ETOR

Ethernet/Serial Gateway

USER MANUAL

Klemsan®

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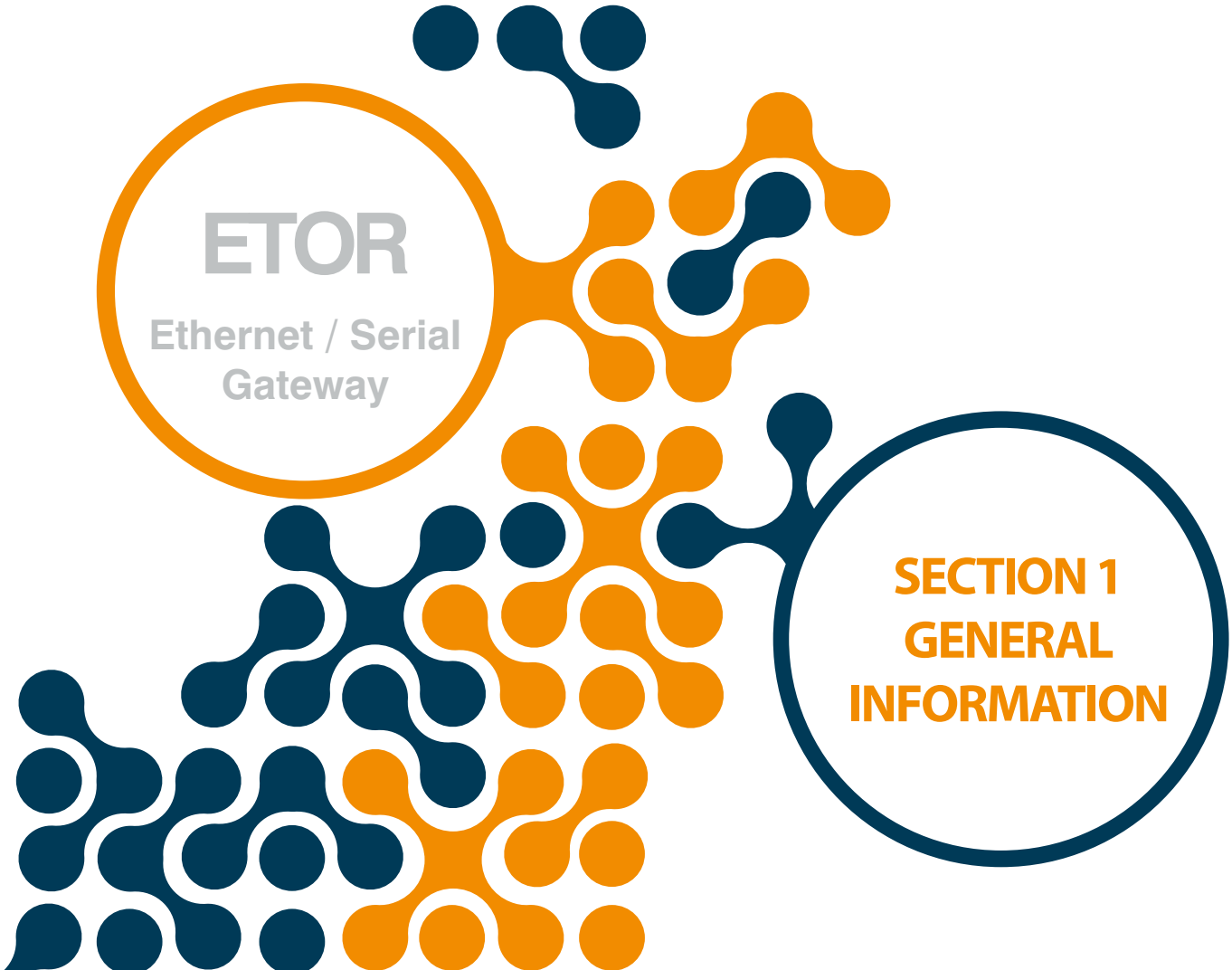
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SECTION 1 GENERAL INFORMATION

ETOR converts between MODBUS and Ethernet protocols and allow user to:
Control and monitor serial devices in the plant over the Internet or local area network with server mode.
Control and monitor devices, that support Ethernet-based protocols, over the serial interface with client mode.

Server Mode:

While operating in the server mode, ETOR converts MODBUS RTU Over TCP, TCP and MODBUS ASCII Over TCP queries that had received from the Internet or local area network to MODBUS RTU and MODBUS ASCII queries and forwards them to serial devices. It converts the response it had received from the devices to query protocol and sends it to the querying device (master).

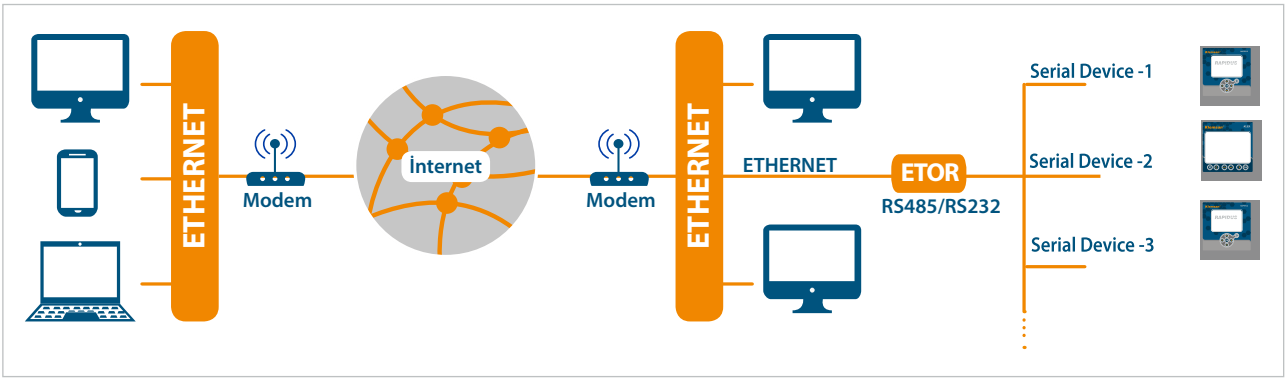


Figure 1-1 General Operating Principle of Server Mode

Table 1-1Protocols Supported in the Server Mode

QUERY SIDE		RESPONSE SIDE	
Physical Port	**Ethernet**	**Physical Port**	**Serial**
Protocol	MODBUS TCP	**Protocol**	MODBUS RTU
	MODBUS RTU Over TCP		MODBUS ASCII
	MODBUS ASCII Over TCP		

Client Mode:

While operating in the client mode, ETOR converts MODBUS RTU and MODBUS ASCII queries that had received from the serial port to MODBUS RTU Over TCP, TCP and MODBUS ASCII Over TCP queries and forwards them to remote devices connected to the Internet or local area network. It converts the response it had received from the devices to query protocol and sends it to the querying device (master).

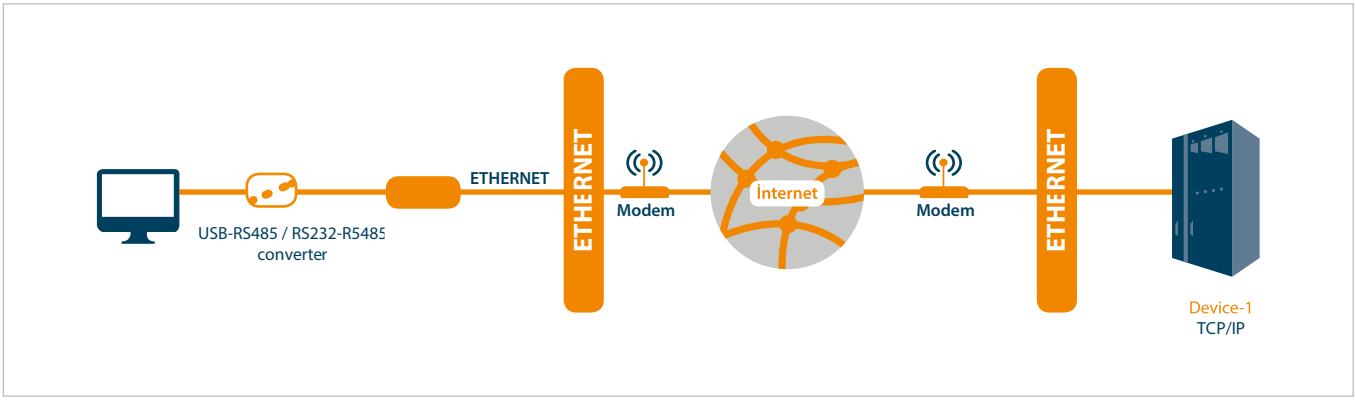
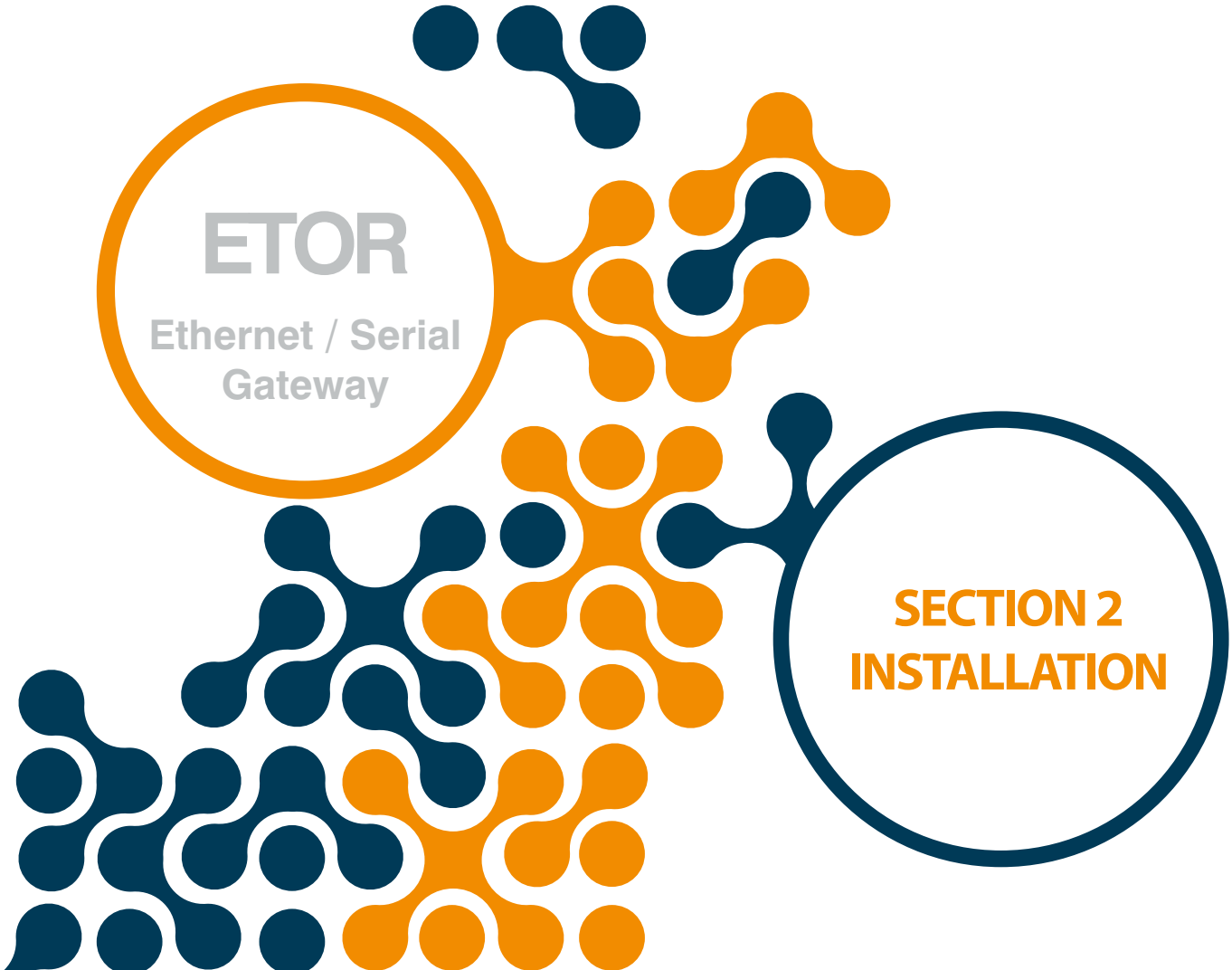


Figure 1-2 General Operating Principle of Client Mode

Table 1-2 Protocols Supported in the Client Mode

QUERY SIDE		RESPONSE SIDE	
Physical Port	**Serial**	**Physical Port**	**Ethernet**
Protocol	MODBUS RTU	**Protocol**	MODBUS TCP
	MODBUS ASCII		MODBUS RTU Over TCP
			MODBUS ASCII Over TCP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INSTALLATION

SECTION 2 INSTALLATION

2.1 Definitions on ETOR

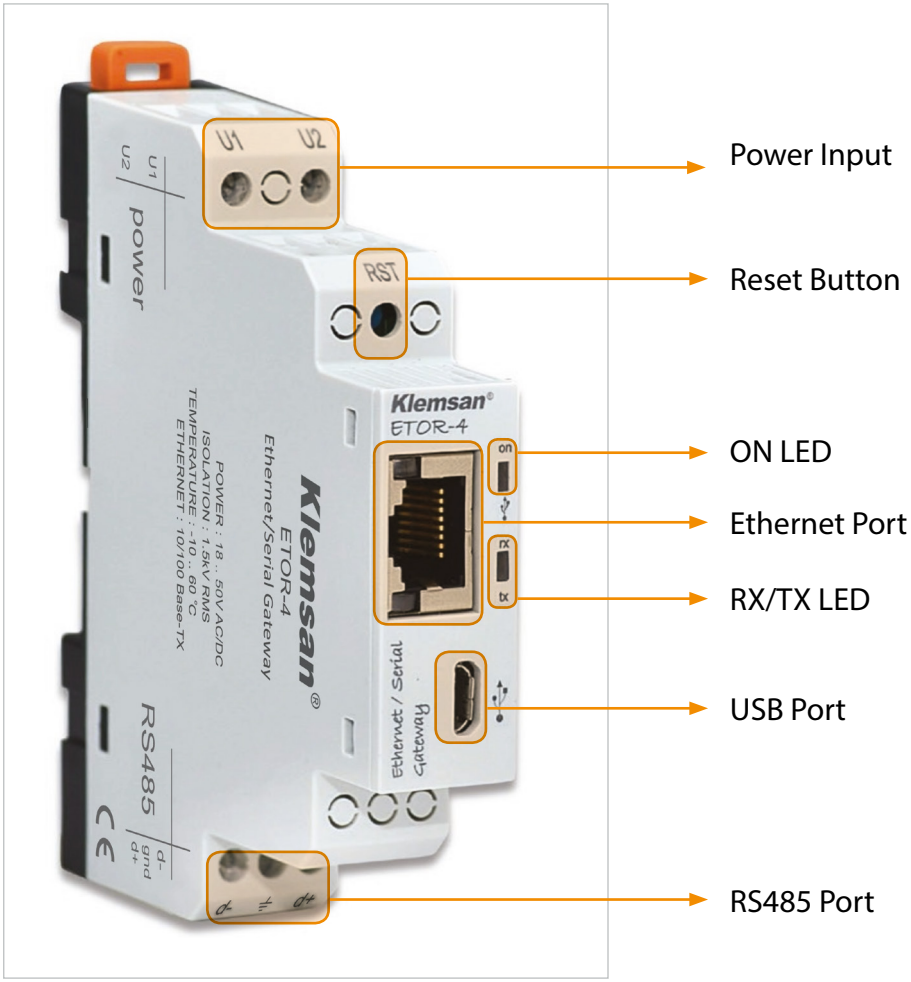


Figure 2-1 Definitions on ETOR

U1-U2 Input:
ETOR is powered on from U1-U2 input. 18 … 50V AC/DC must be applied.

RST Button:
Device is restarted when it is pressed.

ON LED:
When the LED color is orange, that means device is powered on from only U1-U2 input.
When the LED color is orange, that means micro-usb cable is connected to ETOR.

RX/TX LED:
When the LED color is orange, that means device is being responded to RX query.
When the LED color is blue, that means device is being responded to TX query.
If RX/TX queries come to ETOR rapidly, RX/TX LED color can be seem as white.

ON LED & RX/TX LED:
If two of them blink at the same time, it means that ETOR is restarted.

Ethernet Port:
Ethernet cable must be inserted.

USB Port:
Micro-USB cable must be inserted to this port. Device can power on with USB port as well. If operator wants to use Gateway Master must be connected to PC over micro-usb cable.

RS485 Port:
It provides to communicate with the devices that support Modbus Protocol.

2.2 Configuring ETOR

There are three options when ETOR is configured.

1) Using Gateway Master software over USB port. (will be explained in "Section 3")

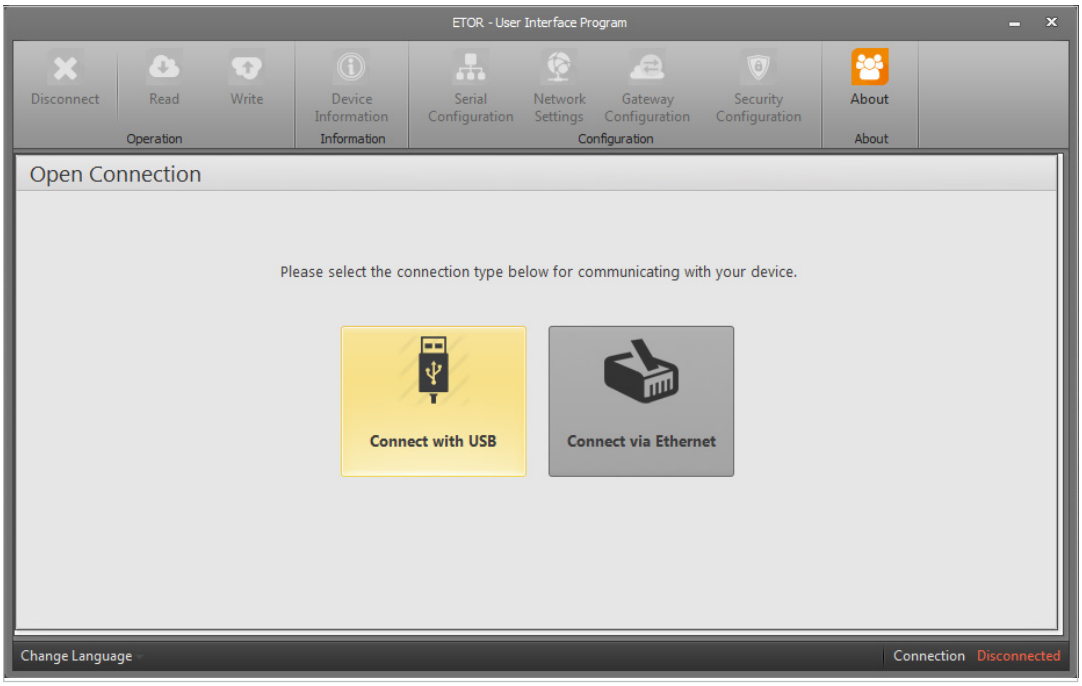


Figure 2-2 Gateway Master Software

2) Writing ETOR's IP address to the Gateway Master. (will be explained in "Section 4")

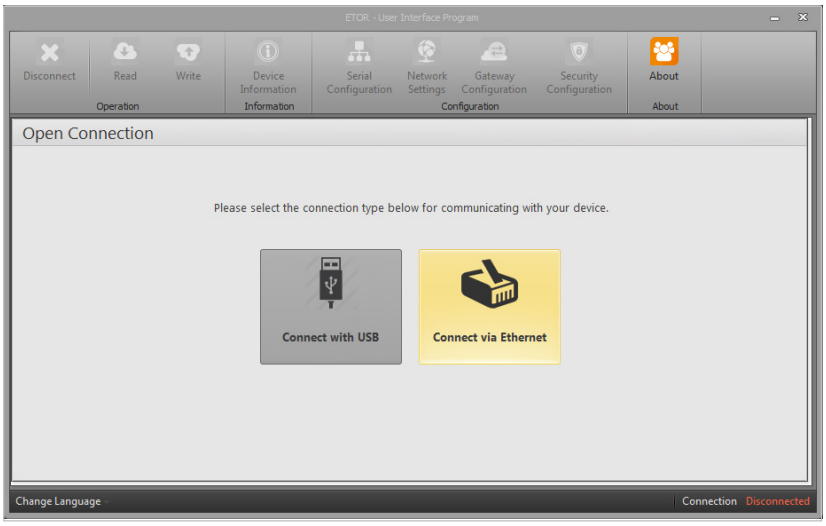


Figure 2-3 Connect via ethernet with Gateway Master

2) Writing ETOR's IP address to the Web browser. (will be explained in "Section 4")

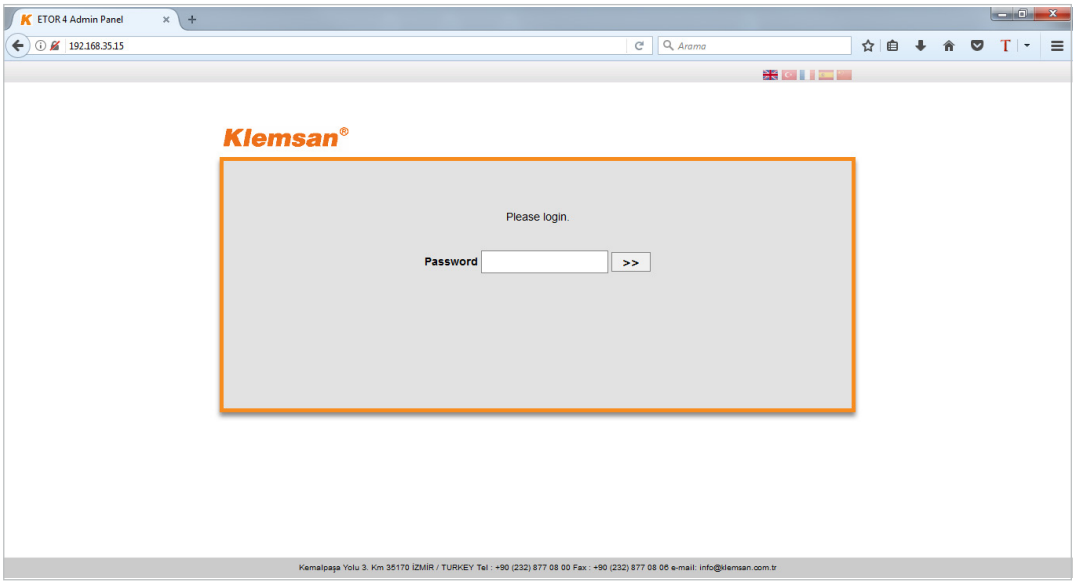


Figure 2-4 ETOR Web interface

NOTE: *In order to access ETOR's web interface; operator should change ETOR's default IP and other related settings with using Gateway Master software.*

2.3 Required Installations for Configuration Software

In order to configure ETOR over USB port, required installations will be explained in this section.
Operator can find necessary files in the CD that is in product box.

- Setup=> GatewayMaster.exe must be installed for ETOR' configuration software.

2.3.1 Installing ETOR Configuration Software

Run GatewayMaster.exe which resides in the CD that comes with the product. After selecting the desired target where software will be setup, click on the "Next" button and continue with the next step.

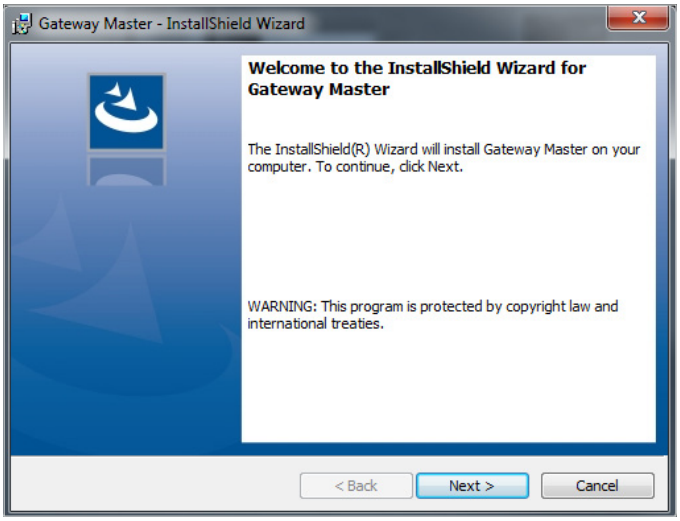


Figure 2-5

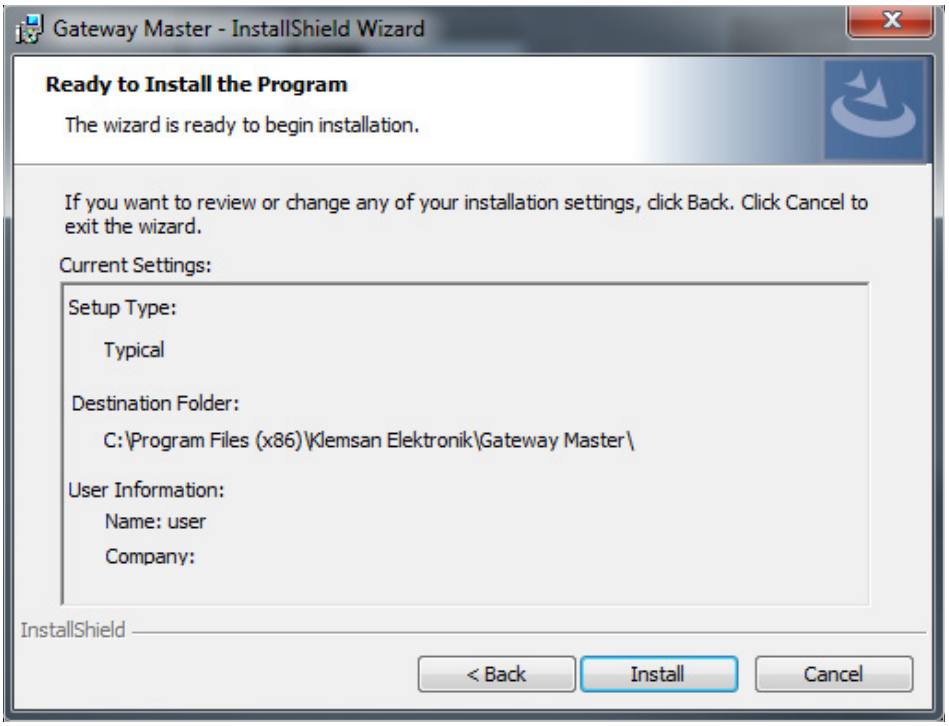


Figure 2-6 Driver Setup (Step 4)

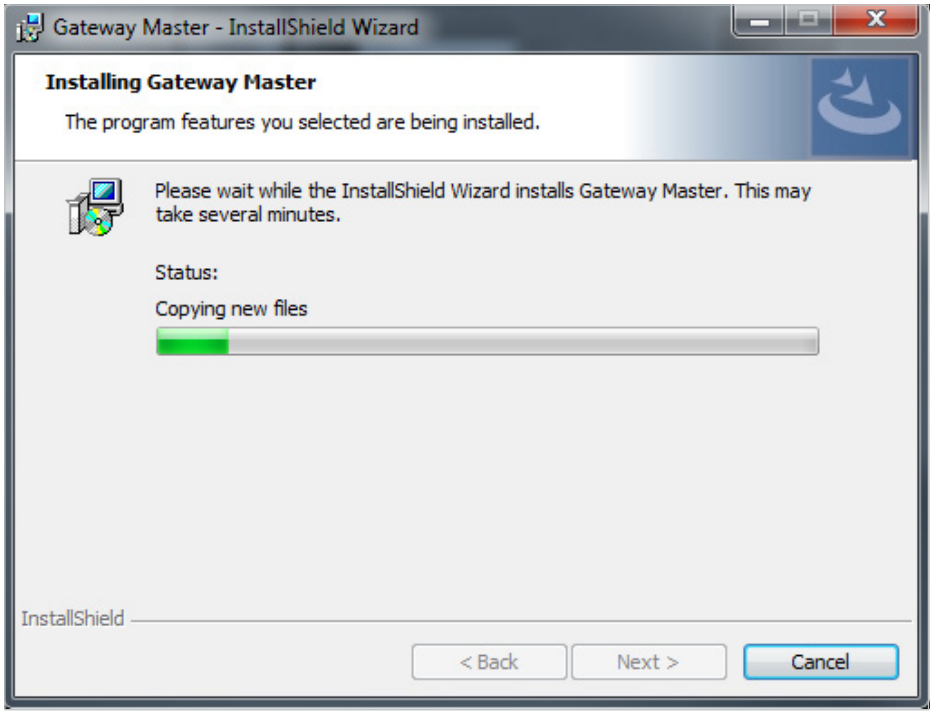


Figure 2-7 Driver Setup (Step 5)

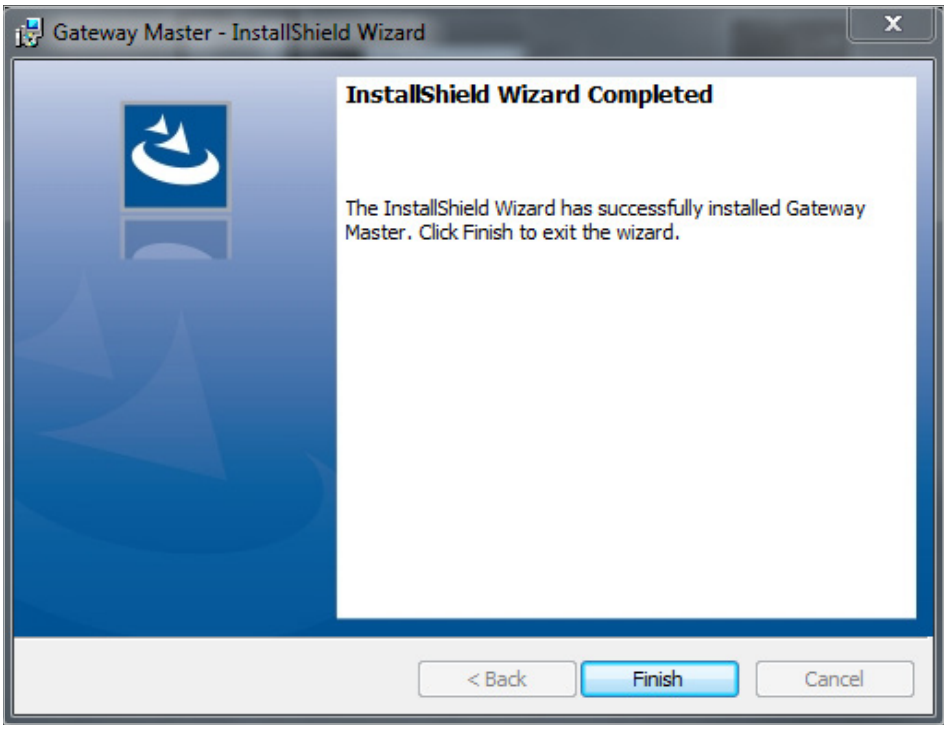


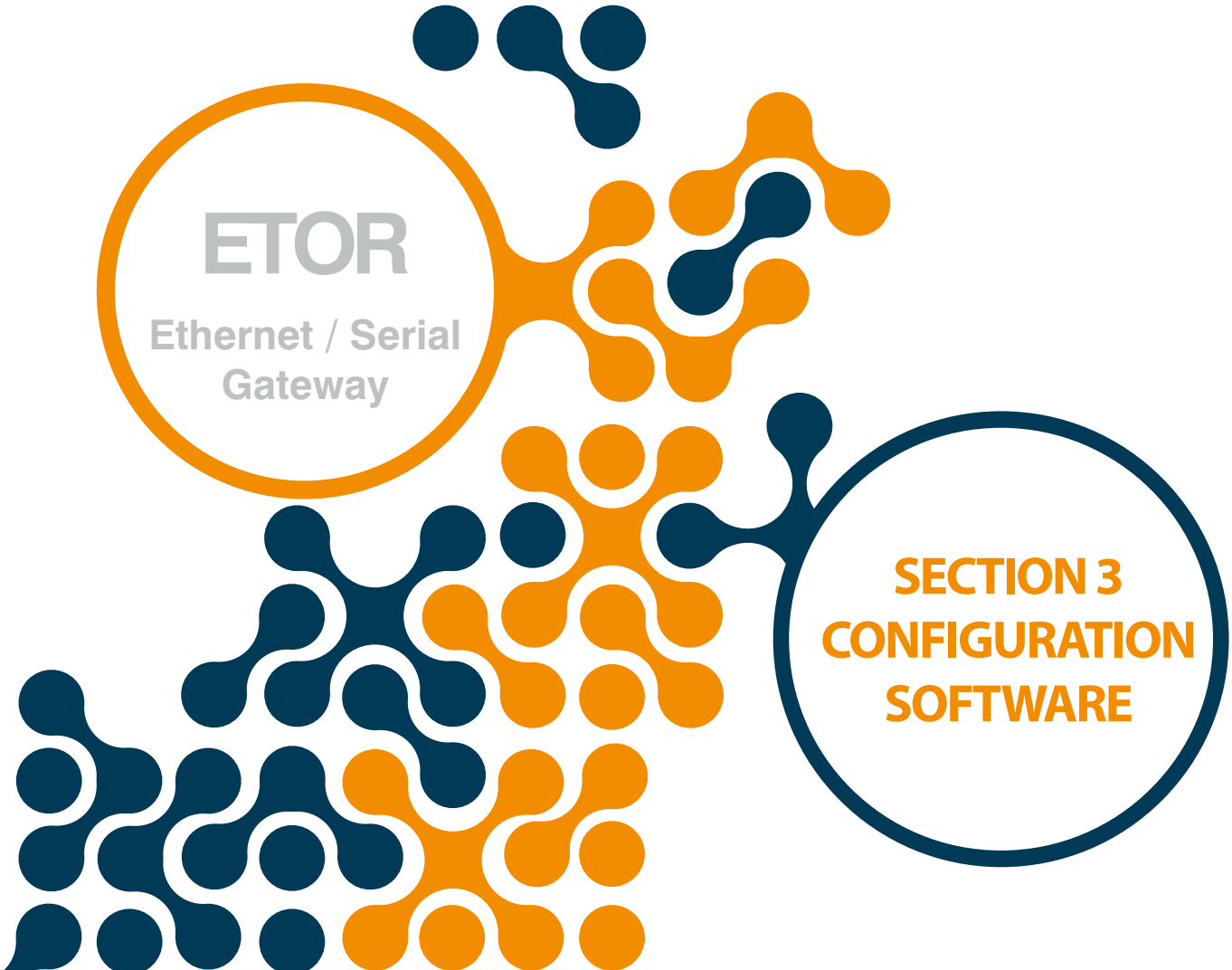
Figure 2-8 Driver Setup (Step 6)

Setup wizard will show a list summarizing the content to be installed. Click the "Next" button again and start setup. When setup is completed, finish the setup by the word "Finish".

After click "Finish" button, USB Driver setup screen shown. An example of installation of ETOR was explained below..

Figure 2-9 Driver Setup (Step 1)

Figure 2-10 Driver Setup (Step 2)


ETOR
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SECTION 3
CONFIGURATION
SOFTWARE

SECTION 3 CONFIGURATION SOFTWARE

After the steps in "Section 2" are completed successfully;

- ETOR must be connected to the PC via Micro-USB cable.
- After that configuration software must be run. Configuration software can be accessed by the shortcut created from the Windows Start menu or by the shortcut created on the desktop.

3.1 Connection Settings

If ETOR is connected to the PC via USB cable, virtual COM port to which ETOR connects will be listed in the software as in Figure 3-2. If the correct port doesn't appear on the list, the list can be updated by clicking the "Refresh" button.

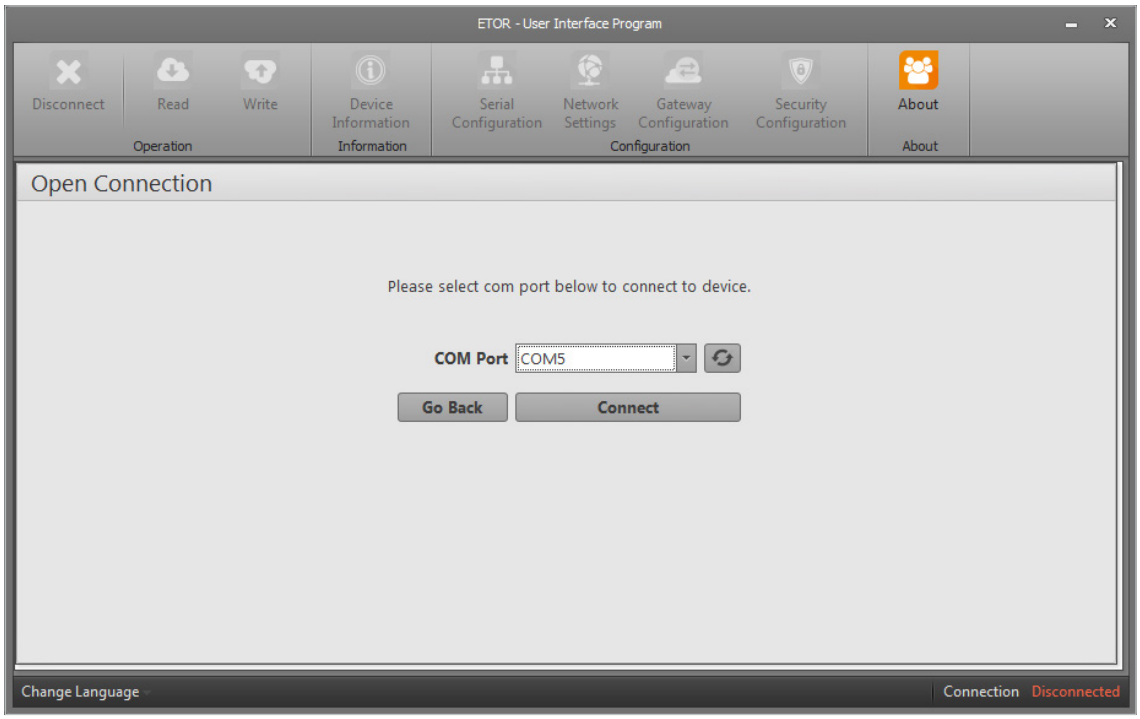


Figure 3-1 Virtual Com Port that ETOR is connected

NOTE: *If the virtual serial port to which ETOR connects is not known, it can be selected as shown in Figure 3-2. After the correct port is selected, software connection to ETOR is ensured by pressing "Connect" button.*

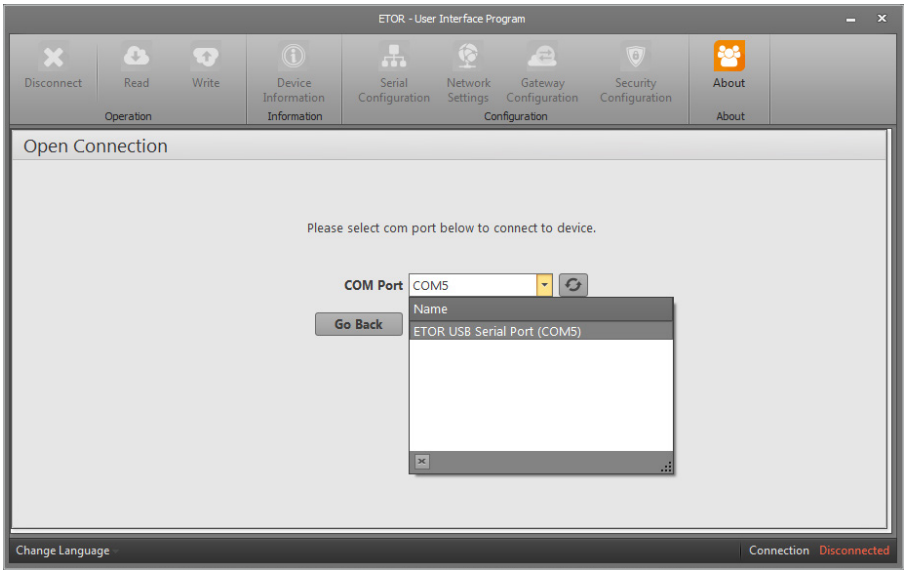


Figure 3-2 COM Port Selection

NOTE: *After the connection, "Device Information", "Serial Configuration", "Network Settings", "Gateway Configuration", "About", "Disconnect", "Read" and "Write" tabs will be enabled and they will be visible on the tabs concerning up-to-date configuration settings of the connected ETOR. ETOR must not be disconnected from the USB without clicking the "Disconnect" button. "Security Configuration" will be enabled when connected via ethernet.*

3.2 Network Settings

In this tab, settings for the network to which ETOR connects are made. Meanings of the terms used in this tab are briefly as follows:

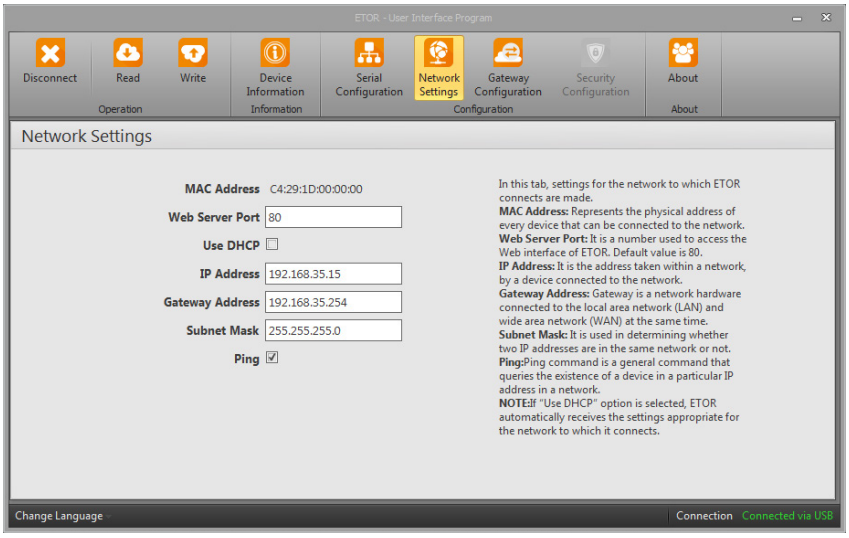


Figure 3-3 Network Settings

MAC Address:

Represents the physical address of every device that can be connected to the network. It is assigned to the devices during production by the producing company and cannot be changed by the user. Even if they have the same brand and model, MAC address has to be different for every device. MAC address is a 48 bit data. They are shown in the order of hexadecimal numbers as follows:

Example:

C4 : 29 : 1D : 00 : 00 : 00

IP Address:

It is the address taken within a network, by a device connected to the network. It is a form of logical addressing but not physical addressing. With the provision that they are in different networks, there can be many devices with the same IP address . IP addresses can be changed by the user. In IPv4 standard, IP addresses are represented by 4 bytes. They are shown in the order of decimal numbers as follows:

Example:

192.168.35.15

Gateway Address:

Gateway is a network hardware connected to the local area network (LAN) and wide area network (WAN) at the same time. There are different IP addresses in the local area network and wide area network. Gateway address is the IP address of the gateway in the local area network. Data packages forwarded to this IP address are handled in the gateway and transferred to the wide area network.

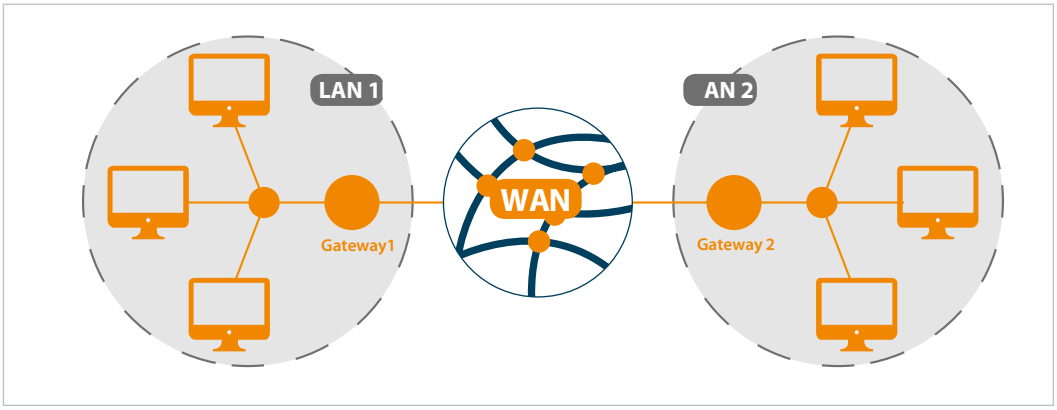


Figure 3-4 Operating Principle of The Gateway

Subnet Mask:

It is used in determining whether two IP addresses are in the same network or not.

Network settings of ETOR can be configured in two ways:

1. When "Use DHCP" is selected, ETOR automatically receives the settings appropriate for the network to which it connects.

2. If the IP address is to be entered by the gateway and subnet mask, "Use DHCP should not be selected and values compatible with the network to which ETOR connects should be entered in the appropriate fields. Default network settings of ETOR are as follows:

Table 3-1 Default Network Settings of ETOR

Network Configuration	Manual (DHCP off)
IP Address	192.168.35.15
Gateway Address	192.168.35.254
Subnet Mask	255.255.255.0
Web Server Port	80
Ping	Selected

Web Server Port:

It is a number used to access the Web interface of ETOR. Default value is 80. In order not to experience any problems in routing , it is recommended not to have another device connected to the network listening to the selected port. When a port number other than the default value is used, write ";" and then the selected port number in the address line of the Web browser, after the IP address in order to access the Web interface.

Example:

If IP address of ETOR is assigned as 192.168.35.27 and network server port as 601, the address 192.168.35.27:601 must be written in the address area of the Web browser in order to access Web interface.

Ping:

Ping command is a general command that queries the existence of a device in a particular IP address in a network. By this command, it is also possible to check whether ETOR is connected to the network properly. If this option is enabled, ETOR responds to the ping query, if it is not, ETOR does not respond to the ping query.

3.3 Serial Port Settings

In this tab, serial communication settings of ETOR are made. Values in this tab should be selected in accordance with the devices with serial interfaces in the MODBUS network. If these values are not set in accordance with the MODBUS network, a healthy serial communication will not be performed. Default serial communication settings for ETOR are as follows:

Table 3-2 Default Serial Port Settings for ETOR

Baud Rate	38400
Stop Bit	1
Parity	None

Baud Rate:
ETOR supports 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 baud rates.

Stop Bit:
ETOR supports 1 and 2 stop bit.

Parity:
ETOR supports single parity and double parity modes and modes without parity.

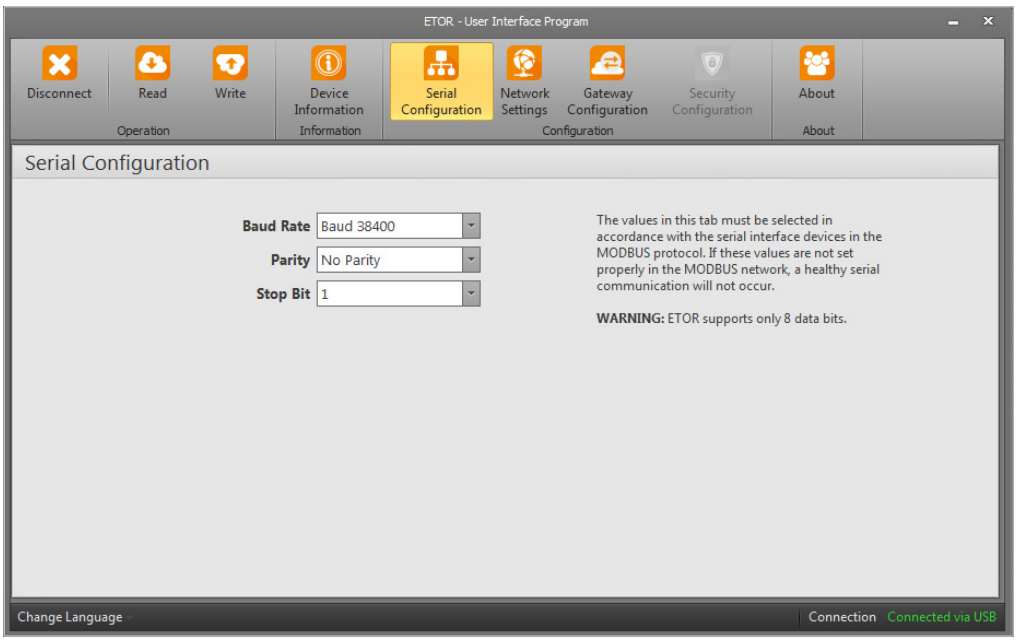


Figure 3-5 Serial Port Settings

3.4 Gateway Settings

ETOR can be worked as a server or client. Gateway Settings tab is divided into two sub sections independently from Server or Client Mode.

- MODBUS Request Side (interface in which information will be requested from ETOR)
- MODBUS Response Side (interface in which ETOR will make queries).

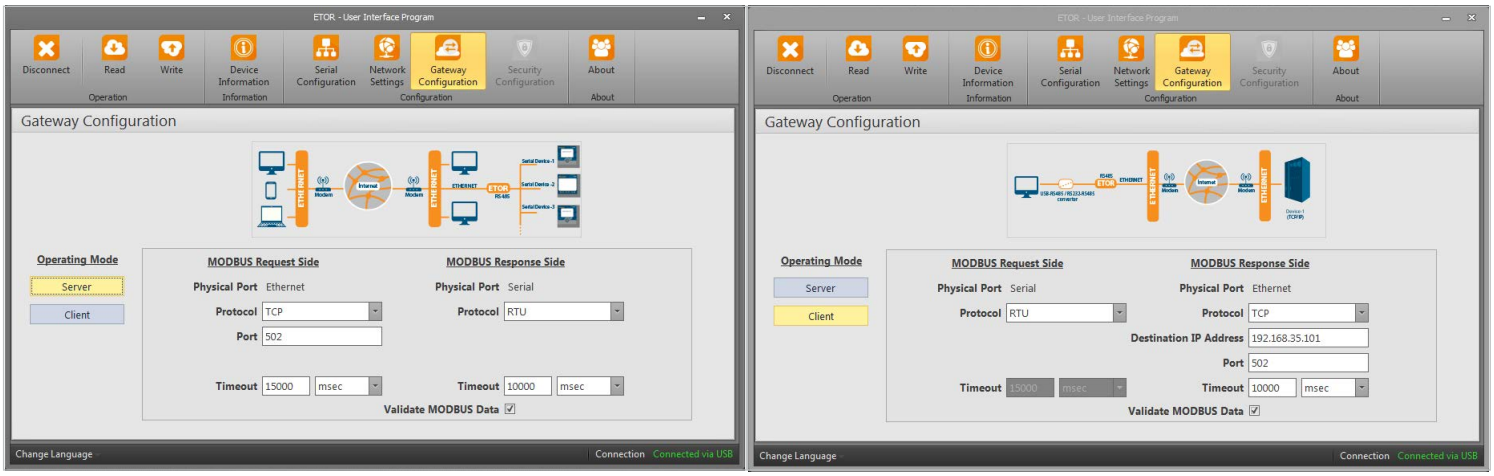


Figure 3-6 Gateway Settings

NOTE: *If the option "Validate MODBUS data" is not active, the data flow is carried out using the communication protocol of the existing system.*

When the "Validate MODBUS data" option is active, data flow is allowed if it communicates with the MODBUS protocol during data transfer. If the protocol is not MODBUS, communication will not take place.

Default gateway settings of ETOR are as follows:

Table 3-3 Default Gateway Settings of ETOR

	MODE OF OPERATION	PHYSICAL PORT	PROTOCOL	PORT	TIMEOUT
MODBUS REQUEST SIDE	Server	Ethernet	Modbus TCP	502	10000 msec
MODBUS RESPONSE SIDE	Server	Serial	Modbus RTU	-	1000 msec

3.4.1 Server Mode

While operating in the server mode, ETOR converts MODBUS RTU Over MODBUS TCP, TCP and MODBUS ASCII Over TCP queries it had received from the Internet or local area network to MODBUS RTU and MODBUS ASCII queries and forwards them to serial devices.

It converts the response it had received from the devices to query protocol and sends it to the querying device (master).

3.4.1.1 Modbus Request Side

Physical Port:
In the server mode, notification areas in MODBUS Request Side (interface in which information will be requested from ETOR) pane and settings that can be performed are as follows:

Protocol:
Types of MODBUS queries coming to ETOR over the Ethernet connection is identified by the help of this area. Either MODBUS RTU Over MODBUS TCP, TCP or MODBUS ASCII Over TCP is selected.

Port:
Port to which ETOR will listen.

Timeout:
In the server mode, if a new query does not come to ETOR until the end of timeout period at the query side, ETOR shuts down the TCP connection to the machine sending query and allocates resources for the new TCP connections. If the time between the two queries is greater than the timeout period, a new TCP connection should be made before the query is sent.

3.4.1.2 Modbus Response Side

In server mode, notification areas in the MODBUS Response Side (interface in which ETOR will make queries) pane and settings that can be performed are as follows:

Physical Port:
It is for notification purposes. While running in the server mode, MODBUS responses have to come to ETOR over serial connection.

Protocol:
Types of MODBUS responses coming to ETOR over serial connection is identified by the help of this field. Either MODBUS RTU protocol or MODBUS ASCII protocol is selected.

Timeout:
It is the wait time for response from each device on ETOR' s MODBUS network. If no response is received from the device to which the query is sent, switching to the next remote connection query is performed.

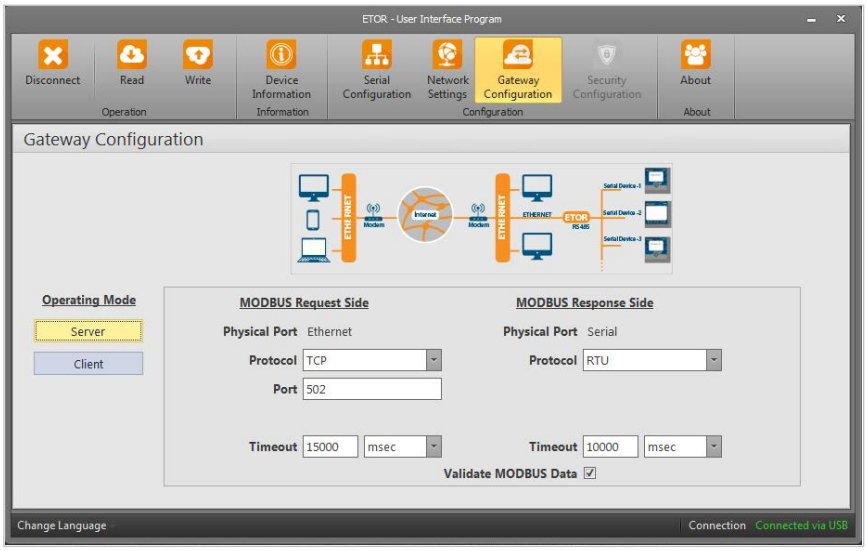


Figure 3-7 Server Mode Settings Screen

Server Mode Communication Example:
In this scenario, it is desired to take data from a device that accepts MODBUS RTU query using a computer that is connected to the network. MODBUS software in the computer can create MODBUS TCP queries only from port no. 502. In this case, in oder to have a healthy data communication, the following steps should be taken:

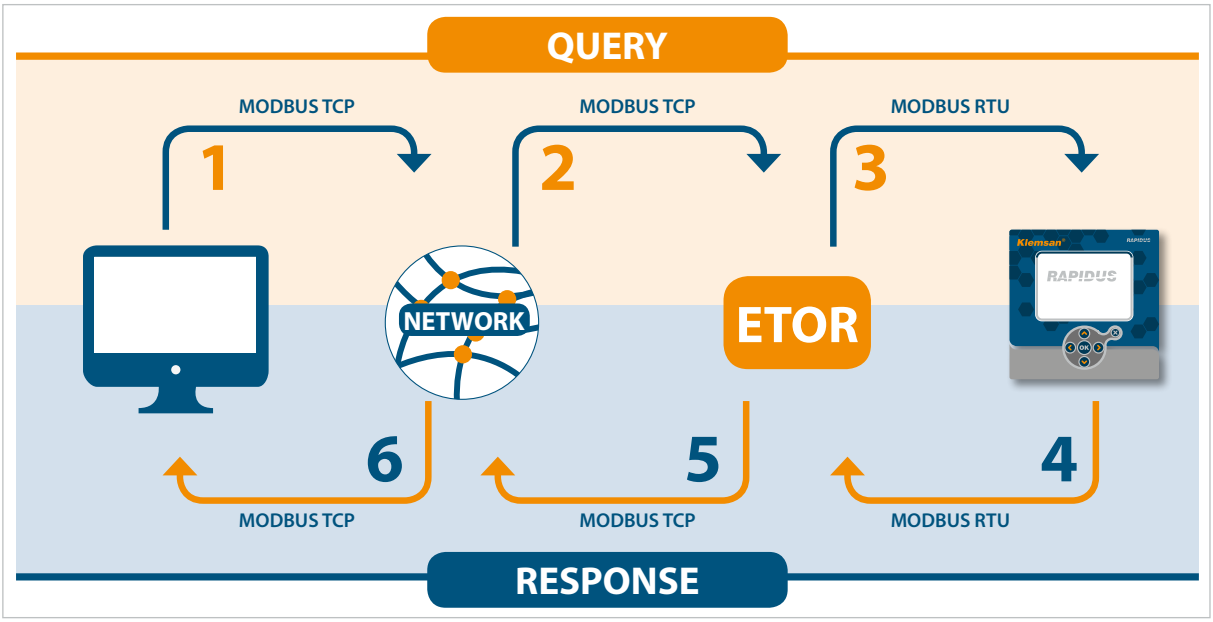


Figure 3-8 Server Mode Data Communication Scenario

Serial communication parameters of the serial device in slave status are as follows:

Table 3-4 Server Mode Serial Communication Settings

Baud Rate	57600
Stop Bit	1
Parity	None

1. MODBUS TCP query created by the software in the computer is sent to the network via Ethernet port.

2. Being connected to the same network, ETOR takes MODBUS TCP from the Ethernet port and converts it to MODBUS RTU query.

3. ETOR forwards the converted query to the serial device via serial port and waits for response until timeout period expires (1 second is assumed to be enough for this scenario).

4. Serial device forwards the data that comes from ETOR and that correspond to MODBUS RTU query to ETOR in the form of MODBUS RTU response from its serial port. ETOR receives the response from its serial port and converts it to MODBUS TCP response.

5. ETOR sends the converted MODBUS TCP response to the network via Ethernet port.

6. Software in the computer notifies the user by using MODBBUS TCP response it had received from the network.

Taking this into account, serial communication and gateway settings of ETOR should be configured as follows:

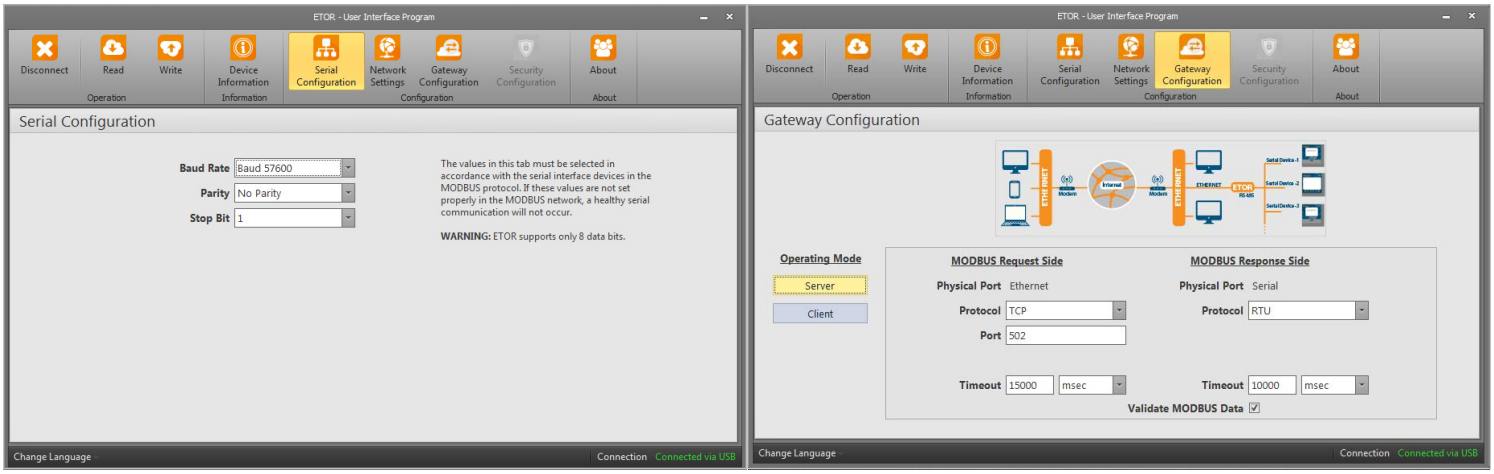


Figure 3-9 Server Mode Communication Example

3.4.2 Client Mode

While operating in the client mode, ETOR converts MODBUS RTU and MODBUS ASCII queries it had received from the serial port to MODBUS RTU Over MODBUS TCP, TCP and MODBUS ASCII Over MODBUS RTU and TCP queries and forwards them to remote devices connected to the Internet or local area network.
It converts the response it had received from the devices to query protocol and sends it to the querying device (master).

3.4.2.1 Modbus Query Side

In the client mode, notification areas in MODBUS Query Side (interface in which information will be requested from ETOR) pane and settings that can be performed are as follows:

Physical Port:
It is for notification purposes. While running in the client mode, MODBUS responses have to come to ETOR over the serial connection.

Protocol:
Types of MODBUS responses coming to ETOR over serial connection is identified by the help of this field. Either "MODBUS RTU" protocol or "MODBUS ASCII" protocol is selected.

3.4.2.2 Modbus Response Side

In the client mode, notification areas in the MODBUS Response Side (interface in which ETOR will make queries) pane and settings that can be performed are as follows:

Physical Port:
It is for notification purposes. While running in the client mode, MODBUS queries have to come to ETOR over the Ethernet connection.

Protocol:
Types of MODBUS responses coming to ETOR through Ethernet connection is identified by the help of this field. Either MODBUS RTU Over TCP, TCP or MODBUS ASCII Over TCP is selected.

Port:
Port to which ETOR will listen.

Target IP Address:
Port to which ETOR will connect.

Timeout:
Throughout this period, ETOR waits response for the last query it had sent to the slave devices. If it does not receive any response over this period, it waits for a new query from the serial interface.

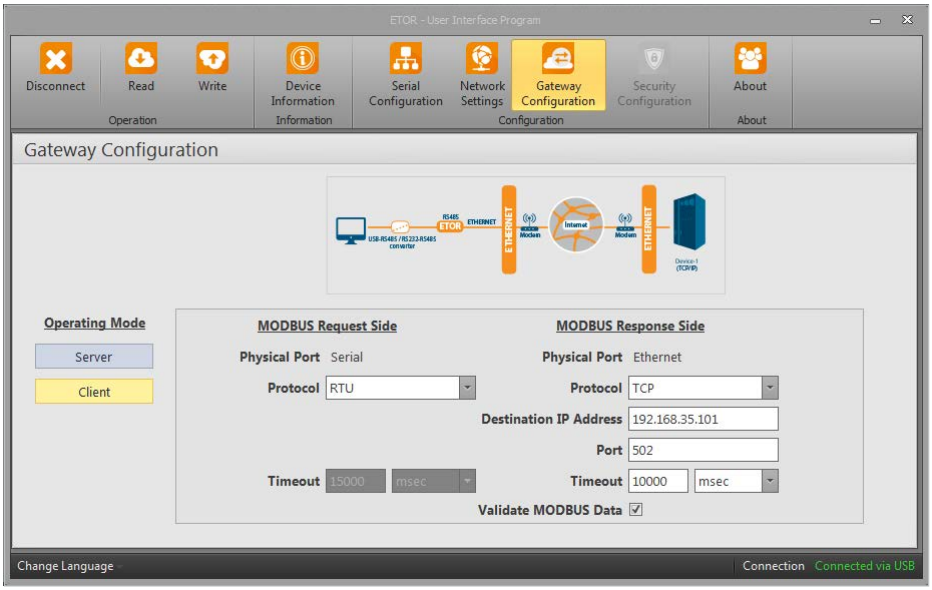


Figure 3-10 Client Mode Settings Screen

Server Mode Communication Example:

In this scenario, it is desired to take data from a device at address 192.168.1.101, that accepts MODBUS RTU query from port no. 502, using a computer that is not connected to the network.

MODBUS software in the computer can create MODBUS ASCII queries . In this case, in oder to have a healthy data communication, the steps below need to be followed:

1. MODBUS ASCII query created by the software in the computer is sent to ETOR via serial port.

2. ETOR receives MODBUS ASCII query from its Ethernet port and converts it to MODBUS TCP query.

3. ETOR forwards the converted query to slave device via the Ethernet port and waits for the response until timeout period expires (1 second is assumed to be enough for this scenario).

4. Slave device forwards the data that correspond to MODBUS TCP query and come from ETOR to ETOR in the form of MODBUS TCP response from its Ethernet port. ETOR receives the MODBUS TCP response from the Ethernet port and converts it to MODBUS ASCII response.

5. ETOR sends the converted MODBUS ASCII response to the computer via the serial port.

6. Software in the computer notifies the user by using MODBBUS ASCII response it receives from the network.

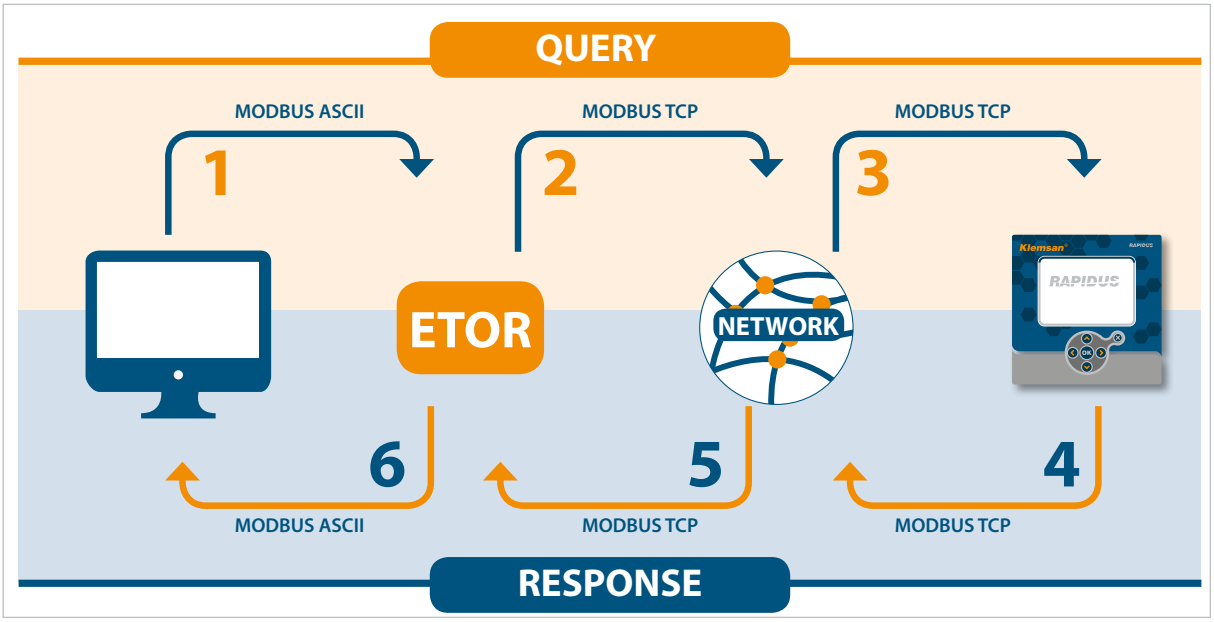


Figure 3-11 Client Mode Data Communication Scenario

Serial communication parameters of the serial device in master status are as follows:

Table 3-5 Mode Serial Communication Settings

Baud Rate	57600
Stop Bit	1
Parity	None

Taking this into account, serial communication and gateway settings of ETOR should be configured as follows:

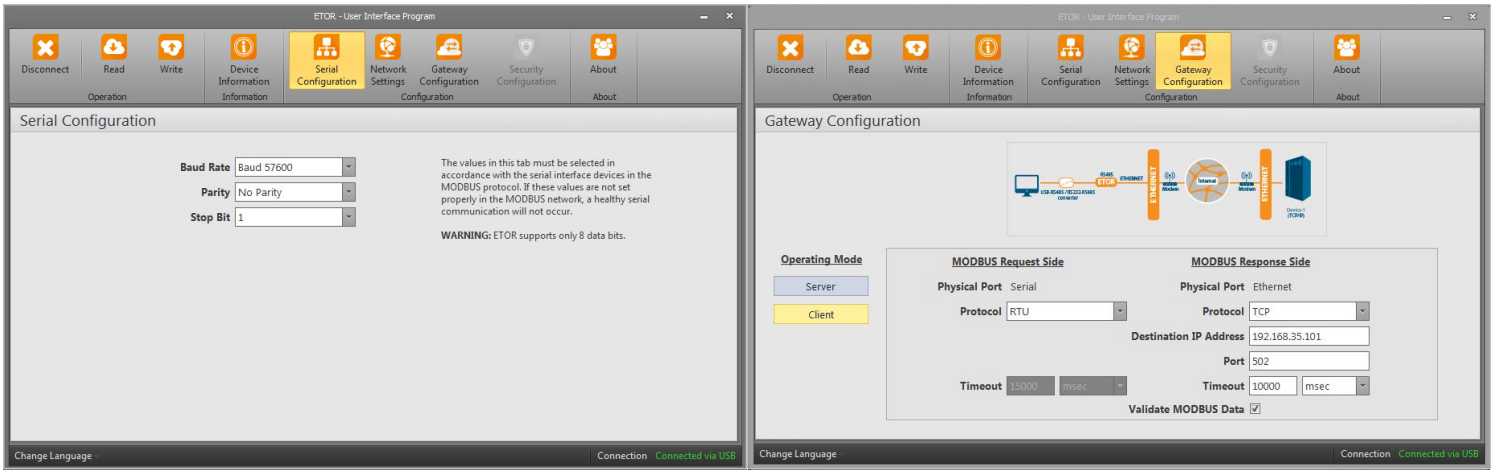


Figure 3-12 Client Mode Communication Example

3.5 Device Information Page

Information on model, serial number, software version, PCB version and assembly date of ETOR are included in this tab.

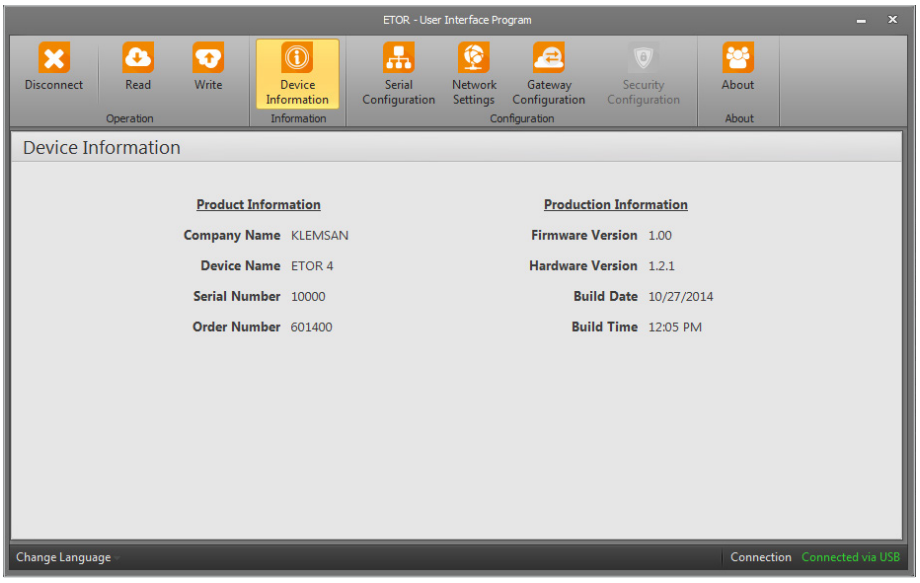
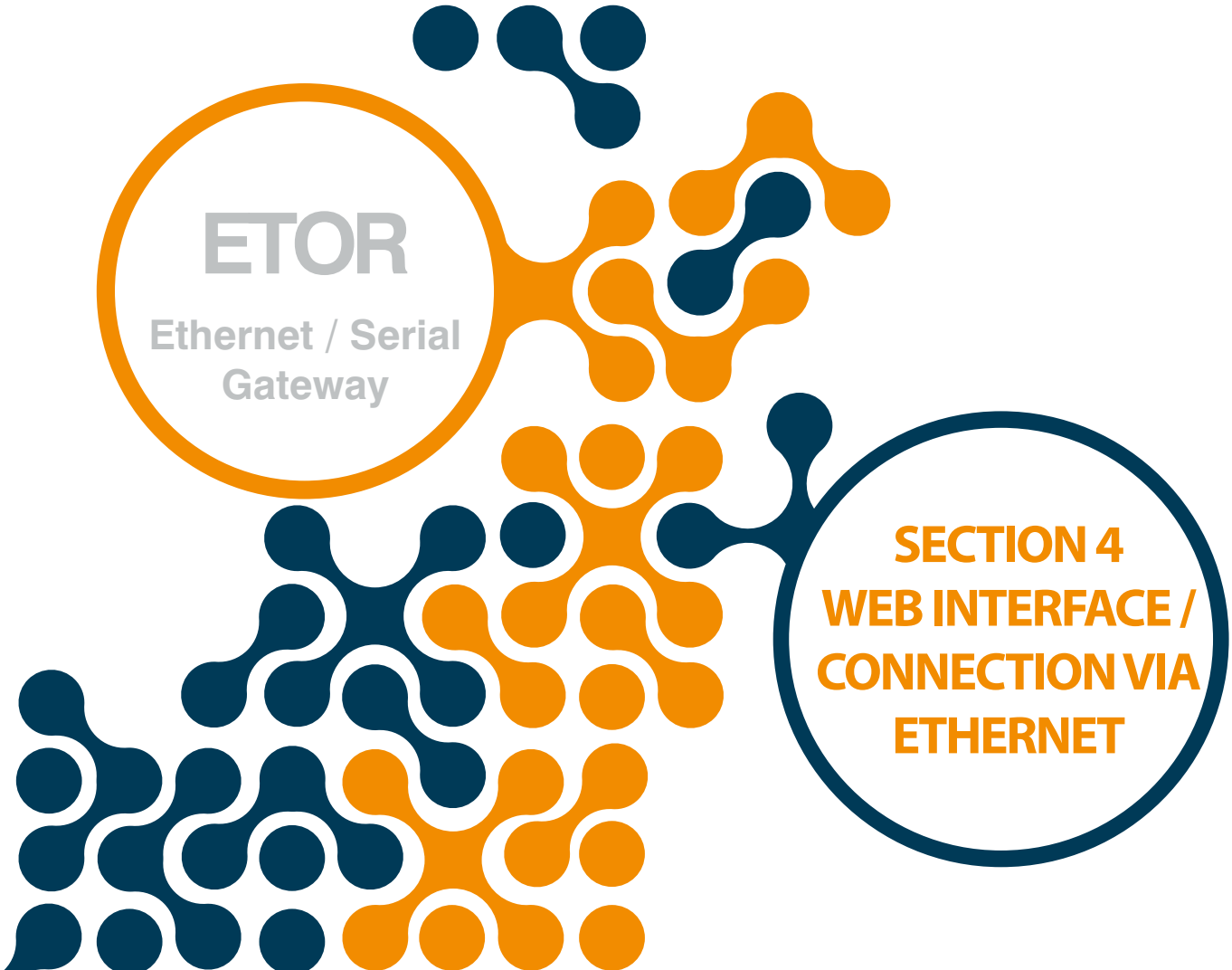


Figure 3-13 Device Information

When the "Write" button is pressed, changes made will be saved and ETOR will start from the beginning.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WEB INTERFACE /
CONNECTION VIA
ETHERNET

SECTION 4 WEB INTERFACE / CONNECTION VIA ETHERNET

ETOR Web interface is a software in which all the configuration settings of ETOR series products can be made and which can run over embedded Web server. To access the Web interface, any device with an installed Web browser, including tablet and smart phones can be used.

Home page of the Web interface can be accessed by writing ETOR' s default IP address 192.168.35.15 on the address line of the Web browser or by writing the assigned IP address using configuration software. Default password is "Klemsan". For the reason that ETOR is a device that can be accessed from the Internet, it is important to change the default password for security. Steps for changing the password will be explained in detail below.

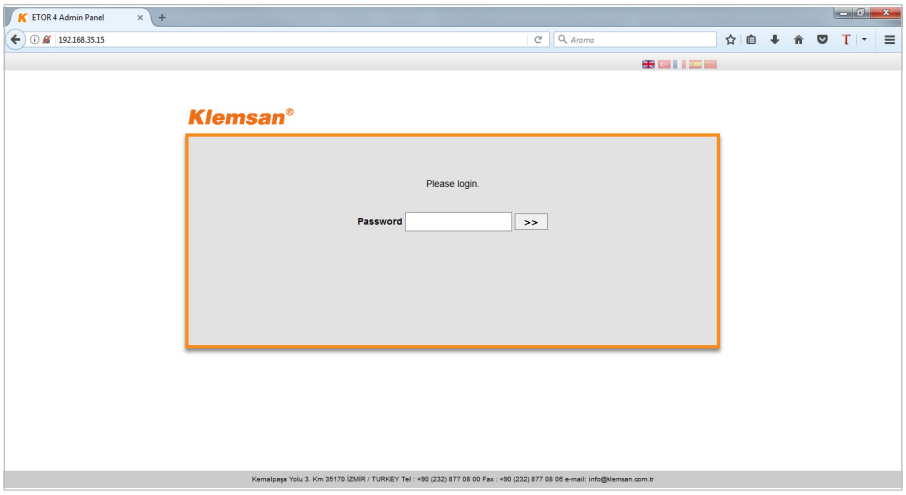


Figure 4-1 Web Interface Home Page

If the password is entered correctly, configuration tabs will appear on the screen.

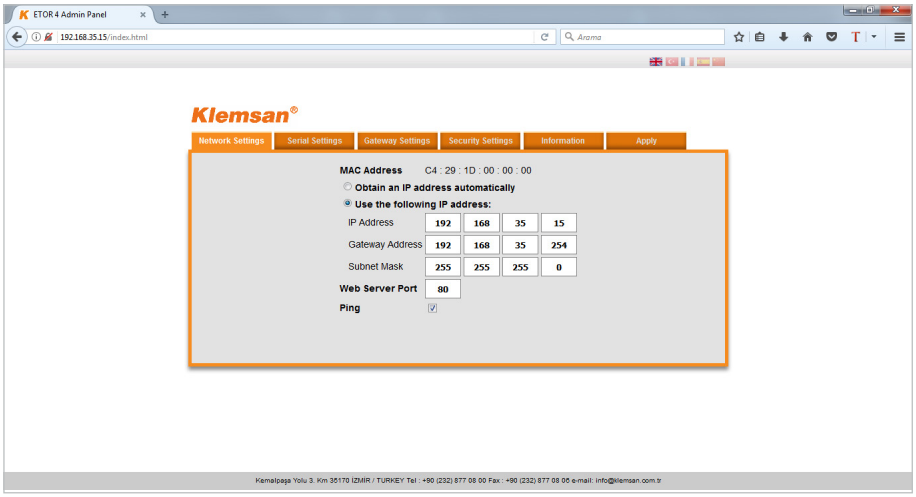


Figure 4-2 Web Interface Network Settings Tab

Except security settings, Web interface is very similar to the configuration software from the design point of view. Therefore tabs except the "Security Settings" tab are not covered in detail here.

4.1 Security Settings

In this tab, password needed to enter Web interface can be changed. For the reason that ETOR is a device that can be accessed from the Internet, it is important to change the default password for security. Desired password must be written both on the "New Password" and "Confirm New Password" areas. If the two passwords match and the new password has conformity, a check mark, otherwise a cross sign, will appear on the left side of the password.

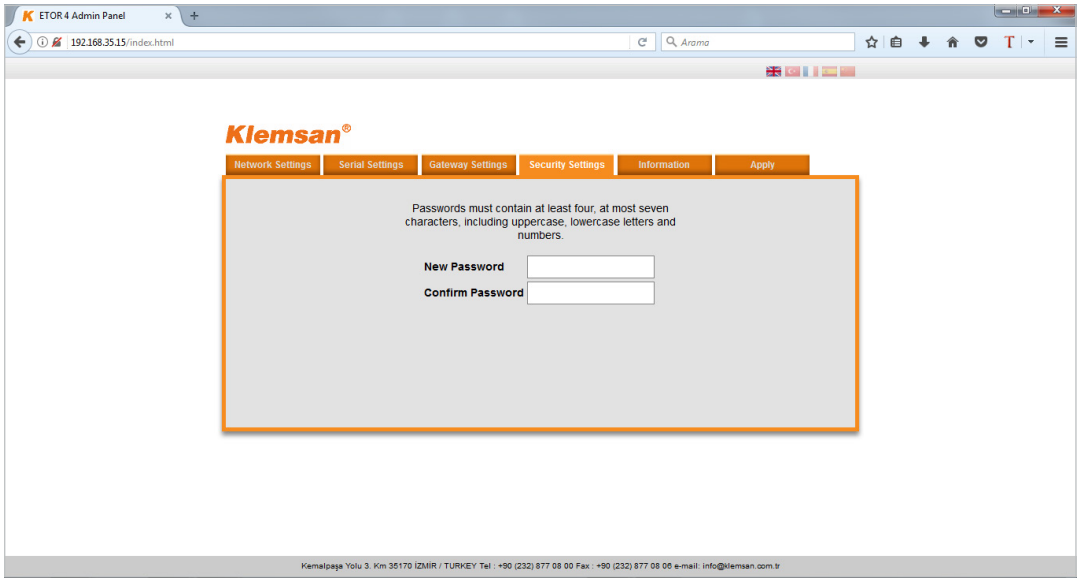


Figure 4-3 Web Interface Security Settings Tab

After the desired configurations are made, settings can be saved by pressing the "Apply" button.

4.2 Connection via Ethernet

In this tab, can be connected via internet with using Gateway Master Software. When the program is started; click the "Connect via ethernet" button for enter access informations.

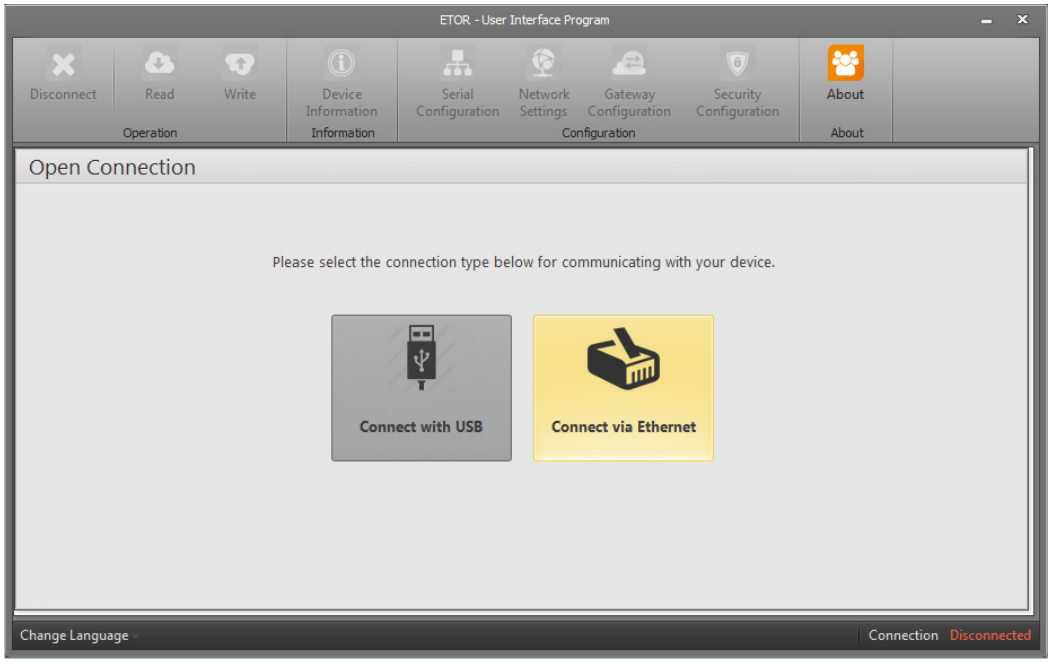


Figure 4-4 Connection via Ethernet

Factory settings shown below:

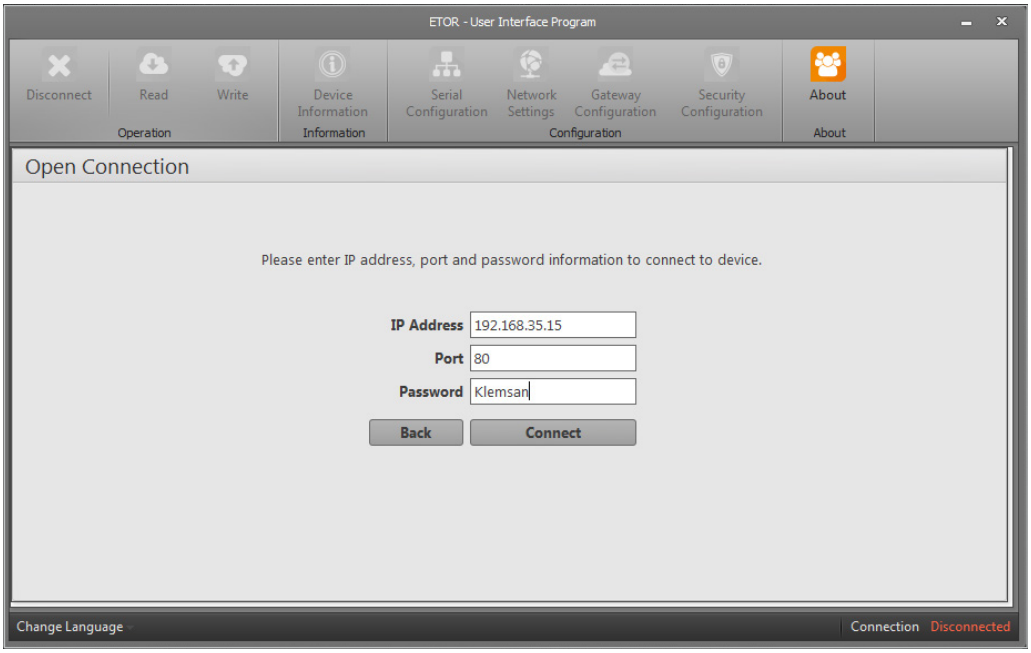
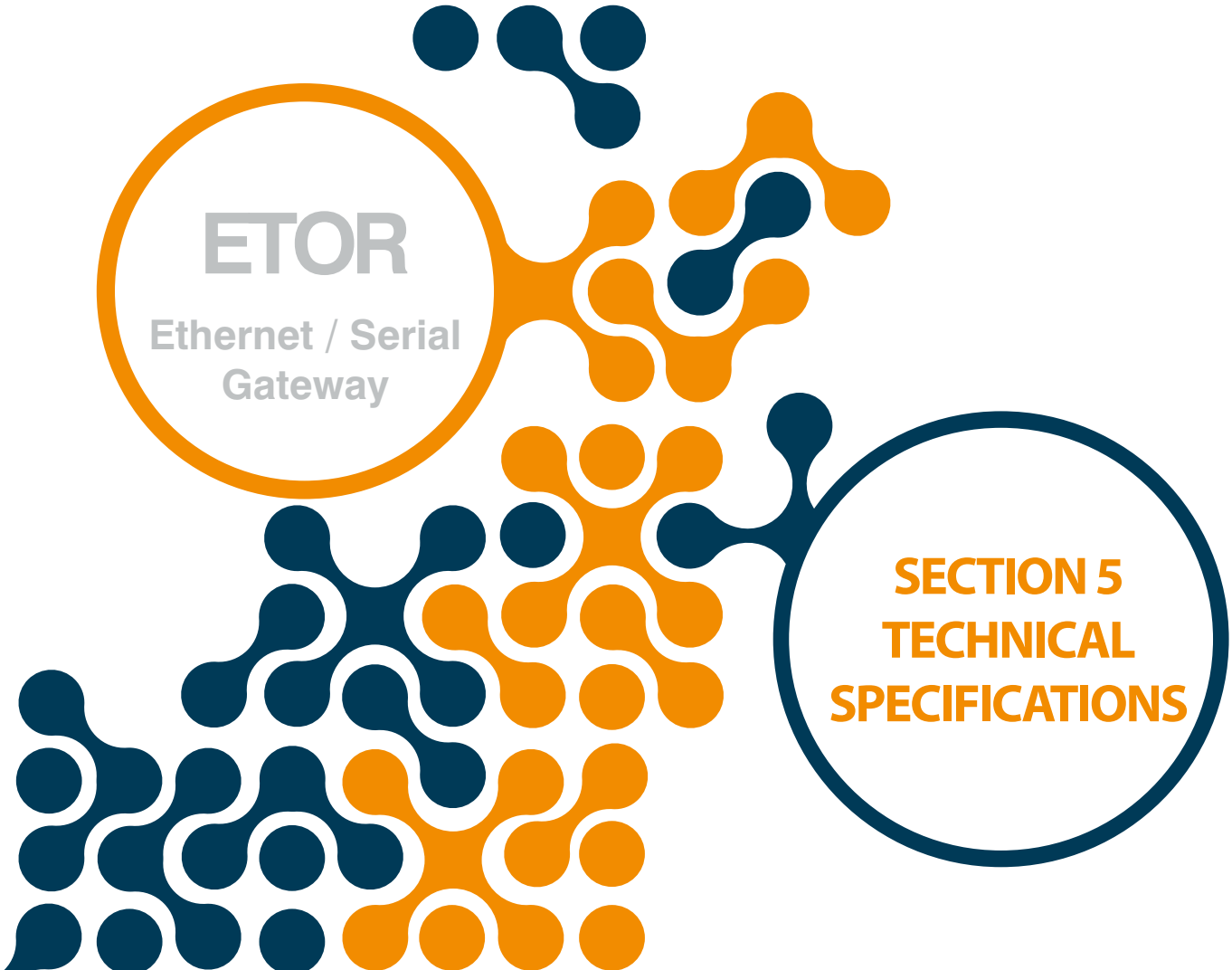


Figure 4-5 Connection via Ethernet

NOTE: *Port is web port.*

After the desired configurations are made, settings can be saved by pressing the "Save" button.


ETOR
Ethernet / Serial
Gateway
SECTION 5
TECHNICAL
SPECIFICATIONS

SECTION 5 TECHNICAL SPECIFICATIONS

Power Supply

Voltage ..... U1-U2 input, 18-50V AC/DC or USB port
Frequency 45-65Hz
Consumption ..... <1.2W and <2.2VA

Operating Temperature

-10…60 °C

Isolation

1.5kV RMS

Ethernet

10/100 Base-TX

Network Feature

6 Remote Connection
Ability to Configure by the Web Interface
DHCP (Automatic IP Receive)
ARP
Ping blocking

Serial Communication

Supports up to 64 Devices (ETOR-4)
Baudrate: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Stop Bit and Parity Bit Adjustment

USB

Ability to Configure over USB
Micro USB Connection Interface

Supported Protocols

MODBUS TCP
MODBUS RTU Over TCP
MODBUS ASCII Over TCP
MODBUS RTU
MODBUS ASCII

Dimensions

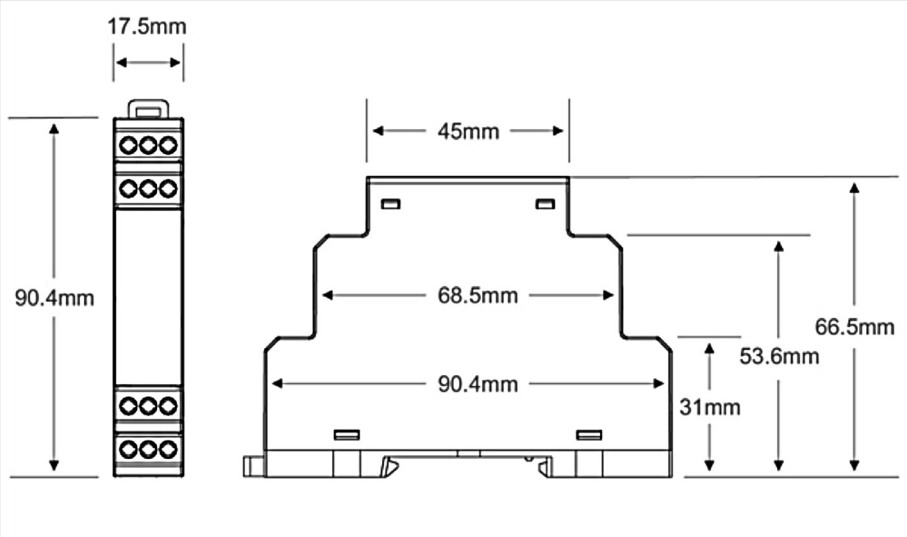


Figure 5-1 Dimensions

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