GTOR-4

GPRS/Serial Gateway

User Manual

Klemsan®

TABLE OF CONTENTS

SECTION 1 GENERAL INFORMATION 5

1.1 General Information 5
1.2 Proper Use and Safety Conditions 6
1.3 Connections and Micro SIM Card Placement 6

SECTION 2 INSTALLATION 7

2.1 Definitions on GTOR 8
2.2 Required Installations for Configuration Software 10
2.2.1 Installation of GTA Configuration Program 10
2.2.2 Installation of GTOR USB Driver: 11

SECTION 3 CONFIGURATION SOFTWARE 12

3.1 Connection Settings 13
3.1.1 Connect with USB 13
3.1.2 Connection with GPRS 15
3.2 Device Information 15
3.3 GSM Information 16
3.4 Serial Port Settings 16
3.5 APN (Access Point Name) Settings 17
3.6 Gateway Settings 19
3.7 Security Settings 20

SECTION 4 TECHNICAL SPECIFICATIONS 22

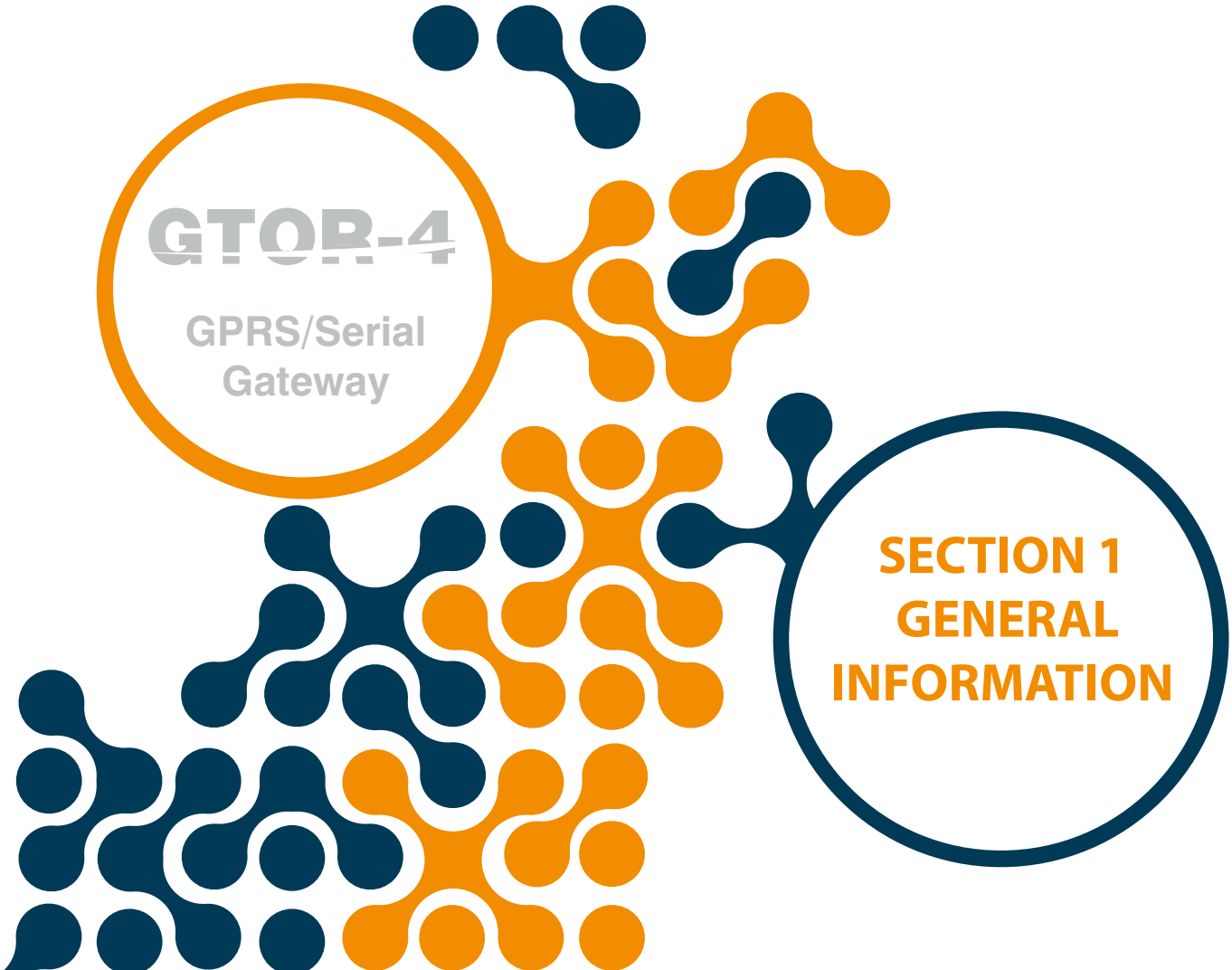
Figure

Figure 1-1 Server Mode General Operation Principle 5
Figure 1-2 USB 6
Figure 1-3 Micro SIM Kart 6
Figure 1-4 Antenna 6
Figure 2-1 Definitions on GTOR 8
Figure 2-2 Setup-1 10
Figure 2-3 Setup-2 10
Figure 2-4 Setup-3 10
Figure 2-5 Setup-4 10
Figure 2-6 Setup-5 11
Figure 2-7 Setup-6 11
Figure 3-1 User Interface Program 13
Figure 3-2 Connection Types 13
Figure 3-3 Virtual Serial Port Connected to GTOR 14
Figure 3-4 Device Manager 14

Figure 3-5 Connect with GPRS 15
Figure 3-6 Device Information 15
Figure 3-7 GSM Information 16
Figure 3-8 Serial Port Information 16
Figure 3-9 APN Settings 17
Figure 3-10 Gateway Settings 18
Figure 3-11 Data Communication Scenario 19
Figure 3-12 Security Settings 20
Figure 4-1 Dimensions 23

TABLOLAR

Tablo 1-1 Supported Protocols in Server Mode 5
Tablo 3-1 Settings Menu Tree 19


GTOR-4
GPRS/Serial
Gateway
SECTION 1
GENERAL
INFORMATION

SECTION 1 GENERAL INFORMATION

1.1 General Information

GTOR series products connect to serial MODBUS devices with TCP / IP based systems via GPRS service. In this way, it is possible to remotely control and monitor serial devices connected to MODBUS network via GPRS service. GTOR can be easily integrated into existing MODBUS networks thanks to their wide range of configuration options.GTOR series products works as a TCP / IP server, allows 4 MODBUS Gateway connections and 1 configuration connection.

Server Mode:

GTOR converts MODBUS TCP or MODBUS RTU over TCP and MODBUS ASCII Over TCP queries received via GPRS to MODBUS RTU and MODBUS ASCII queries and sends them to serial devices via built-in RS485 / RS232 interface.The response from the serial devices is converted to the request protocol and sends it to the querying device (master) via TCP / IP.

It provides configuration via USB or TCP / IP using GPRS service. The on-screen LED shows a lot of information such as power, signal strength level, operating status.

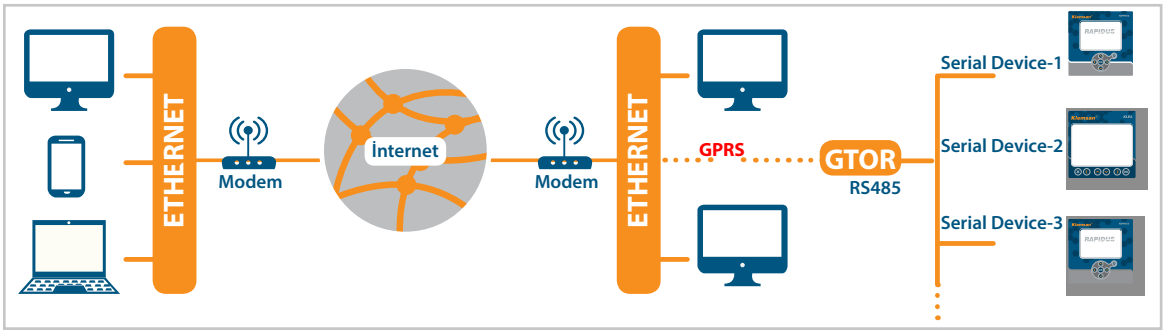


Figure 1-1 Server Mode General Operation Principle

Tablo 1-1 Supported Protocols in Server Mode

REQUEST		RESPONSE	
GPRS		SERIAL	
Protocol	MODBUS TCP	Protocol	MODBUS RTU
	MODBUS RTU over TCP		MODBUS ASCII
	MODBUS ASCII Over TCP		

1.2 Proper Use and Safety Conditions

- Installation and connections should be established in accordance with the instructions set out in the manual by authorized persons. Unless the connection is built properly, device should not be operated.
- Before wiring the device up, make sure that energy is cut off
- Use a dry cloth to remove the dust from the device/clean the device. Avoid using alcohol, thinner or a corrosive material.
- Device should be engaged only after all the connections are made.
- Do not open the inside of the device. There are no parts which the users can intervene inside.
- Device should be kept away from humid, wet, vibrant and dusty environments.

> The manufacturing company may not be kept responsible for unfavorable incidents that arise out of the failure to follow the above cautions.

1.3 Connections and Micro SIM Card Placement

Supply voltage should be applied to GTOR within the range of 11 ... 30VDC.

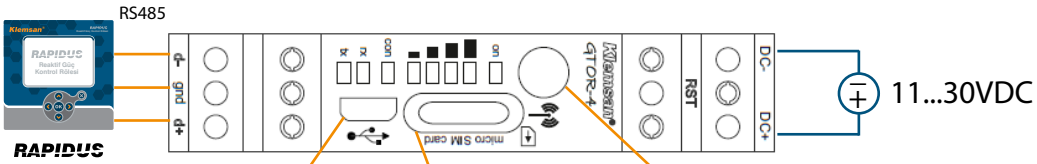


Figure 1-2 USB

Figure 1-3 Micro SIM Card

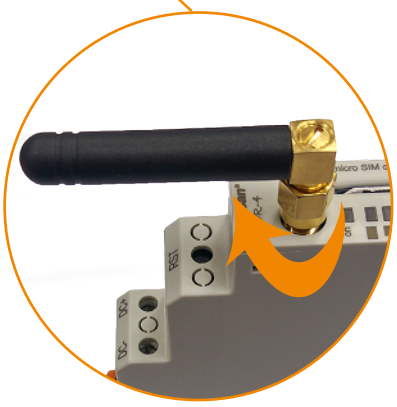
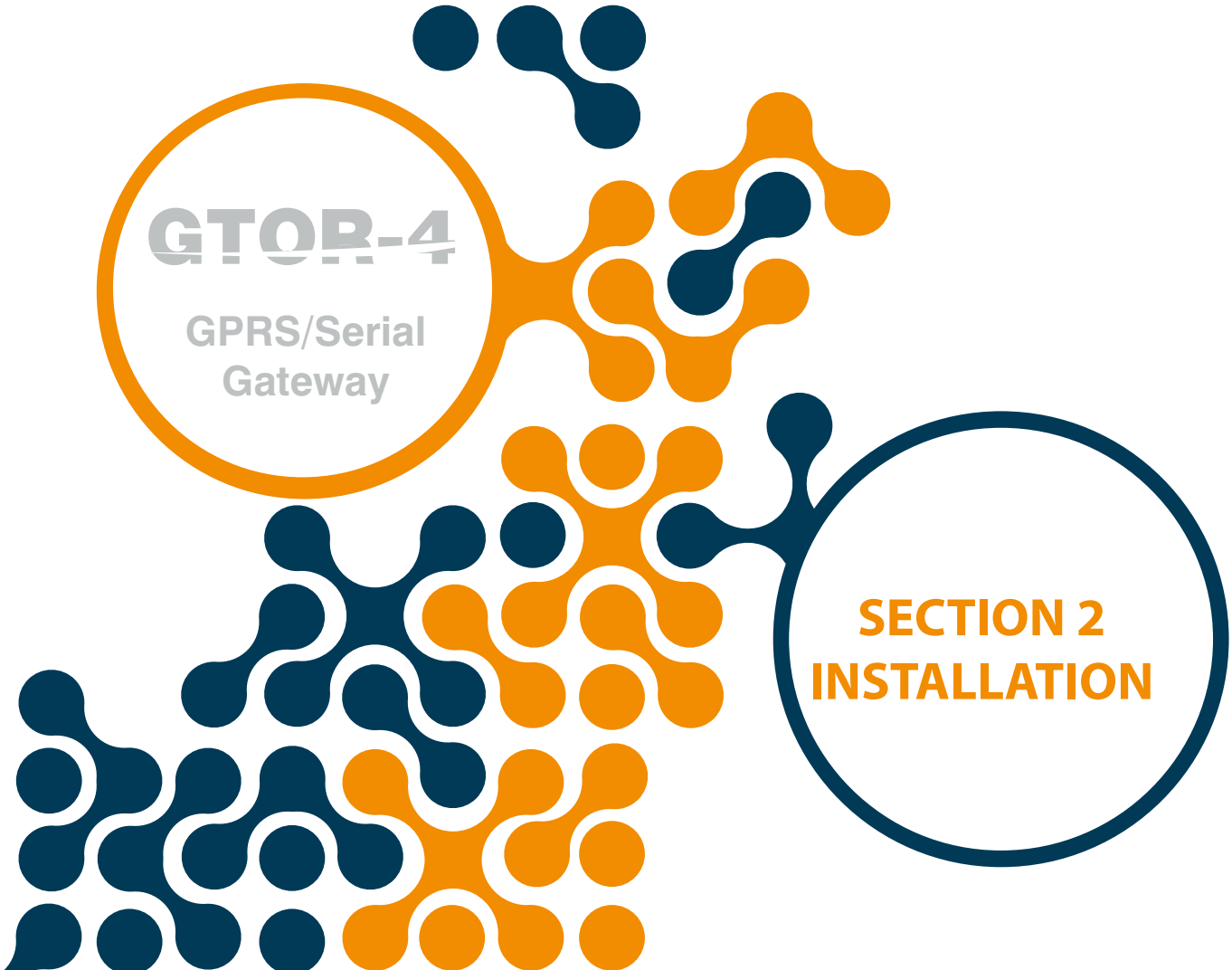


Figure 1-4 Antenna


GTOR-4
GPRS/Serial
Gateway
SECTION 2
INSTALLATION

SECTION 2 INSTALLATION

2.1 Definitions on GTOR

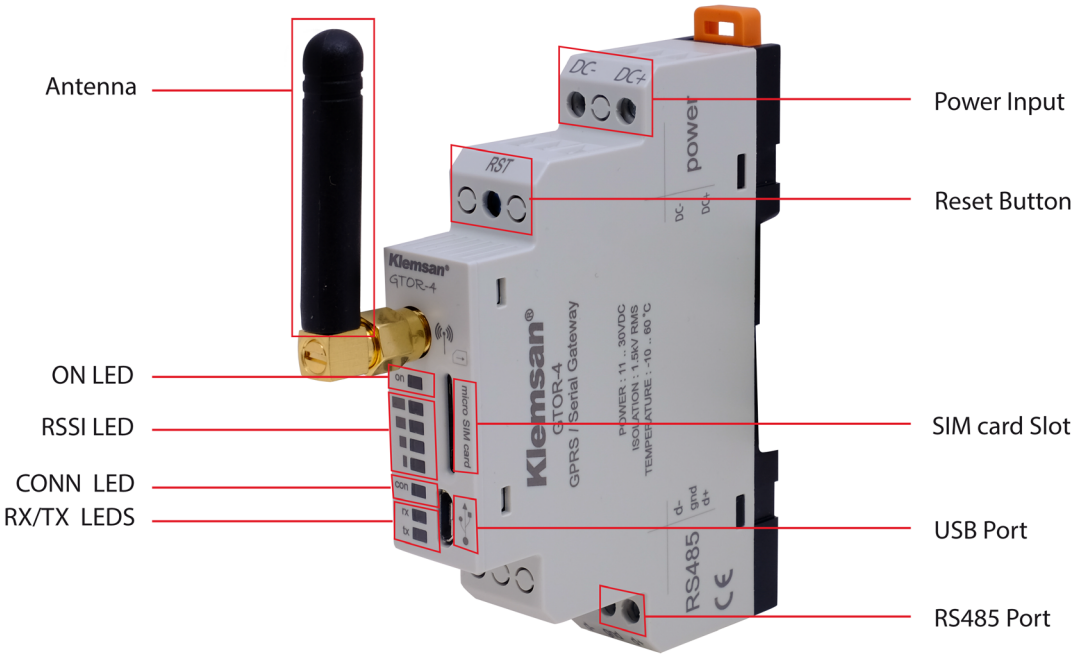


Figure 2-1 Definitions on GTOR

DC-,DC+ Input:

Gtor is powered on from DC-, DC+ input. 11 … 30V AC/DC must be applied.

RST Button:

When pressed briefly (<5 sec) the device restarts. When pressed for a long time (≥ 5 sec), the device returns to the factory settings and starts again.

SIM Card Slot:

Micro-SIM card input. If the GTOR has a fixed IP address and deactivate PIN code of the SIM card, the device will be connected to the GPRS network. The RSSI LEDs blink continuously if a Micro-SIM card is not inserted or a Micro-SIM card with a PIN lock is inserted. If a valid Micro-SIM card is installed, the device needs to be restarted.

USB Port:
That port is where the Micro-USB cable is connected. This input can also be used as a power connection.To use the "GatewayMaster" program; this port must be connected to the computer. However, GPRS functions of GTOR will not work when GTOR is energized via USB.

The GTOR scan for 5 seconds at startup to see if the Micro-USB cable is plugged in, and the RX and TX LEDs will blink during this time. If the micro-USB cable is plugged in, the RX and TX LEDs are always on and the GTOR is ready to be configured via "GtorUSBConfig" via USB. If the Micro-USB cable is not plugged in, the RX and TX LEDs will go out and the GTOR is prepare to perform its basic functions.

RS485 Port:
Provides, communication with serial devices that MODBUS RTU and Modbus ASCII protocols supported.

Antenna:
The SMA type connection where the external antenna connection is made.

ON LED:
If the LED is on, the device's supply is from the DC-, DC+ input. Or the micro-USB cable is plugged into the device.

RSSI LEDs:
It indicates connected to the GSM network and shows the signal strengths.

-113dB <RSSI ≤ -101dB All LEDs are off.

-99dB <RSSI ≤ -93dB S1 LED is on. S2, S3 and S4 LEDs are off.

-91dB <RSSI ≤ -85dB The S1 and S2 LEDs are on. S3 and S4 LEDs are off.

-83dB <RSSI ≤ -77dB The S1, S2 and S3 LEDs are on. S4 LED is off.

-75dB <RSSI All LEDs are on.

The RSSI LEDs blink continuously if a Micro-SIM card is not inserted or a Micro-SIM card with a PIN lock is inserted.

CONN LED:
When the LED is blinking the device is ready to operate in server mode. When the LED is on continuously, it means the device is turned on in server mode and is connectable to the device. When the LED flashes, it means that the RST button is pressed and the device will return to the factory settings.

RX LED:
The GTOR will scan for 5 seconds at startup to see if the Micro-USB cable is plugged in, and the RX LED flashes during this time. If the Micro-USB cable is plugged in, the RX LED is always on. If the micro-USB cable is not plugged in, the RX LED goes out. It means that when the LED is on, the data from the serial device comes to the GTOR while the GTOR is performing its essential functions.

TX LED:
The GTOR will scan for 5 seconds at startup to see if the Micro-USB cable is plugged in, and the TX LED flashes during this time. If the Micro-USB cable is plugged in, the TX LED is always on. If the micro-USB cable is not plugged in, the TX LED goes out. It means that when the LED is on, the data from the GTOR comes to the serial device while the GTOR is performing its essential functions.

2.2 Required Installations for Configuration Software

This section will explain the setups necessary to configure Gtor via the USB port. You can find the required file in the CD in the product box.

2.2.1 Installation of GTOR Configuration Program

"GatewayMaster.exe" in the CD that comes with the product should be installed. After selecting the desired destination for the program installation, click "Next" button and the next step is passed.

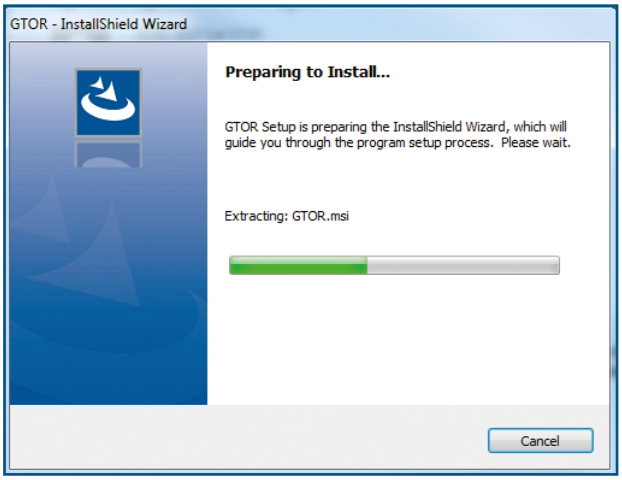


Figure 2-2 Setup-1

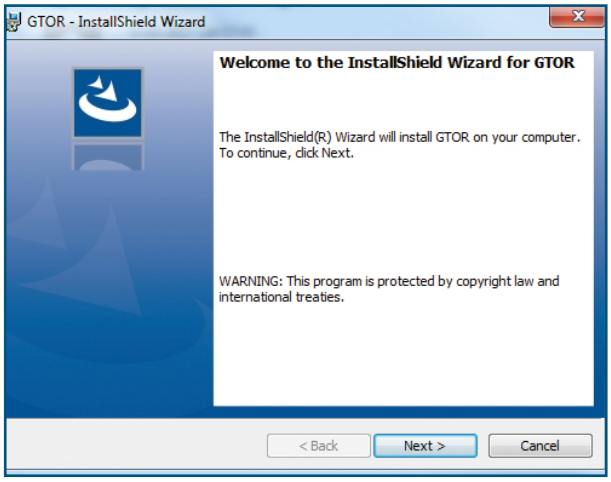


Figure 2-3 Setup-2

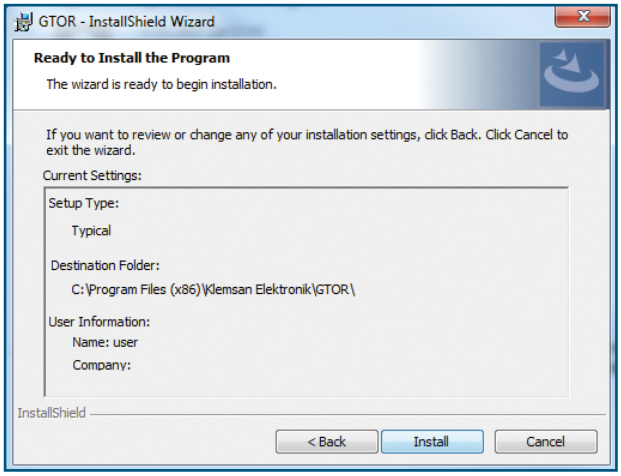


Figure 2-4 Setup-3

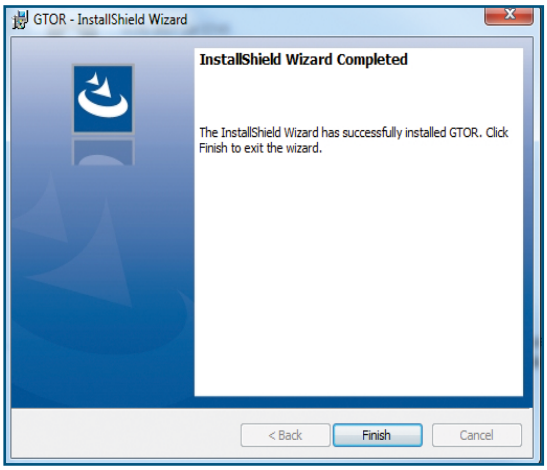


Figure 2-5 Setup-4

The setup wizard will display a list that summarizes the contents to be loaded. Installation is started by clicking "Next" button again. When the installation is finished, click "Finish" to complete the installation.

2.2.2 Installation of GTOR USB Driver:

For GTOR USB Driver installation, the following screens will come up after program installation. By following the steps you can set up your driver.

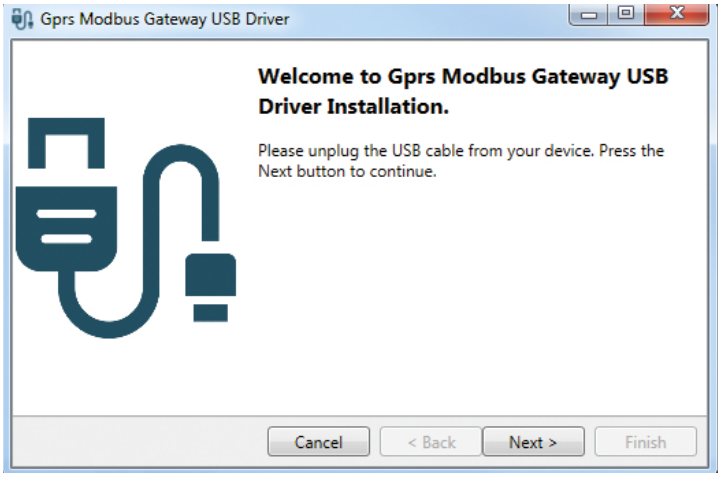
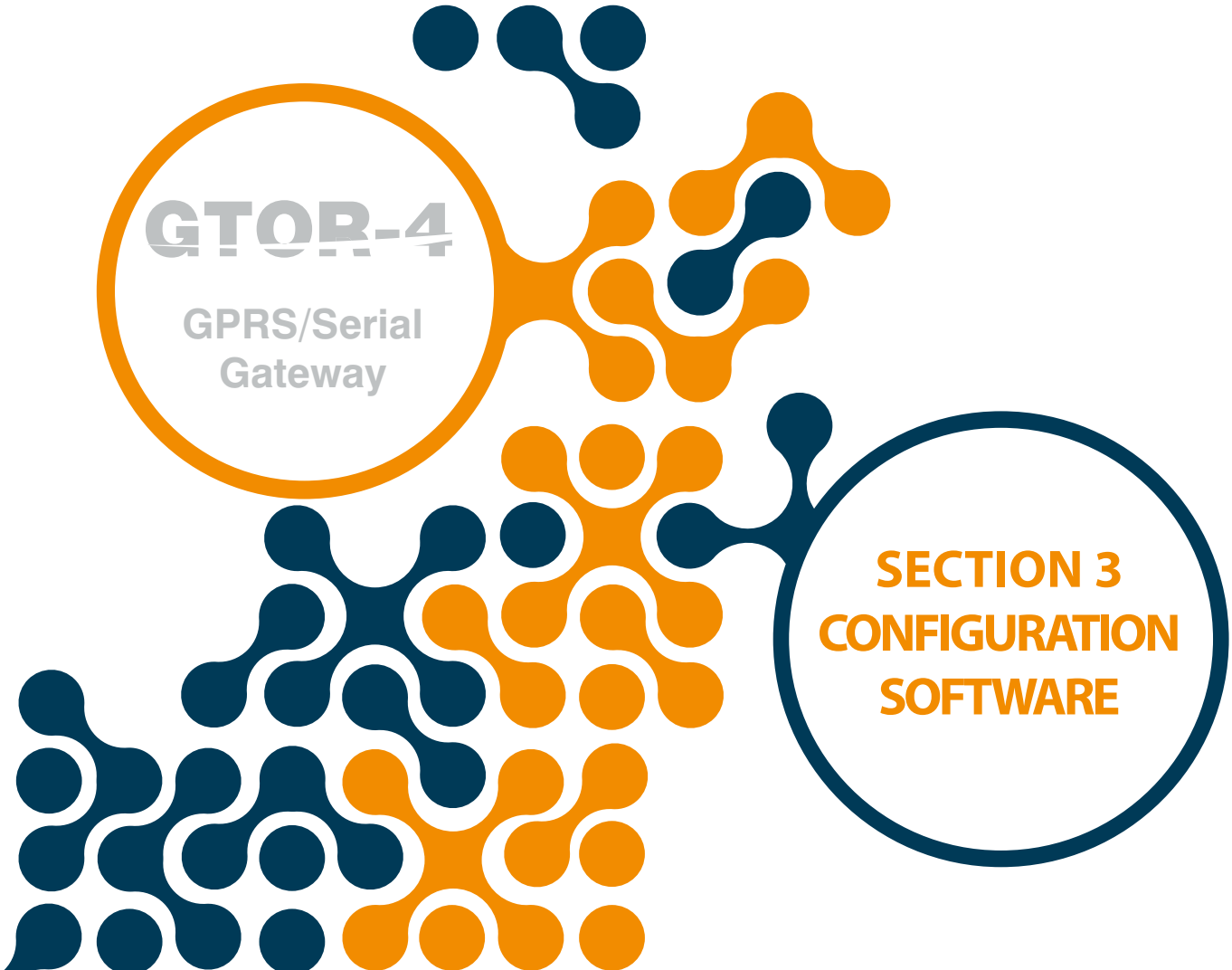


Figure 2-6 Setup-5

Figure 2-7 Setup-6


GTOR-4
GPRS/Serial
Gateway
SECTION 3
CONFIGURATION
SOFTWARE

SECTION 3 CONFIGURATION SOFTWARE

After the operations described in the heading "Chapter 2 Installation" are carried out;
● The connection between the computer where the program is installed and the Gtor should be connected with the Micro-USB cable.
● Then the configuration program should be run. The Configuration Program can be accessed from the Windows Start menu or from the desktop shortcut.

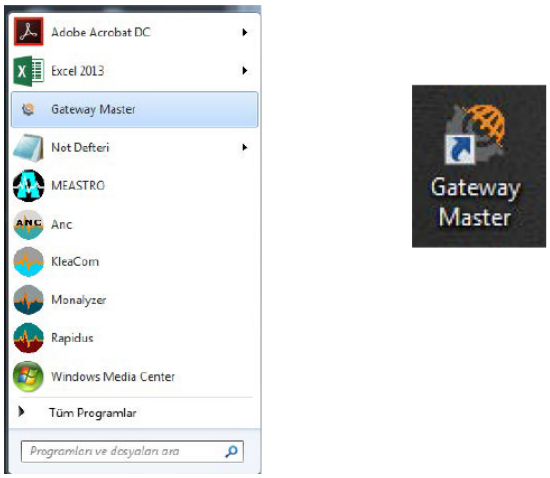


Figure 3-1 User Interface Program

3.1 Connection Settings

3.1.1 Connect with USB

GTOR User Interface Program can configure GTOR via micro-USB in serial and over TCP / IP.
The communication option will be displayed on the screen when the program is started.

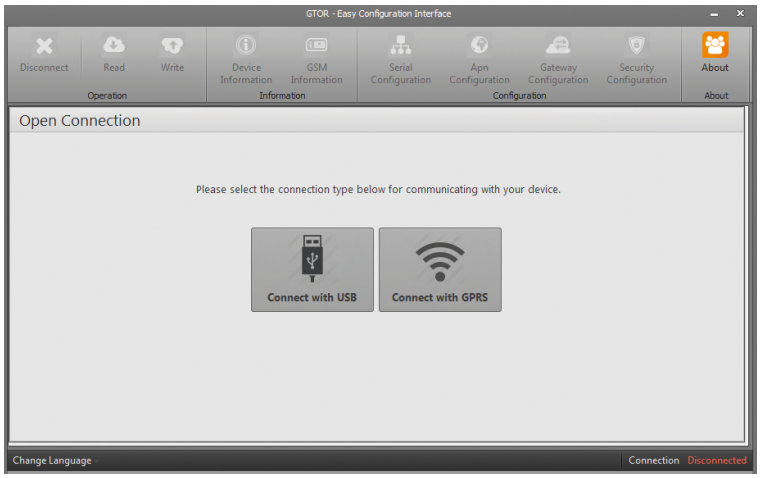


Figure 3-2 Connection Types

NOTE: Once the device is connected to one of these options, press the 'Write' button to save the changes made.

When the "Connect with USB" button is pressed, the GTOR settings are read and written in series via micro-USB.
However, only the settings in the configuration tabs (Serial Configuration, APN Configuration, Gateway Configuration, Security Configuration) can be changed. If the GTOR is connected to the PC via a USB cable, the virtual COM port to which the GTOR is connected will be listed in the program as shown in Figure 3-3.
If the correct port does not appear in the list, it can be updated by pressing the "Refresh" button.

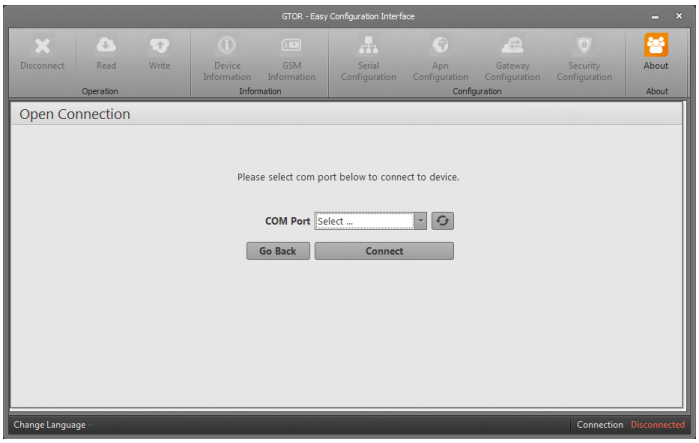


Figure 3-3 Virtual Serial Port Connected to GTOR

NOTE: If the virtual serial port to which GTOR is connected is unknown, the "Device Manager" program can be used. After selecting the correct port, "Connect" button is pressed to connect the program with GTOR.

NOTE: After connection is established, the "Read", "Write", "Info", "Settings", and "About" tabs will be active and the current configuration settings of the connected GTOR will be visible in the respective tabs. The GTOR's USB connection must not be interrupted before the "Disconnect" button is pressed.

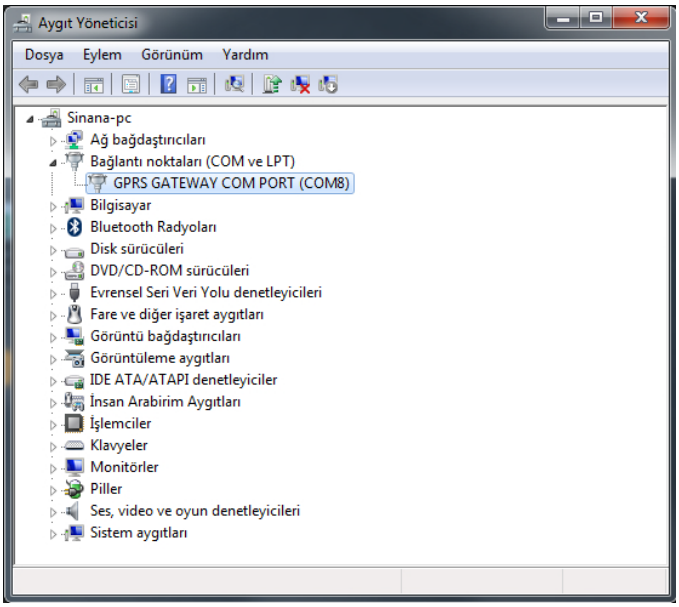


Figure 3-4 Device Manager

3.1.2 Connection with GPRS

All settings except the APN settings can be read and changed when connected to the GTOR via GPRS. APN settings can only be read. Information on the information tabs (Device Information and GSM Info) can only be read. When the "Connect with GPRS" button is pressed, first the static IP of GTOR and the security code assigned to the port number and GTOR to be connected must be written.

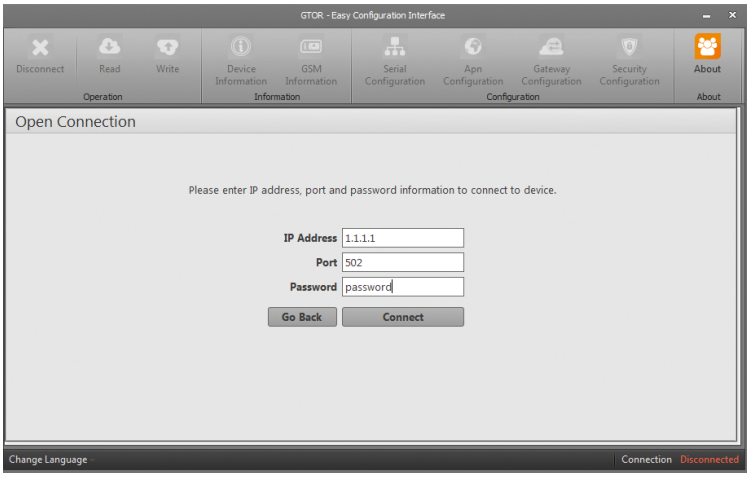


Figure 3-5 Connect with GPRS

NOTE: The IP address of the SIM card, as well as the port and password information of the device are required for this feature to be available. The device default port is set to '502' and the password is set to "**Pass"**. (The password is "**Klemsan**" before version 1.05).

NOTE: When the device is accessed with GPRS, the time starts again when reading or writing is done within the remaining time of the connection timeout (5 min.). When this time is up, communication with the device is terminated automatically.
After the communication settings are done, "Connect" button must be pressed.
When "Connect" button is pressed, GTOR data is read and it goes to "Device Information" tab..

3.2 Device Information

This tab contains information on GTOR. In the "Product Information" section, there is information about the product, in the "Production Information" section, there is production information about the production.

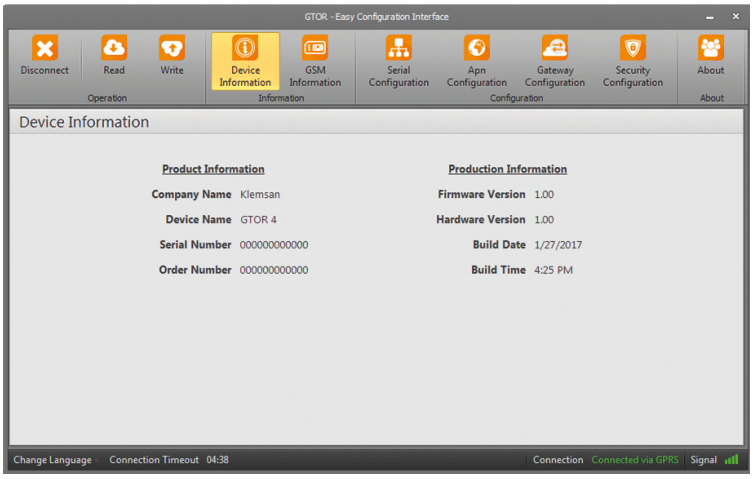
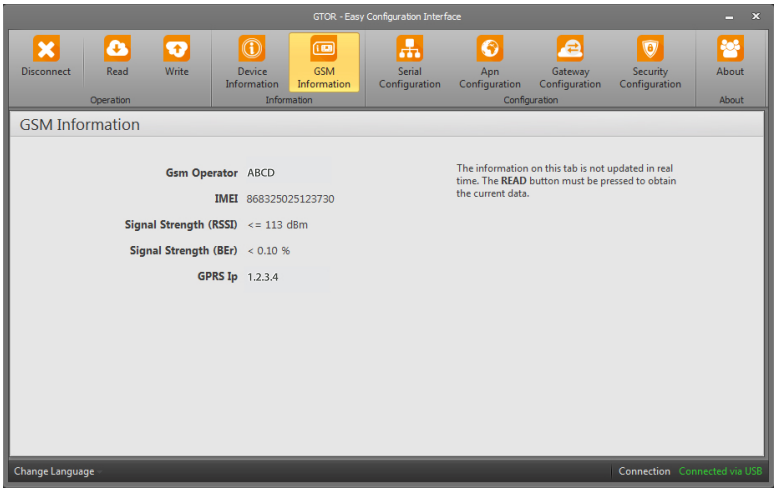


Figure 3-6 Device Information

3.3 GSM Information

This tab contains information on IMEI number, Operator name, RSSI (Signal strength), BER (Bit error rate) and SIM card IP address(GPRS Ip).
NOTE: If accessing to the SIM card IP address (GPRS IP) via USB is required, the device supply terminals must be energized to activate the GPRS modem.



NOTE: If signal;
-113 dB <RSSI ≤ -101 dB
(0% signal quality)

-99 dB <RSSI ≤ -93 dB
(25% signal quality)

-91 dB <RSSI ≤ -85 dB
(50% signal quality)

-83dB <RSSI? -77dB
(75% signal quality)

-75 dB <RSSI
(100% signal quality)

Figure 3-7 GSM Information

3.4 Serial Port Settings

In this tab, the serial communication settings of GTOR are made. The values in this tab must be selected in accordance with the serial interfaces of the MODBUS network. If these values are not set according to the MODBUS network, a healthy serial communication will not occur.
GTOR's default serial communication settings are:
Baud Rate 38400
Stop Bit 1
No Parity

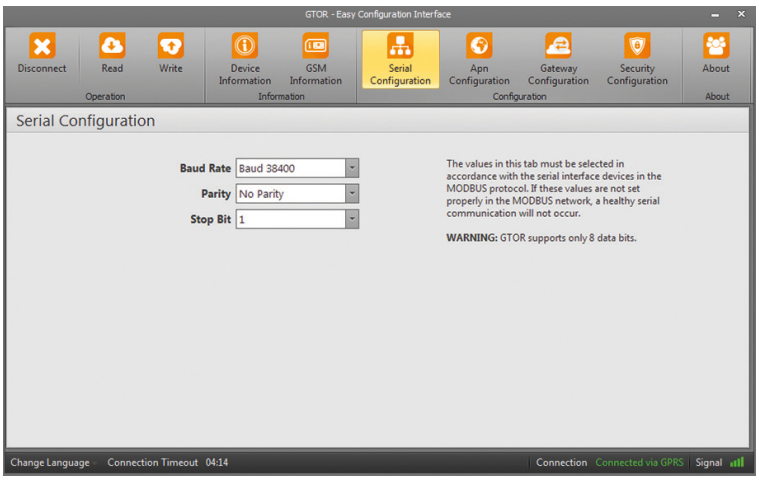


Figure 3-8 Serial Port Information

GTOR supports only 8 data bits.

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

Stop Bit:
GTOR supports 1 and 2 stop bits.

Parity:
GTOR; No Parity, odd and even parity modes.

3.5 APN (Access Point Name) Settings

The settings of the APN defined by the SIM card inserted in the GTOR are entered in this tab. If these settings are not set correctly, data communication will not occur.

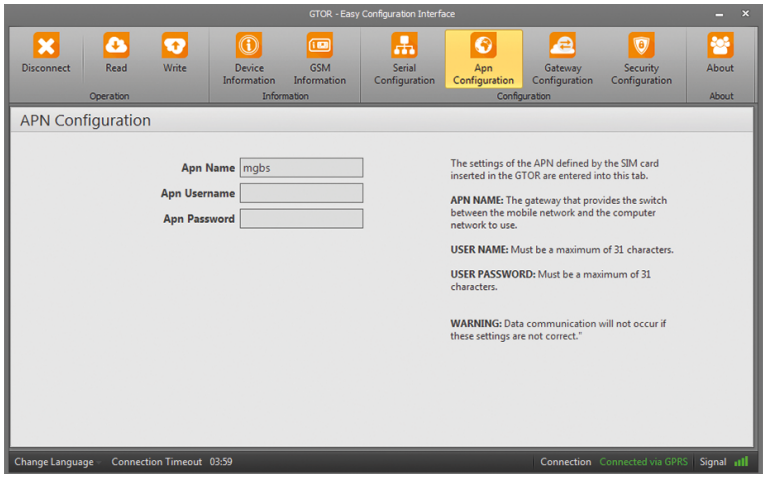


Figure 3-9 APN Settings

APN Name: The gateway that provides the switch between the mobile network and the computer network to use. It has a maximum of 31 characters.
APN Username: Up to 31 characters.
APN User Password: Up to 31 characters. This setting can only be changed via serial communication.

The settings of the APN defined by the SIM card inserted in the GTOR are entered in this tab. If these settings are not set correctly, data communication will not occur.

3.6 Gateway Settings

In this tab, GTOR gateway settings can be made.
The default gateway settings for GTOR are:

Port: 502
Request Type : MODBUS TCP
Response Type : MODBUS RTU
Request Timeout: 60sn
Response Timeout : 1sec

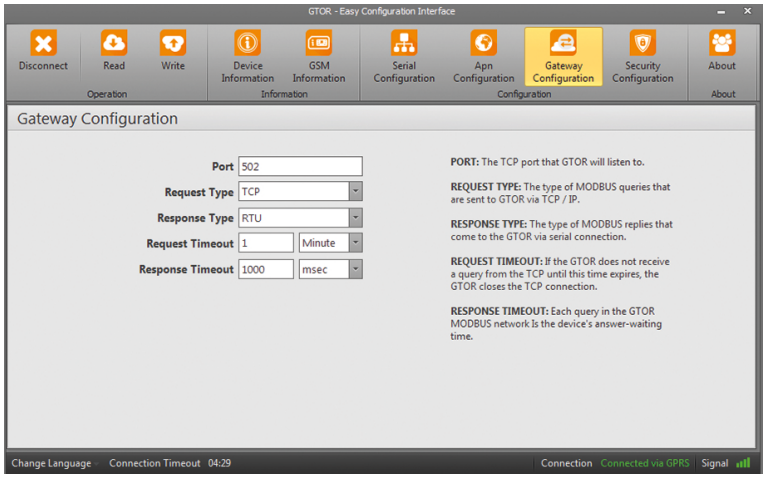


Figure 3-10 Gateway Settings

Port:

The TCP port that GTOR will listen to.

Request Type:

The type of MODBUS queries that are sent to the GTOR over the GPRS network is determined by this field.

"MODBUS TCP", "MODBUS RTU over TCP" and "MODBUS ASCII over TCP" protocols are selected.

Response Type:

The type of MODBUS responses to the GTOR via the serial link is determined by this field. One of the "MODBUS RTU" and "MODBUS ASCII" protocols is selected.

Request Timeout:

In server mode, if a new query does not arrive in GTOR until the query "timeout" expires, the GTOR will close the TCP connection with the sending machine and allocate resources for new TCP connections.

If the time between two queries is greater than the timeout expired on the query side, a new TCP connection must be opened before the query is sent.

Response Timeout:

In GTOR's MODBUS network, it is the response waiting time from each serial device that is interrogated. If no response is received from the querying device during this time, the next remote connection query is passed.

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:

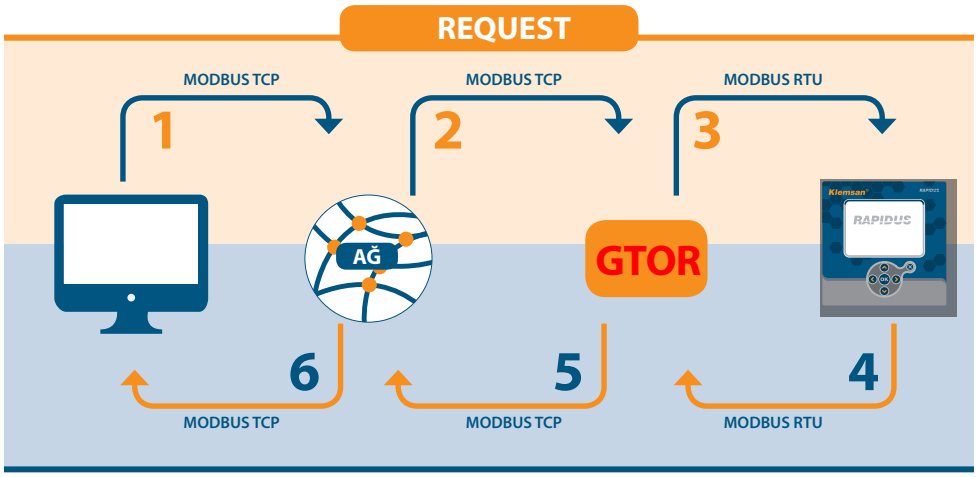


Figure 3-11 Data Communication Scenario

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

Tablo 3-1 Settings Menu Tree

Baud Rate	57600
Stop Bit	1
Parity	None

1. The MODBUS TCP query created by the software on the computer is sent to the network via the GPRS.

2. The GTOR connected to the same network takes the MODBUS TCP query via GPRS and turns it into the MODBUS RTU query.

3. The GTOR transmits the query to the serial device via the serial port and waits until the timeout expires (assuming 1 second is sufficient for this scenario).

4. The serial device transmits the data corresponding to the MODBUS RTU inquiry from the GTOR to the GTOR from the serial port as MODBUS RTU response. The GTOR takes the MODBUS RTU response from the serial port and translates it into the MODBUS TCP response.

5. GTOR sends the converted MODBUS TCP response over the GPRS network.

6. The software on the computer informs the user of the use of the MODBBUS TCP respond received from the network.

3.7 Security Settings

In this tab, "Connect via GPRS" is used to set the password to be entered when connecting.

Special letters should not be used when deciding the password. The specified password can be up to 8 characters. The characters '!', '?', '.', '*', '_', '-' and '#' can be used with upper and lower case letters and numbers.

The default password for GTOR is "**Pass"**. (The password is "**Klemsan**" before version 1.05). If you press the 'Write' button after changing the password, the confirmation screen will disappear.

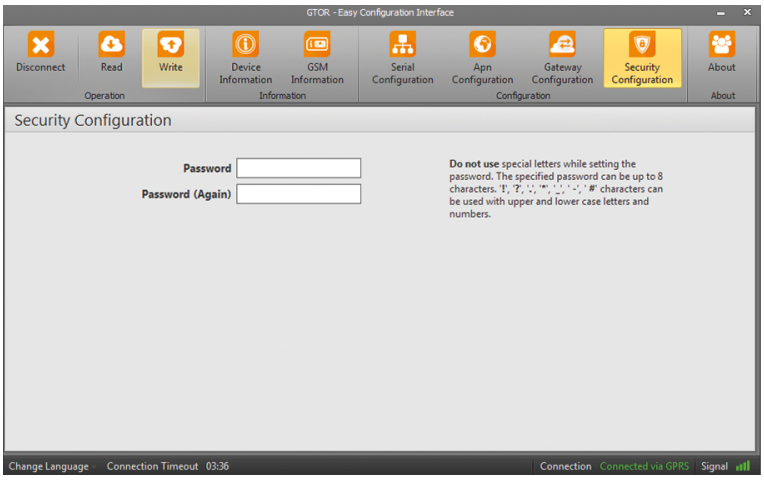


Figure 3-12 Security Settings

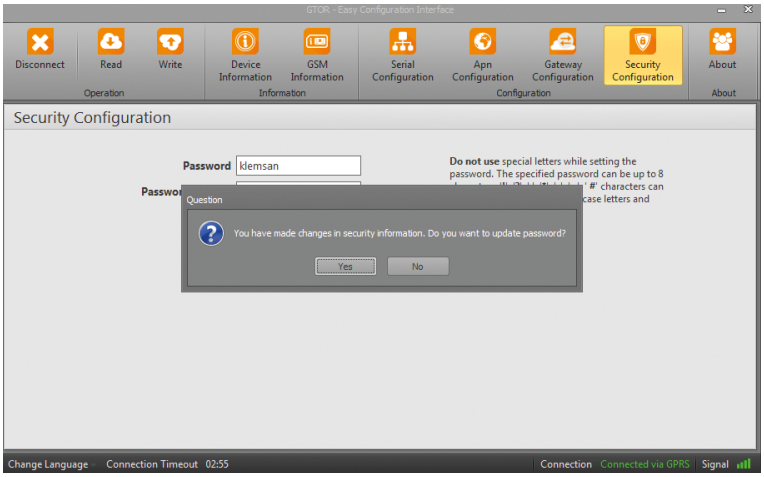
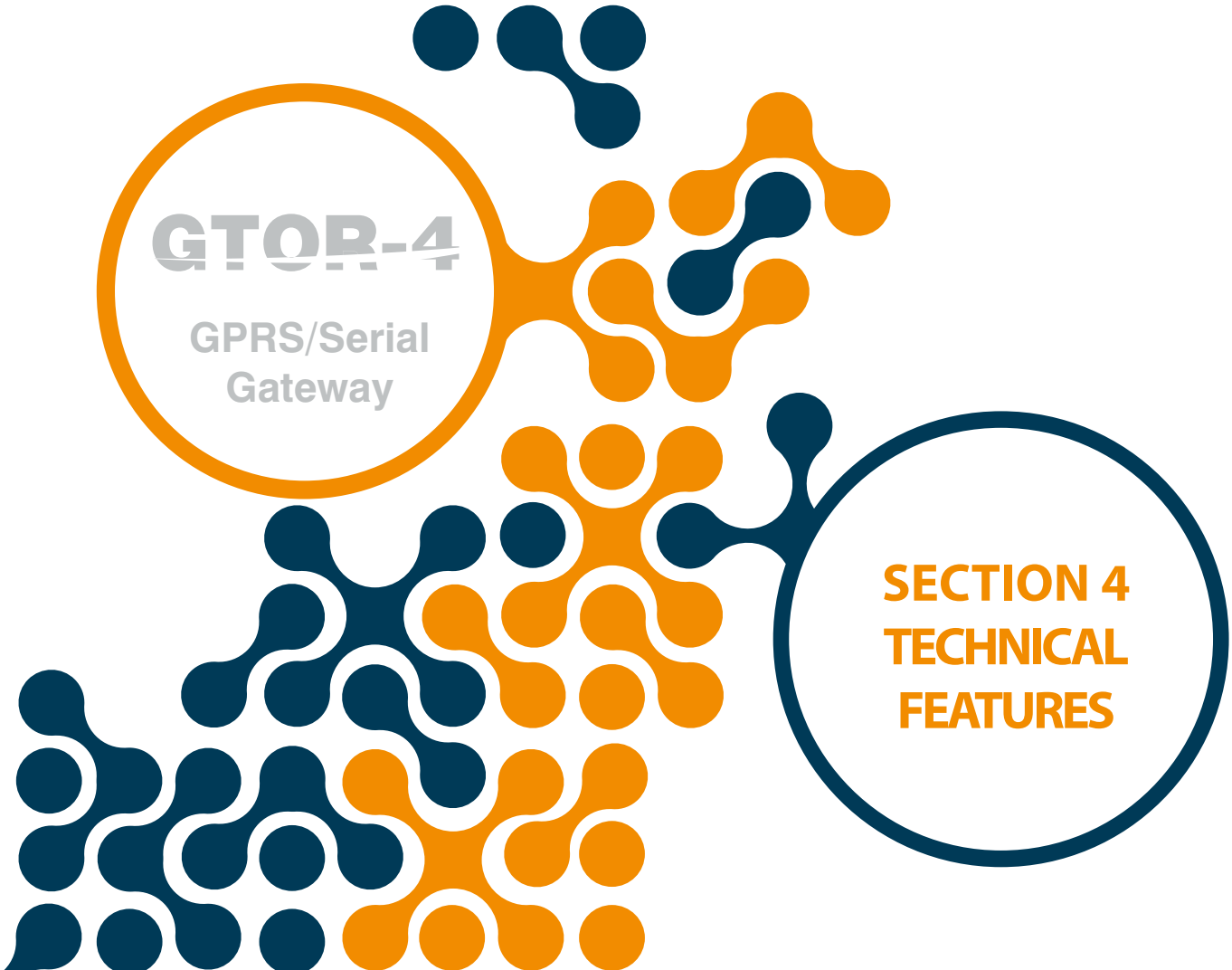


Figure 3-13 Password Confirmation Screen


GTOR-4
GPRS/Serial
Gateway
SECTION 4
TECHNICAL
FEATURES

SECTION 4 TECHNICAL SPECIFICATIONS

SUPPLY

Voltage ..... 11-30VDC from DC+ DC- terminals, or USB Port

Power Consumption ..... <1.2W

Working Temperature..... -10…60 °C

Isolation.....1.5kV RMS

GSM MODULE FEATURES

SIM/USIM..... 3V/1.8V

Quad Band..... 850/900/1800/1900MHz

GPRS Multi Slot Class..... Class 12 85.6kbps (Downlink) 85.6kbps (Uplink)

GPRS Mobile Station..... Class B

Compliant to GSM Phase 2/2+..... Class 4 (2W @850/900MHz)

..... Class 1 (1W @1800/1900MHz)

SERIAL COMMUNICATIONS

Device support for up to 64 pcs.

Baudrate 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200

Stop Bit 1,2

Parity ..... None, Even, Odd

Data..... 8 Bit

USB

Configurable via USB

Micro USB Connection Interface

SUPPORTED PROTOCOLS

MODBUS TCP

MODBUS RTU over TCP

MODBUS ACII over TCP

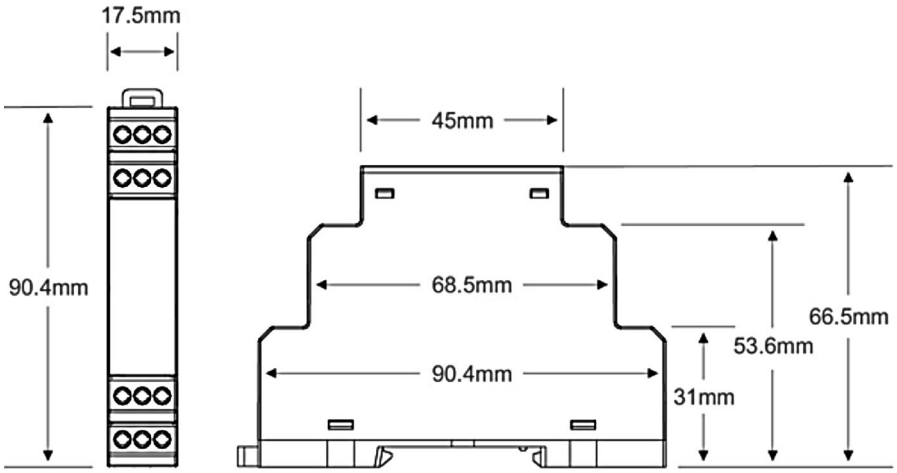


Figure 4-1 Dimensions

Kızılüzüm Mahallesi Kemalpaşa Kızılüzüm Cad. No:15 - 35730
Kemalpaşa - İzmir / TURKEY Tel: (+90 232) 877 08 00 Fax: (+90 232) 877 08 06
www.klemsan.com / info@klemsan.com.tr

Klemsan®

Revizyon No: 20112018