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USER MANUAL

communication module MK-ETH-1

22 Jan. 2020

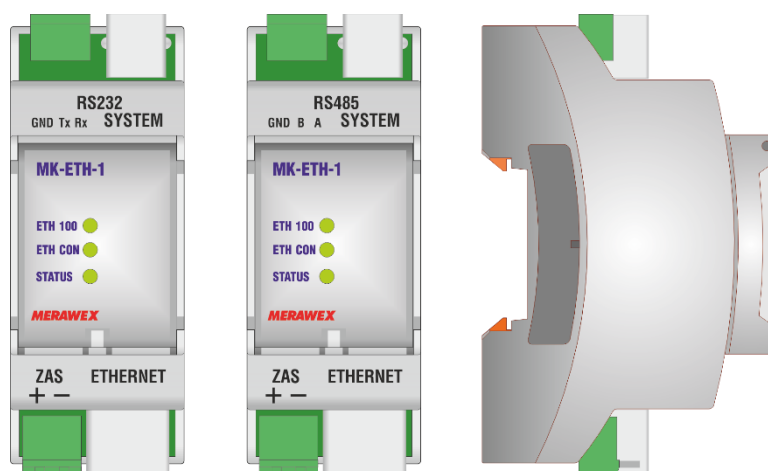
1. Application	2
2. Technical information	2
3. Connection	3
4. Module configuration.....	3
5. WWW interface.....	4
6. SNMP Interface	9
7. Module software update	12
8. Signalization.....	13
Appendix A - Connection cables.....	13

1. Application

The MK-ETH-1 module is dedicated for cooperation with the MERAWEX devices such as:

- Telecom power systems 3U, the SI48 and SI24 Series
- Telecom power systems 1U of the SI48-1U Series
- ZM power supplies of AC, AZC, PZC types
- ZSP135DR Series power supplies
- ZSP100/ZSP121 Series power supplies

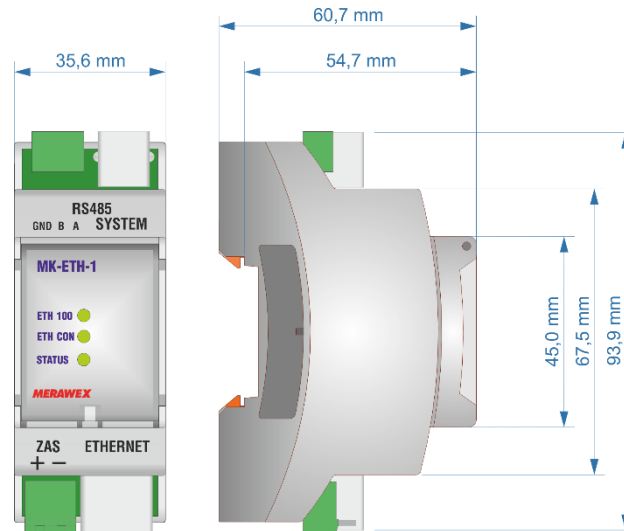
The function of the module is to enable access to devices via TCP/IP based computer networks. From the side of the monitored device, the RS232 or RS485 interface is used depending on the version. The basic information about a device status is available from the level of the web browser and the SNMP protocol agent. In addition, the module offers access from the ModbusTCP protocol. The module is designed for mounting on a TS-35 rail.



2. Technical information

Electrical and mechanical parameters

Name	Value
The range of power voltage through ZAS connector	10...65V
Max. power consumption	1.5W
Working temperature range	-40...55°C
Dimensions (W×H×D) – without plugs in sockets	35.6×93.9×60.7
Protection degree EN 60529:2003	IP20
Electrical insulation strength: <ul style="list-style-type: none"> • between the power circuit and the RS232 or RS485 circuit • between the power circuit and the ETH communication connector • between the ETH communication connector and the RS232 or RS485 circuit 	710V _{DC} 710V _{DC} 710V _{DC}



3. Connection

Connector	Output No.	Signal *1)	View of connector	Required plug Required cable	Function
RS232 RS485 SYSTEM	5	GND		RJ12-6/6	Device connection
	3	TxD/B			
	4	RxD/A		MC 1.5/2-ST-3.81 PHOENIX 2 × min 0.5mm ²	
	1	RxD/A			
	2	TxD/B			
	3	GND			
ZAS	1	+ of mains		MSTB 2.5/2-ST-5.08 PHOENIX 2× min 0.5mm ²	Module powering
	2	- of mains			
ETHERNET	1	RX+		RJ45-8/8 connection with: HUB: crossed PC: straight	Ethernet Connection
	2	RX-			
	3	TX+			
	4	NC			
	5	NC			
	6	TX-			
	7	NC			
	8	NC			

Description of module connectors

*1) Depending on a type of module, the RxD, TxD and GND signals for RS232 or A, B, GND signals for RS485 are available on the connector.

4. Module configuration

Configuration takes place via the web interface by using a web browser. The configuration includes:

- TCP/IP network interface settings
- Indication of a device type to which the module will be connected
- SNMP agent settings
- Password setting for the module (optionally)
- Configuration of the ModbusTCP function
- TFTP server configuration

In finding the module in the local network, a dedicated netset.exe application can be helpful (available at the manufacturer).

5. WWW interface

Note: The following examples will refer to a module configured to work with a SI48-1U device.

The web interface enables remote monitoring of a power system condition by means of a web browser. By entering the address of the module, for example: <http://192.168.1.100> you can enter the homepage.

The screenshot shows the MERAWEX web interface. On the left is a navigation menu with the following items: Home, General, Communication, Power Supply, Service, and About. The main content area is divided into two sections:

Device parameters

Parameter	Value	
Battery 1 voltage	54.4	V
Battery 2 voltage	---	V
Output voltage	54.3	V
Battery 1 current	0.0	A
Battery 2 current	---	A
Output current	0.0	A
Battery temperature	24	°C
Internal temperature	24	°C

Device state

Parameter	State
Work mode	float

The structure of the web interface is divided into the following tabs:

5.1. Home

The view of this tab depends on a type of a device to which the module is connected and shows the current state of the device. In the picture below you can see the current measurements of voltage, current, temperature, operating status and detected faults and errors.

The screenshot shows the MERAWEX web interface. On the left is a navigation menu with the following items: Home, General, Communication, Power Supply, Service, and About. The main content area is divided into two sections:

Device parameters .

Parameter	Value	
Battery 1 voltage	54.3	V
Battery 2 voltage	---	V
Output voltage	54.3	V
Battery 1 current	0.0	A
Battery 2 current	---	A
Output current	0.0	A
Battery temperature	---	°C
Internal temperature	30	°C

Device state .

Parameter	State
Work mode	float
Battery temperature failure	warning

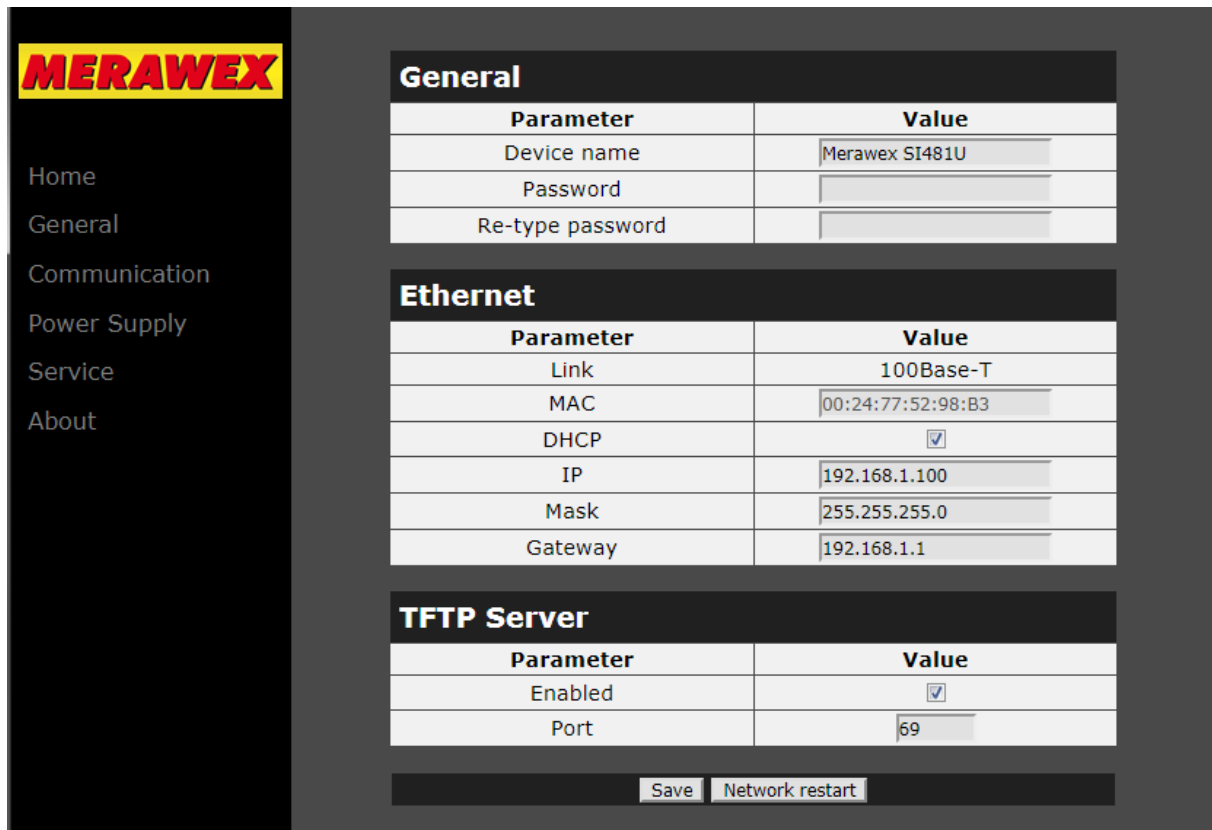
5.2. General

In this place the basic module settings, i.e. are done:

- Giving a name which will identify a given module/device
- You can set a password that will be required to use the web interface

Note: The http connection to the module is not encrypted and may be intercepted in public networks.

- TCP/IP network settings, i.e.: address, subnet mask, gateway and DHCP client
- The TFTP server setting that is used to change the module firmware and that should normally be turned off



The screenshot displays the Merawex web interface with a dark sidebar on the left containing navigation links: Home, General, Communication, Power Supply, Service, and About. The main content area is titled 'General' and contains three tables of settings.

General

Parameter	Value
Device name	Merawex SI481U
Password	
Re-type password	

Ethernet

Parameter	Value
Link	100Base-T
MAC	00:24:77:52:98:B3
DHCP	<input checked="" type="checkbox"/>
IP	192.168.1.100
Mask	255.255.255.0
Gateway	192.168.1.1

TFTP Server

Parameter	Value
Enabled	<input checked="" type="checkbox"/>
Port	69

At the bottom of the settings area, there are two buttons: 'Save' and 'Network restart'.

5.3. Communication

In this place the basic settings of the SNMP agent are done, i.e.:

- Activation or deactivation of the agent
- SNMP protocol port settings; the default is 161 and 162
- Fixing names for the SNMP protocol 'community'
- Indication of up to 4 IP addresses to which *trap* notifications will be sent
- Setting the basic required SNMP protocol information, i.e.: name, location and contact

After saving the settings, you can check the correctness of the action by sending a test notification (test gangway).

From this place you can also download the MIB file with the module SNMP data structure definition.

MERAWEX

- Home
- General
- Communication
- Power Supply
- Service
- About

SNMP Agent

Parameter	Value
Enabled	<input checked="" type="checkbox"/>
Port	<input type="text" value="161"/>
Trap port	<input type="text" value="162"/>
Read community	<input type="text" value="public"/>
Write community	<input type="text" value="private"/>
Trap community	<input type="text" value="trap"/>
Trap recipient 1	<input type="text"/>
Trap recipient 2	<input type="text"/>
Trap recipient 3	<input type="text"/>
Trap recipient 4	<input type="text"/>
Download MIB file	MIB File

MIB II System Group

Parameter	Value
MIB SysContact	<input type="text" value="Admin"/>
MIB SysName	<input type="text" value="Merawex"/>
MIB SysLocation	<input type="text" value="Gliwice"/>

5.4. Power Supply

In this place, you can indicate a device to which the module will be connected, i.e.:

- SI-3U: telecom power systems of the SI48 and SI24 Series
- SI-1U: telecom power systems of the SI48-1U Series
- ZM..AC, AZC, PZC: power supplies of the ZM Series
- ZSP135DR: fire protection power supplies of the ZSP135DR Series
- ZSP100/121: fire protection power supplies of the ZSP100 and ZSP121 Series
- Modbus TCP gateway: ModbusTCP protocol gateway function; description below.

Note: The other types shown in the list, i.e.:

- SI48-2U
- ZDSO400-xR1
- ZDSO400-xR2/R4

they are not for use in this module and they should not be chosen.

Note: If the module works with the SI-3U or SI-1U devices, the (*Clear alarms*) item is visible. This is due to the specificity of these devices in which reported faults are recorded and must be deleted manually to disable their signalization. Of course, such the deletion will be effective only when the cause of the fault disappears. Please see the User Manual of a specific device for more information.

Note: The module communicates with devices by using their interface. Depending on a device type, it can be ModbusASCII for SI-3U, SI-1U, ZM and ZSP135DR, or ModbusTCP for ZSP100/121. To provide the correct operation, please, make sure that the devices have such the protocols set up and that their addresses (*SlaveID*) are set to the value 1.

The module offers access to the connected device by using the ModbusTCP protocol. This function should be disabled if it is not used. The use of this function requires knowledge of the device memory map, which can be found in the device documentation or ask the manufacturer for its availability.

Note: The ModbusTCP connection statement suppresses the SNMP and WWW protocols. The *Timeout* parameter determines the time after which the connection will be broken if there is no data exchange.

The implementation of the ModbusTCP protocol in the module imposes a limit on the total protocol frame length to the value of 255 bytes.

The screenshot shows the MERAWEX web interface. On the left is a navigation menu with the following items: Home, General, Communication, Power Supply, Service, and About. The main content area is titled 'Power supply' and contains a table with two columns: 'Parameter' and 'Value'. The first row shows 'Power supply type' with a dropdown menu set to 'SI48-1U'. The second row shows 'Clear alarms' with an 'Execute' button. Below this is the 'Modbus TCP gateway' section, also with a table of 'Parameter' and 'Value'. The first row shows 'Enabled' with a checked checkbox. The second row shows 'TCP port' with a text input field containing '502'. The third row shows 'Timeout [s]' with a text input field containing '10'. At the bottom of the Modbus TCP gateway section is a 'Save' button.

Parameter	Value
Power supply type	SI48-1U
Clear alarms	<input type="button" value="Execute"/>

Parameter	Value
Enabled	<input checked="" type="checkbox"/>
TCP port	502
Timeout [s]	10

Working in Modbus TCP Gateway mode

The module can be set as a ModbusTCP protocol gate, which means that the received ModbusTCP queries will be converted to the selected RTU or ASCII protocol on the serial interface side, and the responses are converted in the opposite direction. This allows access using the ModbusTCP protocol to devices that are not on the list.

After selecting from the list and setting this function, the serial port configuration items appear which have to be set to the desired values.

MERAWEX

- Home
- General
- Communication
- Power Supply
- Service
- About

Power supply

Parameter	Value
Power supply type	Modbus TCP gateway
Modbus protocol type	RTU
Port speed [bps]	9600
Port data bits	8
Port parity	none

Modbus TCP gateway

Parameter	Value
Enabled	<input checked="" type="checkbox"/>
TCP port	502
Timeout [s]	10

Save

Note. Modbus TCP Gateway mode operation results in inactivity of the SNMP agent and the device status will not be displayed on the website.

5.5. Information and Service (About, Service)

The Service tab does not contain any relevant information from the user's point of view. On the Information tab, you can check the current firmware version of the module.

MERAWEX

- Home
- General
- Communication
- Power Supply
- Service
- About

About

MK-ETH-1

Platform Embedded

Version 1.0.3

Merawex Sp. z o.o.
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44-122 Gliwice, Poland
www.merawex.com.pl

Developed by Łukasz Panasiuk
www.embedded.pl

6. SNMP Interface

The module supports the SNMP protocol version 1 together with the asynchronous sending of trap notifications to maximum 4 recipients. For servicing many Merawex devices, a universal MIB has been designed. It contains all possible signals in supported devices. A specific device supports only a subset of the universal base, depending on the equipment and capabilities. The main OID in the MIB structure is .1.3.6.1.4.1.32228.4

The configuration of the basic SNMP agent operation parameters is possible in the Communication tab (the figure below). In this tab you can also download the current MIB file for this firmware version.

MERAWEX

Home
General
Communication
Power Supply
Service
About

SNMP Agent

Parameter	Value
Enabled	<input checked="" type="checkbox"/>
Port	161
Trap port	162
Read community	public
Write community	private
Trap community	trap
Trap recipient 1	
Trap recipient 2	
Trap recipient 3	
Trap recipient 4	
Download MIB file	MIB File

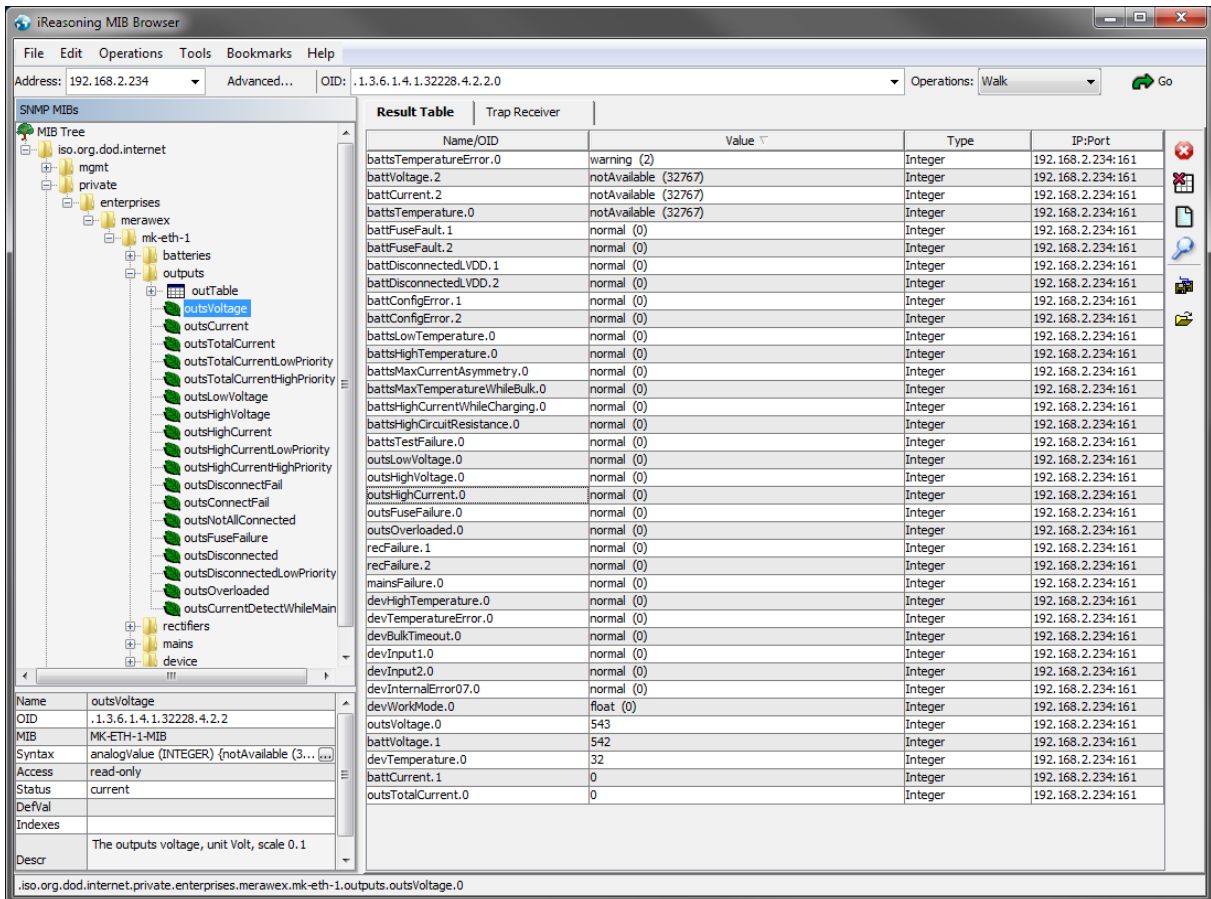
MIB II System Group

Parameter	Value
MIB SysContact	Admin
MIB SysName	Merawex
MIB SysLocation	Gliwice

Save Send trap

An example of appearance of data returned by the SNMP agent

Note. Modbus TCP Gateway mode operation results in inactivity of the SNMP.



In the case of appearance or change of the fault status or error in the operation of the monitored device, the module sends a *newEvent* notification (SNMP Trap function) to the indicated IP addresses. Then, in order to recognize the event, the SNMP manager must read the current state of the device.

The screenshot shows the iReasoning MIB Browser interface. The left pane displays a MIB tree with the path: iso.org.dod.internet > mgmt > private > enterprises > merawex > mk-eth-1 > outputs > outTable > outsVoltage. The right pane shows a 'Trap Receiver' window with a table of events. One event is visible: 'newEvent' from source '192.168.2.234' at time '2018-02-22 15:17:33'. Below the table, the event details are shown:

Source:	192.168.2.234	Timestamp:	20 minutes 23 seconds	SNMP Version:	1
Enterprise:	.iso.org.dod.internet.private.enterprises.merawex.mk-eth-1			Community:	trap
Specific:	1				
Generic:	enterpriseSpecific				
Variable Bindings:					
Name:	.iso.org.dod.internet.mgmt.mib-2.system.sysUpTime.0				
Value:	[TimeTicks] 20 minutes 22 seconds (122200)				
Description:	"Device new event"				

At the bottom left, a table provides details for the selected MIB object 'outsVoltage':

Name	outsVoltage
OID	.1.3.6.1.4.1.32228.4.2.2
MIB	MK-ETH-1-MIB
Syntax	analogValue (INTEGER) {notAvailable (3... (0)}
Access	read-only
Status	current
DefVal	
Indexes	
Descr	The outputs voltage, unit Volt, scale 0.1

The status bar at the bottom shows the full path: .iso.org.dod.internet.private.enterprises.merawex.mk-eth-1.outputs.outsVoltage.0

Note: The ModbusTCP connection statement suppresses the SNMP and WWW protocols.

7. Module software update

If necessary, the software update of the module is carried out using any TFTP client or application from the manufacturer. A file with the new firmware version is sent to the module and then an update is performed.

Things to do in order to upgrade:

1. The module must have an active TFTP server, see: General tab
2. By using a TFTP client, a firmware binary file is sent to the module using the name of the target file *firmware.bin*
3. After the transfer, go to the About tab of the WWW and press the Upgrade button to complete process.
4. After a few seconds, the module will restart with the new software version.

Example of sending a firmware file to a module of the IP address *192.168.2.239*, file named *MK ETH 1_v1.0.3_EN.tpc.bin*, by using the TFTP client which is available in the Windows operating system.

```
tftp -i 192.168.2.239 put MK-ETH-1_v1.0.3_EN.tpc.bin firmware.bin
```

The view of the Information (About) tab after loading the file:

The screenshot shows the Merawex web interface. On the left is a navigation menu with the Merawex logo and links for Home, General, Communication, Power Supply, Service, and About. The main content area is titled 'About' and displays the following information:

MK-ETH-1
Platform Embedded
Version 1.0.3
Merawex Sp. z o.o.
ul. Toruńska 8
44-122 Gliwice, Poland
www.merawex.com.pl
Developed by Łukasz Panasiuk
www.embedded.pl

Below this is a 'Firmware upgrade' section with a table:

Parameter	Value
File length	359552 bytes

At the bottom of the 'Firmware upgrade' section is an 'Upgrade' button.

8. Signalization

LED diode name	Colour / Sequence of colours	Description
ETH 100	off	The module works in a 10Mb/s network
	green	The module works in a 100Mb/s network
ETH CON	green	Signalization of Ethernet connection and communication
STATUS	green	Normal operation, web interface and SNMP. For the Modbus TCP Gateway mode operation, signaling active TCP connection.
	flashing green	The ModbusTCP connection on, the WWW and SNMP interfaces have been stopped
	red	Communication error with the connected device
	off	For the Modbus TCP Gateway mode operation, signaling no active TCP connection.
	another indication	Internal error of the module, contact with the manufacturer required

Appendix A - Connection cables

Connection cable for the SI48-1U and SI48-3U power systems.

