

# **GEM-05/GEM-10/10SH GPRS/Modbus Gateway User Manual**

*Rev 1.07  
01/2014*

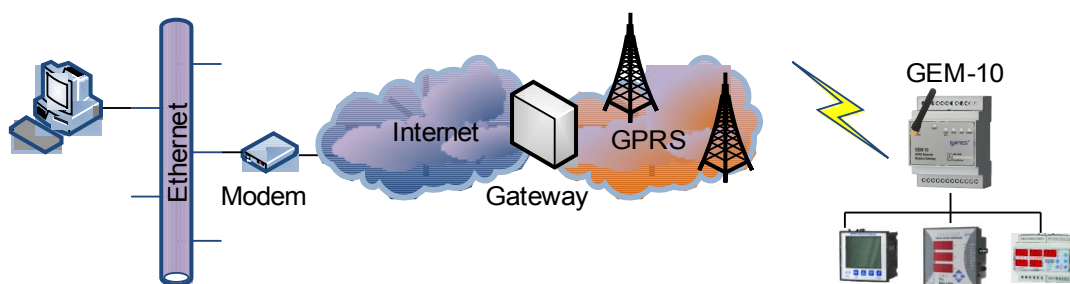
# 1.Introduction

## 1.1 General Features

ENTES GEM GPRS/Modbus Gateway devices allow you to connect to your devices which communicate using Modbus protocol via GPRS or Ethernet network. With GEM-10, you can use just one of the GPRS or Ethernet connection options or you can use one of them as backup connection for the other one. GEM-10SH can be used to read predefined electricity meters when used with ENTES meter reading software. GEM-05 model doesn't include the meter reading feature and can only use GPRS connection for ModbusTCP communication.

General features of GEM series devices are listed below.

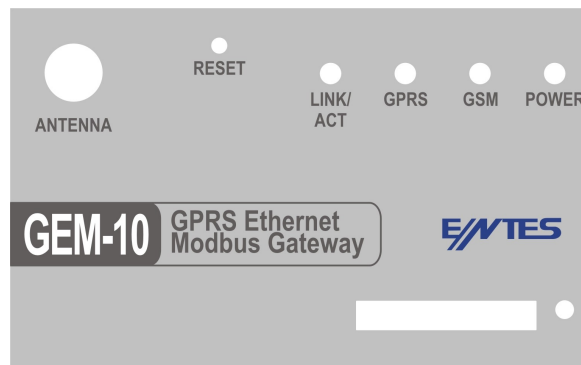
- Cinterion MC55i Quad-band GPRS modem
- 10/100 Mbps Ethernet port (for GEM-10 and GEM-10SH models)
- RS232, RS485 port (300...115200 bps)
- Mini-USB port for configuration
- Ability to work with SIM cards which have static or dynamic IP
- Ability to set the device parameters via WEB by using Ethernet connection (for GEM-10 and GEM-10SH models)
- Ability to work in server or client mode
- Ability to work in ModbusTCP and Tunnel mode
- Ability to read predefined meter information (only for GEM-10SH model)



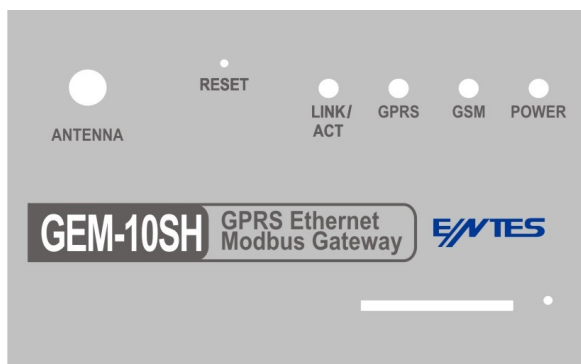
*Technical Data:*

Category	Description
Network Protocols	TCP/IP, ARP, ICMP,HTTP, ModbusTCP
Serial Ports	RS485 for communication, USB port for configuration
Operating Modes	ModbusTCP/RTU and Modbus Tunnel
Network Interface	10/100 Mbps auto-negotiation
Serial Communication Formats	Data Bits: 5-6-7-8 data bit Stop Bit: 1-1.5-2 characters Parity: Odd-Even-None
Serial Interface	300-115200 bps
Power Supply	12-20V DC
Isolation and Protection	RS485 port: 500V Ethernet port: 1500V 15KV ESD protection on USB port 10/1000 $\mu$ s (600W) transient pulse protection on RS485 port

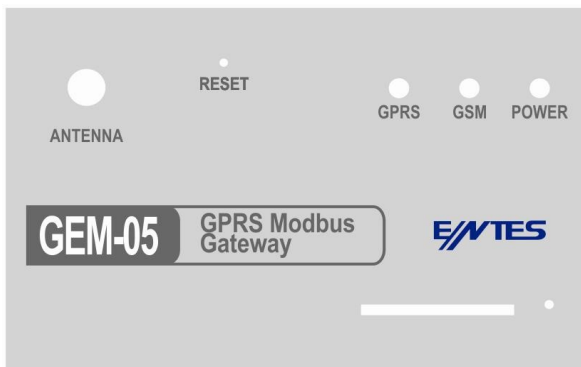
**Table 1. GEM-10 Technical Data**



**GEM-10 Front Panel**



**GEM-10SH Front Panel**



**GEM-05 Front Panel**

## 1.2 LED Functions

Not available for GEM-05

	POWER	GSM	GPRS	LINK
<b>Green</b>	Not Ready	-	Connected to GPRS	Ethernet Link
<b>Red</b>	Ready	-	-	-
<b>Red (flash)</b>	-	Connecting to GSM	-	-
<b>Red -Green</b>	-	Signal Strength	-	-
<b>Green (flash)</b>	-	-	-	Ethernet Data

	Signal level is very good
	Signal level is good
	Signal level is moderate
	Signal level is low
	Signal level is very low

## 1.3 Placing the SIM card

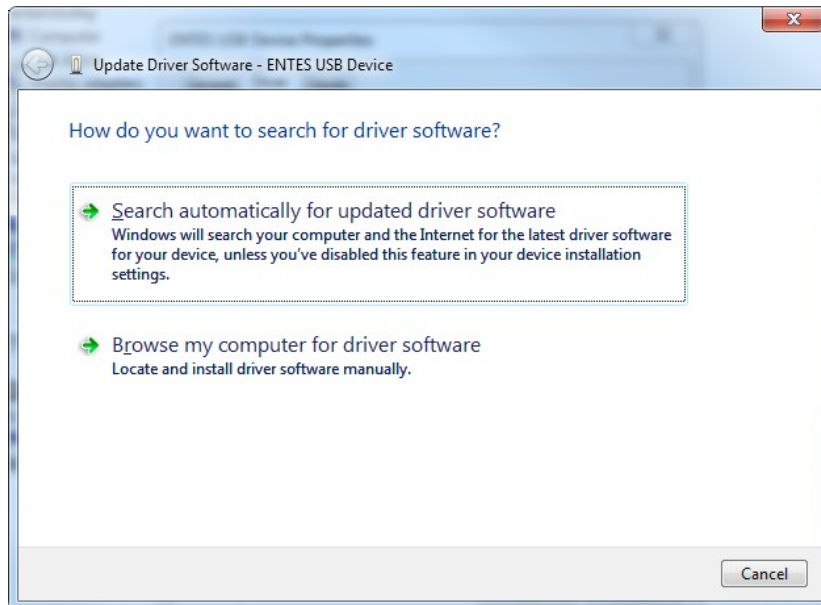
Place a pen or a screwdriver with a fine tip to the hole next to the SIM card slot and push gently. Place the SIM card to the opened SIM card tray and slide the tray back in. **Turn the power supply of the device off before placing the SIM card.**

## 1.4 Driver Installation

Since GEM configuration tool communicates using the USB port of your computer, USB drivers in accompanying CD must be installed to your computer.

To install the drivers;

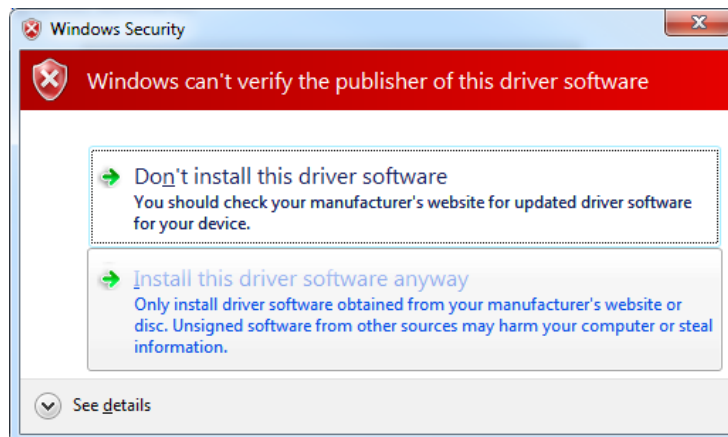
1. Connect the device to the USB port of your computer. POWER LED will turn on and your hardware will be automatically detected.
2. To locate the driver files, click on “Browse my computer for driver software” option.



3. On the next window, select the location of your drivers and click on “Next” button.

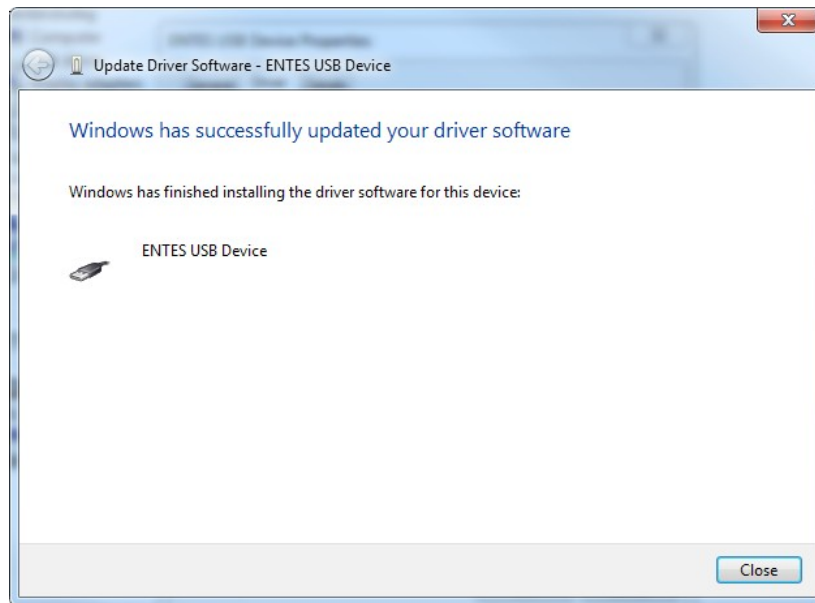


4. Click on “Install this driver software anyway” on the driver compatibility verification window.

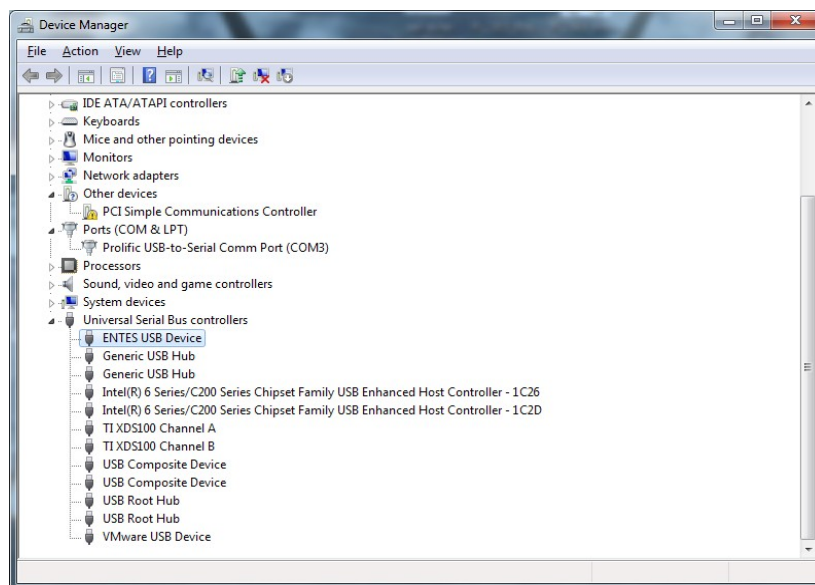


5. Your computer will backup your files for System Restore.

6. When the window below is displayed, copying of necessary files to computer is finished.



7. After the installation is finished, you can see your device under **Start->Control Panel->Device Manager->Universal Serial Bus controllers**.



**Important: Before inseting the SIM card into the device, disable the PIN code request of SIM using your mobile phone. Otherwise, GEM-10 will not connect to Internet.**

## Configuration

In order to use the GEM configuration program, you must install the .NET Framework program located in the CD.

**Important: On computers with Windows 7, configuration software must be run as administrator.**

## 2.1 Connection Settings



- **TCP Connection Type**

If you want the device to connect to the IP address in the “*Server IP*” box, select the “*TCP Client*” option. Otherwise to wait for the incoming TCP connections, select “*TCP Server*” option.

- **Operating Mode**

In this section, you can select if your Modbus packages are converted to ModbusTCP or get tunneled when they are transferred via TCP. If GEM-10SH is going to be used for meter reading according to the IEC62056-21 (OBIS) standard, select “Meter Reading” from the drop-down menu.

**Note: Meter reading feature is available only on GEM-10SH model.**

- **ModbusTCP Port**

It represents the port number which will be used for ModbusTCP.

- **TCP Timeout**

If the device is configured as Server, this value represents the waiting time in seconds for GPRS connection to refresh in case of a data transmission absence.



- **Connection Type (This option is available only for GEM-10/GEM-10SH models)**

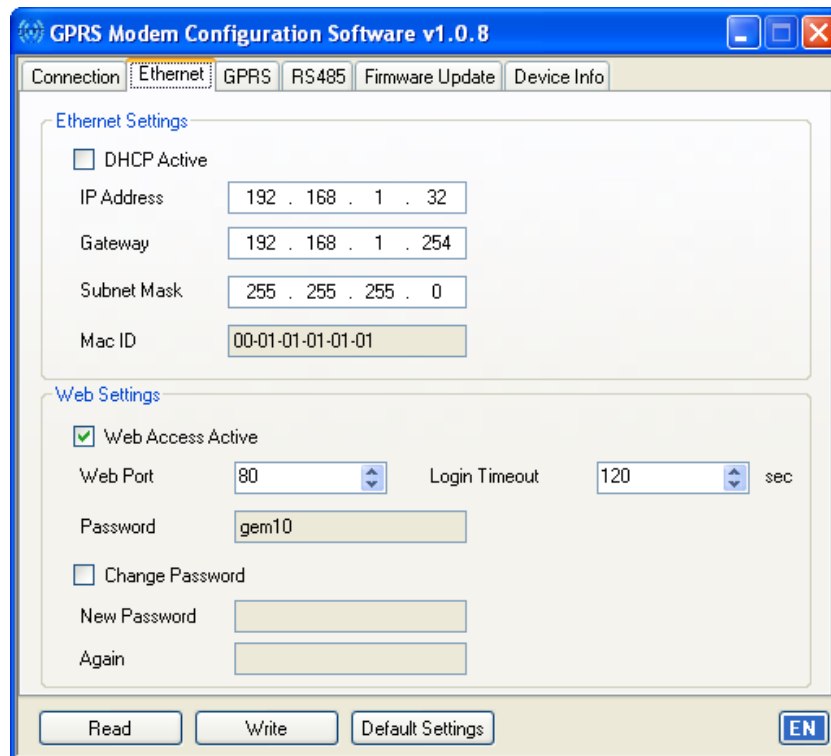
In this section, you can select the interface on which the ModbusTCP communication will occur. If you select Ethernet/GPRS option, the device will first try to connect to server using Ethernet. In case of failure, the device tries to connect to server IP address using GPRS. After the GPRS connection is established, the device continues to send ping requests to the server in 5 second intervals using Ethernet. If 4 consecutive ping requests get responds, connection via GPRS is terminated and it is redirected to Ethernet.

This setting is valid only if the device is configured as Client.

- **Server IP**

If the device is configured as Client, this address represents the IP address to connect to.

## 2.2 Ethernet Settings (It is not available on GEM-05 model)



- **DHCP Active**

It indicates that the device will take its IP address for ethernet connection from a DHCP server.

- **IP Address**

It shows the IP address of the device for ethernet connection. If the device is assigned an IP address by a DHCP server then this field shows the IP address assigned to it.

- **Gateway**

It shows the address of the gateway or modem on which the device connects to Internet..

- **Subnet Mask**

It shows the network address to which the device is connected..

- **MAC ID**

It shows the unique MAC address of the device.

- **WEB Access Active**

This setting enables the user to change the device settings via WEB interface. To enable this feature, click on this option.

- **WEB Port**

It indicates the port number which will be used for WEB access.

- **Login Timeout**

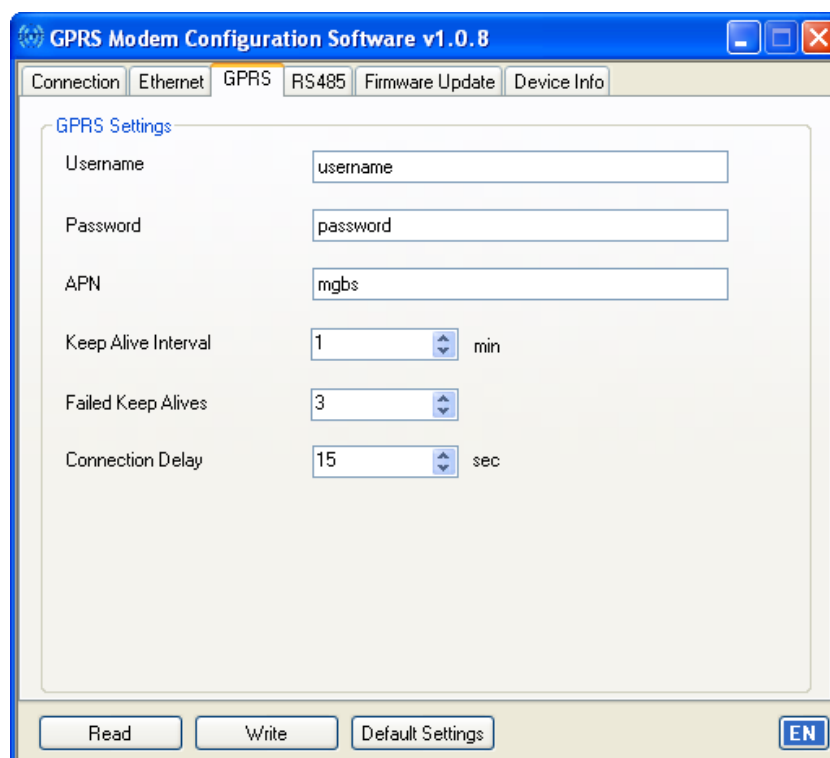
It indicates for how long the device will wait before disabling the user to reenter to WEB access page if the WEB access page is closed without clicking on the Exit button.

- **Password**

To change the password which is used for WEB access, activate the “*Change Password*” option and enter your new password. Default password is “gem10” and case-sensitive.

**\*\* Access to the WEB interface of the device is only possible by using the ethernet port.**

## 2.3 GPRS Settings



The screenshot shows the 'GPRS Modem Configuration Software v1.0.8' window. The 'GPRS' tab is selected, and the 'GPRS Settings' section is visible. The settings are as follows:

Field	Value	Unit
Username	username	
Password	password	
APN	mgbps	
Keep Alive Interval	1	min
Failed Keep Alives	3	
Connection Delay	15	sec

At the bottom of the window, there are buttons for 'Read', 'Write', 'Default Settings', and 'EN'.

- **Username**

Username which will be used for GPRS connection.

- **Password**

Password which will be used for GPRS connection.

- **APN**

Enter the APN name which is defined by your GSM carrier for GPRS connection.

- **Keep-Alive Interval**

It indicates the interval of keep-alive packages sent by the device to detect idle status of GPRS data channel.

- **Failed Keep Alives**

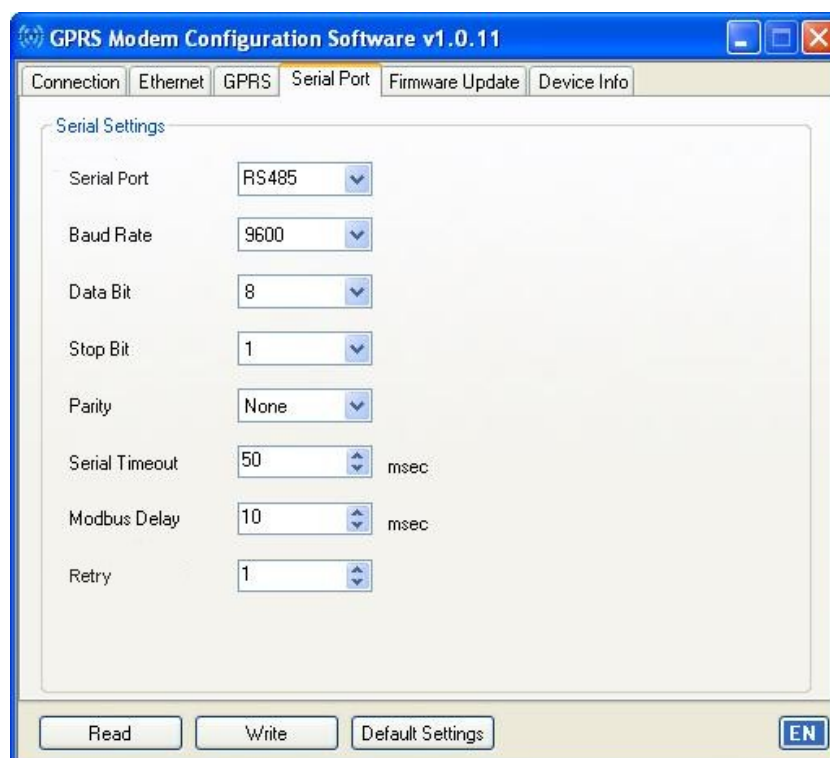
If the device can't get responses to keep-alive packages as the number defined in this box, it refreshes the GPRS connection.

- **Connection Delay**

This option is valid if the device is set as Client and it indicates the reconnection attempt interval to the server (monitoring point).

**\*\* Please contact your GSM provider for information about your Username, Password and APN Name.**

## 2.4 Serial Port Settings



- **Serial Port**

It indicates the serial communication port of your device. You can select RS485 or RS232 interface. RS232 port contains only Rx and Tx signals.

- **Baud Rate**

It indicates the communication speed of your device. Supported speeds are 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200 bps.

- **Data Bit**

It indicates how many bits constitute the data package. Supported bit numbers are 5, 6, 7 and 8.

- **Stop Bit**

In serial communication protocols, stop bit comes after data and parity bits and it indicates the end of data package. Supported stop bit numbers are 1, 1.5 and 2.

- **Parity**

It is the parameter which is used to verify the authenticity of data package. Supported options are Odd, Even and None.

- **Serial Timeout**

It indicates for how long the response from the queried device will be waited.

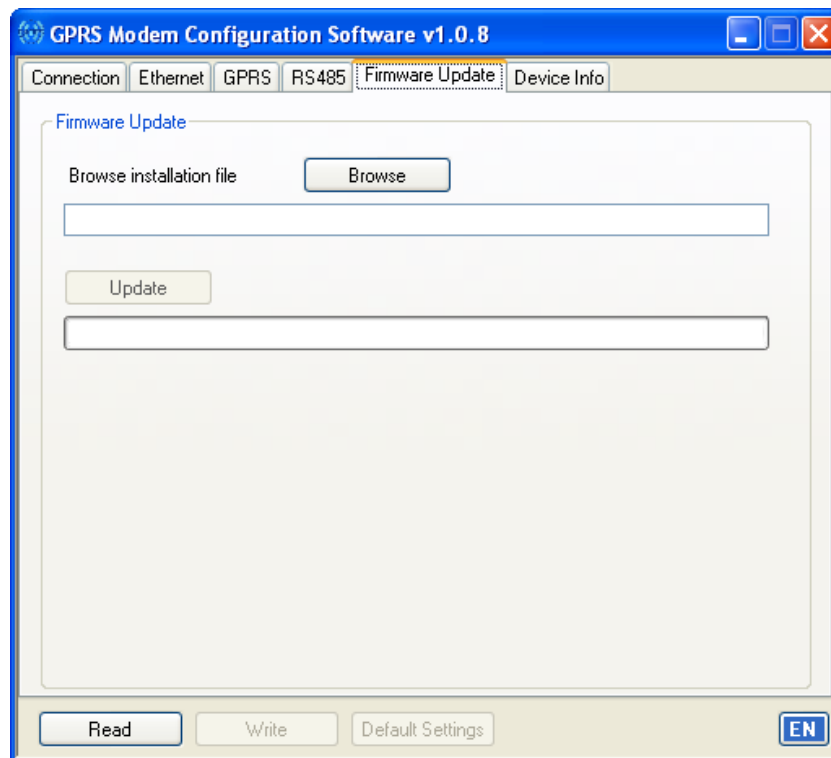
- **Delay**

It indicates the delay between the response of Modbus device and next transmitted Modbus query.

- **Retry**

It indicates how many times the device will retry for the non-responsive OBIS (IEC62056-21) queries during meter reading. It is only valid for “Meter Reading” operating mode.

## 2.5 Firmware Update

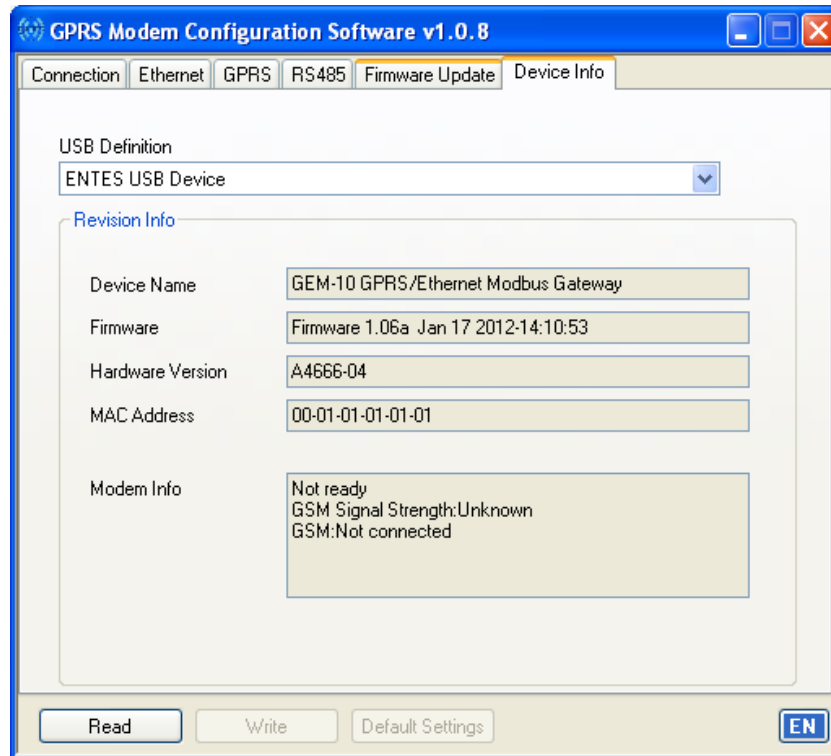


You can update the device to latest firmware from this section.

To do this;

- Click on Open button and select the firmware file that you will upload.
- Click on Update button and start the update process. After the device resets, it will install the selected file.
- After the updating is finished, the device will restart itself and start its operation again.
- After the update, the device will start operation with factory settings.

## 2.6 Device Info



All hardware/software information is displayed in this section. Additionally; GSM connection state, GSM signal strength and GPRS IP of modem can be monitored in this section.

**Important: For the new settings to take effect, the power supply of the device has to be switched off and on again.**

## 2.7 Accessing Device Settings via WEB Interface (only for GEM-10/GEM-10SH)

The device contains an HTTP server which lets the user to change the device settings remotely. This way, the user can change device settings without the need of actually being near the device. In order for this feature to be usable, “*WEB Access Active*” under WEB Settings must be selected.

To access the device settings;

- i. Enter the IP address of the device into your browser address line.




- ii. Enter the WEB access password on the following page (*gem10* by factory default).

Dil Seçiniz/Select Language English

Enter Password

Password

iii. A page that shows the device settings will be displayed. By using the menus on the left side, all device settings can be accessed.



- Home
- System Settings
- GPRS Settings
- Network Settings
- RS485 Settings
- Change Password
- Device Info
- Save Settings
- Logout

ModbusTCP  ModbusTCP Server  ModbusTCP Client

ModbusTCP Port

ModbusTCP Timeout  secs

Server IP  .  .  .

Modbus Tunneling  No  Yes

Interface Ethernet

iv. After changing any of the settings on each page, click on “Update” button. When all operations on pages are finished, click on “Save Settings” option. Your new settings will be saved on the permanent memory, GEM-10 will restart itself and start its operation again.