	Total T1-3 Export Active Energy	double	RO	03H	Wh	
1212	Phase 1 T1-3 Export Active Energy	double	RO	03H	Wh	
1216	Phase 2 T1-3 Export Active Energy	double	RO	03H	Wh	

Energy Data						
Address	Parameter	Data Type	W/R	Function	Description	Default
1220	Phase 3 T1-3 Export Active Energy	double	RO	03H	Wh	
1224	Total T1-3 Import Reactive Energy	double	RO	03H	VArh	
1228	Phase 1 T1-3 Import Reactive Energy	double	RO	03H	VArh	
1232	Phase 2 T1-3 Import Reactive Energy	double	RO	03H	VArh	
1236	Phase 3 T1-3 Import Reactive Energy	double	RO	03H	VArh	
1240	Total T1-3 Export Reactive Energy	double	RO	03H	VArh	
1244	Phase 1 T1-3 Export Reactive Energy	double	RO	03H	VArh	
1248	Phase 2 T1-3 Export Reactive Energy	double	RO	03H	VArh	
1252	Phase 3 T1-3 Export Reactive Energy	double	RO	03H	VArh	
1196	Phase 1 T1-4 Import Active Energy	double	RO	03H	Wh	
1200	Phase 2 T1-4 Import Active Energy	double	RO	03H	Wh	
1204	Phase 3 T1-4 Import Active Energy	double	RO	03H	Wh	
1208	Total T1-4 Export Active Energy	double	RO	03H	Wh	
1212	Phase 1 T1-4 Export Active Energy	double	RO	03H	Wh	
1216	Phase 2 T1-4 Export Active Energy	double	RO	03H	Wh	
1220	Phase 3 T1-4 Export Active Energy	double	RO	03H	Wh	
1224	Total T1-4 Import Reactive Energy	double	RO	03H	VArh	
1228	Phase 1 T1-4 Import Reactive Energy	double	RO	03H	VArh	
1232	Phase 2 T1-4 Import Reactive Energy	double	RO	03H	VArh	
1236	Phase 3 T1-4 Import Reactive Energy	double	RO	03H	VArh	
1240	Total T1-4 Export Reactive Energy	double	RO	03H	VArh	
1244	Phase 1 T1-4 Export Reactive Energy	double	RO	03H	VArh	
1248	Phase 2 T1-4 Export Reactive Energy	double	RO	03H	VArh	
1252	Phase 3 T1-4 Export Reactive Energy	double	RO	03H	VArh	

Partial Energy Data						
Address	Parameter	Data Type	W/R	Function	Description	Default
2000	Total Import Active Energy	double	RO	03H	Wh	
2004	Phase 1 Total Import Active Energy	double	RO	03H	Wh	
2008	Phase 2 Total Import Active Energy	double	RO	03H	Wh	
2012	Phase 3 Total Import Active Energy	double	RO	03H	Wh	
2016	Total Export Active Energy	double	RO	03H	Wh	
2020	Phase 1 Total Export Active Energy	double	RO	03H	Wh	
2024	Phase 2 Total Export Active Energy	double	RO	03H	Wh	
2028	Phase 3 Total Export Active Energy	double	RO	03H	Wh	
2032	Total Import Reactive Energy	double	RO	03H	VArh	
2036	Phase 1 Total Import Reactive Energy	double	RO	03H	VArh	
2040	Phase 2 Total Import Reactive Energy	double	RO	03H	VArh	
2044	Phase 3 Total Import Reactive Energy	double	RO	03H	VArh	
2048	Total Export Reactive Energy	double	RO	03H	VArh	
2052	Phase 1 Total Export Reactive Energy	double	RO	03H	VArh	
2056	Phase 2 Total Export Reactive Energy	double	RO	03H	VArh	
2060	Phase 3 Total Export Reactive Energy	double	RO	03H	VArh	

Balance Energy Data						
Address	Parameter	Data Type	W/R	Function	Description	Default
2100	Total Active Energy	double	RO	03H	Wh	
2104	Phase 1 Total Active Energy	double	RO	03H	Wh	
2108	Phase 2 Total Active Energy	double	RO	03H	Wh	
2112	Phase 3 Total Active Energy	double	RO	03H	Wh	
2116	Total Reactive Energy	double	RO	03H	VArh	
2120	Phase 1 Total Reactive Energy	double	RO	03H	VArh	
2124	Phase 2 Total Reactive Energy	double	RO	03H	VArh	
2128	Phase 3 Total Reactive Energy	double	RO	03H	VArh	

Demand Data						
Address	Parameter	Data Type	W/R	Function	Description	Default
3000	PD* Phase 1 Current	float	RO	03H	A	
3002	PD* Phase 2 Current	float	RO	03H	A	
3004	PD* Phase 3 Current	float	RO	03H	A	
3006	PD* Total Current	float	RO	03H	-	
3008	PD* Total Import Active Power	float	RO	03H	W	
3010	PD* Total Export Active Power	float	RO	03H	W	
3012	PD* Total Import Reactive Power	float	RO	03H	VAr	
3014	PD* Total Export Reactive Power	float	RO	03H	VAr	
3016	PD* Total Apparent Power	float	RO	03H	VA	
3018	MD* Phase 1 Current	float	RO	03H	A	
3020	MD* Phase 2 Current	float	RO	03H	A	
3022	MD* Phase 3 Current	float	RO	03H	A	
3024	MD* Total Current	float	RO	03H	-	
3026	MD* Total Import Active Power	float	RO	03H	W	
3028	MD* Total Export Active Power	float	RO	03H	W	
3030	MD* Total Import Reactive Power	float	RO	03H	VAr	
3032	MD* Total Export Reactive Power	float	RO	03H	VAr	
3034	MD** Total Apparent Power	float	RO	03H	VA	

*PD: Demand data measured at the end of the previous demand period.

**MD: It is the maximum of the demand data measured in the device

Digital Input Counters						
Address	Parameter	Data Type	W/R	Function	Description	Default
5000	Digital Input 1 Counter	uint32_t	RO	03H	-	
5002	Digital Input 1 On Time	uint32_t	RO	03H	hour	
5004	Digital Input 2 Counter	uint32_t	RO	03H	-	
5006	Digital Input 2 On Time	uint32_t	RO	03H	hour	

4Q Reactive Energy Data						
Address	Parameter	Data Type	W/R	Function	Description	Default
8000	Total Q1 Reactive Energy	double	RO	03H	VArh	
8004	Total Phase 1 Q1 Reactive Energy	double	RO	03H	VArh	
8008	Total Phase 2 Q1 Reactive Energy	double	RO	03H	VArh	
8012	Total Phase 3 Q1 Reactive Energy	double	RO	03H	VArh	
8016	Total Q2 Reactive Energy	double	RO	03H	VArh	
8020	Total Phase 1 Q2 Reactive Energy	double	RO	03H	VArh	
8024	Total Phase 2 Q2 Reactive Energy	double	RO	03H	VArh	
8028	Total Phase 3 Q2 Reactive Energy	double	RO	03H	VArh	
8032	Total Q3 Reactive Energy	double	RO	03H	VArh	
8036	Total Phase 1 Q3 Reactive Energy	double	RO	03H	VArh	

4Q Reactive Energy Data						
Address	Parameter	Data Type	W/R	Function	Description	Default
8040	Total Phase 2 Q3 Reactive Energy	double	RO	03H	VArh	
8044	Total Phase 3 Q3 Reactive Energy	double	RO	03H	VArh	
8048	Total Q4 Reactive Energy	double	RO	03H	VArh	
8052	Total Phase 1 Q4 Reactive Energy	double	RO	03H	VArh	
8056	Total Phase 2 Q4 Reactive Energy	double	RO	03H	VArh	
8060	Total Phase 3 Q4 Reactive Energy	double	RO	03H	VArh	
8064	T1 Q1 Reactive Energy	double	RO	03H	VArh	
8068	T1 Phase 1 Q1 Reactive Energy	double	RO	03H	VArh	
8072	T1 Phase 2 Q1 Reactive Energy	double	RO	03H	VArh	
8076	T1 Phase 3 Q1 Reactive Energy	double	RO	03H	VArh	
8080	T1 Q2 Reactive Energy	double	RO	03H	VArh	
8084	T1 Phase 1 Q2 Reactive Energy	double	RO	03H	VArh	
8088	T1 Phase 2 Q2 Reactive Energy	double	RO	03H	VArh	
8092	T1 Phase 3 Q2 Reactive Energy	double	RO	03H	VArh	
8096	T1 Q3 Reactive Energy	double	RO	03H	VArh	
8100	T1 Phase 1 Q3 Reactive Energy	double	RO	03H	VArh	
8104	T1 Phase 2 Q3 Reactive Energy	double	RO	03H	VArh	
8108	T1 Phase 3 Q3 Reactive Energy	double	RO	03H	VArh	
8112	T1 Q4 Reactive Energy	double	RO	03H	VArh	
8116	T1 Phase 1 Q4 Reactive Energy	double	RO	03H	VArh	
8120	T1 Phase 2 Q4 Reactive Energy	double	RO	03H	VArh	
8124	T1 Phase 3 Q4 Reactive Energy	double	RO	03H	VArh	
8128	T2 Q1 Reactive Energy	double	RO	03H	VArh	
8132	T2 Phase 1 Q1 Reactive Energy	double	RO	03H	VArh	
8136	T2 Phase 2 Q1 Reactive Energy	double	RO	03H	VArh	
8140	T2 Phase 3 Q1 Reactive Energy	double	RO	03H	VArh	
8144	T2 Q2 Reactive Energy	double	RO	03H	VArh	
8148	T2 Phase 1 Q2 Reactive Energy	double	RO	03H	VArh	
8152	T2 Phase 2 Q2 Reactive Energy	double	RO	03H	VArh	
8156	T2 Phase 3 Q2 Reactive Energy	double	RO	03H	VArh	
8160	T2 Q3 Reactive Energy	double	RO	03H	VArh	
8164	T2 Phase 1 Q3 Reactive Energy	double	RO	03H	VArh	
8168	T2 Phase 2 Q3 Reactive Energy	double	RO	03H	VArh	
8172	T2 Phase 3 Q3 Reactive Energy	double	RO	03H	VArh	
8176	T2 Q4 Reactive Energy	double	RO	03H	VArh	
8180	T2 Phase 1 Q4 Reactive Energy	double	RO	03H	VArh	
8184	T2 Phase 2 Q4 Reactive Energy	double	RO	03H	VArh	
8188	T2 Phase 3 Q4 Reactive Energy	double	RO	03H	VArh	

Configuration Activation						
Address	Parameter	Data Type	W/R	Function	Description	Default
15000	Device Password	uint32_t	W	10H	1 - 999999	1 - 999999



In order to be able to configure via communication, the device password must be entered first. Then, other parameters can be configured.

Serial Communication Settings						
Address	Parameter	Data Type	W/R	Function	Description	Default
10000	Slave ID	uint32_t	R/W	03H/10H	-603744	1
10002	Baudrate	uint32_t	R/W	03H/10H	0 - 1200 01/01/00 01/02/00 01/03/00 4 - 19200 5 - 38400 6 - 57600	5
10004	Parity	uint32_t	R/W	03H/10H	0 - NONE 1 - ODD 2 - EVEN	0
10006	Stop Bit	uint32_t	R/W	03H/10H	0 - STOP 1 1 - STOP 2	0
10008	Endiennes	uint32_t	R/W	03H/10H	0 - Big Endian 1 - Little Endian 2 - Big Endian Byte Swap 3 - Little Endian Byte Swap	0

Pulse 1 Output Settings						
Address	Parameter	Data Type	W/R	Function	Description	Default
10100	Pulse 1 Source	uint32_t	R/W	03H/10H	0 - Import Active	0
10104	Pulse 1 Energy	uint32_t	R/W	03H/10H	1 - 9 (Wh/Varh)	1
10106	Pulse 1 Multiplier	uint32_t	R/W	03H/10H	3 - x 1	3
10108	Pulse 1 Duration	uint32_t	R/W	03H/10H	30-2500(mSec)	50

Pulse 2 Output Settings						
Address	Parameter	Data Type	W/R	Function	Description	Default
10200	Pulse 2 Source	uint32_t	R/W	03H/10H	0 - Import Active 1 - Export Active 2 - Import Reactive 3 - Export Reactive	2
10204	Pulse 2 Energy	uint32_t	R/W	03H/10H	1 - 9 (Wh/Varh)	1
10206	Pulse 2 Multiplier	uint32_t	R/W	03H/10H	0 - x 0,001 1 - x 0,01 2 - x 0,1 3 - x 1 4 - x 10 5 - x 100 6 - x 1000	3
10208	Pulse 2 Duration	uint32_t	R/W	03H/10H	30-2500(mSec)	50

Digital Input Settings						
Address	Parameter	Data Type	W/R	Function	Description	Default
10300	Input 1 Source	uint32_t	R/W	03H/10H	0 - Counter 1 - Tariff	0
10302	Input 1 Delay	uint32_t	R/W	03H/10H	100-2000(msec)	200
10304	Input 1 Edge	uint32_t	R/W	03H/10H	0 - Rising 1 - Falling 2 - Both	0
10306	Input 2 Source	uint32_t	R/W	03H/10H	0 - Counter 1 - Tariff	0
10308	Input 2 Delay	uint32_t	R/W	03H/10H	100-2000(msec)	200
10310	Input 2 Edge	uint32_t	R/W	03H/10H	0 - Rising 1 - Falling 2 - Both	0

Network Settings						
Address	Parameter	Data Type	W/R	Function	Description	Default
10400	CT Primary	float	R/W	03H/10H	5-9999(A)	5
10402	CT Secondary	uint32_t	R/W	03H/10H	0 - CT / 1 1 - CT / 5	1
10404	VT Primary	float	R/W	03H/10H	100-1000000(V)	230
10406	VT Secondary	float	R/W	03H/10H	100-500(V)	230
10410	System Frequency	uint32_t	R/W	03H/10H	0 - 50Hz 1 - 60Hz	0
10412	Connection Type	uint32_t	R/W	03H/10H	0 - 3P4W 1 - 3P3W	0

Demand Settings						
Address	Parameter	Data Type	W/R	Function	Description	Default
10500	Demand Method	uint32_t	R/W	03H/10H	0 - Fixed 1 - Sliding 2 - Rolling	1
10502	Demand Period	uint32_t	R/W	03H/10H	1-60(Minute)	15
10504	Sub Interval	uint32_t	R/W	03H/10H	1-60(Minute)	1

Sub-Tariff Settings						
Address	Parameter	Data Type	W/R	Function	Description	Default
10600	Sub-Tariff 1	uint32_t	R/W	03H/10H	1 - T1-1 2 - T1-2 3 - T1-3 4 - T1-4	1
10602	Hour	uint32_t	R/W	03H/10H	0-23	0
10604	Minute	uint32_t	R/W	03H/10H	0-59	0
10606	Sub-Tariff 2	uint32_t	R/W	03H/10H	0 - Off 1 - T1-1 2 - T1-2 3 - T1-3 4 - T1-4	0
10608	Hour	uint32_t	R/W	03H/10H	0-23	0
10610	Minute	uint32_t	R/W	03H/10H	0-59	0
10612	Sub-Tariff 3	uint32_t	R/W	03H/10H	0 - Off 1 - T1-1 2 - T1-2 3 - T1-3 4 - T1-4	0
10614	Hour	uint32_t	R/W	03H/10H	0-23	0
10616	Minute	uint32_t	R/W	03H/10H	0-59	0
10618	Sub-Tariff 4	uint32_t	R/W	03H/10H	0 - Off 1 - T1-1 2 - T1-2 3 - T1-3 4 - T1-4	0
10620	Hour	uint32_t	R/W	03H/10H	0-23	0
10622	Minute	uint32_t	R/W	03H/10H	0-59	0

Sub-Tariff Settings						
Address	Parameter	Data Type	W/R	Function	Description	Default
10624	Sub-Tariff 5	uint32_t	R/W	03H/10H	0 - Off 1 - T1-1 2 - T1-2 3 - T1-3 4 - T1-4	0
10626	Hour	uint32_t	R/W	03H/10H	0-23	0
10628	Minute	uint32_t	R/W	03H/10H	0-59	0
10630	Sub-Tariff 6	uint32_t	R/W	03H/10H	0 - Off 1 - T1-1 2 - T1-2 3 - T1-3 4 - T1-4	0
10632	Hour	uint32_t	R/W	03H/10H	0-23	0
10634	Minute	uint32_t	R/W	03H/10H	0-59	0
10636	Sub-Tariff 7	uint32_t	R/W	03H/10H	0 - Off 1 - T1-1 2 - T1-2 3 - T1-3 4 - T1-4	0
10638	Hour	uint32_t	R/W	03H/10H	0-23	0
10640	Minute	uint32_t	R/W	03H/10H	0-59	0
10642	Sub-Tariff 8	uint32_t	R/W	03H/10H	0 - Off 1 - T1-1 2 - T1-2 3 - T1-3 4 - T1-4	0
10644	Hour	uint32_t	R/W	03H/10H	0-23	0
10646	Minute	uint32_t	R/W	03H/10H	0-59	0
10648	Sub-Tariff 9	uint32_t	R/W	03H/10H	0 - Off 1 - T1-1 2 - T1-2 3 - T1-3 4 - T1-4	0
10650	Hour	uint32_t	R/W	03H/10H	0-23	0
10652	Minute	uint32_t	R/W	03H/10H	0-59	0
10654	Sub-Tariff 10	uint32_t	R/W	03H/10H	0 - Off 1 - T1-1 2 - T1-2 3 - T1-3 4 - T1-4	0
10656	Hour	uint32_t	R/W	03H/10H	0-23	0
10658	Minute	uint32_t	R/W	03H/10H	0-59	0

Real Rime Clock						
Address	Parameter	Data Type	W/R	Function	Description	Default
33000	Day	uint32_t	R/W	03H/10H	0-31	1
33002	Month	uint32_t	R/W	03H/10H	0-12	15
33004	Year	uint32_t	R/W	03H/10H	0-99	
33006	Hour	uint32_t	R/W	03H/10H	0-23	
33008	Minute	uint32_t	R/W	03H/10H	0-59	
33010	Second	uint32_t	R/W	03H/10H	0-59	

Device Flags						
Address	Parameter	Data Type	W/R	Function	Description	Default
45000	Error Flags	uint32_t	R	10H	00x00000001 - Pulse 1 Error 0x00000002 - Pulse 2 Error 0x00000004 - Rotation Error 0x00000008 - Current Error	
30000	Digital Input Flags	uint32_t	R	10H	0x00000001 - Input 1 0x00000002 - Input 2	

Command List						
Address	Parameter	Data Type	W/R	Function	Description	Default
31000	General Commands	uint16_t	W	06H	1000-Save Config 1100-Return To Default 1200- Restart 1300-Clear Demand 1600-Clear Input Counter 1800-Change Tariff	

MED 4

SECTION 5
FACTORY DEFAULT
SETTINGS

Network Settings (Devices with CT Connection)			
Parameter	Factory Default	Unit	Setting Range
CT Primary	5	-	2958221
CT Secondary	5	-	45413
VT Primary	230	-	100-1000000
VT Secondary	230	-	100-500
System Frequency	50	Hz	50/60
Connection Type	3P4W	-	3P4W / 3P3W

 There is no "Network Settings" for direct connected devices. Only "3P4W" connection type is supported.

Communication Settings			
Parameter	Factory Default	Unit	Setting Range
Slave ID	1	-	-603744
Baudrate	38400	-	1200 / 4800 / 9600 / 19200 / 38400 / 57600
Parity	None	-	None / Odd / Even
Stop Bit	1	-	45323
Endiannes	BE	-	BE / LE / BE SWAP / LE SWAP

Digital Input Settings			
Parameter	Factory Default	Unit	Setting Range
Digital Input 1			
Source	Counter	-	Tariff / Input Counter
Delay	200	msec	100-2000
Edge	Both	-	Rising / Falling / Both
Digital Input 2			
Source	Counter	-	Tariff / Input Counter
Delay	200	msec	100-2000
Edge	Both	-	Rising / Falling / Both

Pulse Output Settings			
Parameter	Factory Default	Unit	Setting Range
Pulse Output 1			
Source	Import Active Energy	-	I. Active / I. Reactive / E. Active / E. Reactive
Value	2	-	45536
Multiplier	1	-	1
Duration	50	msec	30-2500
Pulse Output 2			
Source	Import Reactive Energy	-	I. Active / I. Reactive / E. Active / E. Reactive
Value	2	-	45536
Multiplier	1	-	1
Duration	50	msec	30-2500

MED 4

SECTION 6
TECHNICAL
SPECIFICATIONS

TECHNICAL SPECIFICATIONS	
Parameter	Factory Default
Supply	
Voltage	85..300V AC/DC
Frequency	45..65 Hz
Measurement Inputs	
Voltage	1..300V RMS (L-N)
Current	0.01..6A / 0.25..100A
Frequency	45..65 Hz
Digital Inputs (Optionally 2 pcs)	
Input Type	Dry Contact
Pulse Outputs (Optionally 2 pcs)	
Voltage	5..30V DC
Current	50mA
Insulation	3750V RMS
Demand Period	
Demand Period	1-60 minutes (adjustable)
Environmental Conditions	
Operating Temperature	-25°C..+70°C
Storage Temperature	-30°C..+80°C
Humidity	Max %95, no condensation
Dimensions	
Width	72 mm
Height	90 mm
Depth	70 mm
Protection Class	
Front	IP54
Back	IP20
Power Consumption	
Power Consumption	<3VA

Measurement Accuracy				
Symbol	Measurement Type	Performance Class	Setting Range	Other Complementary Characteristics
P	Total Active Power	0,5	1 % $I_n \leq I \leq I_{max}$	
0,5 Ind to 0,8 Cap		Other	1200 / 4800 / 9600 / 19200 / 38400 / 57600	
Q	Total Reactive Power	1	2 % $I_n \leq I \leq I_{max}$	
0,25 Ind to 0,25 Cap		-	45323	
S	Total Apparent Power	1	2% $I_n \leq I \leq I_{max}$	
EA	Total Active Energy	0,5	0 to 9999 MWh	IEC 62053-22 Class 1
ER	Total Reactive Energy	1	0 to 9999 MVarh	IEC 62053-23 Class 2
f	Frequency	0,2	45 – 65 Hz	
I	Phase Current	0,5	10 % $I_n \leq I \leq I_{max}$	
IN	Neutral Current (Calculated)	0,5	10 % $I_n \leq I \leq I_{max}$	
U	Voltage	0,5	$U_{min} \leq U \leq U_{max}$	
PF	Power Factor	0,2	0,5 Ind to 0,8 Cap	
THDV	Total Harmonic Distortion Voltage	1	0 % to 20 %	
THDI	Total Harmonic Distortion Current	1	0 % to 100 %	
IN	Neutral Current (Calculated)	0,5	10 % $I_n \leq I \leq I_{max}$	
U	Voltage	0,5	$U_{min} \leq U \leq U_{max}$	
PF	Power Factor	0,2	0,5 Ind to 0,8 Cap	
THDV	Total Harmonic Distortion Voltage	1	0 % to 20 %	
THDI	Total Harmonic Distortion Current	1	0 % to 100 %	



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