Klemsan®

MED 2 Series
User Manual

klemsan.com.tr

SECTION 1

GENERAL INFORMATION

Klemsan MED2 series devices are MID-approved energy meters that measure and record the basic electrical parameters required for monitoring single-phase power lines.

The following parameters are optionally measured in the devices.

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

Device Model	C80-1M-V3CT	B80-1M-V2CT	C80-1M-V3	B80-1M-V2	B80-0M-O2	B80-0M-O2P	B80-0W-O1
Order Number	606363	606364	606365	606366	606367	606368	606369
Mounting	Rail Mount	Rail Mount	Rail Mount	Rail Mount	Rail Mount	Rail Mount	Rail Mount
Screen Type	Custom LCD	Custom LCD	Custom LCD	Custom LCD	Custom LCD	Custom LCD	Custom LCD
Measurement Quality (EN 50470)	Class C	Class B	Class C	Class B	Class B	Class B	Class B
Current Measurement	CT Connection	CT Connection	80 Amps Direct Connection	80 Amps Direct Connection	80 Amps Direct Connection	80 Amps Direct Connection	80 Amps Direct Connection
Measured Parameters	All Measurement*	All Measurement*	All Measurement*	All Measurement*	All Measurement*	All Measurement*	Only kWh
Demand Measurement	√	√	√	√	-	-	-
Partial Counter	√	√	√	√	-	√	-
Number of Tariffs	4	2	4	2	1	1	1
Pulse Output	2 (1 Fixed, 1 Adjustable)	2 (1 Fixed, 1 Adjustable)	2 (1 Fixed, 1 Adjustable)	2 (1 Fixed, 1 Adjustable)	2 (1 Fixed, 1 Adjustable)	2 (1 Fixed, 1 Adjustable)	1 (Fixed)
RS485 Communication	√	√	√	√	-	-	-

All measurements*: are measured with the parameters mentioned above.

- Support for direct connections of up to 80 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
- 4 tariff options
- Unauthorized-access protection with user password
- MID Approval
- Adjustable digital output for alarm and pulse output optionally
- LCD display (energy measurement, instant measurements and device information)
- Modbus RTU communication via RS485 interface
- Backlight on time setting
- Sealable enclosure

MED2 Series

SECTION 1

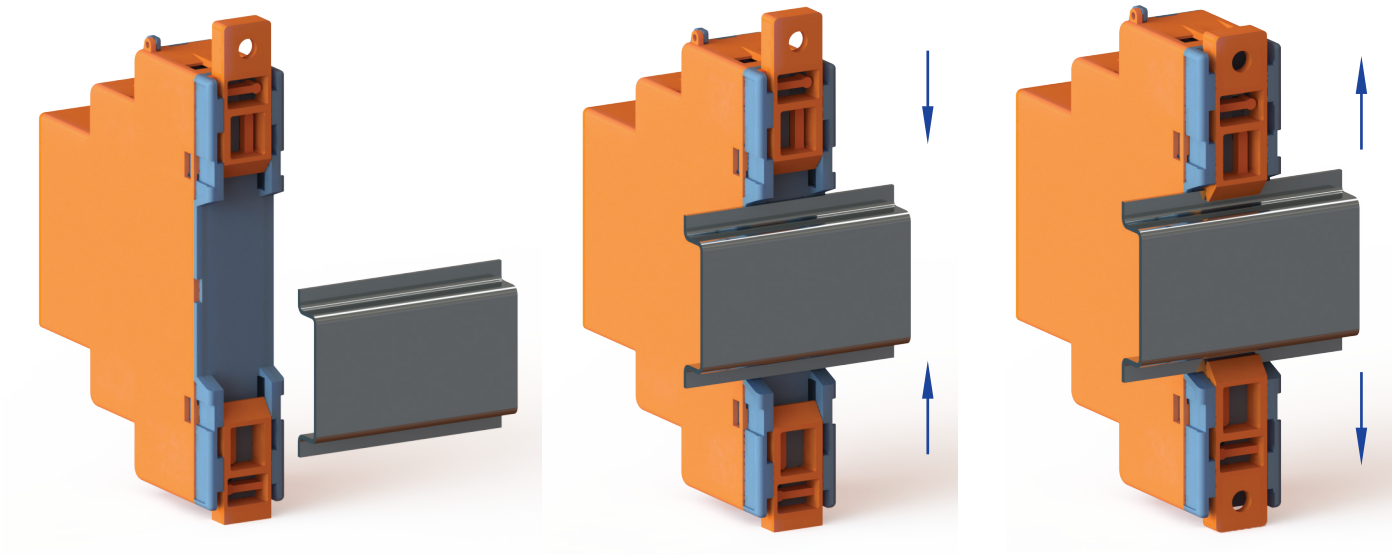
INSTALLATION

2.1 Preparation for Installation

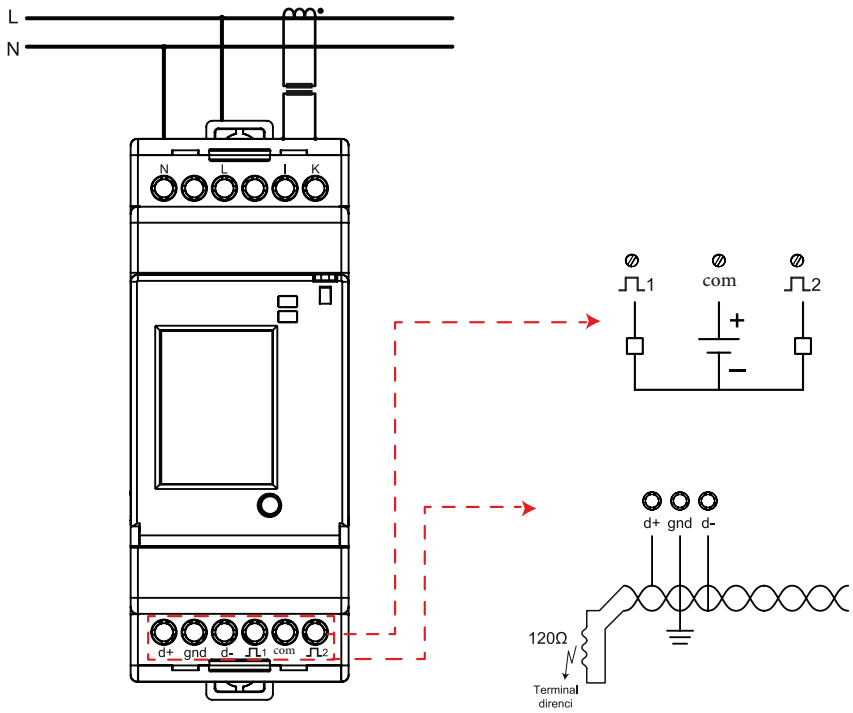
• Assembly and related connections of the product must be implemented by authorized persons in accordance with the instructions of the user manual. The device should not be operated without making the correct connections.
• Before connecting the device to the mains, make sure that the power is cut off.
• 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.

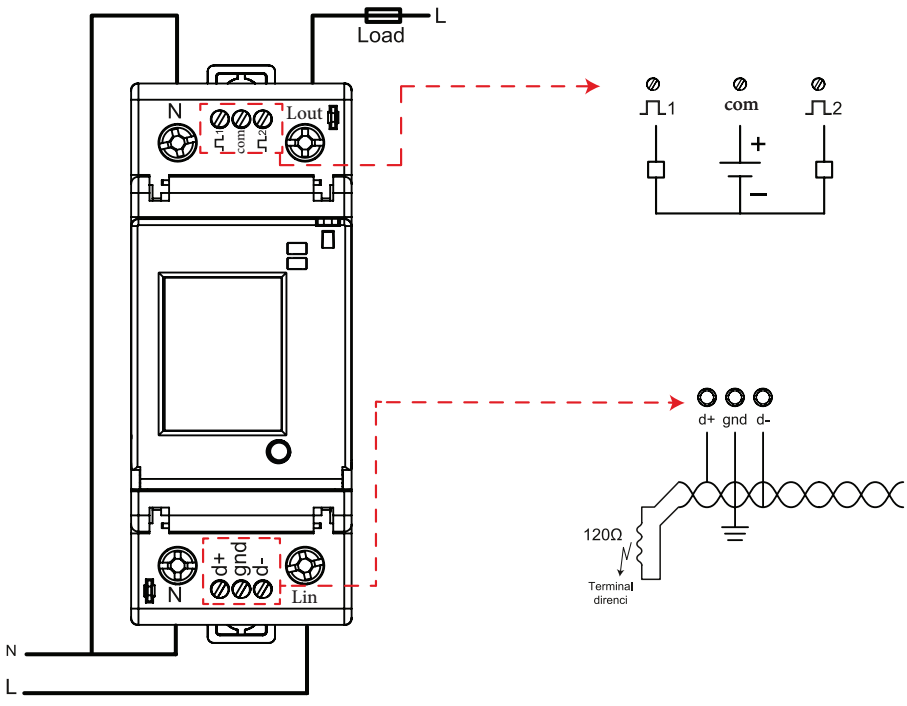
2.2 Mounting



2.3 Terminals and Wiring



The connection diagram above is for devices with transformer connection.



The connection diagram above is for devices with direct connection.

2.3.1 Products with Direct Connection

Lin: t 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.

2.3.2 Products with Transformer Connection

L input: Phase input of the AC voltage being measured.

N output: Neutral input of the AC voltage being measured.

k: Input connection of the AC current being measured.

l: Output connection of AC current being measured.

2.3.3 Common Connections

Pulse1 Output ⎍ : It is the output terminal of the DC voltage applied to the “-“ terminal when digital output 1. By default, the pulse 1 output gives 1000 impulses (1000 imp/kWh) for each measured kWh. Pulse duration is 100 ms.

Pulse2 Output ⎍ : t is the output terminal of the DC voltage applied to the “-“ terminal when digital output 2. By default, the pulse 2 output gives 1000 impulses (1000 imp/kWh) for each measured kWh. 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.

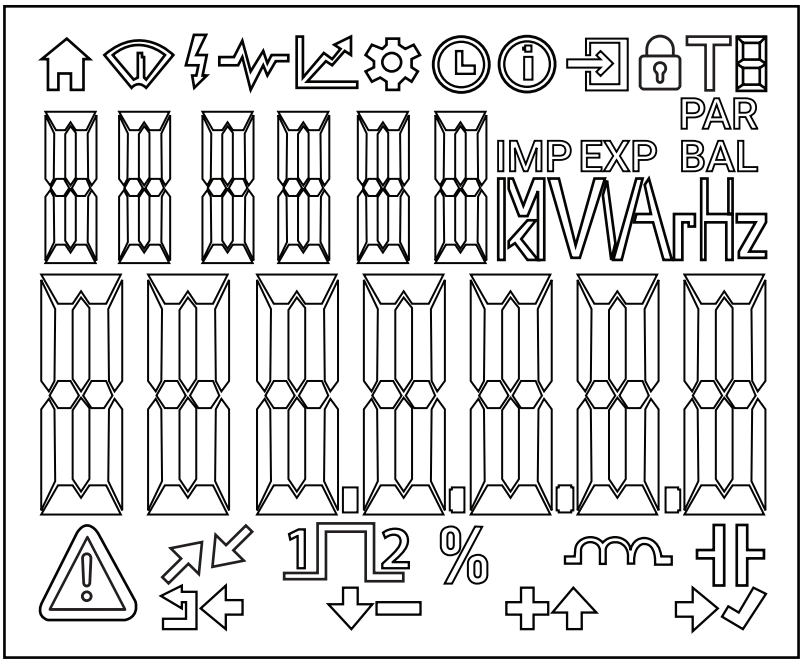
d-: It is the data- input of the RS-485 interface.

> ! The terminal descriptions are general and vary according to the models.

> ! After wiring and configurations are made, the terminals and cover must be sealed. The device has 2 sealable terminals and 1 sealable cover.

2.4 Icons and LED Notifications

The descriptions of the icons that appear on the device screen are shown below.



	Main Page Icon
	Measurement Page Icon
	Energy Page Icon
	Instant Values Page Icon
	Demand Page Icon
	Settings Page Icon
	Date-Time Page Icon
	Device Info Page Icon
	Input Page Icon
	Error and Warning Icon
	Communication Icons
	Pulse Icons
	Button Function Icons

! The icons on the screen are general and vary according to the devices.

SECTION 3

MENU

There are 5 main menus on the device.

3.1 Measurement

The following data is displayed under the Measurement tab.

MEASUREMENT (MEASURE)		
	Import Active Energy	Total
		T1
		T1-1
		T1-2
		T1-3
		T1-4
		T2
	Export Active Energy	Total
		T1
		T1-1
		T1-2
		T1-3
		T1-4
		T2
	Import Reactive Energy	Total
		T1
		T1-1
		T1-2
		T1-3
		T1-4
		T2
	Export Reactive Energy	Total
		T1
		T1-1
		T1-2
		T1-3
		T1-4
		T2
	Partial Counter	Import Active Energy
		Export Active Energy
		Import Reactive Energy
		Export Reactive Energy
		Start / Stop
		Reset

Energy Balance	Active Energy
	Reactive Energy
Runtime Values	Voltage
	Current
	Active Power
	Reactive Power
	Apparent Power
	PF
	Frequency
Demand	Current
	Import Active Power
	Export Active Power
	Import Reactive Power
	Export Reactive Power
	Apperant Power
Max Demand	Current
	Import Active Power
	Export Active Power
	Import Reactive Power
	Export Reactive Power
	Apperant Power

Import Active Energy

Under this tab, there is import active energy data measured in the device. According to the number of tariffs available in the device, the total and tariff values are displayed.

> ! The starting page of the devices is "Total Import Active Energy" as a MID requirement and cannot be changed. If no button is pressed on the device for 5 minutes, “Total Import Active Energy” will appear on the screen.

Export Active Energy

Under this tab there is the export active energy data measured in the device. According to the number of tariffs available in the device, the total and tariff values are displayed.

Import Reactive Energy

Under this tab, there is import reactive energy data measured in the device. According to the number of tariffs available in the device, the total and tariff values are displayed.

Export Reactive Energy

Under this tab, there is import reactive energy data measured in the device. According to the number of tariffs available in the device, the total and tariff values are displayed.

Partial Counter

Partial counters are energy meters that can be started, stopped and reset at any time by the users. It is used to see the energy consumption/generation in the desired time range. It can be started with the "Start" command on the menu, then stopped with the "Stop" command. If a stopped counter is restarted, it will continue to be counted. When the partial counter wants to be reset, the "Reset" command is used.

Energy Balance

It shows the difference between the absolute values of the energy consumed and the generated energy.

	Formula
Active Energy Balance	|(Total Import Active Energy)| - |(Total Export Active Energy)|
Reactive Energy Balance	|(Total Import Reactive Energy)| - |(Total Export Reactive Energy)|

Runtime Values

This tab shows the instant values of the following parameters.

- Voltage
- Current
- Active power
- Reactive power
- Apparent power
- Power Factor
- Frequency

Demand

The previous demand values of the current, import active power, export active power, import reactive power, export reactive power and apparent power are displayed in this tab.

Maksimum Demand

The maximum demand values of the current, import active power, export active power, import reactive power, export reactive power and apparent power are displayed in this tab.

> ! The menu features mentioned above are general and vary according to the device models.

3.2 Settings

SETTINGS (SET)	Serial Communication	Slave ID	1 .. 247
		Baudrate	1200 2400 4800 9600 19200 38400 57600 115200
		Parity	None Odd Even
		Stop Bit	1 2
		Data Type	Big Endian (BE) Little Endian (LE) Big Endian Byte Swap (BE SWAP) Little Endian Byte Swap (LE SWAP)
	Demand (DEMAND)	Method	Slide Rolling Fixed
		Period	1 .. 60 mins
		Sub-interval	1 .. 60 mins
	Pulse	Source	Import Active Energy Export Active Energy Import Reactive Energy Export Reactive Energy
		Energy	1 .. 9
		Multiplier	1 10 (MUL10) 100 (MUL100) 1000 (MUL1000) 1/1000 (DIV1000) 1/100 (DIV100) 1/10 (DIV10)
		Duration	30 .. 2500 msec
	Device Settings	Language	Türkçe English
		Backlight	On Off Time Dependent
		Time	10 .. 60 sec
	Date and Time	Year	00 .. 99
		Month	1 .. 12
		Day	1 .. 31
		Hour	00 .. 23

		Minute	00 .. 59
		Second	00 .. 59
	Network	CT Primary	Unchangeable
		CT Secondary	Unchangeable
		VT Primary	Unchangeable
		VT Secondary	Unchangeable
	Security	Protection	On Off
		Password	0000000 .. 9999999
	Clear	Settings	
		Partial Counter	
		Demand	
		All	

! The tariff configuration in devices is done via communication and explained under the title of “Tariff Configuration”.

Serial Communication Settings

The devices have an optional RS485 serial communication interface. “Slave ID”, “Baudrate”, “Parity”, “Stop Bit” and “Data Type” settings of devices with this interface are made under this tab.

The default values are as follows.

- Slave ID:1
- Baudrate:38400
- Parity: None
- Stop Bit: 1
- Data Type: Big-Endian (BE)

Demand Settings

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

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 adjusted lower time intervals. If the demand calculation method is selected as Rolling, “Sub-interval” should also be determined. The sub-interval must be equally divisible by the period. If a non-divisible sub-interval is set to the period, the sub-interval value is calculated as 1 minute. The device updates the demand value at the end of the time interval.

The default values are as follows
- Method: Sliding
- Period: 15 min.
- Sub-interval: 1 min. (It is unimportant in demand calculation because its method is “Sliding”)

Pulse Settings

Pulse outputs are used to get output according to the counted energy value. There are optionally 2 pulse outputs in the devices.

In the devices, the 1st pulse output is fixed and gives 1 (1000imp / kWh) pulse for every 1Wh. The duration of the pulse is fixed and is 100 ms.

The 2nd pulse output, which is optionally available in the devices, is adjustable, and the energy source to be pulsed, the amount of energy to be counted for one pulse and the pulse duration must be entered.

4 different selections can be made for “source”. The source of the pulse 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 “Energy”. It is multiplied by the parameter selected from the “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 “Time” parameter. For example,
Pulse 2 Source → Import Active Energy
Pulse 2 Energ →5
Pulse 2 Multiplier →MUL10 (means it will be multiplied by 10.)
Pulse 2 Time →1000 (its unit is milliseconds.)

Suppose the parameters are selected as above.
The device will give 1 pulse for 5x10= 50 Wh energy. The pulse will remain active for 1 second.

Device Settings

Under this tab, the language and backlight status of the device are set. The device has 2 different language settings, Turkish and English. The backlight, on the other hand, can be adjusted in 3 different options: on (on), off (off) and time dependent. If it is selected as a time dependent, how long it will remain active (Time) should be selected.

Date&Time

It is the date and time setting section of the device. The 6 different parameters must be entered separately:

• Year
• Month
• Day
• Hour
• Minute
• Second

Network Settings

There are 2 different options in the devices direct connection and current transformer connection. As MID requirements in products with current transformer connection, CT and VT settings are made when the device is energized for the first time. Changes cannot be made afterward.

When the products with current transformers are first energized, respectively;

• CT Primary
• CT Secondary
• VT Primary
• VT Secondary
değerleri girilmelidir.

After entering the value for each parameter, confirmation is requested from the user.

After entering all 4 parameters, CT and VT ratios are shown on the screen 2 times and then confirmation is requested. After the confirmation, the “Total Import Active Energy” page, which is the product starting page, appears.
If no confirmation is given, the values can be re-entered.

! CT and VT parameters are shown on the screen but, these parameters are not changeable.

Security Settings

Password protection is set on the device under this tab.

The default values are as follows:

Protection: Off
Password: 0000001

Clear

4 different parameters can be cleared under this tab.

Setting: Used to return to factory settings.

Partial: As it can be reseted from the Measurements tab, the partial energy counter can also be reseted under this menu.

Demand: Demand data is cleared under this tab.

All: Used for all parameters mentioned above.

3.3 Date&Time

The devices with a real time clock (RTC) have this menu. The date and time settings of the device are displayed under this menu..

3.4 Info

The information about the device is shown under this tab.

Device Info (INFO)	Order Number
	Serial Number
	Firmware Number
	Hardware Version
	Modbus Version

Order Number
The order number for the device is displayed.

Serial Number
The serial number of the device is displayed.

Firmware Version
The firmware version of the device is displayed.

Hardware Version
The hardware version of the device is displayed.

Modbus Version
The Modbus version of the device is displayed.

3.5 Login

This is the section where the password is entered. When the password is entered successfully, the text “SUCCESS” appears on the screen.

SECTION 4

TARIFF CONFIGURATION

Tariff and sub-tariff configurations in devices are made via communication.

There are 2 tariffs as T1 and T2 as an option, and there are 4 sub-tariffs as T1-1, T1-2, T1-3 and T1-4 under the T1 tariff as optional.

> ! The values calculated under the T1 tariff are the sum of the T1-1, T1-2, T1-3 and T1-4 tariffs.

If we give an example over Import Active Energy;
Suppose that

T1-1 = 10 kWh
T1-2 = 15 kWh
T1-3 = 20 kWh
T1-4 = 25 kWh.
Then the value that will appear in the T1 tariff will be 70 kWh.

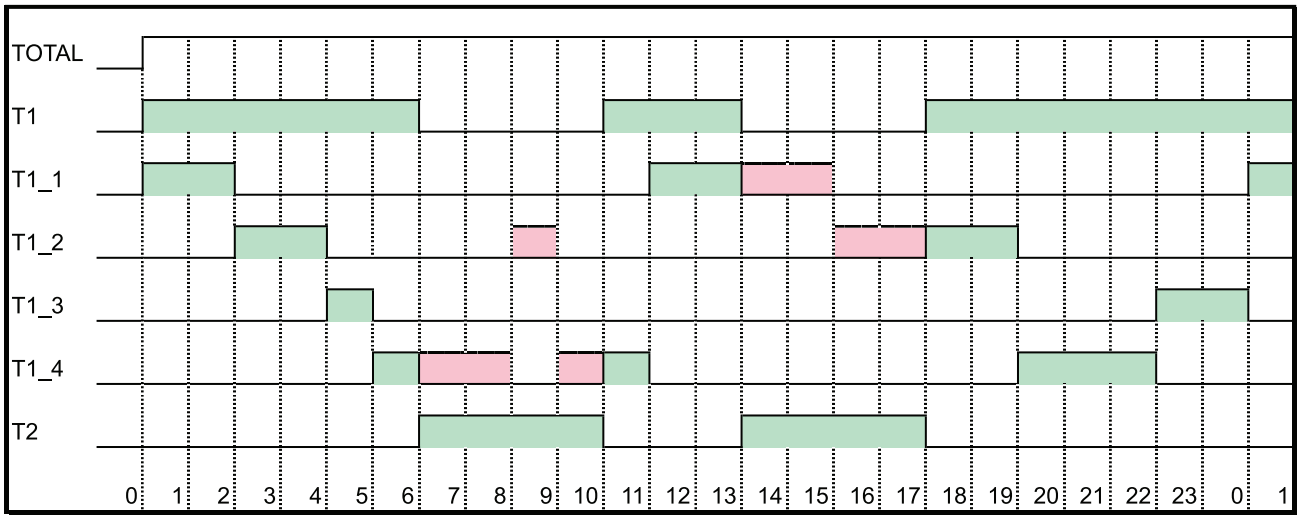
In order to change the tariff counted by the device (from T1 to T2 or vice versa), the change active tariff command must be sent via communication.

For 4-tariff products, sub-tariff changes can be made with 10 different settings depending on time. According to these 10 different settings, which tariff is set in which time zone, the counter of the newly adjusted tariff will be active from that time on. For example, if the following settings are made:

While the configuration and reading operations of the devices can be done via the device, the reading and configuration processes of the devices with RS485 communication interface are also performed via the user interface program “Klemsan Configuration Wizard” and/or various Modbus test interfaces.

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 tariffs will be as in the table below. In the table painted in red, T1 tariffs are active over time, but where there is a T2 tariff, T1 tariffs will not be active. In cases painted with green, the corresponding T1 tariffs are counted.



SECTION 5

RS485 COMMUNICATION

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

You can find the support document (KlemsanConfigurationWizard_Yardım) for the interface program here.

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.

The Modbus tables below are for the **C80-1M-V3CT** and **C80-1M-V3**.

Item	Address	Variable	Type	Read / Write	Function	Description	Default
1	0	Voltage	float	r	03H	V	
2	2	Current	float	r	03H	A	
3	4	Active Power	float	r	03H	W	
4	6	Reactive Power	float	r	03H	VAr	
5	8	Apparent Power	float	r	03H	VA	
6	10	Power Factor	float	r	03H		
7	12	Frequency	float	r	03H	Hz	
8	14	THDV	float	r	03H	%	
9	16	THDI	float	r	03H	%	
10	18	Ø	float	r	03H		
11	300	Total Import Active Energy	double	r	03H	Wh	
12	304	T1 Import Active Energy	double	r	03H	Wh	
13	308	T1-1 Import Active Energy	double	r	03H	Wh	
14	312	T1-2 Import Active Energy	double	r	03H	Wh	
15	316	T1-3 Import Active Energy	double	r	03H	Wh	
16	320	T1-4 Import Active Energy	double	r	03H	Wh	
17	324	T2 Import Active Energy	double	r	03H	Wh	
18	328	Partial Import Active Energy	double	r	03H	Wh	
19	332	Total Export Active Energy	double	r	03H	Wh	
20	336	T1 Export Active Energy	double	r	03H	Wh	
21	340	T1-1 Export Active Energy	double	r	03H	Wh	
22	344	T1-2 Export Active Energy	double	r	03H	Wh	
23	348	T1-3 Export Active Energy	double	r	03H	Wh	
24	352	T1-4 Export Active Energy	double	r	03H	Wh	
25	356	T2 Export Active Energy	double	r	03H	Wh	
26	360	Partial Export Active Energy	double	r	03H	Wh	
27	364	Total Import Reactive Energy	double	r	03H	VArh	
28	368	T1 Import Reactive Energy	double	r	03H	VArh	
29	372	T1-1 Import Reactive Energy	double	r	03H	VArh	
30	376	T1-2 Import Reactive Energy	double	r	03H	VArh	
31	380	T1-3 Import Reactive Energy	double	r	03H	VArh	
32	384	T1-4 Import Reactive Energy	double	r	03H	VArh	
33	388	T2 Import Reactive Energy	double	r	03H	VArh	
34	392	Partial Import Reactive Energy	double	r	03H	VArh	
35	396	Total Export Reactive Energy	double	r	03H	VArh	
36	400	T1 Export Reactive Energy	double	r	03H	VArh	
37	404	T1-1 Export Reactive Energy	double	r	03H	VArh	
38	408	T1-2 Export Reactive Energy	double	r	03H	VArh	
39	412	T1-3 Export Reactive Energy	double	r	03H	VArh	
40	416	T1-4 Export Reactive Energy	double	r	03H	VArh	
41	420	T2 Export Reactive Energy	double	r	03H	VArh	
42	424	Partial Export Reactive Energy	double	r	03H	VArh	
43	428	Balance Active Energy	double	r	03H	Wh	
44	432	Balance Reactive Energy	double	r	03H	Wh	
45	500	Current Demand	float	r	03H	A	
46	502	Import Active Power Demand	float	r	03H	W	
47	504	Export Active Power Demand	float	r	03H	W	

Item	Address	Variable	Type	Read / Write	Function	Description	Default
48	506	Import Reactive Power Demand	float	r	03H	VAr	
49	508	Export Reactive Power Demand	float	r	03H	VAr	
50	510	Apparent Power Demand	float	r	03H	VA	
51	512	Max. Current Demand float	float	r	03H	A	
52	514	Max. Import Active Power Demand	float	r	03H	W	
53	516	Max. Export Active Power Demand	float	r	03H	W	
54	518	Max. Import Reactive Power Demand	float	r	03H	VAr	
55	520	Max. Export Reactive Power Demand	float	r	03H	VAr	
56	522	Max. Apparent Power Demand	float	r	03H	VA	
57	600	Day	uint32_t	r / w	03H / 10H	01-31	
58	602	Month	uint32_t	r / w	03H / 10H	01-12	
59	604	Year	uint32_t	r / w	03H / 10H	00-99	
60	606	Hour	uint32_t	r / w	03H / 10H	00-23	
61	608	Minute	uint32_t	r / w	03H / 10H	00-59	
62	610	Second	uint32_t	r / w	03H / 10H	00-59	
63	700	Slave ID	uint32_t	r / w	03H / 10H	1-247	1
64	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
65	704	Parity	uint32_t	r / w	03H / 10H	0 = None 1 = Odd 2 = Even	0
66	706	Stopbit	uint32_t	r / w	03H / 10H	0 = Stop Bit 1 1 = Stop Bit 2	0
67	708	Endian	uint32_t	r / w	03H / 10H 03H / 10H	0 = Big Endian 1 = Little Endian 2 = Big Endian Byte Swap 3 = Little Endian Byte Swap	0
68	710	Demand Method	uint32_t	r / w	03H / 10H	0 = Fixed 1 = Sliding 2 = Rolling	1
69	712	Demand Period	uint32_t	r / w	03H / 10H	1 - 60 sec.	15
70	714	Sub Interval	uint32_t	r / w	03H / 10H	1 - 60 sec.	1
71	716	Pals 1 Source	uint32_t	r	03H	1 = Import Active	1
72	718	Pals 1 Mode	uint32_t	r	03H	0 = Energy	0
73	720	Pals 1 Energy	uint32_t	r	03H	1	1
74	722	Pals 1 Multiplier	uint32_t	r	03H	3 = 1	3
75	724	Pals 1 Duration	uint32_t	r	03H	100 msec.	100
76	726	Pals 2 Source	uint32_t	r / w*	03H / 10H	0 = Off 1 = Import Active 2 = Export Active 3 = Import Reactive 4 = Export Reactive	3
77	728	Pals 2 Mode	uint32_t	r / w*	03H / 10H	0 = Energy	0
78	730	Pals 2 Energy	uint32_t	r / w*	03H / 10H	1-9	1
79	732	Pals 2 Çarpanı	uint32_t	r / w*		0 = 1 / 1000 1 = 1 / 100 2 = 1 / 10 3 = 1 4 = 10 5 = 100 6 = 1000	3

Item	Address	Variable	Type	Read / Write	Function	Description	Default
80	734	Pals 2 Duration	uint32_t	r / w*	03H / 10H	50-2500 msec.	100
81	824	CT Primary	float	r	03H	5.0 - 9999.0	5
82	826	CT Secondary	uint32_t	r	03H	0 = 1 1 = 5	1
83	828	VT Primary	float	r	03H	100.0 - 1000000.0	100
84	830	VT Secondary	float	r	03H	100.0 - 500.0	100
85	836	Tariff Config 1	uint32_t	r / w	03H / 10H	1= T1-1 2= T1-2 3= T1-3 4= T1-4	1
86	838	Hour 1	uint32_t	r / w	03H / 10H	00-24	0
87	840	Minute 1	uint32_t	r / w	03H / 10H	00-59	0
88	842	Tariff Config 2	uint32_t	r / w	03H / 10H	1= T1-1 2= T1-2 3= T1-3 4= T1-4	0
89	844	Hour 2	uint32_t	r / w	03H / 10H	00-24	0
90	846	Minute 2	uint32_t	r / w	03H / 10H	00-59	0
91	848	Tariff Config 3	uint32_t	r / w	03H / 10H	1= T1-1 2= T1-2 3= T1-3 4= T1-4	0
92	850	Hour 3	uint32_t	r / w	03H / 10H	00-24	0
93	852	Minute 3	uint32_t	r / w	03H / 10H	00-59	0
94	854	Tariff Config 4	uint32_t	r / w	03H / 10H	1= T1-1 2= T1-2 3= T1-3 4= T1-4	0
95	856	Hour 4	uint32_t	r / w	03H / 10H	00-24	0
96	858	Minute 4	uint32_t	r / w	03H / 10H	00-59	0
97	860	Tariff Config 5	uint32_t	r / w	03H / 10H	1= T1-1 2= T1-2 3= T1-3 4= T1-4	0
98	862	Hour 5	uint32_t	r / w	03H / 10H		0
99	864	Minute 5	uint32_t	r / w	03H / 10H		0
100	866	Tariff Config 6	uint32_t	r / w	03H / 10H	1= T1-1 2= T1-2 3= T1-3 4= T1-4	0
101	868	Hour 6	uint32_t	r / w	03H / 10H	00-24	0
102	870	Minute 6		r / w	03H / 10H	00-59	0
103	872	Tariff Config 7	uint32_t	r / w	03H / 10H	1= T1-1 2= T1-2 3= T1-3 4= T1-4	0
104	874	Hour 7	uint32_t	r / w	03H / 10H	00-24	0
105	876	Minute 7	uint32_t	r / w	03H / 10H	00-59	0
106	878	Tariff Config 8	uint32_t	r / w	03H / 10H	1= T1-1 2= T1-2 3= T1-3 4= T1-4	0
107	880	Hour 8	uint32_t	r / w	03H / 10H	00-24	0

Item	Address	Variable	Type	Read / Write	Function	Description	Default
108	882	Minute 8	uint32_t	r / w	03H / 10H	00-59	0
109	884	Tariff Config 9	uint32_t	r / w	03H / 10H	1= T1-1 2= T1-2 3= T1-3 4= T1-4	1
110	886	Hour 9	uint32_t	r / w	03H / 10H	00-24	0
111	888	Minute 9	uint32_t	r / w	03H / 10H	00-59	0
112	890	Tariff Config 10	uint32_t	r / w	03H / 10H	1= T1-1 2= T1-2 3= T1-3 4= T1-4	1
113	892	Hour 10	uint32_t	r / w	03H / 10H	00-24	0
114	894	Minute 10	uint32_t	r / w	03H / 10H	00-59	0

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 Counter		
210		Start/Stop Partial Counter		
220		Change Active Tariff		

! In order to activate the writable addresses of the device, the device's password must be entered into the following addresses. Otherwise, the device cannot be configured.

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

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

The Modbus tables below are for the **B80-1M-V2CT** and **B80-1M-V2**.

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	Ø	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	364	Balance Active Energy	double	r	03H		
28	368	Balance Reactive Energy	double	r	03H		
29	500	Current Demand	float	r	03H		
30	502	Import Active Power Demand	float	r	03H		
31	504	Export Active Power Demand	float	r	03H		
32	506	Import Reactive Power Demand	float	r	03H		
33	508	Export Reactive Power Demand	float	r	03H		
34	510	Apparent Power Demand	float	r	03H		
35	512	Max. Current Demand float	float	r	03H		
36	514	Max. Import Active Power Demand	float	r	03H		
37	516	Max. Export Active Power Demand	float	r	03H		
38	518	Max. Import Reactive Power Demand	float	r	03H		
39	520	Max. Export Reactive Power Demand	float	r	03H		
40	522	Max. Apparent Power Demand	float	r	03H		
41	700	Slave ID	uint32_t	r / w	03H / 10H	1-247	1
42	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
43	704	Parity	uint32_t	r / w	03H / 10H	0 = None 1 = Tek 2 = Çift	0

Sayı	Adres	Parametre	Veri Tipi	Okuma / Yazma	Fonksiyon	Açıklama	Varsayılan
44	706	Stopbit	uint32_t	r / w	03H / 10H	0 = Stop Bit 1 1 = Stop Bit 2	0
45	708	Endian	uint32_t	r / w	03H / 10H	0 = Big Endian 1 = Little Endian 2 = Big Endian Byte Swap 3 = Little Endian Byte Swap	0
46	710	Demand Metod	uint32_t	r / w	03H / 10H	0 = Fixed 1 = Sliding 2 = Rolling	1
47	712	Demand Period	uint32_t	r / w	03H / 10H	1 - 60 sec.	15
48	714	Sub Interval	uint32_t	r / w	03H / 10H	1 - 60 sec.	1
49	716	Pals 1 Source	uint32_t	r	03H	1 = Import Aktif	1
50	718	Pals 1 Mode	uint32_t	r	03H	0 = Energy	0
51	720	Pals 1 Energy	uint32_t	r	03H	1	1
52	722	Pals 1 Multiplier	uint32_t	r	03H	3 = 1	3
53	724	Pals 1 Duration	uint32_t	r	03H	100 msec.	100
54	726	Pals 2 Source	uint32_t	r / w	03H / 10H	0 = Off 1 = Import Active 2 = Export Active 3 = Import Reactive 4 = Export Reactive	3
55	728	Pals 2 Mode	uint32_t	r / w*	03H / 10H	0 = Energy	0
56	730	Pals 2 Energy	uint32_t	r / w*	03H / 10H	1-9	1
57	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
58	734	Pals 2 Duration	uint32_t	r / w*	03H / 10H	50-2500 msec.	100
59	824	CT Primer	uint32_t	r	03H	5.0 - 9999.0	5
60	826	CT Sekonder	uint32_t	r	03H	0 = 1 1 = 5	1
61	828	VT Primer	uint32_t	r	03H	100.0 - 1000000.0	100
62	830	VT Sekonder	uint32_t	r	03H	100.0 - 500.0	100

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 Counter		
210		Start/Stop Partial Counter		
220		Change Active Tariff		

! In order to activate the writable addresses of the device, the device's password must be entered into the following addresses. 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 for the device is 0000001. The ASCII equivalent of each character must be entered in the relevant addresses as hex. For example, for a device with a password 1234567, a data entry should be made to the relevant registers as follows.

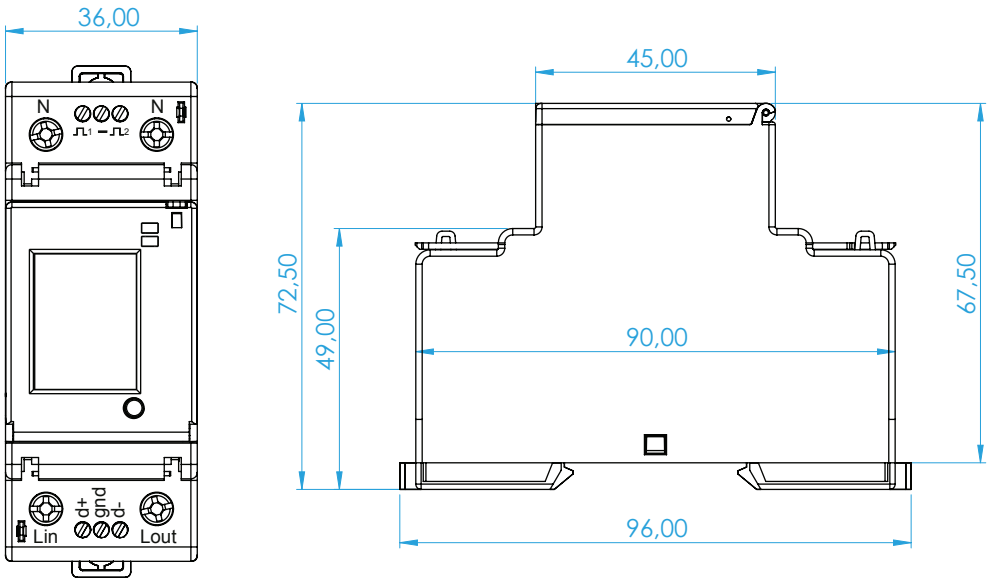
Address	Value (hex)	Value (dec)
6000	0x0037	'NULL' '7'
6001	0x3635	6' '5'
6002	0x3433	5' '3'
6003	0x3231	2' '1'

SECTION 6

TECHNICAL SPECIFICATIONS

Technical Specifications	
General Specifications	
Supply Voltage (Direct Connection)	Over Measurement Inputs
Supply Voltage(CT Connection)	85 - 300 VAC/DC
Power Consumption (Direct Connection)	<2VA
Power Consumption (CT Connection)	0.97 VA & 0.47 W
Current Measurement (Direct Connection)	
Input Consumption	0.2VA
Starting Current (Ist)	20mA
Minimum Current (Imin)	0,25A (0,15A for Class C)
Transition Current (Itr)	0.5A
Reference Current (Iref)	5A
Maximum Current (Imax)	80A
Current Measurement (Direct Connection)	
Input Consumption	0.2VA
Starting Current (Ist)	10mA
Minimum Current (Imin)	0,05A
Transition Current (Itr)	0.25A
Reference Current (Iref)	5A
Maximum Current (Imax)	6A
Voltage Measurement	
Measuring Range	220-240 VAC / 100-120 VAC
Consumption	<3VA
Frequency	
Frequency	45-65 Hz
Energy Measurement	
Active Energy	Class C & Class B (EN 50470)
Reactive Energy	Class 2 (IEC 62053-23
Resolution	1Wh & 1VArh
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	Ayarlanabilir 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
Isolation	2500Vrms
Environmental Factors	
Operating temperature	-25°C to +55°C
Storage temperature	-25°C to +70°C
Humidity	<80% non condensing
Mounting	Internal (box/cabinet)
Enclosure	
Dimensions WxHxD (mm)	18 x 96 x 67,5
Mounting	DIN rail
Protection Class	Front IP51 - Casing IP20
Insulation Class	Class II

6.1 Dimensions



! Seal wire diameter should be 1.2mm maximum.

Klemsan

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