

Klemsan

MED1 Series User Manual



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MED1 Series

SECTION 1
GENERAL INFORMATION

Klemsan MED1 series devices are MID approved energy meters that measure and record the basic electrical parameters required for monitoring a single-phase electric power line.

- Voltage
- Current
- Frequency
- Active power
- Reactive power
- Apparent power
- Power factor
- THDV
- THDI
- 4 quadrants energy



Device Model	B45-0W-01	B45-1M-V1	B45-0M-01
Order Number	606357	606358	606359
Mounting Type	Rail Mount	Rail Mount	Rail Mount
Screen Type	Custom LCD	Custom LCD	Custom LCD
Measurement Quality (EN 50470)	Class B	Class B	Class B
Current Measurement	Direct Connection up to 45Amps	Direct Connection up to 45Amps	Direct Connection up to 45Amps
Measured Parameters	Only kWh	All*	All*
Demand	-	√	-
Partial Counter	-	√	-
Tariff	1	2	1
Pulse Output	1 (Fixed)	2 (1 Fixed, 1 Adjustable)	1 (Fixed)

*The above-mentioned parameter measurements are made in devices that can make multiple measurements.

In addition to the measurement features, the devices have the following functions depending on its model;

- Support for direct connections of up to 45 amps
- Import active, export active, import reactive, export reactive
- Calculates the demand values for current, active power, reactive power and apparent power and stores them in its memory
- 2 tariff options
- Unauthorized-access protection with user password
- MID Approval
- Optionally adjustable digital output for pulse output according to different energy types
- LCD display (energy measurement, instant measurements and device information)
- Modbus RTU communication via RS485 interface
- Backlight on time setting
- Sealable enclosure

MED1 Series

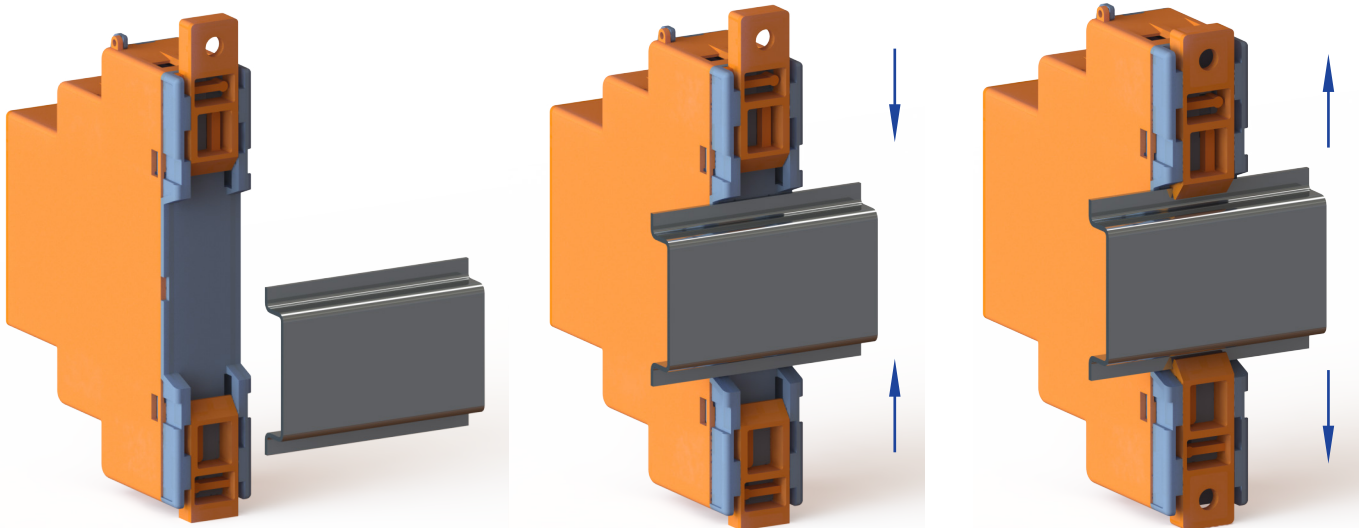
SECTION 2
INSTALLATION

2.1 Preparation for Installation

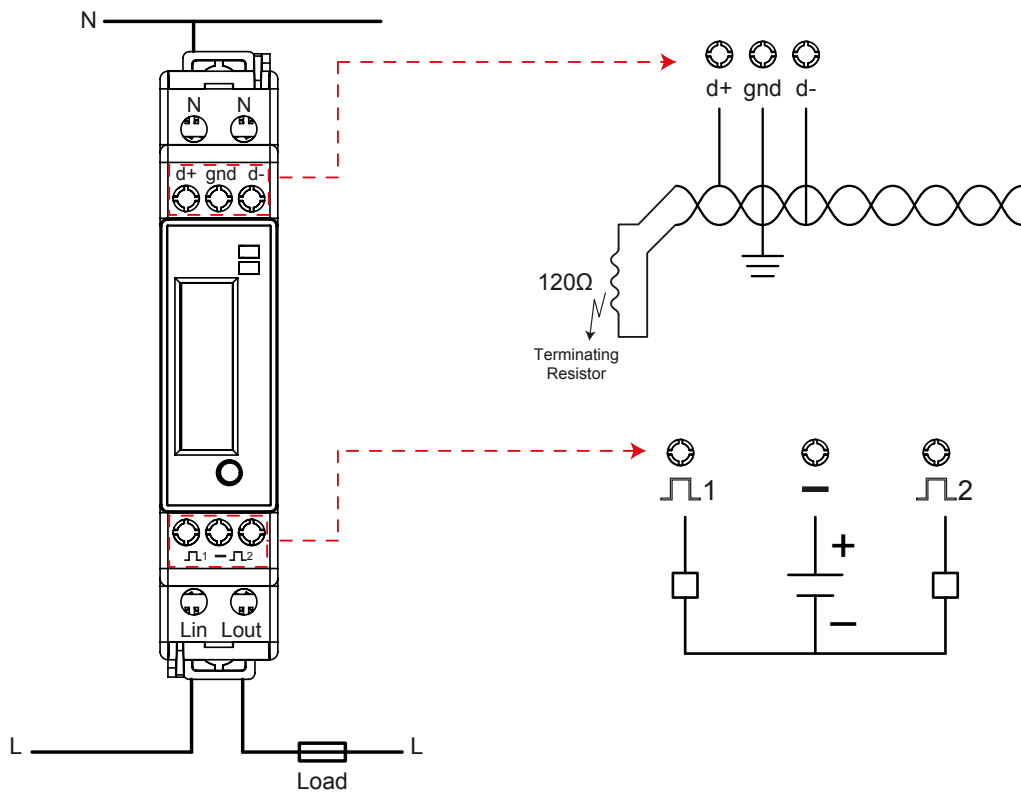
- Assembly and related connections of the product must be implemented by authorized persons in accordance with the instructions of the user manual. The device should not be operated without making the correct connections.
- Before connecting the device to the mains, make sure that the power is cut off.
- Use a dry cloth to clean and dust the device. Do not use alcohol, thinner or any abrasive material.
- The device should only be commissioned after all connections have been made.
- Do not open or dismantle the cover of the device. There are no user-serviceable parts inside.
- The device should be kept away from humid, wet, vibrating and dusty environments.

! The manufacturer is not responsible for any undesirable situations that may arise as a result of not applying the above precautions.

2.2 Mounting



2.3 Terminals and Wiring




2.3.1 Products with Direct Connection

Lin: It is the terminal where the phase input of the device is connected.


Lout: Phase entering from “Lin” terminal exits from “Lout” terminal. From here it must be connected to the load.

N: It is the terminal where the neutral connection of the line is connected.

! : The supply and measurement inputs of the device are common and are made through the “Lin” and “N” terminals. The supply voltage of the device is in the range of 85 .. 300 V AC. Direct connection can be made up to 45 A.

Pulse1 Output "  " : "": It is the output terminal of the DC voltage applied to the "-" terminal when digital output 1 is active.

The related pulse output is fixed and gives 1000 impulses (1000 imp/kWh) for each measured kWh. The pulse duration is 100 ms.

Pulse2 Output "  " : SI: It is the output terminal of the DC voltage applied to the "-" terminal when digital output 2 is active.

The related pulse output is adjustable, and the desired energy value and number can be adjusted. The configuration via the user interface software is shown under the heading "4.2 Configuration Operations".

By default, it gives 1000 impulses (1000 imp/kVArh) for each measured kVArh. The pulse duration is 100 ms."

"com" Input: It is the terminal to which the positive end of the DC voltage to be digitally switched will be connected (common).

d+: It is the data+ input of the RS-485 interface.

gnd: It is the input where the ground connection of the RS-485 interface is made.

d-: It is the data- input of the RS-485 interface.

 The terminal instructions are general and vary according to the models.

 After wiring and configurations made, the terminals must be sealed.
The device has 2 sealable terminals.

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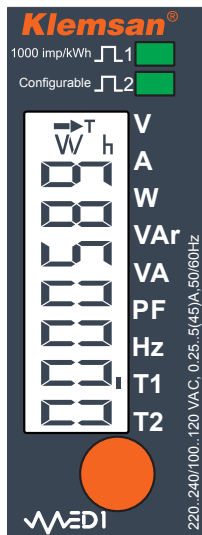
SECTION 3
MENU

Depending on its model, the device shows respectively;

- Total Energy (Import & Export),
- Active Energy (Import & Export),
- Reactive Energy (Import & Export),
- Voltage,
- Current,
- Active Power,
- Reactive Power,
- Apparent Power,
- Power Factor,
- Frequency,
- Communication parameters.

! THDV and THDI values are shown over communication.

! The menu features are general and vary according to the models.



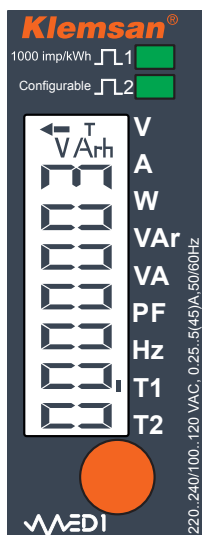
Total Import Active Energy



Total Export Active Energy



Total Import Reactive Energy



Total Export Reactive Energy



T1 Import Active Energy



T1 Export Active Energy



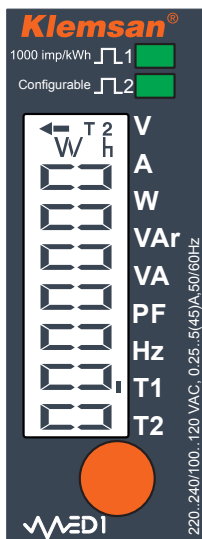
T1 Import Reactive Energy



T1 Export Reactive Energy



T2 Import Active Energy



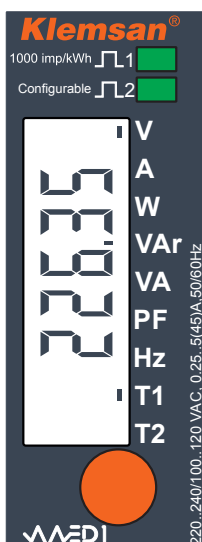
T2 Export Active Energy



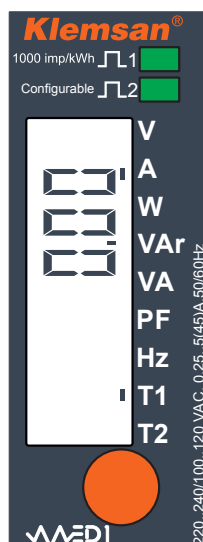
T2 Import Reactive Energy



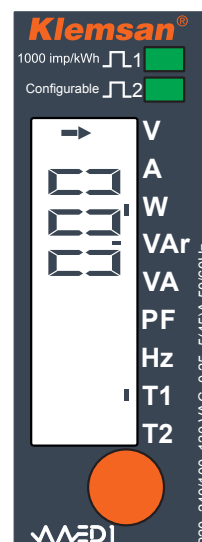
T2 Export Reactive Energy



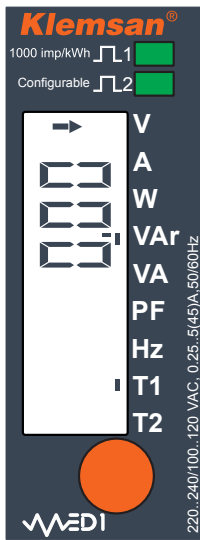
Voltage



Current



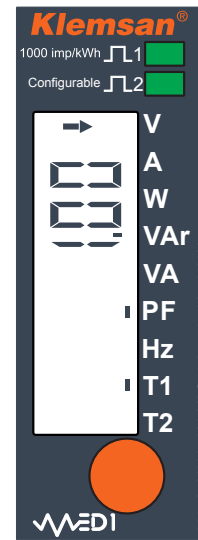
Active Power



Reactive Power



Apparent Power



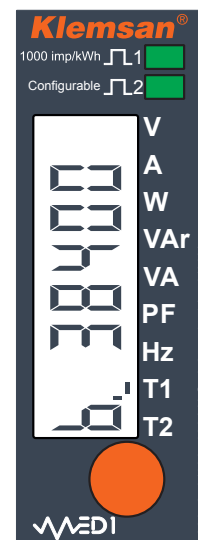
Power Factor



Frequency



Slave ID



Baudrate

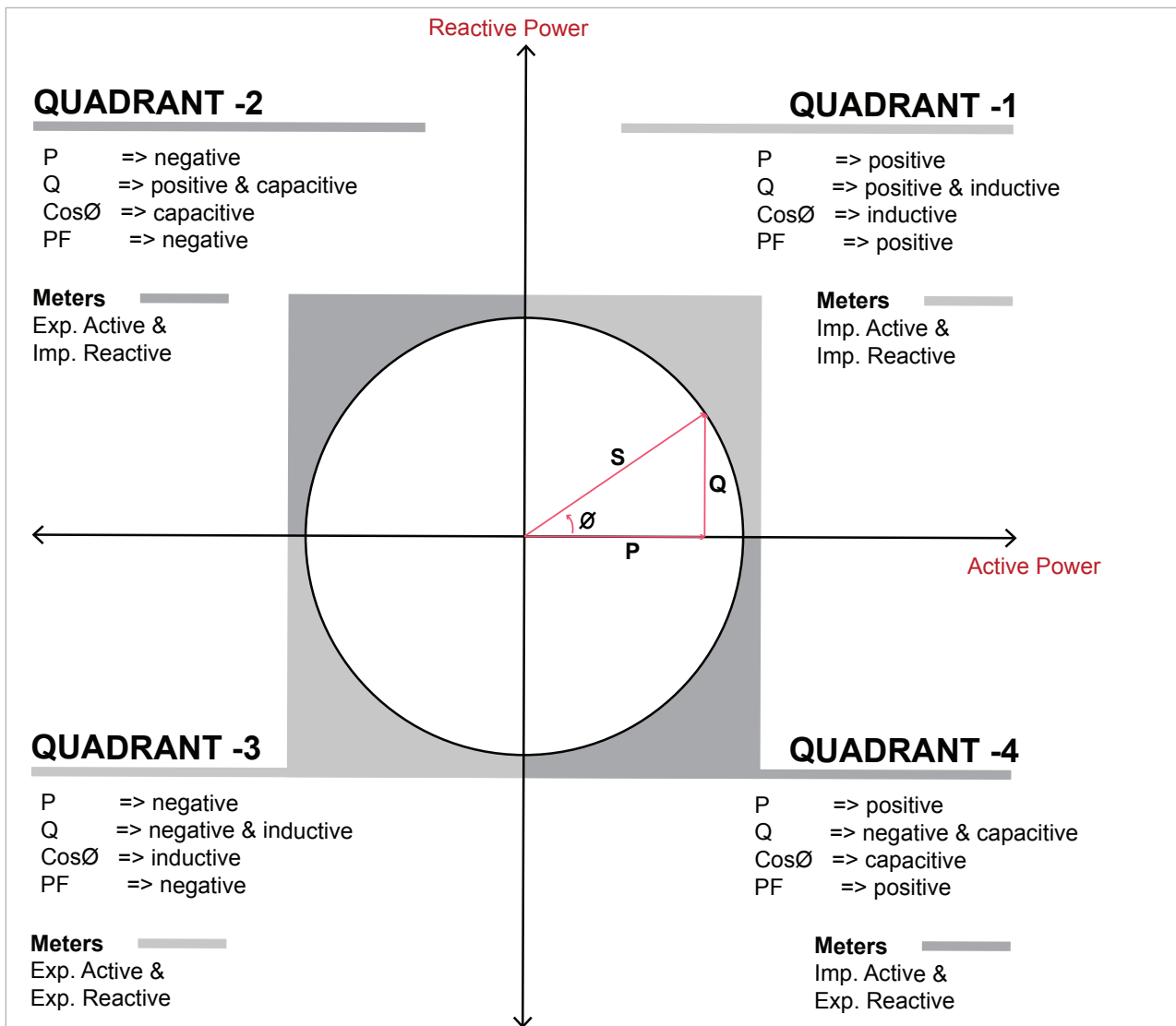


- ! Each time the button on the device is pressed, the menu is switched. Pressing for more than 2 seconds shows the display of the total energy values.

- ! Configuration cannot be made through the device. Configurations are made via the user interface program and/or various Modbus test interfaces.

4 Quadrant Measurement

The difference in angle (\emptyset) between voltage and current gives us information about the direction of energy flow. If the active/reactive power is positive, it means that the active/reactive power is consumed. If the active/reactive power is negative, it means that the active/reactive power is produced.



NOTE: By looking at the signs of P and Q, it can be understood in which quadrant the device is measuring.

For example;

- P= +10kW, Q= +5kVAr → Q-1
- P= -10kW, Q= +5kVAr → Q-2
- P= -10kW, Q= -5kVAr → Q-3
- P= +10kW, Q= -5kVAr → Q-4

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SECTION 4
USER INTERFACE
SOFTWARE

Configuration operations on devices are not performed on the device. Device configuration is done via the user interface program "Klemsan Configuration Wizard" and/or various Modbus test interfaces.

In order for the device to be configured via the Klemsan Configuration Wizard, the related file must be downloaded from the Klemsan web page.

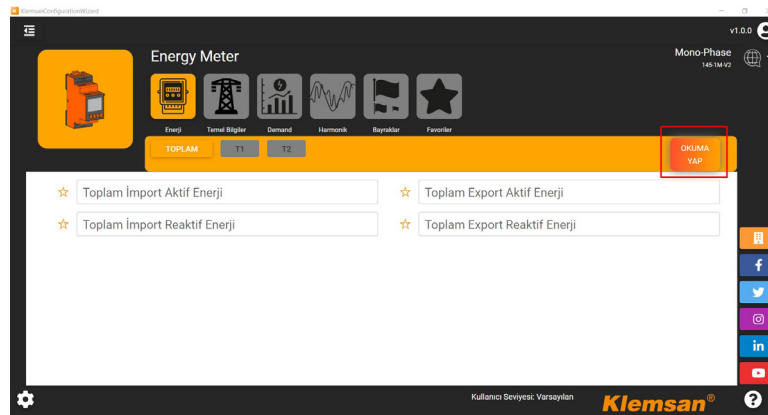
With the user interface program, devices are read and configured. You can find the Support document (KlemsanConfigurationWizard_Yardim) for the interface program here.

4.1 Read Operations


Device identification procedures should be carried out as mentioned in the document KlemsanConfigurationWizard_Yardim.

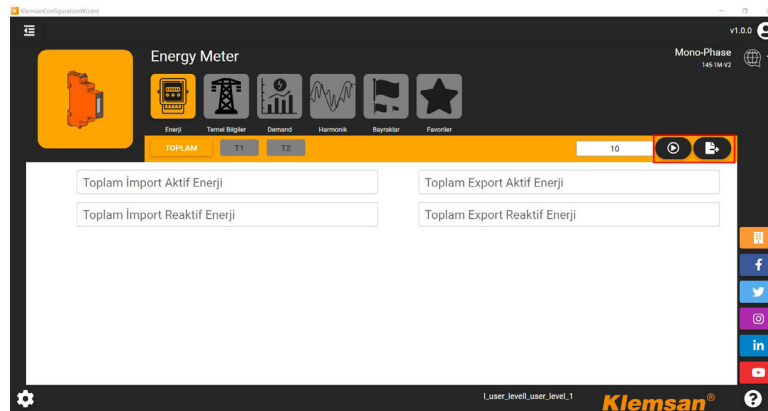
There are 2 different reading processes: "Manual Reading" and "Periodic Reading". After the desired reading type is selected, the device to be read must also be selected.



Manual Reading: All parameters in the selected device are read at the same time. For reading, click on the "Read" icon on the screen.



After clicking on the "Read" icon, all parameters that can be measured on the device are read. You can see the last reading time on the left side of the icon.

Periodic Reading: The data on the selected devices is read continuously in an adjustable period. The period time (sec) must be entered and then the start icon  must be clicked on for the data reading to be started.



The recorded data can be exported in scv format by clicking on the export icon  next to the period start  icon. A total of 1000 data records can be made. No data can be recorded after capacity is filled.

! In the periodic reading, only the data on that page is read. Reading must be restarted for each new page. If you leave the current page without exporting the data, the saved data will be deleted.

When periodic reading is performed, only the reading process of the current page is performed.

In Read Operations;

• **Energy**

Import and export energy data measured in the device are displayed.

• **Basic Info**

This is the screen where basic electrical parameters such as Current, Voltage, Frequency, and Power values are displayed.


• **Demand**

Current and power demand values are displayed.

• **Commands**

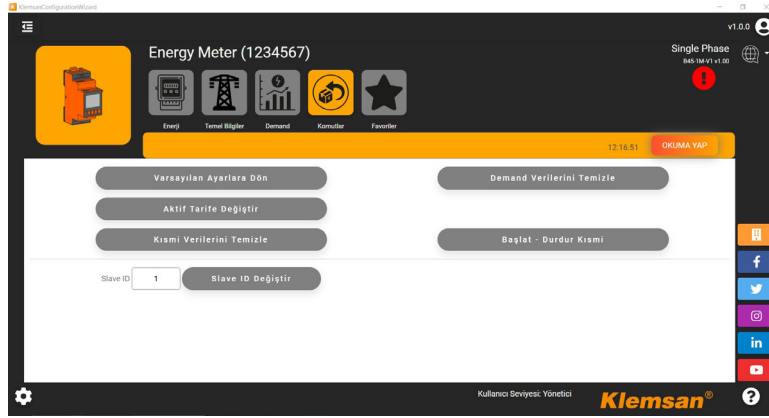
This is the page where the commands are sent to the device (For example, "Return to Default Settings").

• **Favorites**

This is the page where 10 parameters that are added to favorites for the user are displayed in tabs. In order to send the parameters that are selected to be read at the same time to the Favorites page, you must click on the favorites . A total of 10 parameters can be added to the "Favorites" tab.

! Adding parameters to the Favorites tab can only be done in the "Manual Reading" section.

! Operations such as "Slave ID" and "Active Tariff" change of the device can only be done from the "Commands" tab in the "Manual Reading" section.



4.2 Configuration Operations

Device configurations can be made under this tab. Configuration can be done in two different ways, online and offline. While the configurations made with the interface software can be written directly to the device, they can also be saved as a file. The saved configuration files can then be opened with the interface software and written to different devices.

All parameters in the opened configuration file are empty. The parameters to be configured can be changed via these parameters.

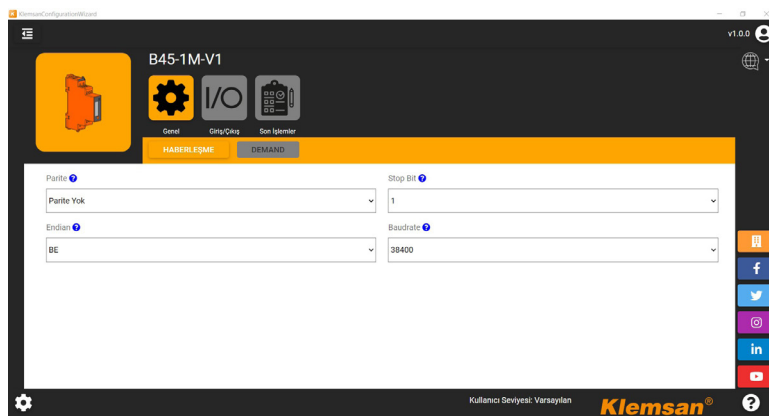
! Not all parameters have to be configured in the configuration file. When the related configuration file is requested to be written to the device, the parameters without any changes will not be written to the device.

! In order to save the same configuration file to different devices, the "Slave ID" setting is made from the "Commands" tab under the "Read Operations" heading.

For example, if the pulse settings of 10 devices are to be configured, only the parameters of the pulse settings should be filled and saved as a file. Then the saved file should be sent to all devices.

General

Under this tab, you can make the general settings of the device, communication and demand settings.



Input / Output

Output configuration is made for the 2nd Pulse in the device. The energy source to be output (Pulse 2 Source), the amount of energy to be counted for one pulse (Pulse 2 Energy and Pulse 2 Multiplier) and the pulse duration (Pulse 2 Duration) must be selected.

4 different selections can be made for "Pulse 2 Source". The source of the energy to be output should be selected here.

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

An integer from 1 to 9 must be entered for "Pulse 2 Energy". It is multiplied by the parameter selected from the "Pulse 2 Multiplier" section and it is determined how much energy will be counted for a pulse. The duration that the pulse will remain active is set with the "Pulse Time" parameter. For example,

Pulse 2 Source → Import Active Energy
 Pulse 2 Energy → 5
 Pulse 2 Multiplier → MUL10 (means it will be multiplied by 10)
 Pulse 2 Duration → 1000 (unit is milliseconds)

Assume that the parameters are selected as above.

The device will give 1 pulse for $5 \times 10 = 50$ Wh energy. The pulse will remain active for 1 second.



Once the configuration is complete, it can be saved as a new file, overwritten or sent to an existing device via the "Final Action" tab.



An incorrect statement entered in the configuration file is shown in the "Final Action" tab.

! Writing to the device can only be done with the "Administrator" user level.

The "Get from Device" tab should be used to configure a previously connected device and see configuration parameters.

The configuration for the connected devices using the "Get from Device" tab is the same as above, and after the desired revision, it can be saved as a new file through the "Final Action" tab, overwrite an existing file or send it to an existing device.

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SECTION 5
RS485
COMMUNICATION

MED series devices communicate using the "Modbus RTU" protocol, thanks to the optional RS485 interface on it. Supported functions are:

- Function 03H: This function reads the readable addresses in the Modbus table.
- Function 10H: This function writes the writable addresses in the Modbus table.

Item	Address	Variable	Type	Read / Write	Function	Description	Default
1	0	Voltage	float	r	03H		
2	2	Current	float	r	03H		
3	4	Active Power	float	r	03H		
4	6	Reactive Power	float	r	03H		
5	8	Apparent Power	float	r	03H		
6	10	Power Factor	float	r	03H		
7	12	Frequency	float	r	03H		
8	14	THDV	float	r	03H		
9	16	THDI	float	r	03H		
10	18	∅	float	r	03H		
11	300	Total Import Active Energy	double	r	03H		
12	304	T1 Import Active Energy	double	r	03H		
13	308	T2 Import Active Energy	double	r	03H		
14	312	Partial Import Active Energy	double	r	03H		
15	316	Total Export Active Energy	double	r	03H		
16	320	T1 Export Active Energy	double	r	03H		
17	324	T2 Export Active Energy	double	r	03H		
18	328	Partial Export Active Energy	double	r	03H		
19	332	Total Import Reactive Energy	double	r	03H		
20	336	T1 Import Reactive Energy	double	r	03H		
21	340	T2 Import Reactive Energy	double	r	03H		
22	344	Partial Import Reactive Energy	double	r	03H		
23	348	Total Export Reactive Energy	double	r	03H		
24	352	T1 Export Reactive Energy	double	r	03H		
25	356	T2 Export Reactive Energy	double	r	03H		
26	360	Partial Export Reactive Energy	double	r	03H		
27	500	Current Demand	float	r	03H		
28	502	Import Active Power Demand	float	r	03H		
29	504	Export Active Power Demand	float	r	03H		
30	506	Import Reactive Power Demand	float	r	03H		
31	508	Export Reactive Power Demand	float	r	03H		
32	510	Apparent Power Demand	float	r	03H		
33	512	Max. Current Demand	float	r	03H		
34	514	Max. Import Active Power Demand	float	r	03H		
35	516	Max. Export Active Power Demand	float	r	03H		
36	518	Max. Import Reactive Power Demand	float	r	03H		
37	520	Max. Export Reactive Power Demand	float	r	03H		
38	522	Max. Apparent Power Demand	float	r	03H		
39	700	Slave ID	uint32_t	r / w	03H / 10H	1-247	1

Item	Address	Variable	Type	Read / Write	Function	Description	Default
40	702	Baudrate	uint32_t	r / w	03H / 10H	0 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600 7 = 115200	5
41	704	Parity	uint32_t	r / w	03H / 10H	0 = None 1 = Tek 2 = Çift	0
42	706	Stopbit	uint32_t	r / w	03H / 10H	0 = Stop Bit 1 1 = Stop Bit 2	0
43	708	Endian	uint32_t	r / w	03H / 10H	0 = Big Endian 1 = Little Endian 2 = Big Endian Byte Swap 3 = Little Endian Byte Swap	1
44	710	Demand Method	uint32_t	r / w	03H / 10H	0 = Fixed 1 = Sliding 2 = Rolling	1
45	712	Demand Period	uint32_t	r / w	03H / 10H	1 - 60 sec.	15
46	714	Sub-interval	uint32_t	r / w	03H / 10H	1 - 60 sec.	1
47	716	Pals 1 Source	uint32_t	r	03H	1 = Import Aktif	1
48	718	Pals 1 Mod	uint32_t	r	03H	Energy	0
49	720	Pals 1 Energy	uint32_t	r	03H	1	1
50	722	Pals 1 Multiplier	uint32_t	r	03H	0 = 1 / 1000 1 = 1 / 100 2 = 1 / 10 3 = 1 4 = 10 5 = 100 6 = 1000	3
51	724	Pals 1 Duration	uint32_t	r	03H	100 msec.	100
52	726	Pals 2 Source	uint32_t	r / w*	03H / 10H	0 = Kapalı 1 = Import Aktif 2 = Export Aktif 3 = Import Reaktif 4 = Export Reaktif	3
53	728	Pals 2 Mod	uint32_t	r / w*	03H / 10H	Energy	0
54	730	Pals 2 Energy	uint32_t	r / w*	03H / 10H	1-9	1
55	732	Pals 2 Multiplier	uint32_t	r / w*	03H / 10H	0 = 1 / 1000 1 = 1 / 100 2 = 1 / 10 3 = 1 4 = 10 5 = 100 6 = 1000	3
56	734	Pals 2 Duration	uint32_t	r / w*	03H / 10H	50-2500 msec.	500

Address	Function	Type	Read / Write	Description
2000	6H	uint16_t	wo	Command Address
Value		Command		Description
100		Save configuration		
110		Return to defaults		
120		Restart		

Address	Function	Type	Read / Write	Description
3000	6H	uint16_t	wo	Command Address
Value		Command		Description
200		Reset Partial Energies		
210		Start / Stop Partial Energies		
220		Change Active Tariff		



In order to activate the writable addresses of the device, the password of the device must be entered at the addresses below. Otherwise, the device cannot be configured.

Item	Address	Variable	Type	Read / Write	Function
1	6000	Password 0-2	3 byte char	r/w	03H/10H
2	6002	Password 3-7	4 byte char	r/w	03H/10H

The default password of the device is 0000001. The ASCII equivalent of each character should be entered in hex at the relevant addresses. For example, for a device with a password of 1234567, a data entry should be made to the relevant registers as follows.

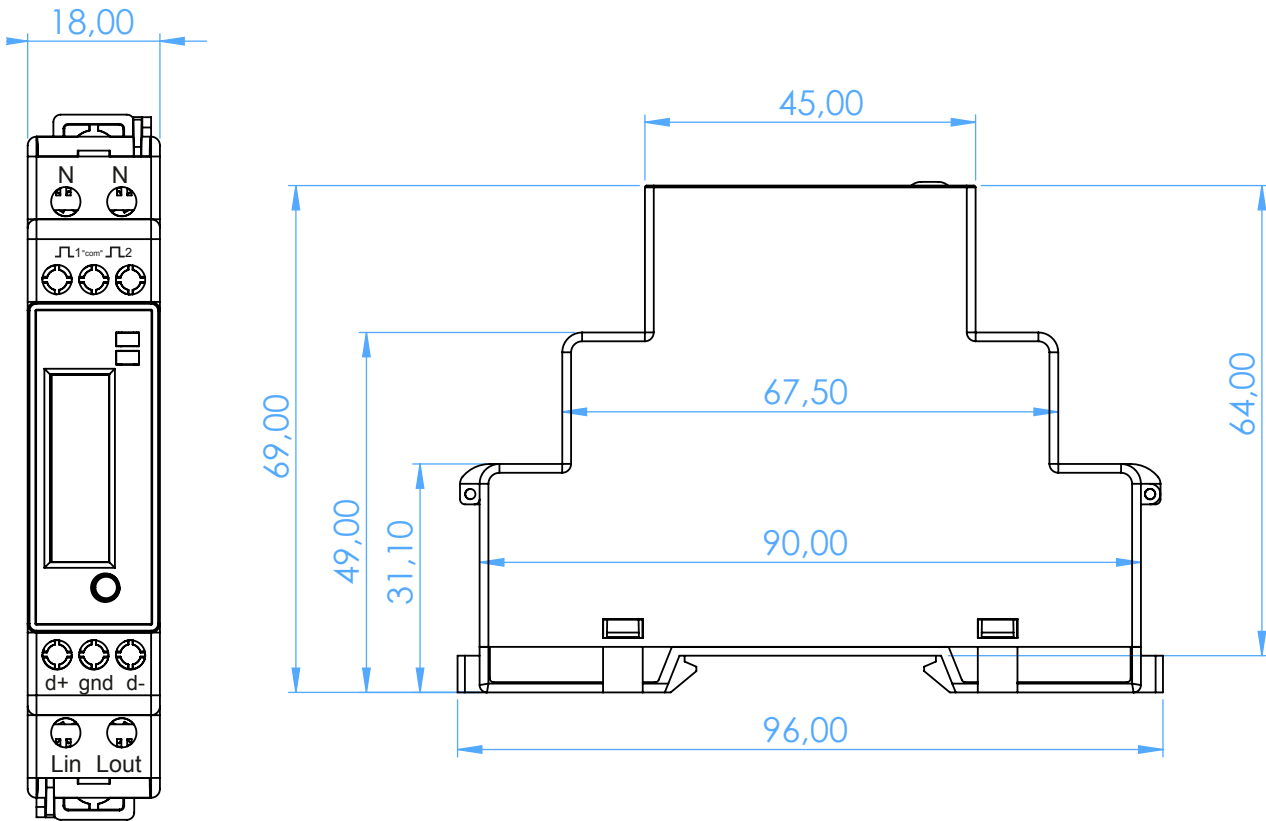
Item	Address	Variable
6000	0x0037	'NULL' '7'
6001	0x3635	6' '5'
6002	0x3433	5' '3'
6003	0x3231	2' '1'

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SECTION 6
TECHNICAL
SPECIFICATIONS

Technical Specifications	
General Specifications	
Supply Voltage	Over Measurement Inputs
Current Measurement	
Input Consumption	0.2VA
Starting Current (Ist)	20mA
Minimum Current (Imin)	0,25A
Transition Current (Itr)	0.5A
Reference Current (Iref)	5A
Maximum Current (Imax)	45A
Voltage Measurement	
Measuring Range	220-240 VAC / 100-120 VAC
Consumption	<3VA
Frequency	45-65 Hz
Energy Measurement	
Active Energy	Class C & Class B (EN 50470)
Reactive Energy	Class 2 (IEC 62053-23)
Resolution	1Wh & 1VArh
Power Consumption	
Power Consumption	2.12 VA & 0.86 WPulse Output
Pulse Output	
Type	Opto-isolated 5..27VDC
Switching Current	50mA
Isolation	5000Vrms optical isolation
Max. contact separation time	18µs
Max. contact engagement time	18µs
Screen	
Type	7-digit LCD with backlight
Refreshing time	1 sec.
Display Backlight activation time	Adjustable 10 - 600 sec.
Active Energy	00000.00 - 9999999 MWh
Reactive Energy	00000.00 - 9999999 MVarh
Communication	
Interface	RS485 2 wires/half duplex
Protocol	Modbus, RTU mode
Baudrate	1200 - 115200 Isolation 2500Vrms
Environmental Factors	
Operating temperature	-25°C to +55°C
Storage temperature	-25°C to +70°C
Humidity	<80% non condensing
Enclosure	
Dimensions WxHxD (mm)	18 x 96 x 64
Mounting	DIN Rail
Protection Class	Front IP51 – Casing IP20
Insulation Class	Class II

6.1 Dimensions



Seal



! Seal wire diameter should be 1.2mm maximum

Klemsan



Scan the QR code for all branches in Turkey and abroad.

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