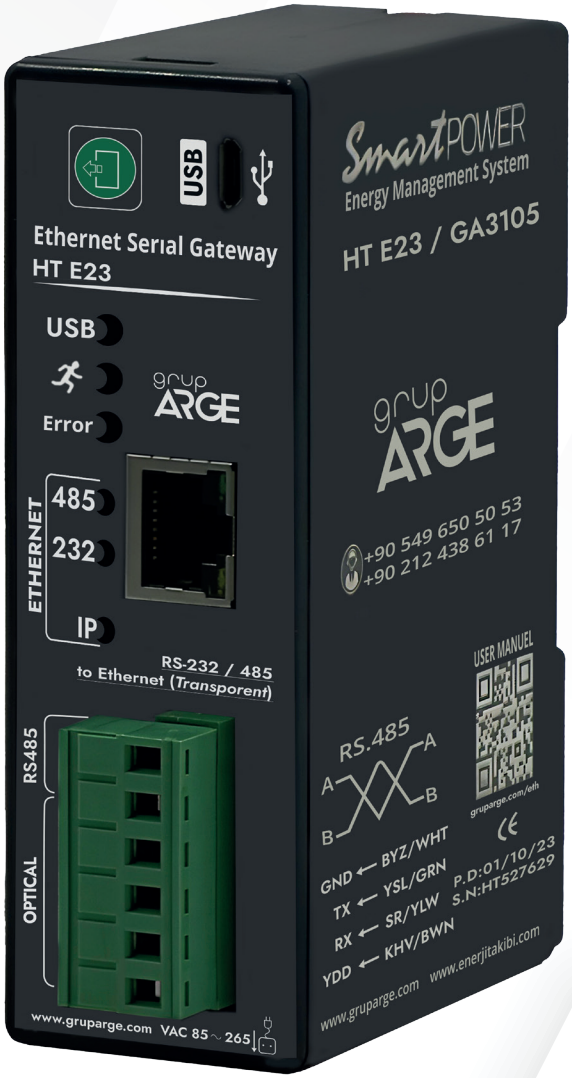
HT E23 Ethernet - Serial Gateway
User Manual



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V.25.1

CONTENTS

PROPER USE AND SAFETY REQUIREMENTS

Cut all the power when connecting and disconnecting the device to a panel.

Do not clean the device with a solvent or similar material. Only use a dry cloth.

Please do not intervene to the device when a technical problem is encountered and get in contact with a technical service within the shortest time.

If the warnings are not taken into account, our company or the authorized dealer shall not be held responsible for the negative consequences.

Do not dispose in the trash, the device must be delivered to the collection centers (electronic device recycling centers). It should be recycled or disposed of without harming human health and environment.

The installation, assembly, activation and operation of the device should be done and used by only expert professionals and in accordance with safety regulations and instructions.

1. INTRODUCTION

1.1. General Features

HT E23 Ethernet Serial Gateway is a product developed for remote monitoring of electronic electricity meters and devices supporting Modbus protocol. It provides communication with electricity meters via optical, RS-232 or RS-485 (2-wire) communication ports and with devices with Modbus protocol via RS-485 port.

In order for the communication terminal to establish an internet connection, it must be connected to the company's internet network via an Ethernet cable. If the cable distance will exceed 70 meters, CAT6 cable should be preferred. If the network to which the device is connected distributes dynamic IP via DHCP, it will automatically receive IP and try to access the internet. The device can be given a static IP address via Ethernet via the GatewayXpert application or by connecting via USB.

Device configuration is done through the GatewayXpert application. Both RS-485 and RS-232 ports of the device can be set to operate in TCP to RTU, TCP to ASCII, RTU over TCP, ASCII over TCP or Full Transparent modes. Devices connected to the Ethernet serial gateway can be accessed with any communication application over Ethernet without any interface application.

1.2. Basic Features

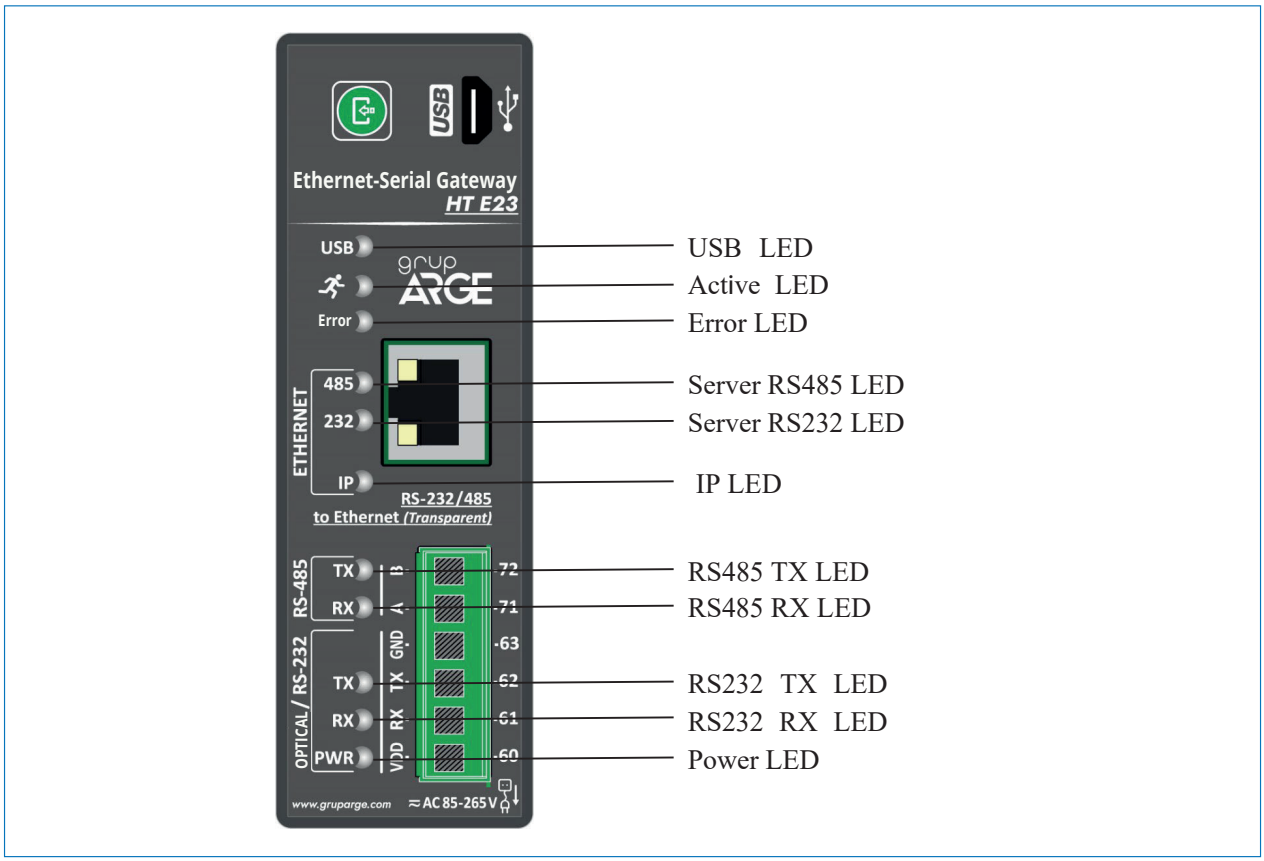
- Microprocessor based.
- Operates with 85-265 V AC supply.
- Supports RS-485 Standard Modbus RTU protocol, RS-232 and optical port communication channels.
- It can communicate with all meters that support TS EN 62056-21 protocol.
- It can read 32 meters or 247 Modbus devices via RS-485 and 1 meter or Modbus device via RS-232.
- One meter can be read via optical reader and RS-232.
- It has LEDs indicating USB, Power, RS-485/Optical (Communication), IP and internet status.
- The operating ambient temperature of the device is between -10 °C and +55 °C.
- Supply consumption power is less than 1 VA.
- It has IP40 protection class.
- The dimensions of the device are (Width-Length-Depth) 36 x 109 x 92 mm.

1.3. Product Assembly and Disassembly

1. Mount the device in a suitable place in the panel (suitable for rail mounting).
2. HT E23 device operates with 85-265 V AC supply.
3. Connection with the device to be communicated:
   a. Electricity Meter / Optical Port
   b. Electricity Meter / RS-232
   c. Electricity Meter / RS-485
   d. Modbus Device (Relay, analyzer, etc.) / RS-485

Connect the Ethernet cable to the Ethernet port.
After checking all connections for the last time, you can start the device by energizing it.

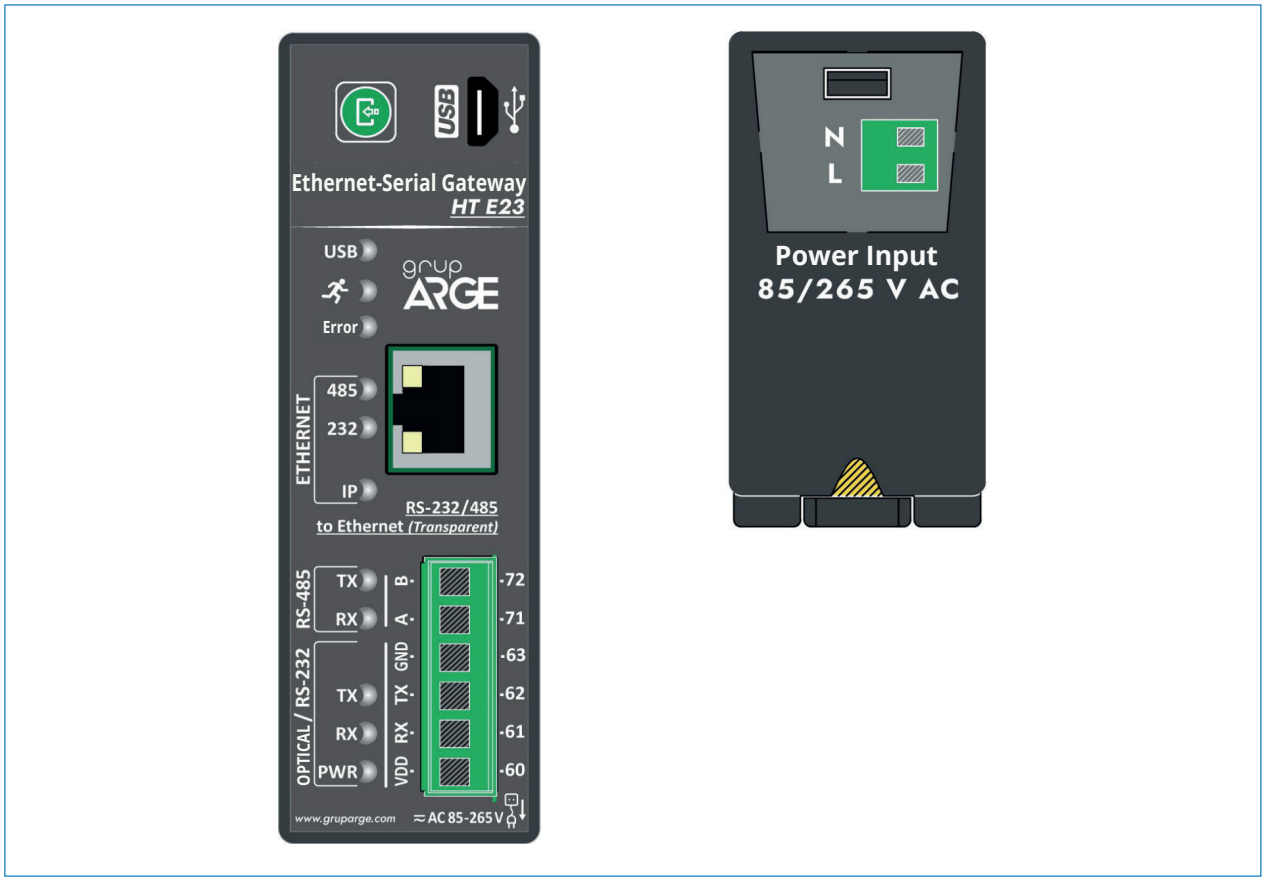
1.4. LEDs and Their Functions



USB LED: Lights when the device is connected to a computer via USB.
Active LED: This LED flashes when the device is actively running.
Error LED: This LED lights up when there is an error condition on the device.
Server RS485 LED: This LED flashes if the device is using the RS485 port over the ethernet connection.
Server RS232 LED: This LED flashes if the RS232 port is used over the device's ethernet connection.

IP LED: This LED is on if the device has a valid IP address.
RS485 TX LED and RS485 RX LED: These LEDs flash when the device is communicating with the devices connected to it via RS485.
RS232 TX LED and RS485 RX LED: These LEDs flash when the device communicates with the devcommunicates with the devices connected to it via RS232.

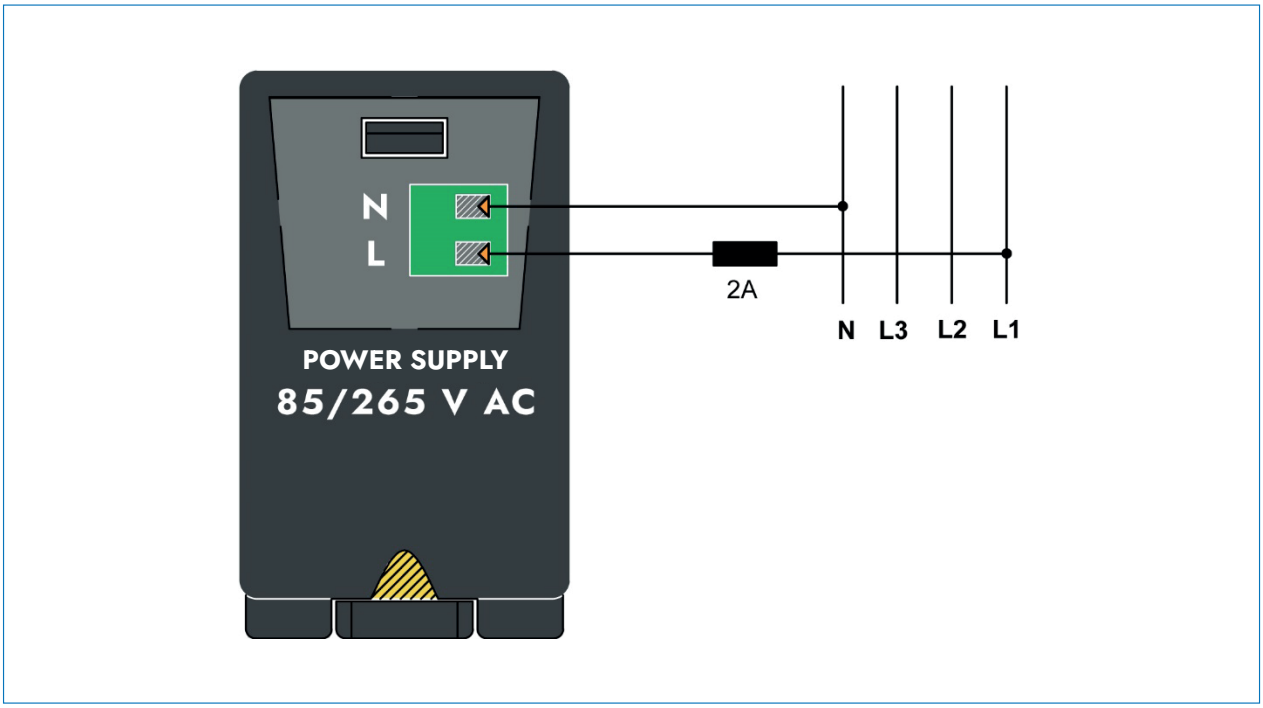
1.5. Terminal Connections



Ethernet		Ethernet Ethernet Cable Input
USB		USB Type-B USB Input (for Configuration)
VDD		VDD Optical Reader Supply (6.2 V DC)
RS-232	TX	Optik/RS-232 Data Transmit
	RX	Optik/RS-232 Data Receive
	GND	Optik/RS-232 Ground
RS-485	A	RS-485 Data +
	B	RS-485 Data -

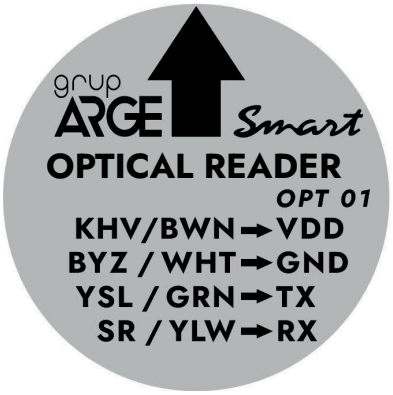
WARNING! Do not energize VDD, TX, RX, GND, A, B terminals.

1.6. Supply Connection



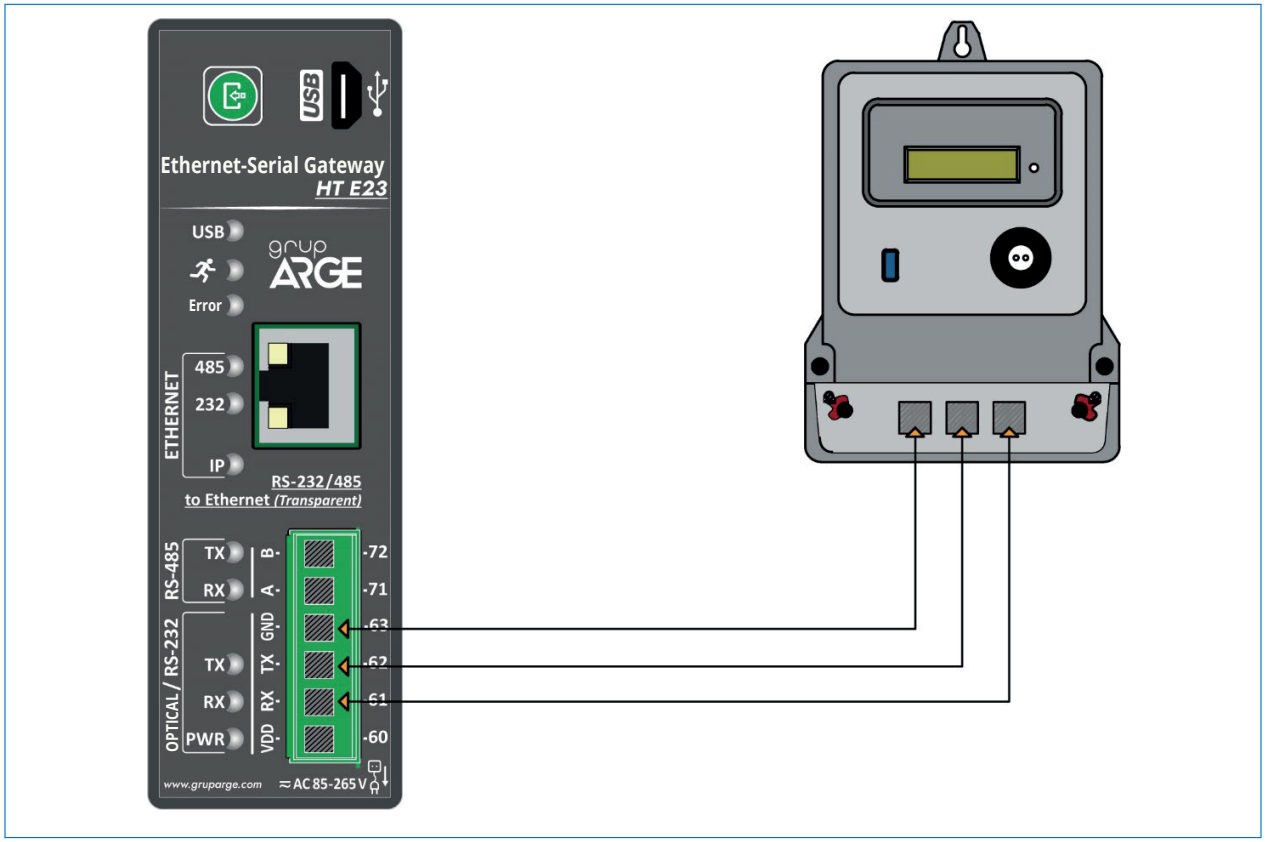
1.7. Meter Communication Connections

1.7.1. Optical Port Connection

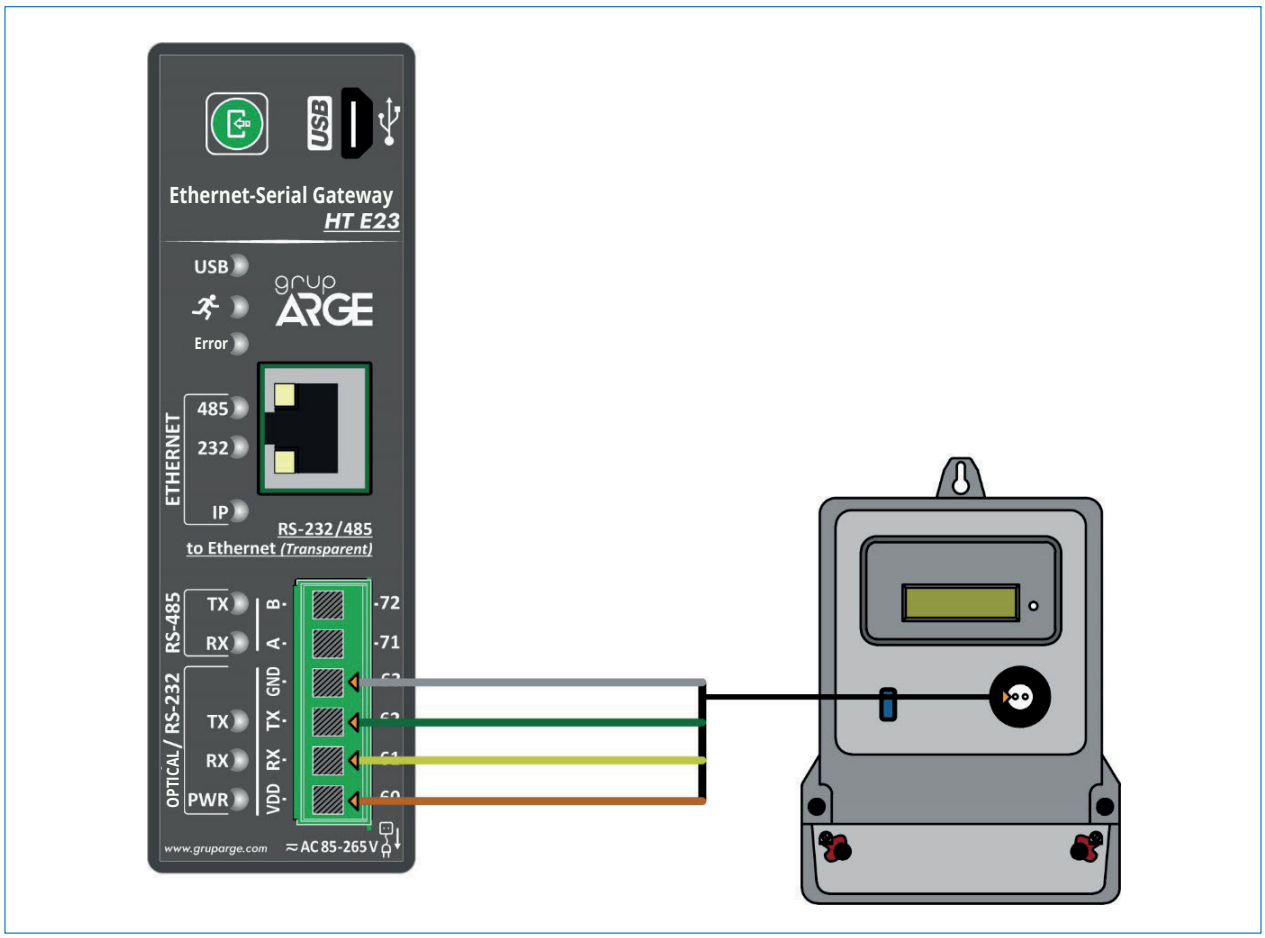


Cable Color	Brown	Green	Yellow	White
Terminal	VDD	TX	RX	GND

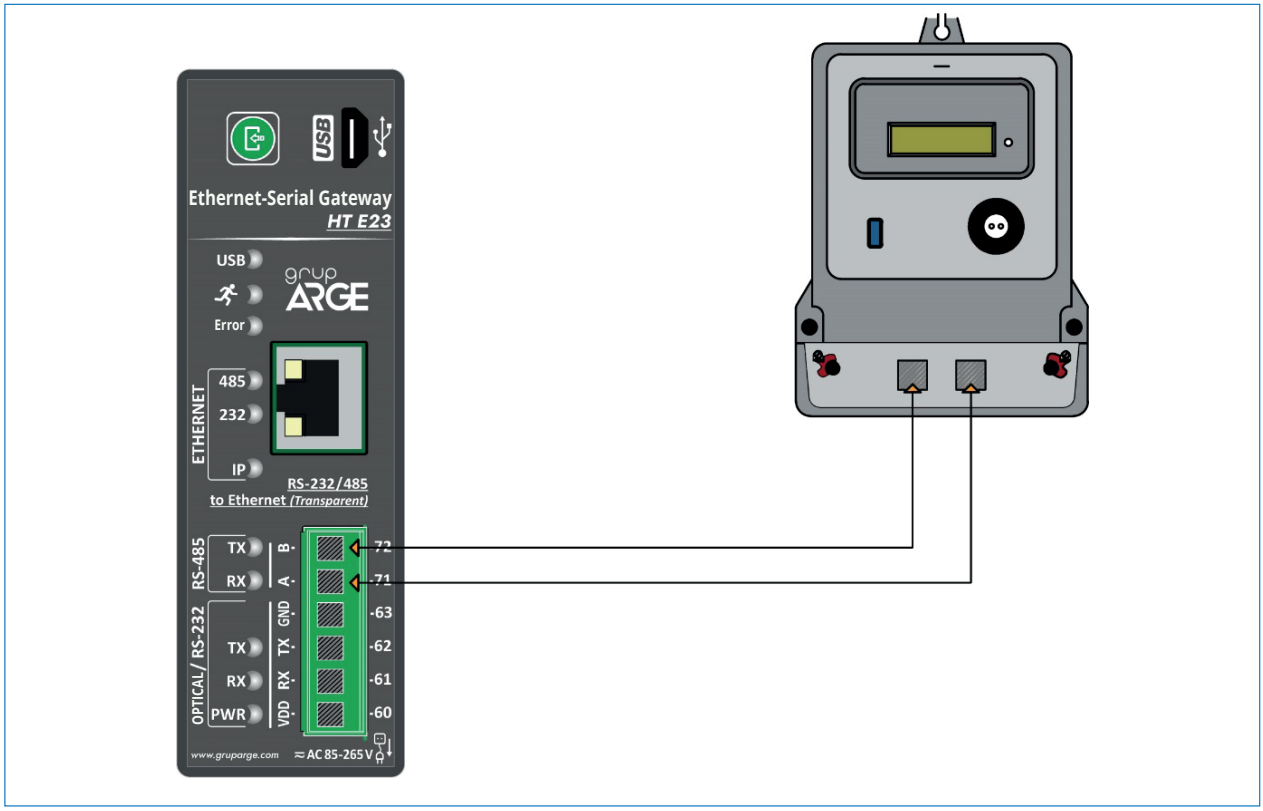
Note: When placing the optical reader on the meter, make sure the arrow mark on the label points to upward direction.



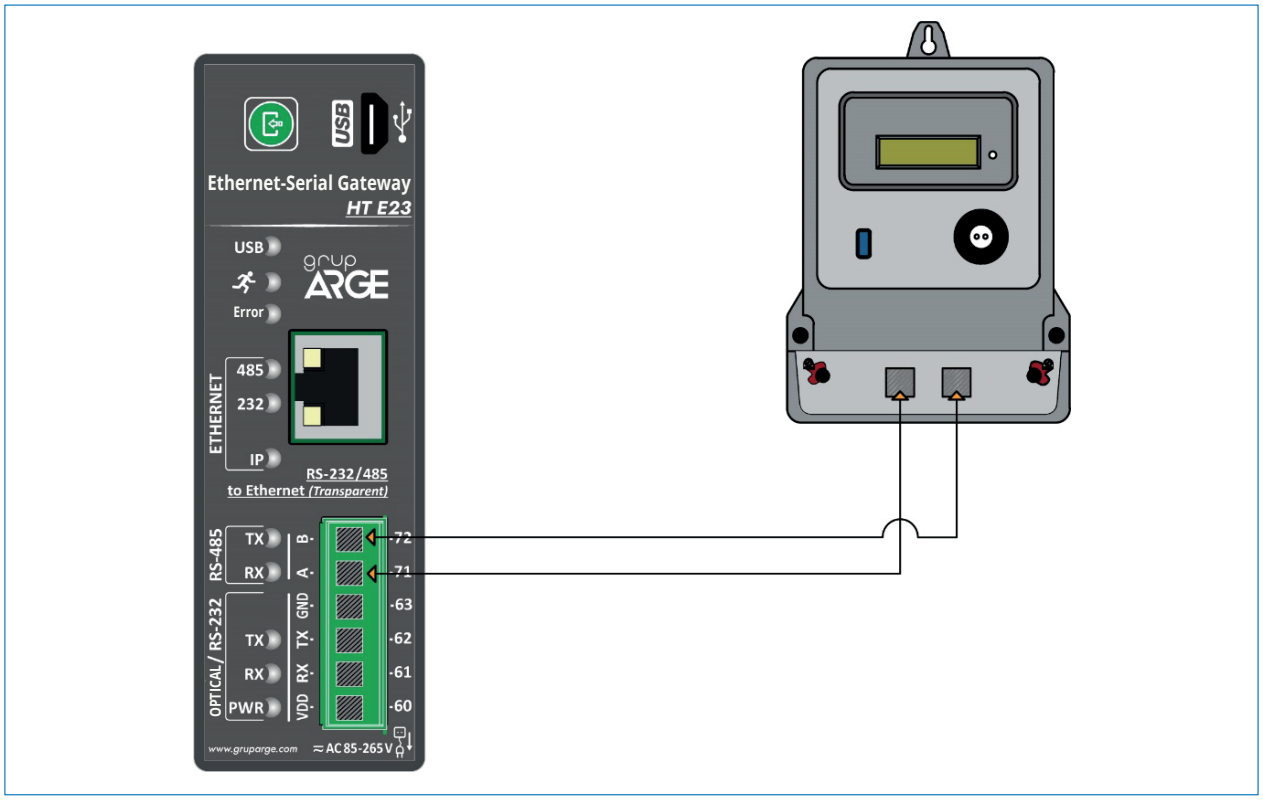
1.7.2. Makel RS-232 Communication Connection



1.7.3. Makel RS-485 Communication Connection & Köhler RS-485 Communication Connection & Viko RS-485 Communication Connection

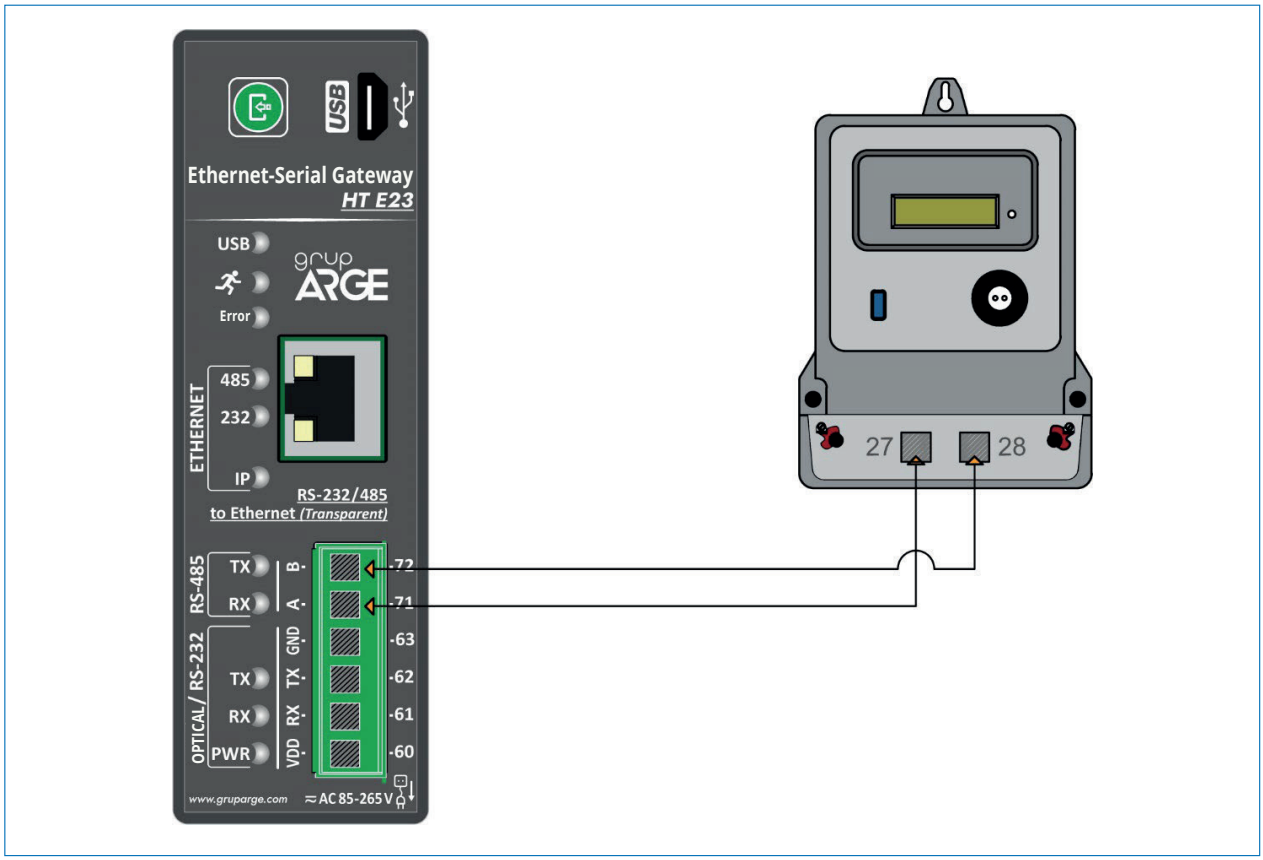


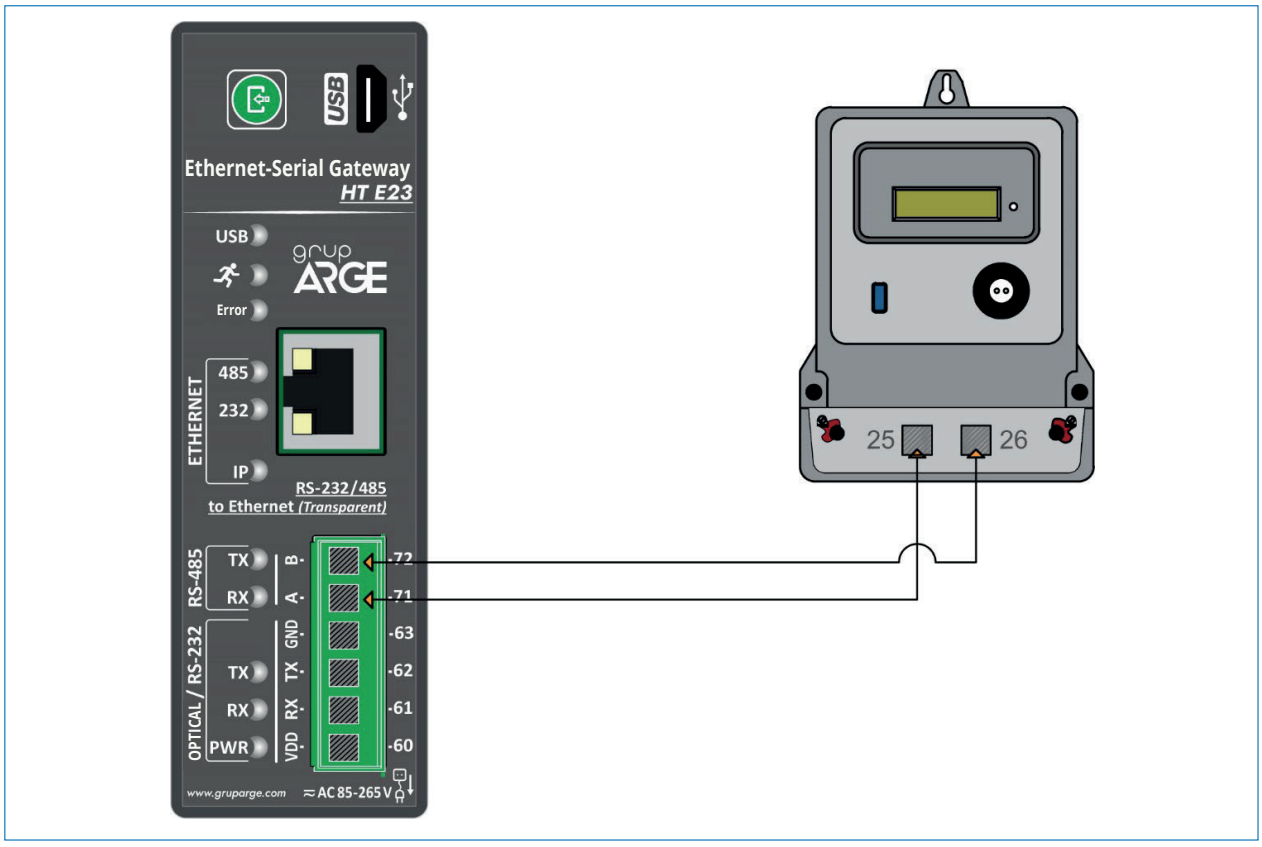
1.7.4. Elektromed RS-485 Communication Connection & Luna RS-485 Communication Connection



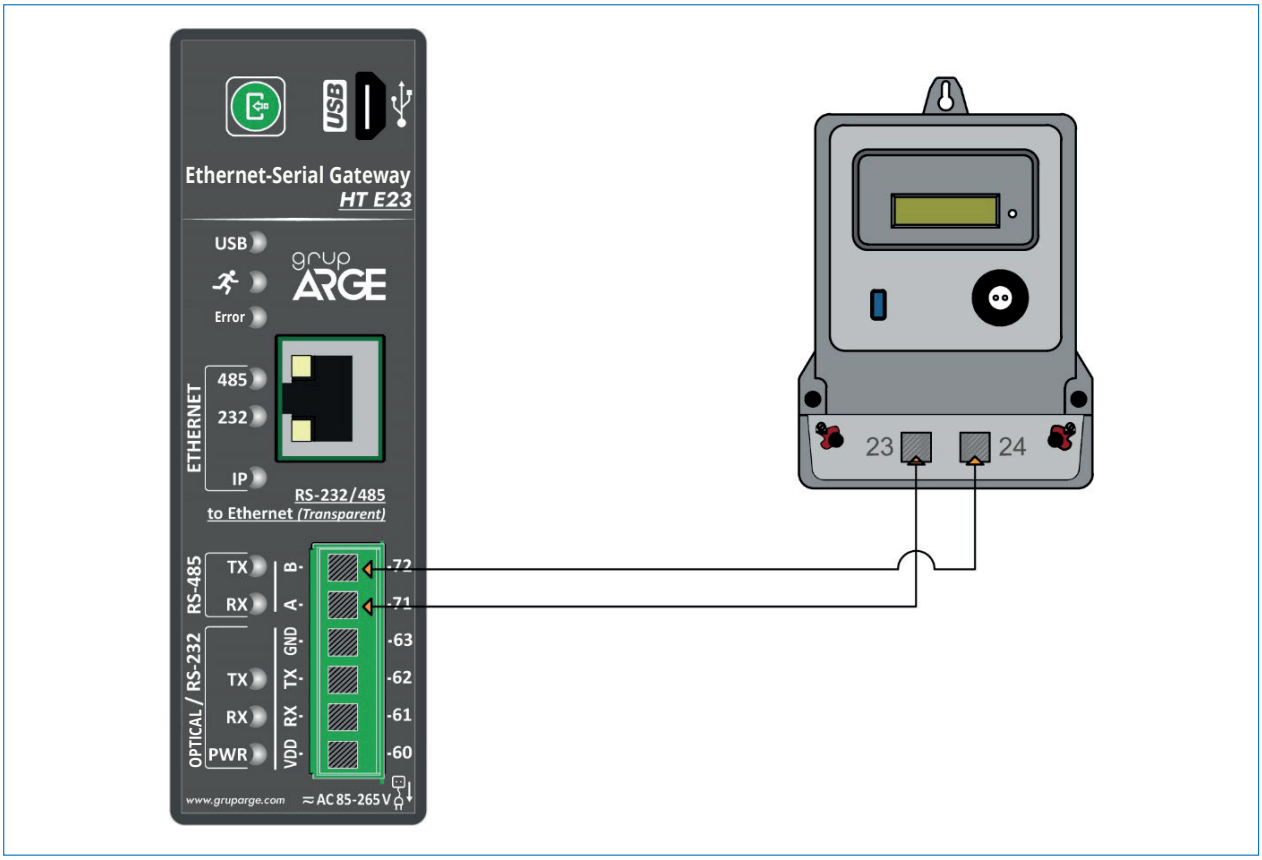
1.7.5. Elster RS-485 Communication Connection

Some models of Elster meters have two RS-485 outputs.

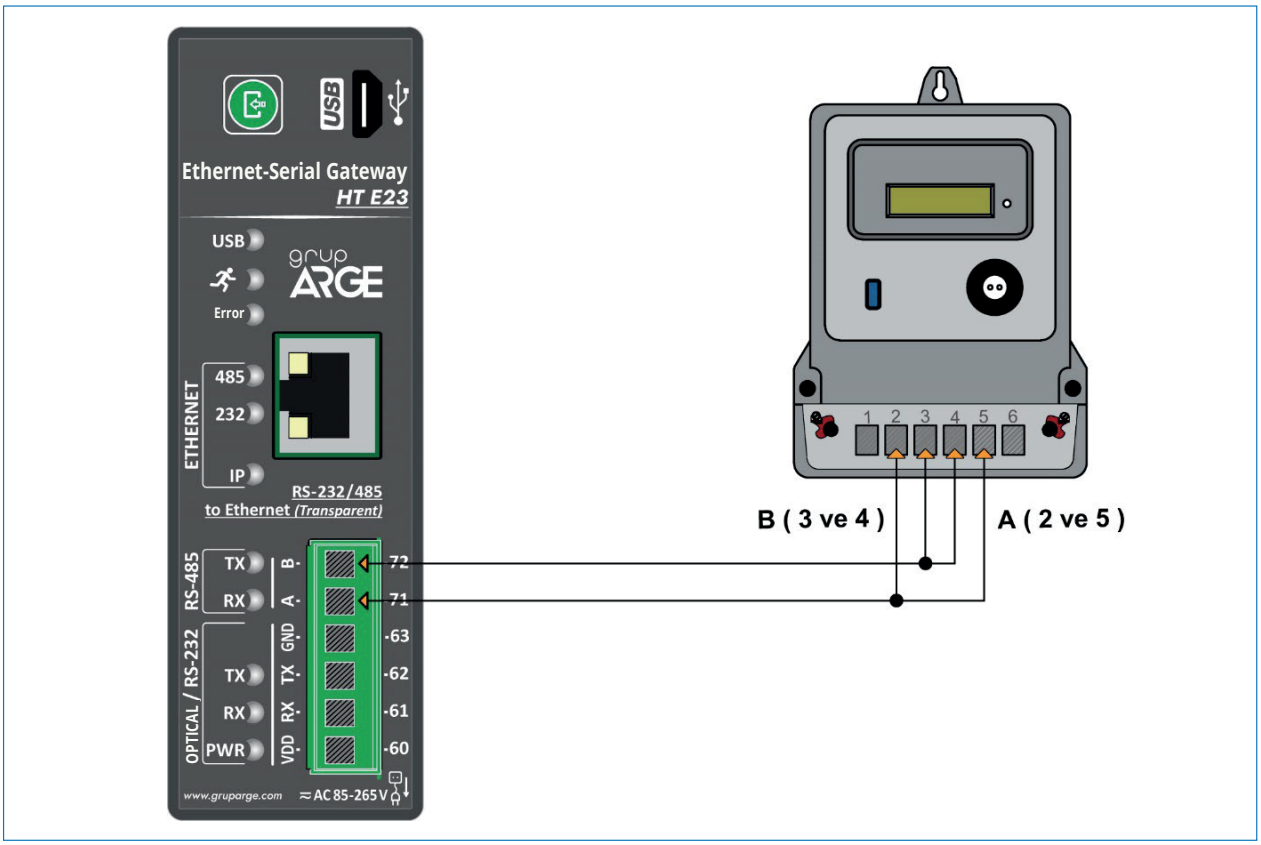




1.7.6. EMH RS-485 Communication Connection



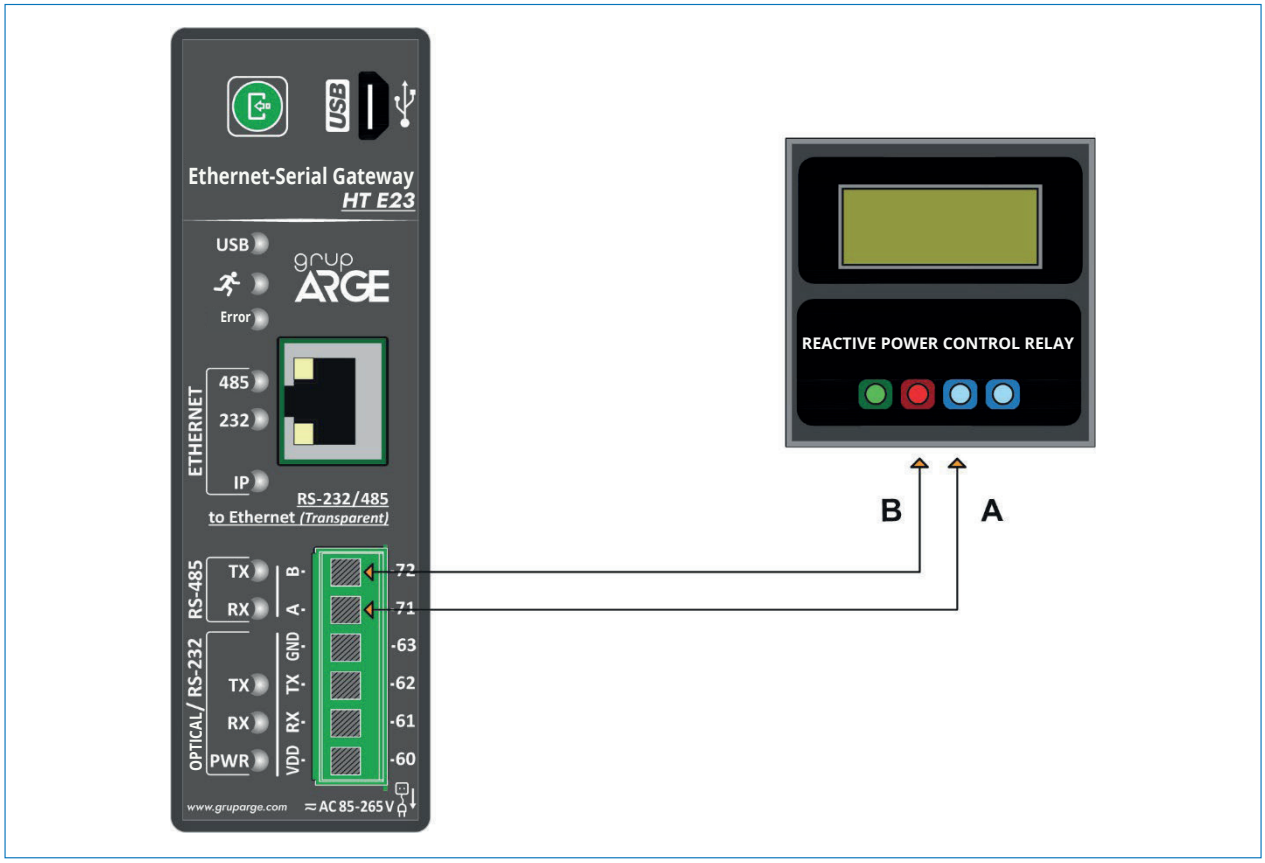
1.7.7. Landis RS-485 Communication Connection



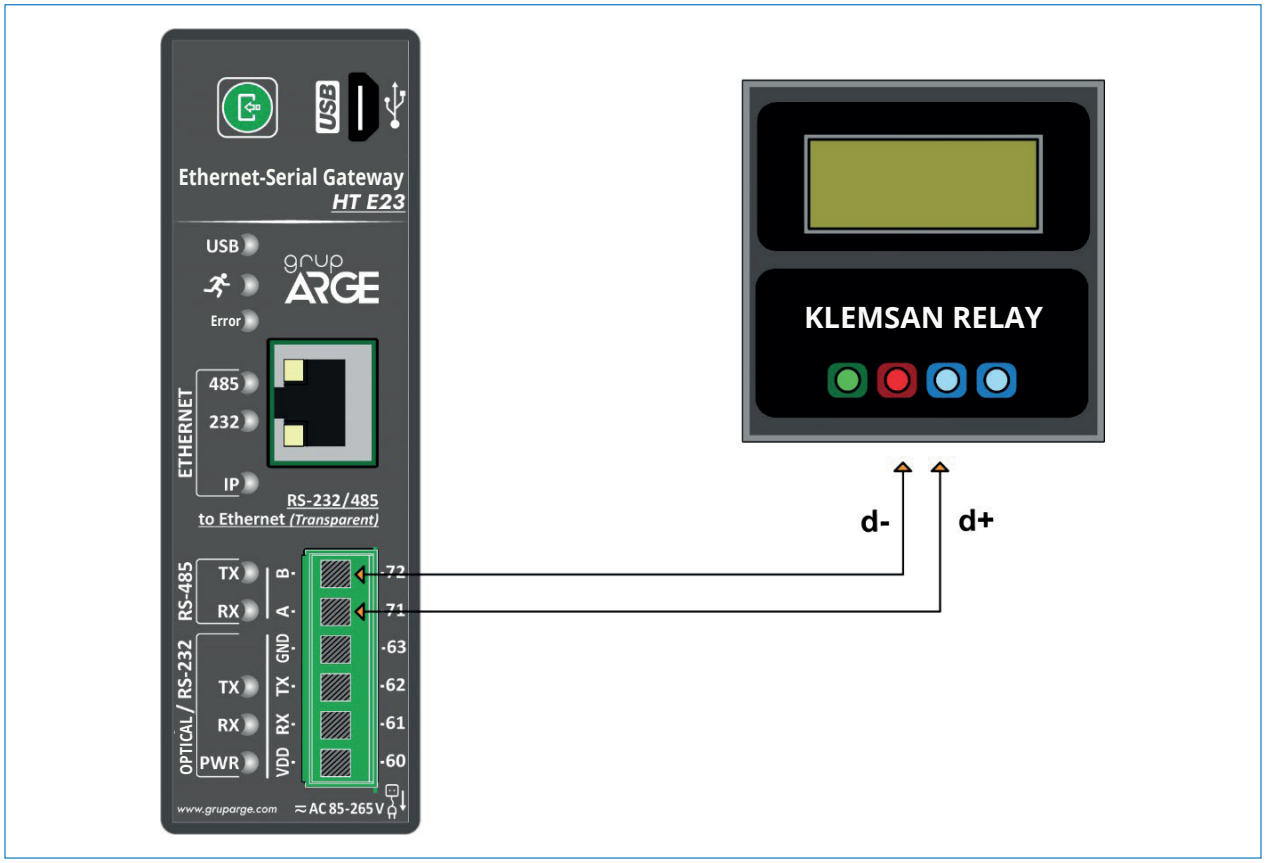
1.8. Power Factor Controller Terminal Connections

If the power factor controller or analyzer to be connected to the modem is named as A and B in the communication terminals, A is connected to A and B is connected to B. The connections of the devices using different nomenclature are shown below.

1.8.1. All Power Factor Controllers Terminal Connections



1.8.2. Klemsan Röle REMO-Q ve RAPIDUS – Klemens Bağlantısı



1.9. AT Command Usage Types

There are 3 different ways to use AT commands and they should always be used with the prefix “AT” or “at” at the beginning of each command line. Also the characters <CR>1 and <LF>2 must be used to terminate the command line.
The three mentioned usages are given below.
1. It is a command to read and apply parameters and is used in the form “AT+<-COMMAND TO USE><CR><LF>”. “AT+485EN<CR><LF>”, ‘AT+READALL<CR><LF>’ are examples.
2. It is a parameter write command and is used in the form “AT+<COMMAND TO USE> <VALUE TO WRITE><CR><LF>”. The command “AT +485EN=1<-CF><LF>” is an example.
3. It is a parametric read command and it is used as “AT+<COMMAND TO USE>? <PARAMETER TO READ><CR><LF>”. If the write command is successful, the device returns “+OK<CR><LF>”. If the read command is successful, the device returns “ <COMMAND USED>=<VALUES><CR><LF>”.

2. AT COMMANDS

2.1. Network Settings Commands

- MACADDR : Device Mac Address
- STATICIPEN : Static IP Parameter

Static IP Durumu	
0	DHCP
1	Static IP

- IPADDR_0 : IP Address 1st block
- IPADDR_1 : IP Address 2st block
- IPADDR_2 : IP Address 3st block
- IPADDR_3 : IP Address 4st block

Example: <IPADDR_0>.<IPADDR_1>.<IPADDR_2>.<IPADDR_3>

[1] This suffix is typed by pressing CTRL+ENTER. The ASCII code is 13.
[2] This suffix is typed by pressing CTRL+SHIFT+ENTER. The ASCII code is 10.

- SUBNETMASK_0 : Subnet Mask 1st block
- SUBNETMASK_1 : Subnet Mask 2st block
- SUBNETMASK_2 : Subnet Mask 3st block
- SUBNETMASK_3 : Subnet Mask 4st block

Example: <SUBNETMASK_0>.<SUBNETMASK_1>.<SUBNETMASK_2>.<SUBNETMASK_3>

- DEFAULTGW_0 : Default Gateway 1st block
- DEFAULTGW_1 : Default Gateway 2st block
- DEFAULTGW_2 : Default Gateway 3st block
- DEFAULTGW_3 : Default Gateway 4st block

Example: <DEFAULTGW_0>.<DEFAULTGW_1>.<DEFAULTGW_2>.<DEFAULTGW_3>

- FIRST_DNS_0 : First DNS 1st block
- FIRST_DNS_1 : First DNS 2st block
- FIRST_DNS_2 : First DNS 3st block
- FIRST_DNS_3 : First DNS 4st block

Example: <FIRST_DNS_0>.<FIRST_DNS_1>.<FIRST_DNS_2>.<FIRST_DNS_3>

- SECOND_DNS_0 : Second DNS 1st block
- SECOND_DNS_1 : Second DNS 2st block
- SECOND_DNS_2 : Second DNS 3st block
- SECOND_DNS_3 : Second DNS 4st block

Example: <SECOND_DNS_0>.<SECOND_DNS_1>.<SECOND_DNS_2>.<SECOND_DNS_3>

2.2. Modem Settings Commands

This section contains the commands available for the modem's own settings and brief descriptions. The tables below the commands indicate which index value is used to represent the values related to that command when it is read or written.

- **485E** : RS485 port

RS485 Port Status	
0	Close
1	Open

- **485PORT** : RS485 port number
- **485MOD** : RS485 Transparent Modem Mode

RS485 Modem Mode	
0	Modbus TCP to Modbus RTU
1	Modbus TCP to Modbus ASCII
2	Modbus RTU over TCP
3	Modbus ASCII over TCP
4	Full Transparent Mode

- **485DATAB** : 485 Uart Data Bit Setting

RS485 Data Bit	
0	7 Bit
1	8 Bit

- **485PARB** : 485 Uart Parity Bit Setting

RS485 Parity Bit	
0	None
1	Even
2	Odd

- **485STPB** : 485 Uart Stop Bit setting can be set according to the values specified in the Stop Bit Value table.

RS485 Stop Bit Value	
0	1 Stop
1	0,5 Stop
2	1,5 Stop
3	2 Stop

- **485BAUD** : 485 Uart Baud Rate can be set according to the values given in the RS485 Baud Rate table.

RS485 Baud Rate (bps)	
0	300
1	600
2	1200
3	2400
4	4800
5	9600
6	19200
7	38400
8	57600
9	115200

- 485TMOUT : RS485 RS485 Modbus timeout (0-150000 milliseconds)
- 485RETRY : RS485 Number of RS232 Modbus retries (0-10 retries)
- 485ETHTMOUT : RS232 Internet timeout (0-255 minutes)
- 232EN : RS232 port

RS232 Port Status	
0	Close
1	Status

- 232PORT : RS232 port Number

- 232MOD : RS232 Transparent Modem Mode

RS232 Modem Mode	
0	Modbus TCP to Modbus RTU
1	Modbus TCP to Modbus ASCII
2	Modbus RTU over TCP
3	Modbus ASCII over TCP
4	Full Transparent Mode

- 232DATAB : RS232 Uart Data Bit Setting

RS232 Data Bit	
0	7 Bit
1	8 Bit

- 232PARB : RS232 Uart Parity bit setting

RS232 Parity Bit	
0	None
1	Even
2	Odd

- 232STPB : RS232 Uart Stop bit setting

RS232 Stop Bit Value	
0	1 Stop
1	0,5 Stop
2	1,5 Stop
3	2 Stop

- 232BAUD : RS232 Uart Baud Rate setting

RS232 Baud Rate (bps)	
0	300

1	600
2	1200
3	2400
4	4800
5	9600
6	19200
7	38400
8	57600
9	115200

- 232TMOUT : RS232 Modbus timeout (0-150000 milliseconds)
- 232RETRY : Number of RS232 Modbus retries (0-10 retries)
- 232ETHTMOUT : RS232 Internet timeout (0-255 minutes)
- ERRRESPONSE : Sending Modbus Error messages

Modbus Error Messages	
0	Close
1	Open

- WRITEALL : Batch write commands related to modem setting as shown below.

AT+WRITEALL=<485EN>,<485PORT>,<485MOD>,<485DATAB>,<485PARB>,<485STPB>,<485BAUD>,<485TMOUT>,<485RETRY>,<485ETHTMOUT>,<232EN>,<232PORT>,<232MOD>,<232DATAB>,<232PARB>,<232STPB>,<232BAUD>,<232TMOUT>,<232RETRY>,<232ETHTMOUT>,<ERRRESPONSE><CR><LF>

- WRITE_NETWORKCFG : Batch write commands related to network settings as shown below.

AT+WRITE_NETWORKCFG=<STATICIPEN>,<IPADDR_0>,<IPADDR_1>,<IPADDR_2>,<IPADDR_3>,<SUBNETMASK_0>,<SUBNETMASK_1>,<SUBNETMASK_2>,<SUBNETMASK_3>,<DEFAULTGW_0>,<DEFAULTGW_1>,<DEFAULTGW_2>,<DEFAULTGW_3>,<FIRST_DNS_0>,<FIRST_DNS_1>,<FIRST_DNS_2>,<FIRST_DNS_3>,<SECOND_DNS_0>,<SECOND_DNS_1>,<SECOND_DNS_2>,<SECOND_DNS_3><CR><LF>

- EVENT : Events are read with Id (AT+EVENT?<ID><CR><LF>)
- WARNING : Warnings are read with Id (AT+WARNING?<ID><CR><LF>)
- ERROR : System errors are read with Id (AT+ERROR?<ID><CR><LF>)
- READALL : Batch read all modem settings commands as shown below

+READALL=<485EN>,<485PORT>,<485MOD>,<485DATAB>,<485PARB>,<485STPB>,<485BAUD>,<485TMOUT>,<485RETRY>,<485ETHTMOUT>,<232EN>,<232PORT>,<232MOD>,<232DATAB>,<232PARB>,<232STPB>,<232BAUD>,<232TMOUT>,<232RETRY>,<232ETHTMOUT>,<ERRRESPONSE ><CR><LF>

- READ_NETWORKCFG : Read all modem settings commands
- EVENTCLEAR : Used to delete event records
- WARNINGCLEAR : Used to delete warning records
- ERRORCLEAR : Used to delete system errors
- CURRENT_IP : Send the IP address received by the device
- RESTART : Restarts the device
- PING : The device returns “OK<CR><LF>” in response
- DEVINFO : Device information is returned in the following format

<Serial Number>,<MAC Address>,<Product Type>,<Product Subtype>,<Main Application Version>,<Sub Application Version>,<Hardware Type>,<Main Hardware Version>,<Sub Hardware Version>,<Parameter Version>,<CR>,<LF>,

3. GATEWAYXPERT APPLICATION

When using the Ethernet-Serial Gateway, a PC program can be used for easy device configuration. The configuration connection can be made over the network or via USB cable.

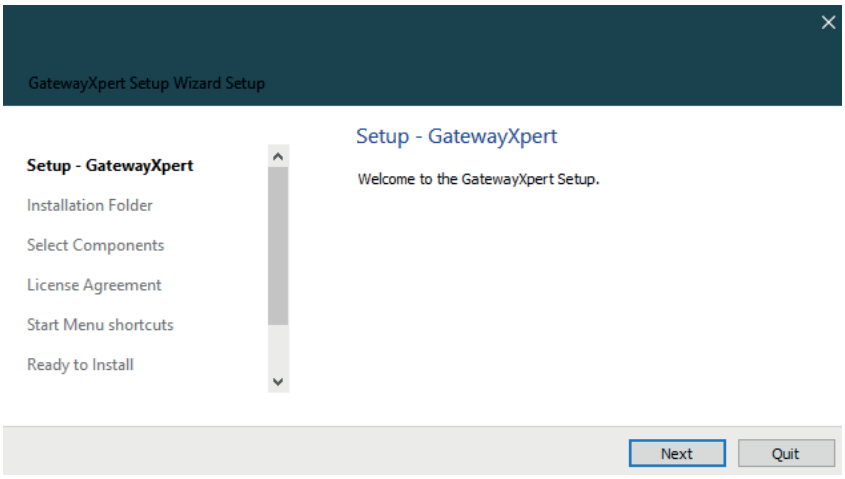
3.1. Installation

The installation of the application can be done by following the steps below. First, you can access the installation file from https://www.gruparge.com/en/documents/software/

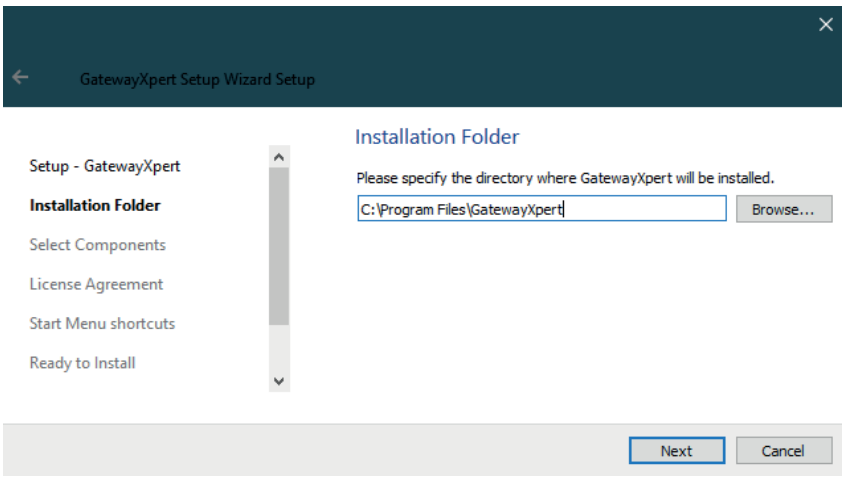
https://www.gruparge.com/en/documents/software/

- First, you will see the pop-up window above. Click on "Additional Information" in this window.

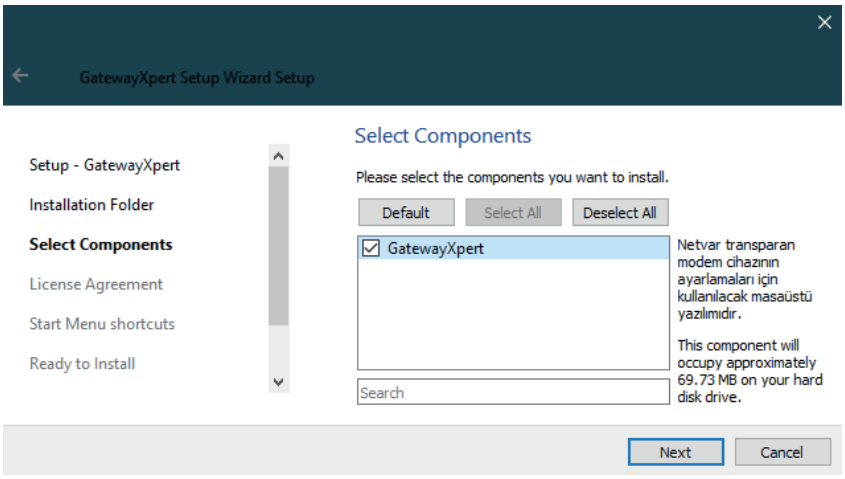
- Then press the "Run Anyway" button as shown above and you will reach the application installation screen.



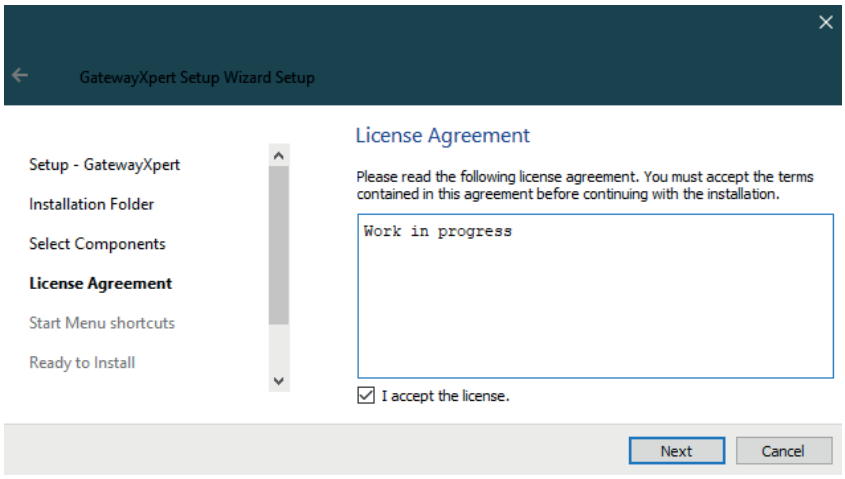
- In this first step, just press the “Next” button.



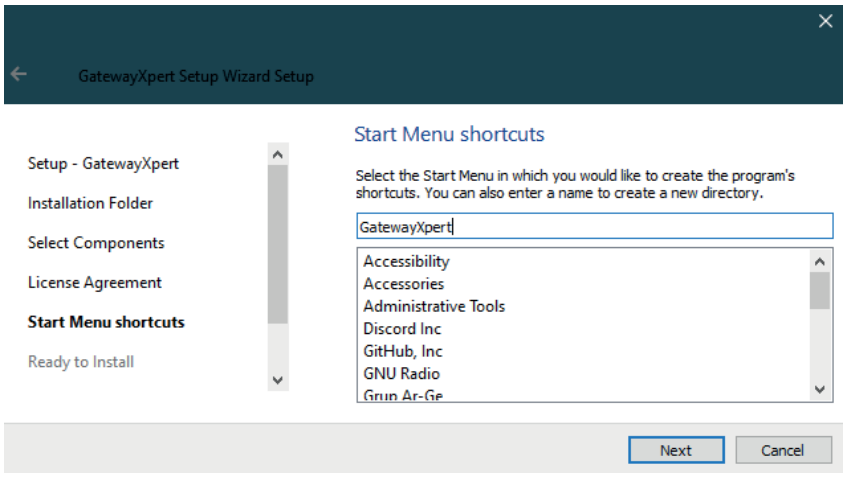
- On the next screen you can type the path to the folder where you want the application to be installed, but we recommend leaving it as default.
  Once the folder is selected, click “Next” and proceed to the next step.



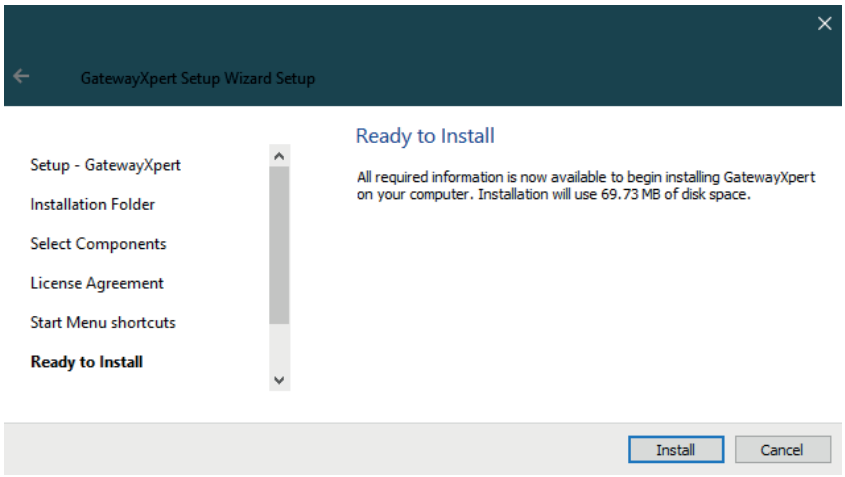
- After selecting the folder to be installed, you will be presented with a window to select the parts of the application to be installed, but since there is only one part to be installed, check the “GatewayXpert” box and click “Next”.



- Since this part of the installation has no function yet, just check the "I accept the license" box and click "Next".



- At this stage of the installation, the name for the shortcut to be created for the program is determined. It is recommended to leave the default name as it is to avoid confusion in the future.

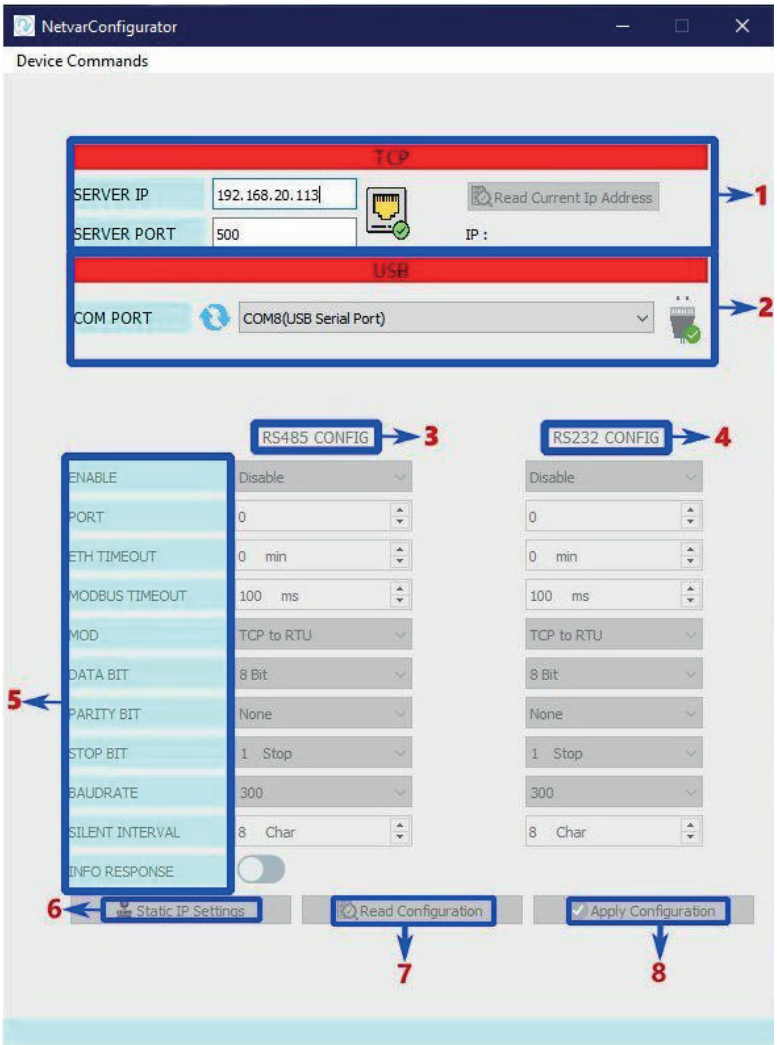


- Finally, press the "Install" button to start the installation and select "yes" in the pop-up window that will appear.

- After the installation is finished, close this screen by pressing the “Finish” button.

*A desktop shortcut is created during installation.

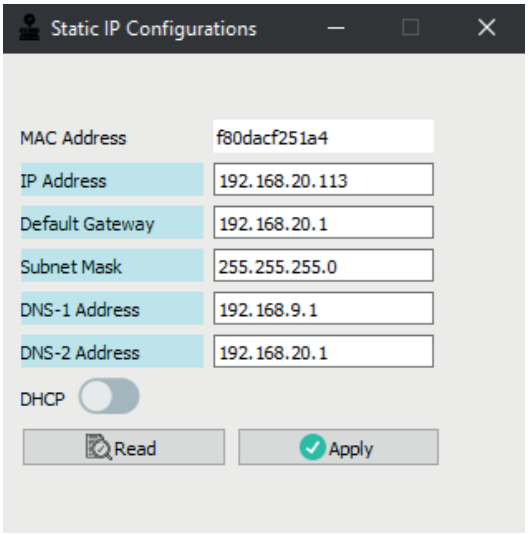
3.2. Use of the Application



3.2.1. GatewayXpert Application

When the application is run, the window shown in 3.2.1. GatewayXpert Application will greet you. The functions of the places marked with numbers are as described below.

1. Server IP and Server Port parameters can be set for TCP connection and “Read Current IP Address” button to read the IP address of the connected device.
2. To connect the modem to a computer via the USB port, select the required USB port and start the connection
3. The parameters under this section are the configuration parameters of the RS485 port of the modem.
4. The parameters under this section are the configuration parameters of the RS232 port of the modem.
5. This section is where the names of the communication parameters of the device are written.
6. The static IP configuration settings of the device are accessed via the “Static IP Settings” button in this section.



Static IP Configuration Window

7. By clicking the “Read Configuration” button in this section, the current configuration settings of the device can be viewed under sections 3 and 4.
8. With the “Apply Configuration” button in this section, the configuration settings specified in sections 3 and 4 are applied to the device.

GatewayXpert v2.01

Device Commands Device Select

ETHERNET

SERVER IP 192.168.0.20

SERVER PORT 502

Read Current Address

192.168.40.100

USB

COM PORT COMG(USB Seri Cihaz)

TCP

SER VER IP

PORT 485 500 Connect

PORT 232 501 Connect

RS485 CONFIG CONFIG

ENABLE	Enable	v
PORT	500	
CONNECT TIMEOUT	JO min	
MODBUS TIMEOUT	1000 ms	
MOD	RTU over TCP	v
DATA BIT	8 Bit	v
PARITY BIT	Nane	v
STOP BIT	1 Stop	v
BAUDRATE	9600	v
SILENT INTER VAL	8 char	
RETRY COUNT	O	
CMD INTER VAL TIM E	100 ms	
PING INTER VAL TIME	2 dk	

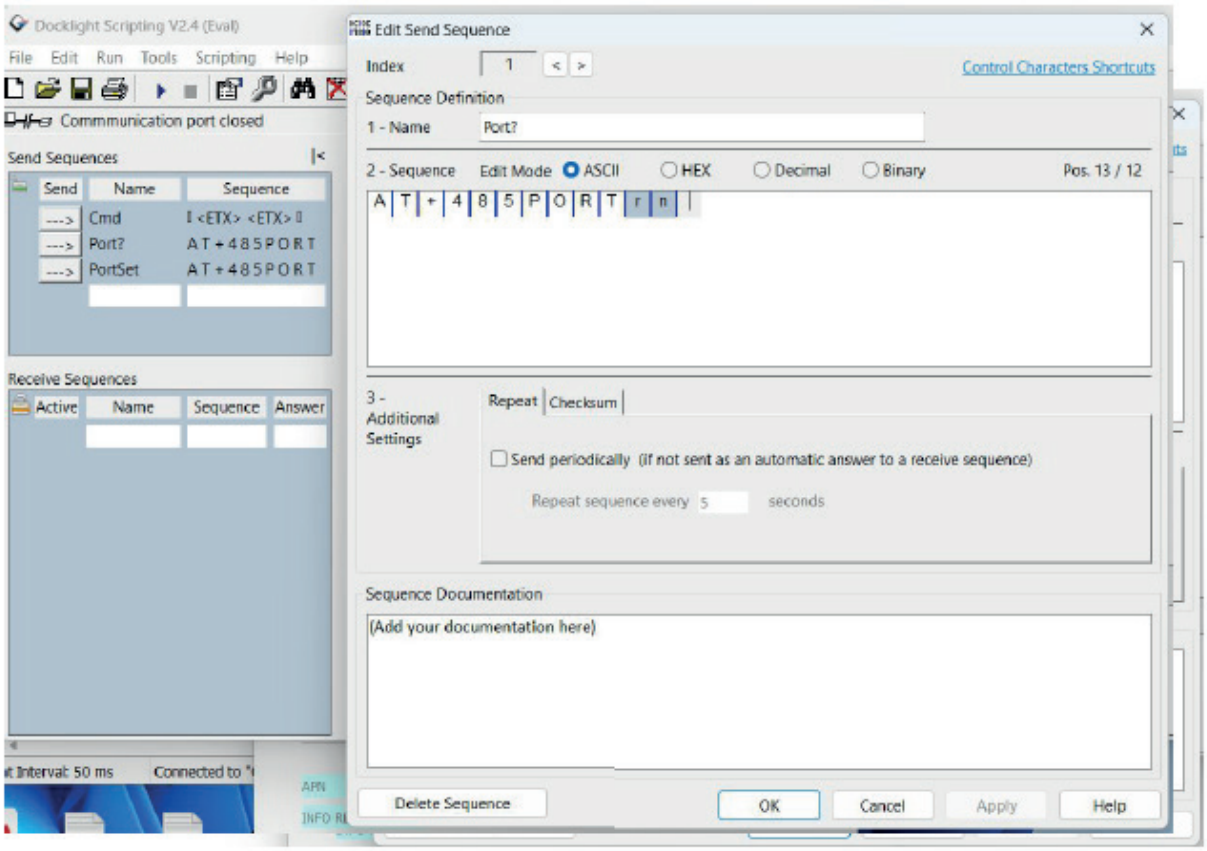
ENERAL

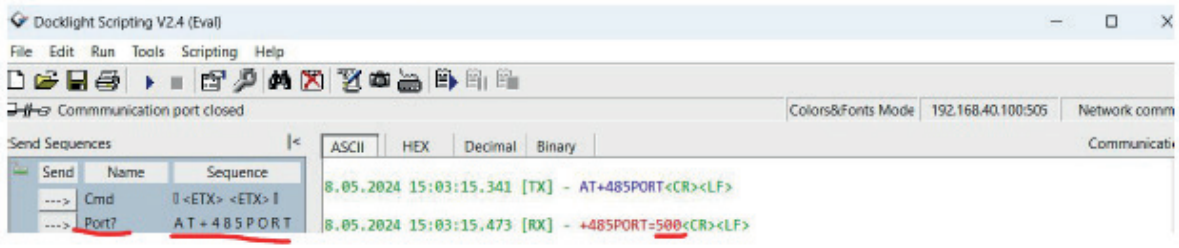
Configuration

To make settings with the GatewayXpert application, you need to connect the modem to the PC via USB cable. Then, in a modem with a network connection, the IP address of the device is learned from the “Read current IP address” section.

For devices connected via RS485, the parameters under the “RS485 Config” heading can be adjusted according to the devices connected to the modem. All settings here can also be adjusted with the parameter command sets in the document. Same situation RS232 also applies to the device connected from the RS485 port.

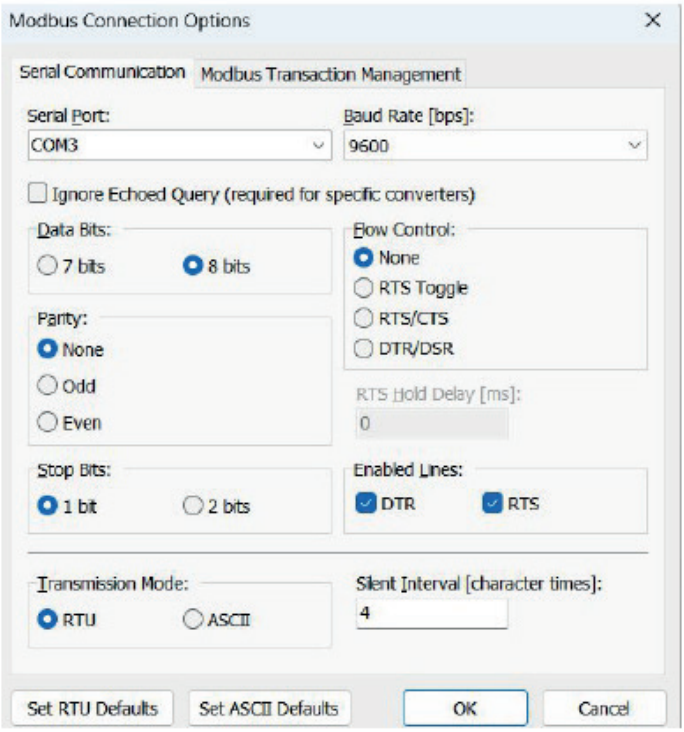
In this example, there is a command to learn the RS485 Port parameter value.





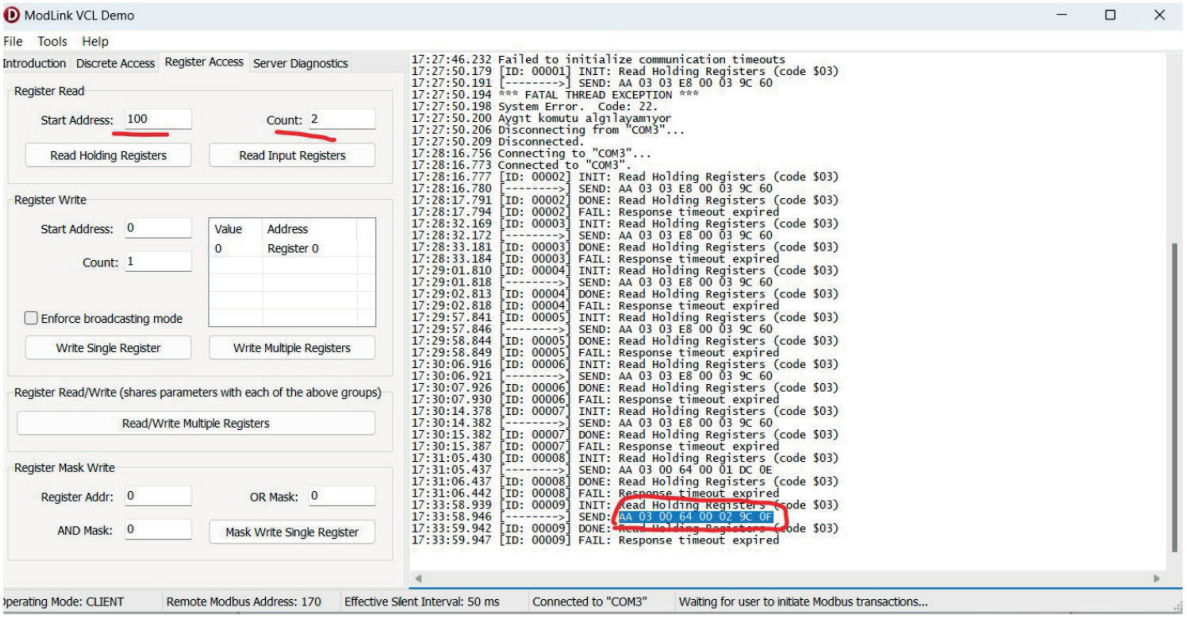
The answer received when the query is made is as follows.

This example shows the query made according to the modbus map of the Grup Arge rail type analyzer. First of all, the connection settings must be made correctly via Modlink. Connection settings are made from the “Modbus Connection Options” page.

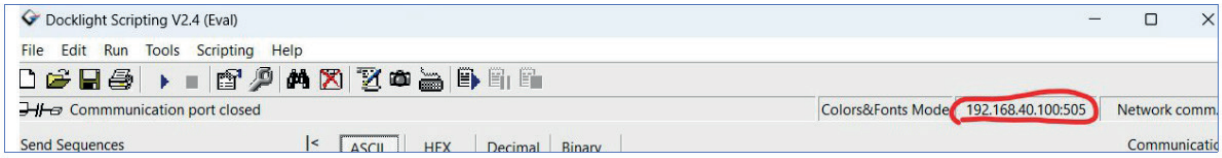


Modbus address of the device is set in “Modbus Client Options” section.

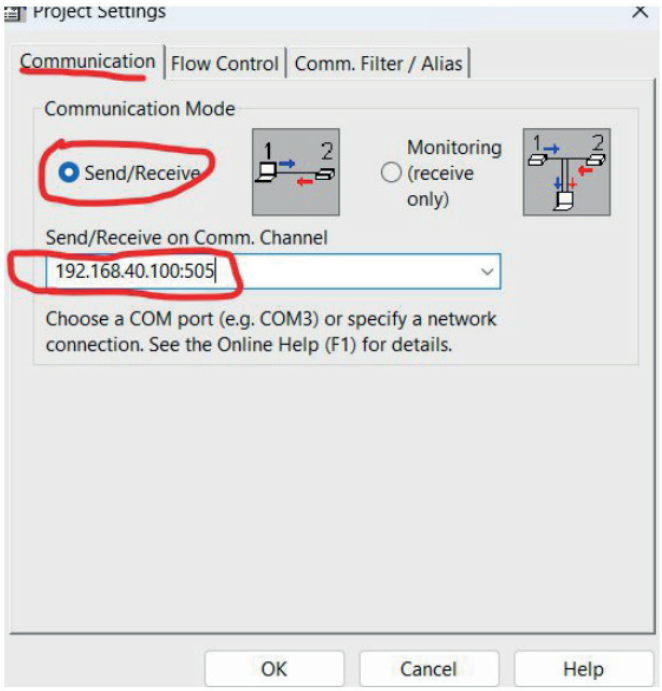
After the above settings are made, the modbus register address to be queried from the “Register Access” section is entered in the “Start Adress” section and if the query will not be made in bulk, only the “Count” section is set according to the length of the relevant register address. For example, if a 32 bit register is to be read, “2” should be written in the “Count” section here. If the size of the register to be read is 16 bits, it should be set to “1”. After entering the values, “Read Holding Register” button is pressed and the HEX query is copied. Here it is not important if there is no answer.



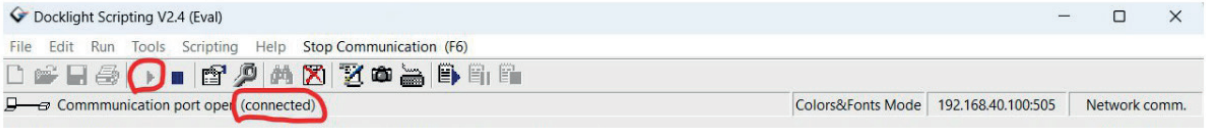
The copied HEX data must be entered into the “Docklight Scripting” application. In order to do this, the “Docklight Scripting” application needs to be configured. After the application is opened, we need to define the “Read current IP address” IP address and RS485 port of the Transparent Modem shown in the GatewayXpert application.



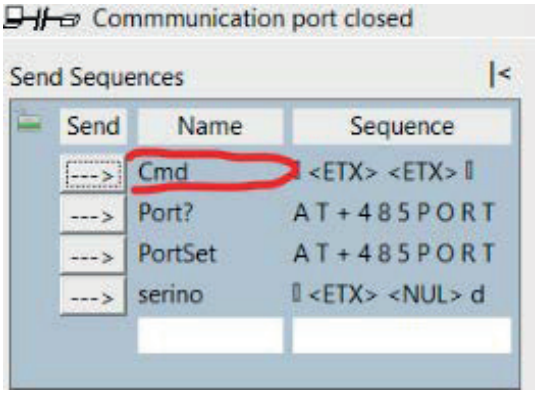
Double click on the marked section to open the setting menu. On the page that opens, in the “Send/Receive on Comm.Channel” section, the “Read current IP address” information that appears in the GatewayXpert application must be written manually, including the port number.



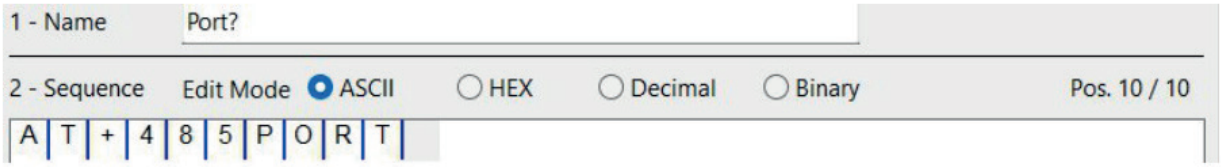
After the settings are made, communication with the modem should be established by pressing the “Play” button in the application. When the connection is established, it will appear as “Connected”.



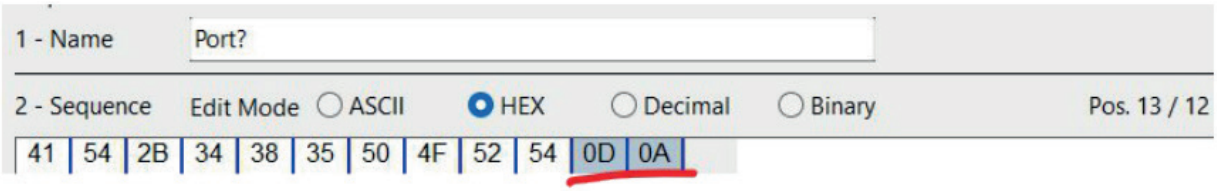
To run the commands in the HT E23 Transparent modem document via the “Docklight Scripting” application, double click the “Name” section in the “Send Sequences” section on the left side.



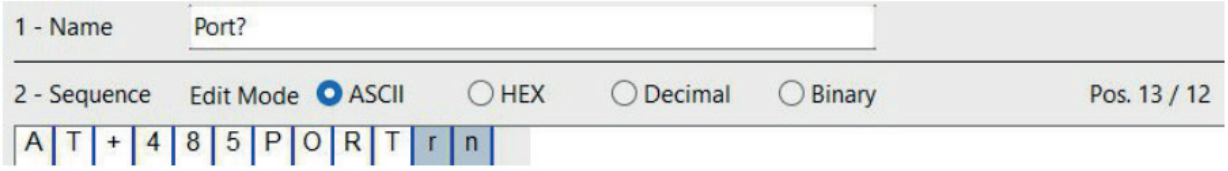
On the screen that opens, the command shown in the document is processed. For example, the command to learn RS485 port information is set as follows. Enter the command when ASCII is selected.



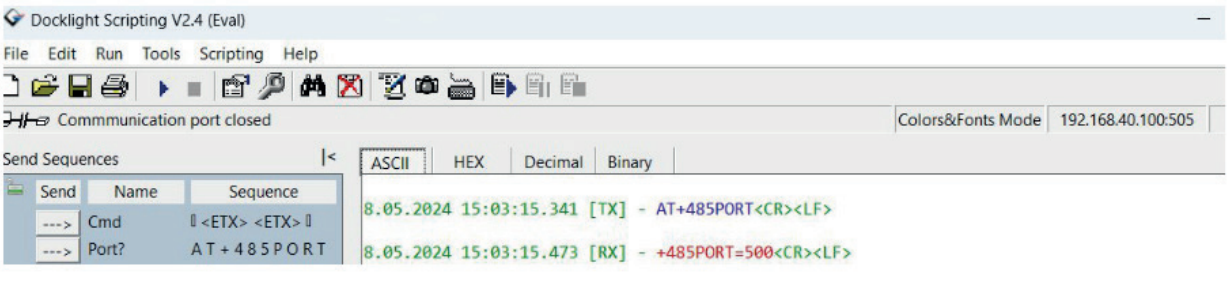
Then select the command HEX and enter “0D - 0A”. All AT commands must be terminated in this way.



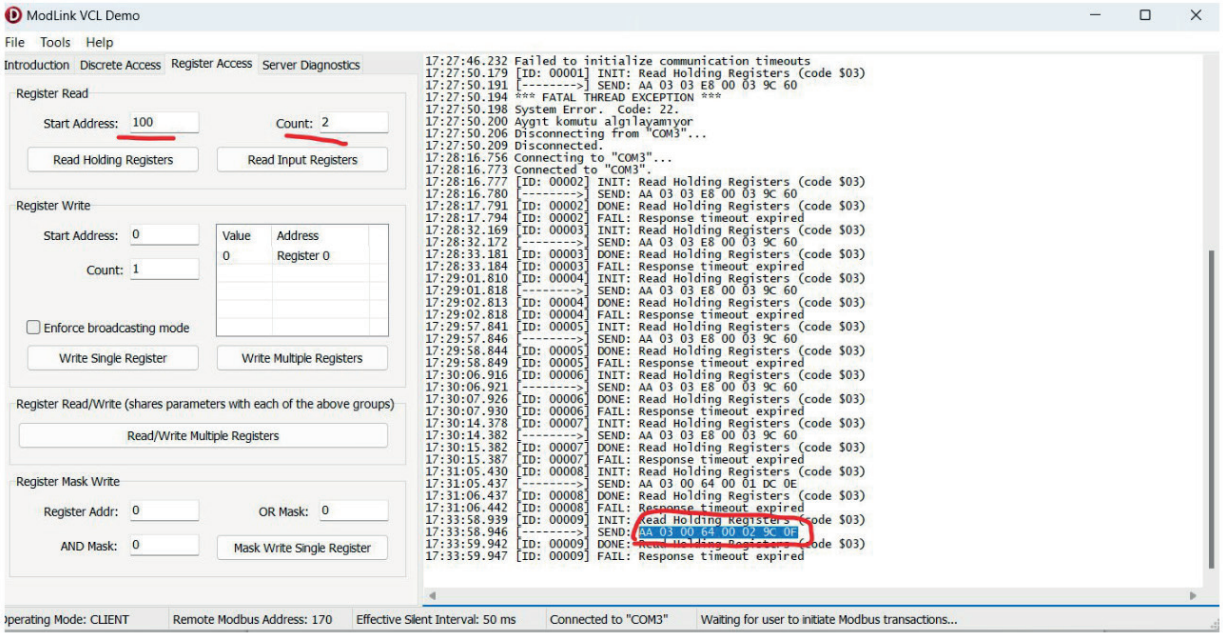
After that, the command to be invoked looks like this.



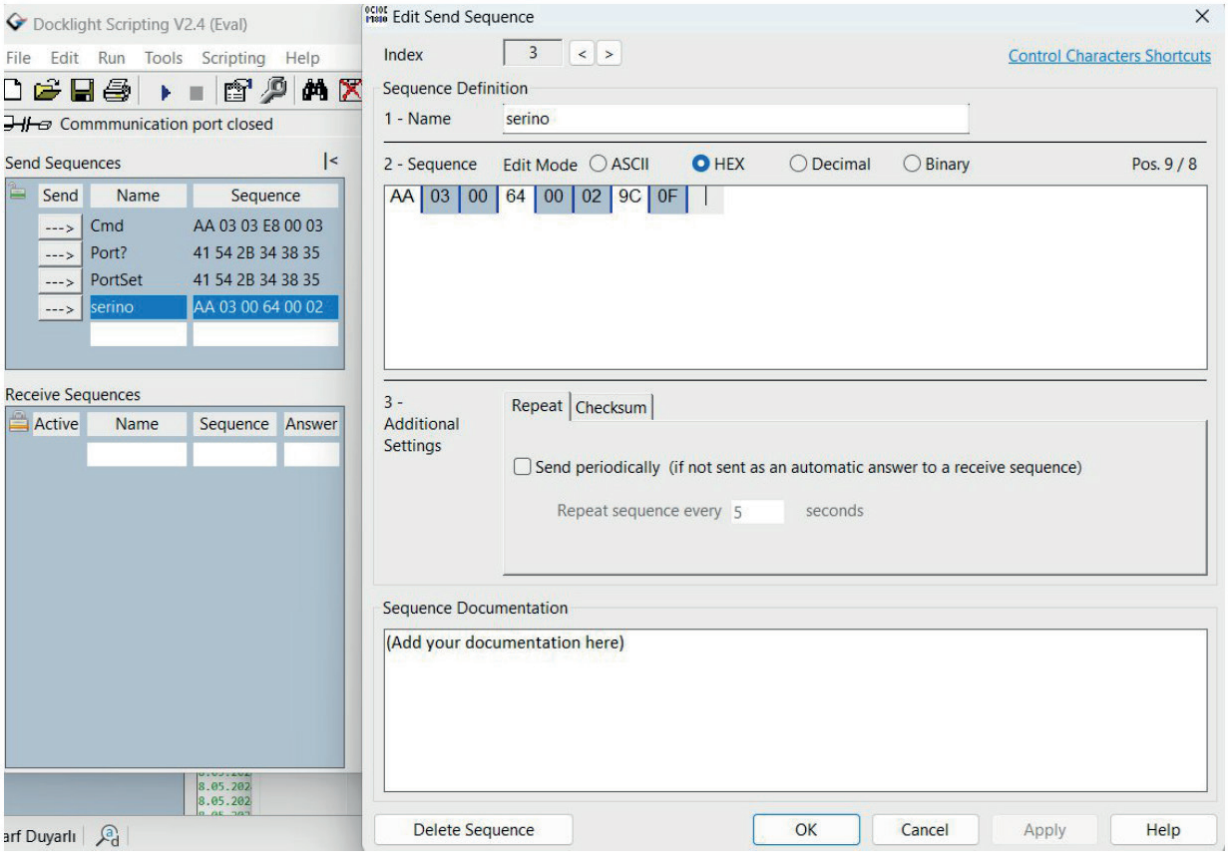
Close this process by saying “Apply” and “Okey”. The command set you created will then appear on the left side of the application. You can run the command by clicking on the arrow on the side and see the result on the right side. Since the result section returns the answer according to the queried function, you should select the appropriate answer type in the section on the right.



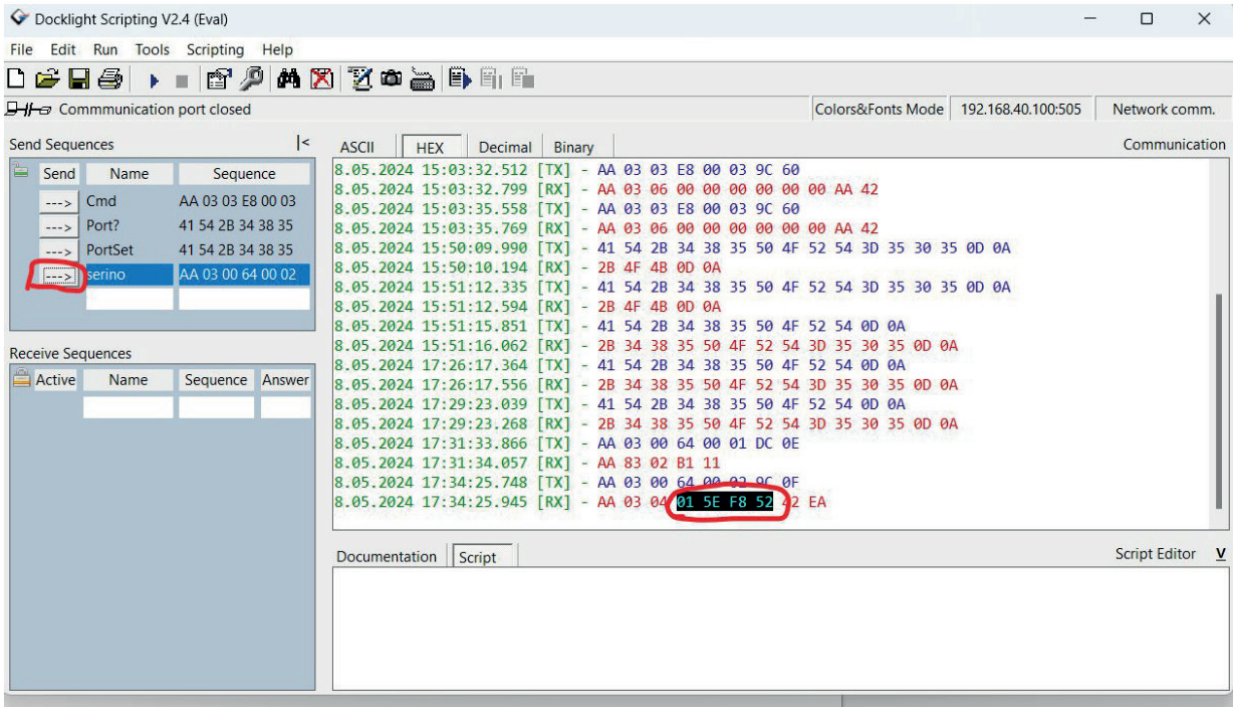
To query or set the data in the Modbus map, we need to define the query HEX information received from the Modlink application to the “Docklight Scripting” application.



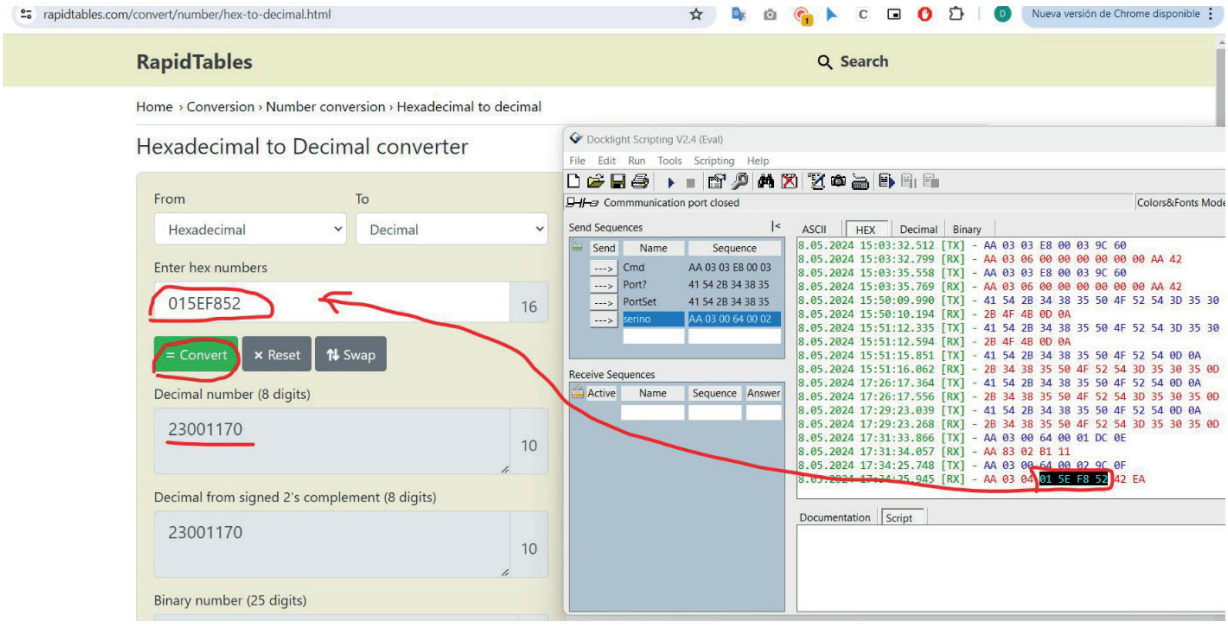
Double click on “Name” in the “Send Sequences” section to open the definition screen and enter the HEX data you copied from the Modlink program.



The command you created by pressing the arrow button on the left side is called and the information returned from the device is received as HEX. The 8 bits of information after the first 6 bits of data in the received HEX content shows us the response from the queried modbus register. You can make sense of this HEX data by converting it to Decimal.



You can convert the HEX data returned from the device with any HEX to Decimal application software or Calculator.



4. TECHNICAL DRAWING