

Anybus[®] SG Gateway

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Anybus® SG Gateway User Manual

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1 Preface

1.1 About this Document

This document describes the Anybus SG-gateway family. The target audience for this document are users that work with the devices during commissioning, configuration, programming and operation phases.

The Anybus SG-gateway family currently consists on three devices, the SG-gateway I/O, the SG-gateway M-Bus and the SG-gateway Profinet. They share many features; *Anybus SG-gateway Family, p. 5*, describes the common functionality, e.g. programming the WEB-PLC.

Anybus SG-gateway I/O, p. 27, describes the hardware features of the SG-gateway I/O.

Anybus SG-gateway M-Bus, p. 31, describes the hardware features of the SG-gateway M-bus.

Chapter 5 describes the hardware features of the SG-gateway Profinet.

For additional related documentation and filed downloads, please visit the support website at www.anybus.com/support.

1.2 Related Documents

Related documents

Document	Author

1.3 Document History

Summary of recent changes

Change	Where (section no.)

Revision list

Version	Date	Author	Description
1.00	2016-01-xx	KeL	First released version

1.4 Conventions

Unordered (bulleted) lists are used for:

- Itemized information
- Instructions that can be carried out in any order

Ordered (numbered or alphabetized) lists are used for instructions that must be carried out in sequence:

1. First do this,
2. Then open this dialog, and
 - a. set this option...
 - b. ...and then this one.

Bold typeface indicates interactive parts such as connectors and switches on the hardware, or menus and buttons in a graphical user interface.

Monospaced text is used to indicate program code and other kinds of data input/output such as configuration scripts.

This is a cross-reference within this document: [Conventions, p. 4](#)

This is an external link (URL): www.hms-networks.com



This is additional information which may facilitate installation and/or operation.



This instruction must be followed to avoid a risk of reduced functionality and/or damage to the equipment, or to avoid a network security risk.



Caution

This instruction must be followed to avoid a risk of personal injury.



WARNING

This instruction must be followed to avoid a risk of death or serious injury.

2 Anybus SG-gateway Family

Anybus SG gateways can be programmed through the internal web server. The WEB-PLC is a simple PLC (Programmable Logic Controller) software with a web based programming interface. WEB-PLC's graphical editor allows you to edit function diagrams similar to the well-known CFCs (Continuous Function Charts).

2.1 System Requirements

The following features are needed on your local computer:

- Ethernet network interface
- Microsoft Windows XP/Vista/7
- Internet connection
- Web-browser:
 - Mozilla Firefox (recommended)
 - Microsoft Internet Explorer 8 or later (version 9 or later recommended)
 - Google Chrome
 - Apple Safari
 - Opera
- Chiptool is available here: <http://anybus.com/products/smartgrid.shtml>

The WEB-PLC software runs on any up-to-date web browser on any PC operating system. The IP-Tool, used to determine/configure your device's IP address, runs on Windows.

2.2 Cable the Device

Use an Ethernet cable to connect the SG device to your PC. If you have an existing network infrastructure, use a patch cable to connect the SG device to your hub or switch. If not, use a crossover cable to directly connect the Ethernet jack of the SG-gateway to the Ethernet jack of your PC's. Connect the power supply unit to the power supply jack of the SG-gateway.

2.3 Configure the Network Settings

To be able to access the embedded web site, the device must have a valid IP address known to us. Therefore we will use the IP-Tool (Chiptool).

When you start the IP-Tool it will scan for SG-gateway on the local network. The MAC IDs of the devices will be displayed in a list. Select the MAC ID of your device from the list. The MAC ID can be found on the label on the housing of the device.

The current IP configuration of the device will be displayed. By default the device will try to get an IP address from a DHCP server at start. If this does not work, an auto IP will be activated. Check if the current settings match the needs of your network. If you are in doubt, ask you network administrator.

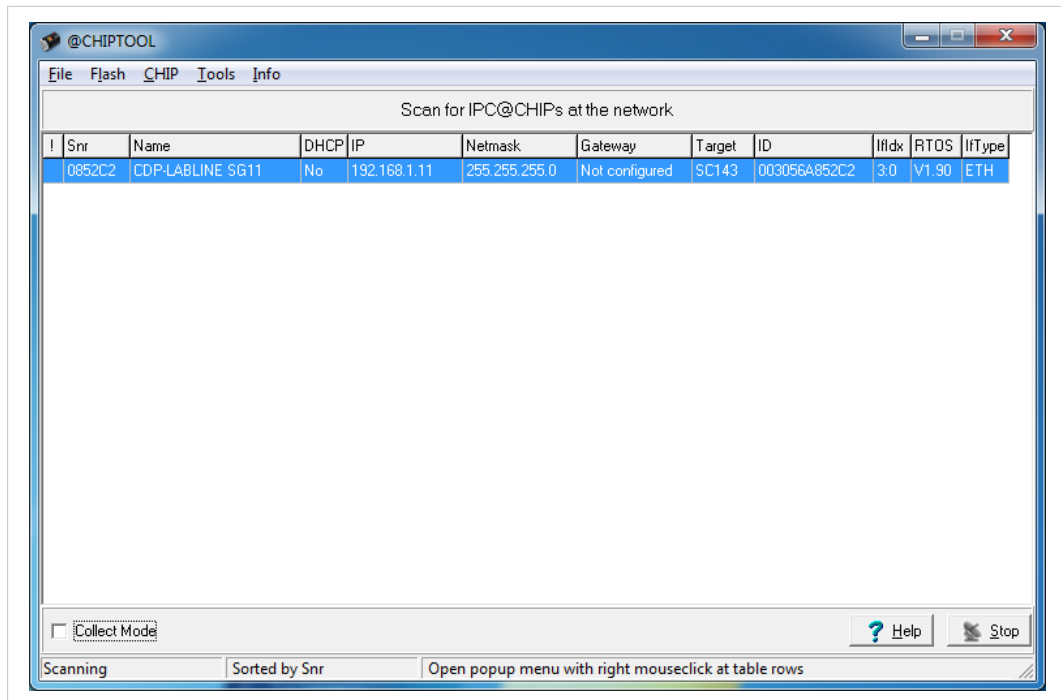


Fig. 1

If necessary, change the addresses. When finished, click the **Config** button. The IP-Tool will ask for a password. By default this password is **hms**. If you're running a firewall, make sure that it does not block any network functions of the IP-Tool.

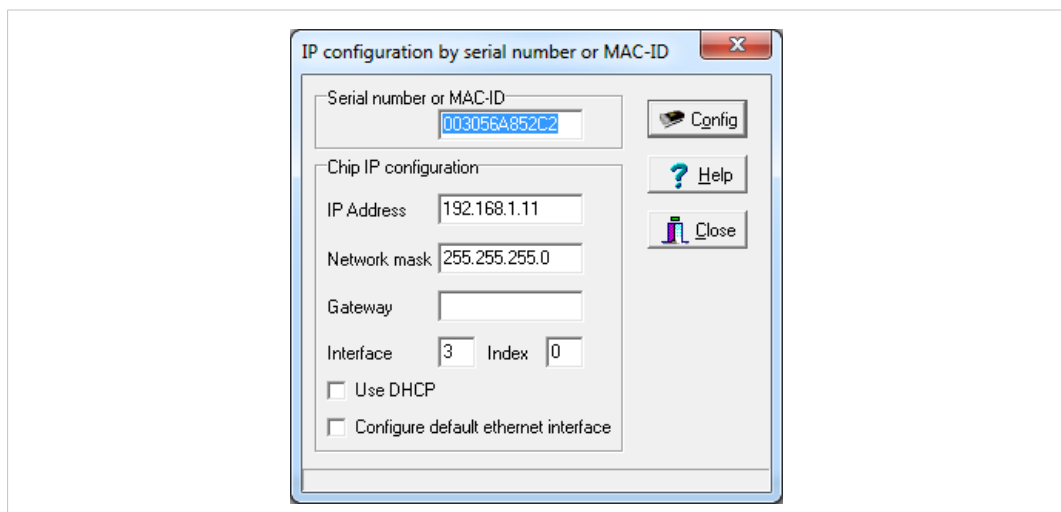


Fig. 2

2.4 Access the Embedded Web Server

Enter the IP address of the device into your web browser. An introduction page will be shown shortly and then you will be forwarded to the home page of the WEB-PLC. The home page provides an overview of the status of the device. Besides the current values of the I/Os it shows information on the device hardware and software and on special components such as the cellular modem or OpenVPN.

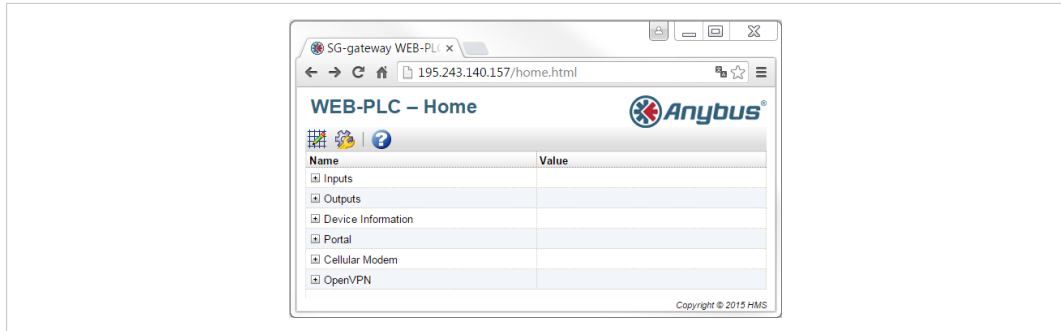



Fig. 3

 Use the **Editor** icon to open the WEB-PLC editor.

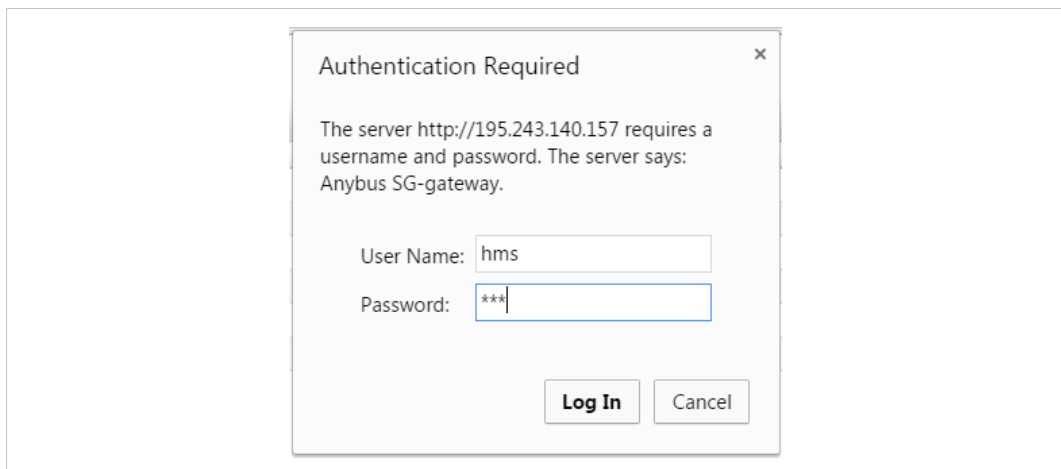




Fig. 4

The web site will request a username and a password. Both are **hms** by default.

2.5 Create an Application

The first example on how to create an application with the WEB-PLC, shows how to build a simple counter. First some elements have to be added to the empty diagram.

1.  Use the **Add unit** icon to add a timer and a counter unit.
2.  Click **Add constant**. Enter the value 5000 in the window and press **OK**

The elements can be dragged and dropped in the diagram. Rearrange them so that they do not overlap. The diagram should look like this:

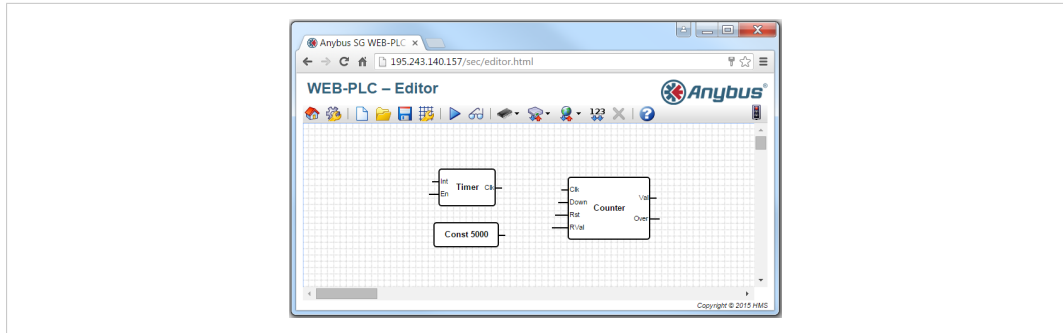


Fig. 5

Connect the elements. To create a connections between two ports, press the left mouse button while the cursor is over one of the ports.

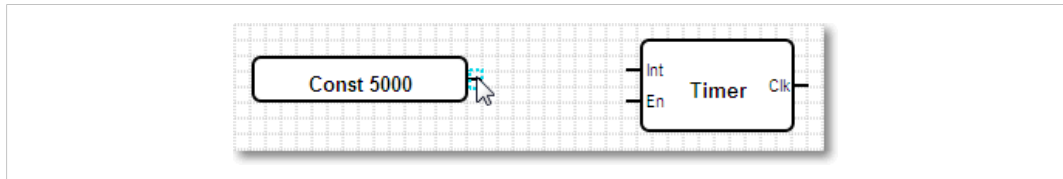


Fig. 6

Drag the appearing blue dotted line over another port and release the mouse button.

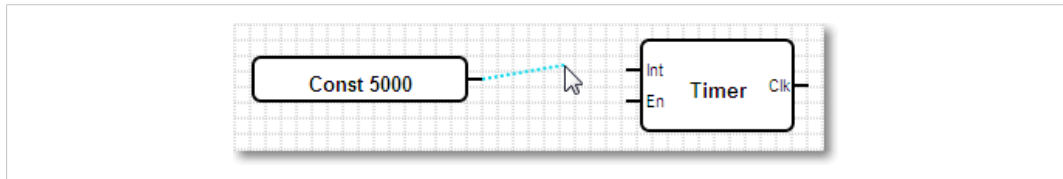


Fig. 7

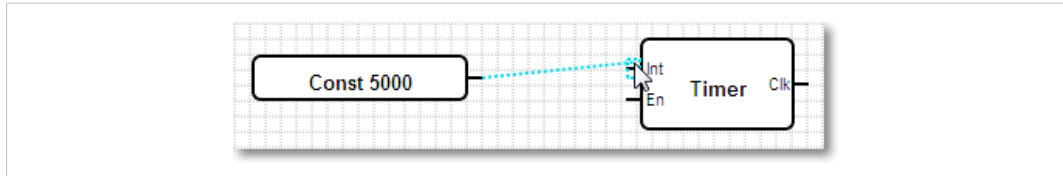


Fig. 8

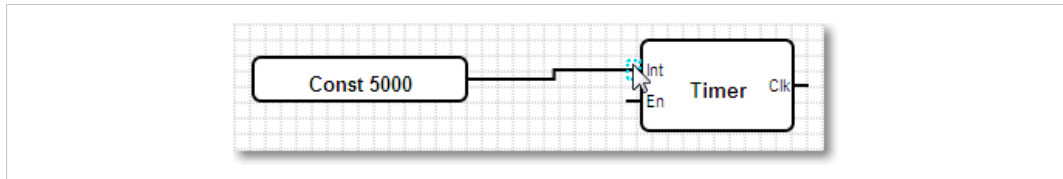


Fig. 9

Use this method to connect the following ports:

- The port of the constant with the **Int** (interval) port of the timer unit.
- The **Clk** (clock) port of the timer unit with the **Clk** port of the counter unit

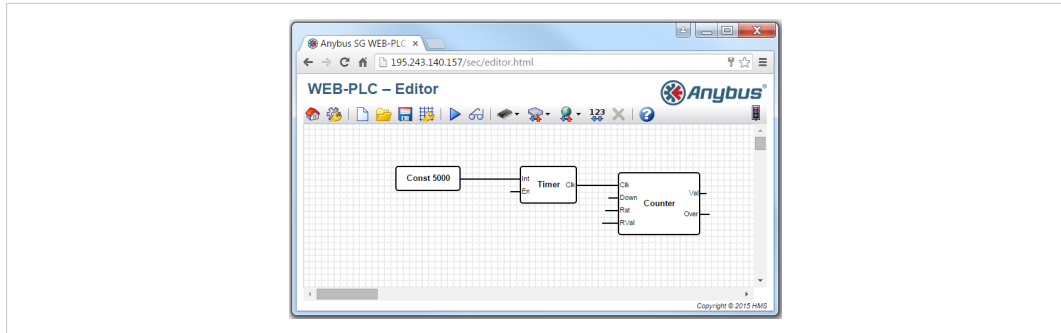


Fig. 10

The timer unit has an enable port (**En**), which must be $\neq 0$ to enable clock output. To achieve this, double click on **En** to negate it.

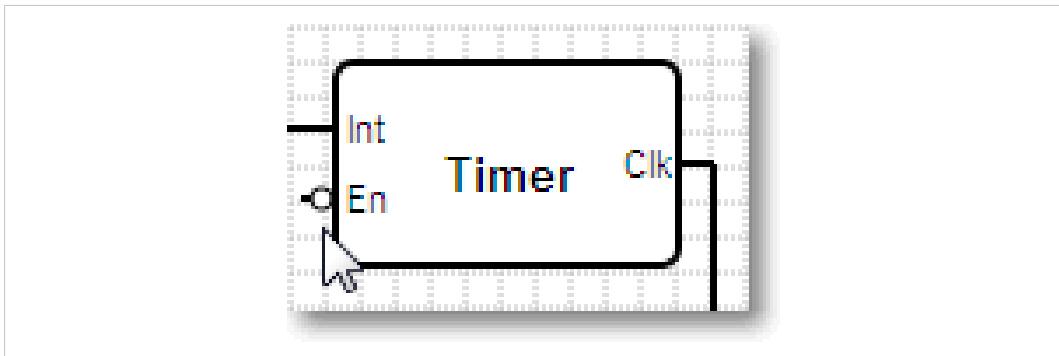


Fig. 11


The timer unit will generate a clock signal with an interval of 5000 ms. The rising edge of the clock signal will trigger the counter unit to increment its value.

 Press **Save diagram** to store the diagram on the device.

Note that the traffic light in the toolbar has changed from red to yellow. The status LED of the device, that indicates diagram execution has been switched on.

2.6 Run your Application

The diagram is now stored on the device but not being executed yet.

 To start execution, press **Start**.

The traffic light in the toolbar will change to green and the status LED indicating diagram execution will start to blink. The diagram is being processed and the counter value will increment.

 To see the current status of the diagram in the editor, press **Start Life View**.

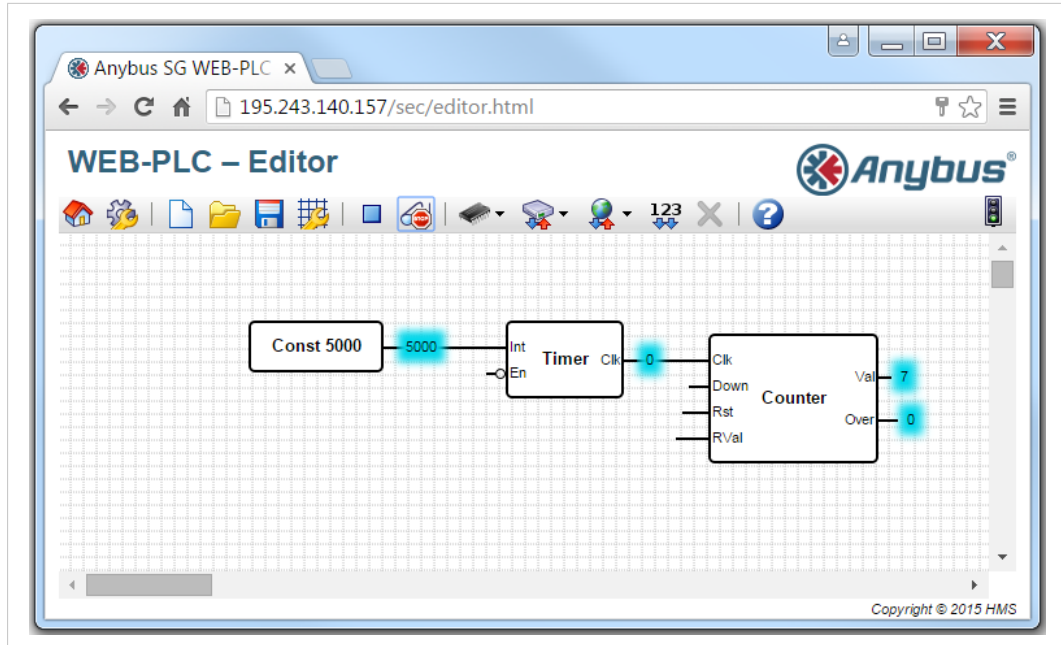


Fig. 12

The value of each output port will be displayed next to the port. The value of the counter unit will increment every 5th second.

2.7 Configure the Device Settings



Press **Settings** to go to the settings page.

On the settings page, there are several tabs for adjusting various configurations, e.g. login data, network settings (DHCP, firewall rules, NAT address translation, OpenVPN, etc.), cellular modem configuration and protocol settings (Modbus, IEC61850, IEC60870-5-104, M-Bus, PROFINET).

The first screen in the settings area is the **Event Log**, which displays all events (information messages, warnings and errors) generated by the device.

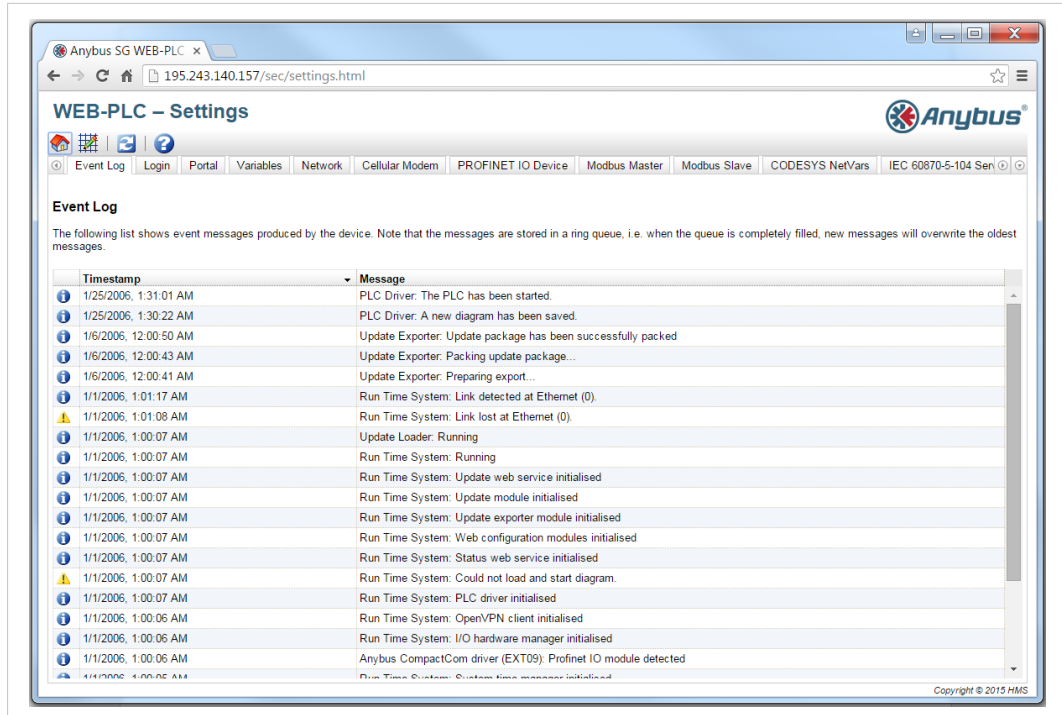


Fig. 13

2.7.1 Network Settings

In the **Network** tab, you can enter or change the IP settings (IP address, network mask, activate/deactivate DHCP), as well as setting up a DNS server, a proxy server and internet gateway.

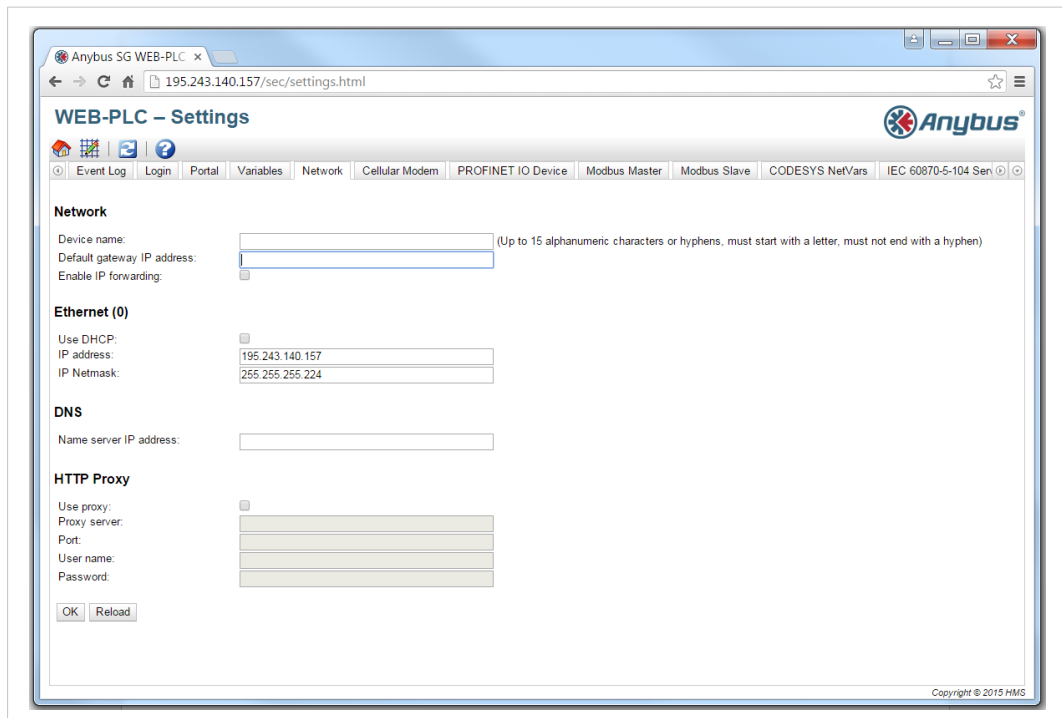


Fig. 14



If needed, contact your network administrator for correct IP settings.

Press **OK** to store your changes

 Press **Reboot** to restart your device in order to apply your changes.

2.7.2 DHCP

The WEB-PLC firmware features a Dynamic Host Configuration Protocol (DHCP) server, which you can activate and configure in this tab.

In the first section you have to configure the maximum number of clients (max. 100, including static mappings) and the leasing time. The server will lease IP addresses from the particular network except for his own. Additionally you can specify Gateway and Name Server IP addresses that will be distributed as well.

In the static leases section you can configure up to 10 static leases. A static lease will assure that a client with a special MAC address will be given a predefined IP address and that this IP address is not leased to another client. The MAC address of the client has to be noted without any delimiters (e.g. 003056A1DB30).

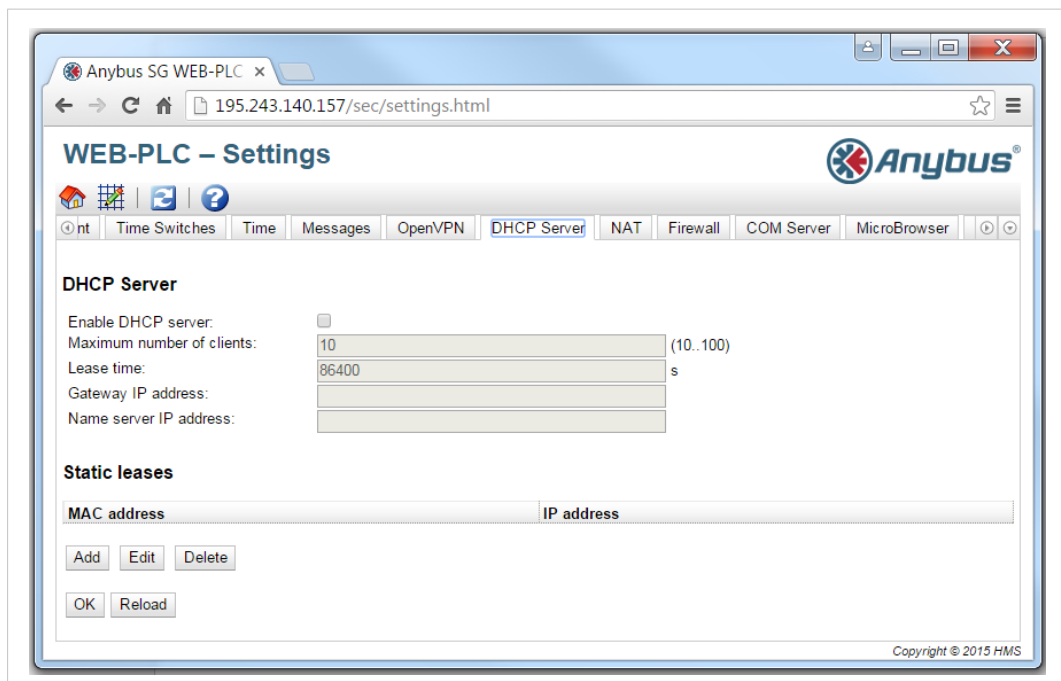


Fig. 15

Press **OK** to store your changes

 Press **Reboot** to restart your device in order to apply your changes.

2.7.3 Login

In this tab you can replace the default username/password combination with your own username/password. If you forget the credentials, restore the factory settings by pressing the **reset** button, [Reset Button, p. 29](#).

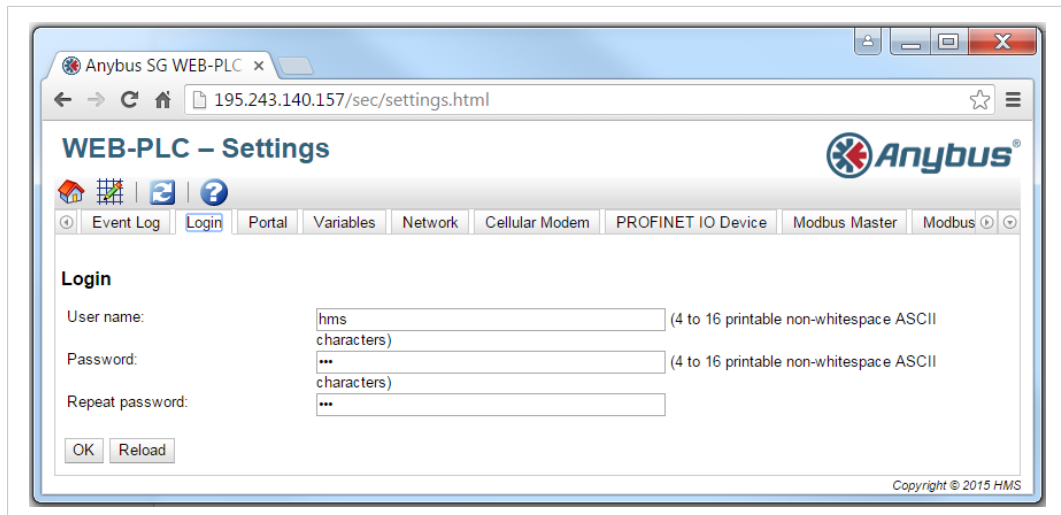


Fig. 16

Press **OK** to store your changes



Press **Reboot** to restart your device in order to apply your changes.

2.7.4 Firewall

The firewall improves security of the device by analyzing network traffic and blocking unallowed traffic. The firewall has a blocking policy, i.e. outgoing connections are allowed while incoming connections will be blocked except if there is a rule allowing this specific connection.

At the top of the settings page you can enable the firewall and configure the maximum number of rules. This determines the number of connections (incoming and outgoing) that can be handled simultaneously.

When enabling the firewall, always make sure that you have defined static rules, that allow you to access the web server, in order to be able to disable the firewall if needed.



If you enable the firewall without any appropriate rules, you will be unable to access your device in any way. You will need to reset the device to factory settings in this case.

Dynamic rules are created by the firewall for outgoing connections. You have to configure how many minutes dynamic rules will be valid (time to live). Static rules allow access to a specific service on your device from the network. You can add up to 30 static rules. Each rule consists of the following parameters:

- Network interface: The network interface from which you want to accept connections.
- Service: Set of predefined services that you may want to allow to be connected to. If the desired service is not on the list, choose **Other** in order to manually specify the protocol and the ports of the service.
- Protocol: Determines base protocol (TCP or UDP) for the service you want to allow.
- Port range: Sets the port(s) for the service to run on. You can specify a single port (set minimum and maximum to the same value) or a port range (e.g. 10000 to 10005). If both parameters are set to 0, connections to any part are allowed (wildcard).

- **IP range:** Determines the IP addresses for the specified service. You can specify a single IP address (set minimum and maximum to the same value) or an IP address range (e.g. 192.168.0.1 to 192.168.0.10). If both parameters are set to 0.0.0.0, connections from any IP address are allowed (wildcard).

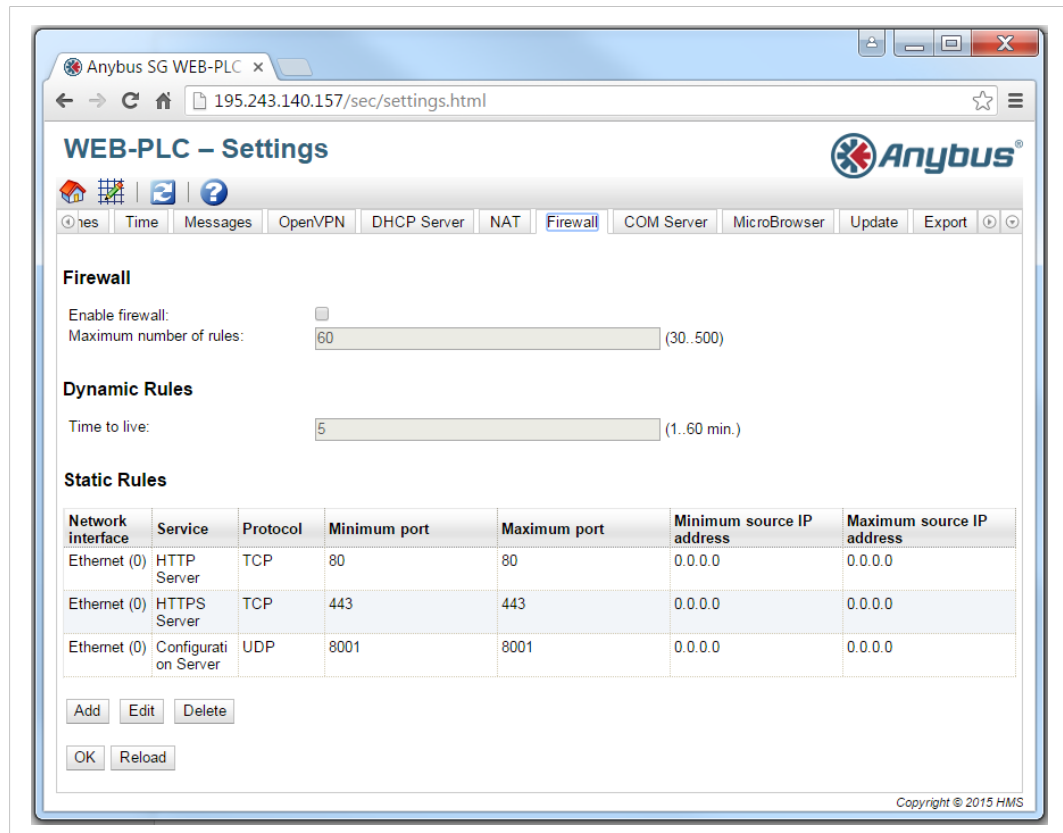


Fig. 17

Press **OK** to store your changes

 Press **Reboot** to restart your device in order to apply your changes.

2.7.5 NAT

The firmware is able to perform network and port address translation (aka NAT/PAT) in order to route traffic between a local (internal) and a global (external) network. This feature can for example be used to allow another device, connected to the local network Ethernet interface of the device, to use the cellular modem internet connection (global network) of the device. At the top of the settings form you can enable the NAT service and configure the internal and external network interface as well as the maximum number of mapping entries. This is the number of connections (incoming and outgoing) that can be handled simultaneously.

Dynamic mapping is used to enable devices from the local network to access the global network. Requests from the local network will be given the global IP address of the device, and the replies will be routed to the respective local device. You have to configure how many minutes dynamic mappings will be valid (time to live). Static mappings are used to make a local device's service accessible from the global network under the global IP address of the SG device. Up to 10 static mappings can be configured. For each you have to configure these four options:

- **Protocol:** TCP or UDP.
- **External Port:** The port at which the service should be reachable from the global network

- Internal Address: The IP address on the local network.
- Internal Port: The port number at which the service is available on the local network

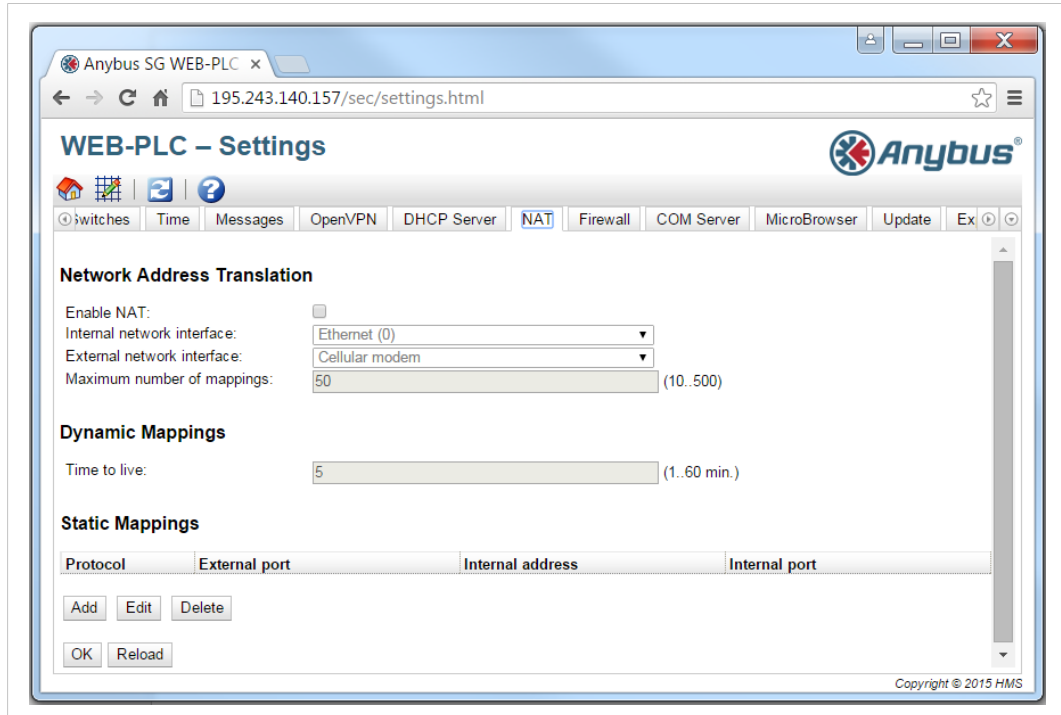


Fig. 18

Press **OK** to store your changes



Press **Reboot** to restart your device in order to apply your changes.

2.7.6 OpenVPN

The firmware includes an OpenVPN client. You can use it to integrate your device into a virtual private network.

The large text input field can be used to edit the OpenVPN configuration file. Please refer to the OpenVPN's documentation (<http://openvpn.net>) for further information. Certificate files can be referenced without any path prefix. Changes to the OpenVPN configuration may take effect before re-starting the device when the OpenVPN connection is (re-)established. It is recommended to reboot the device shortly after changing the configuration to preserve a consistent state.

The bottom section can be used to upload various certificate and key files. First choose file to upload using the the drop-down box. The items in the box also state the file names, through which you can reference the uploaded file inside the configuration above. Choose a file from the local file system and press **Start upload**. Certificates are temporarily stored to the SD card. They are deleted after being applied to the OpenVPN driver.

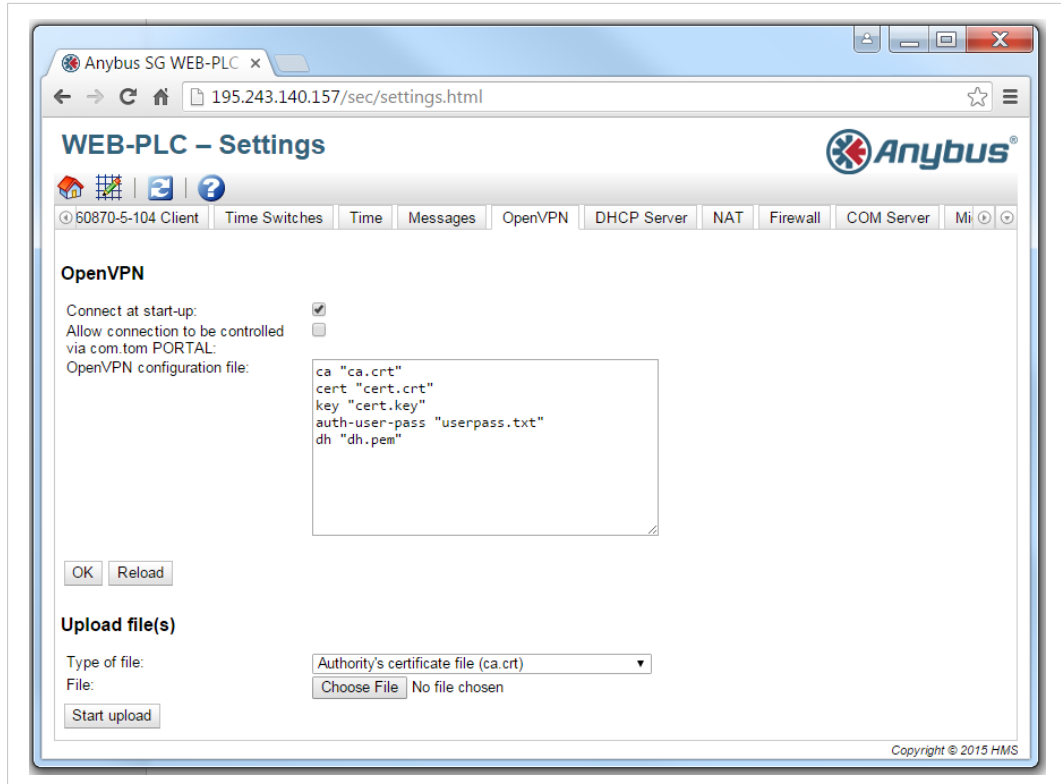


Fig. 19

Press **OK** to store your changes



Press **Reboot** to restart your device in order to apply your changes.

2.7.7 Cellular Modem Settings

To activate the modem, check the **Enable cellular modem** box. If your SIM card requires a PIN, enter it in the **SIM PIN** field. You can allow/disallow the modem to log into a network other than your home network (roaming). Note that roaming connections will normally produce higher costs. To establish a data connection via GPRS or UMTS, check the **Establish data connection** box.

Enter your mobile phone provider's Access Point Name in the APN field. If the APN requires authentication, enter the appropriate values, too. If you don't have this information, contact your mobile phone provider.

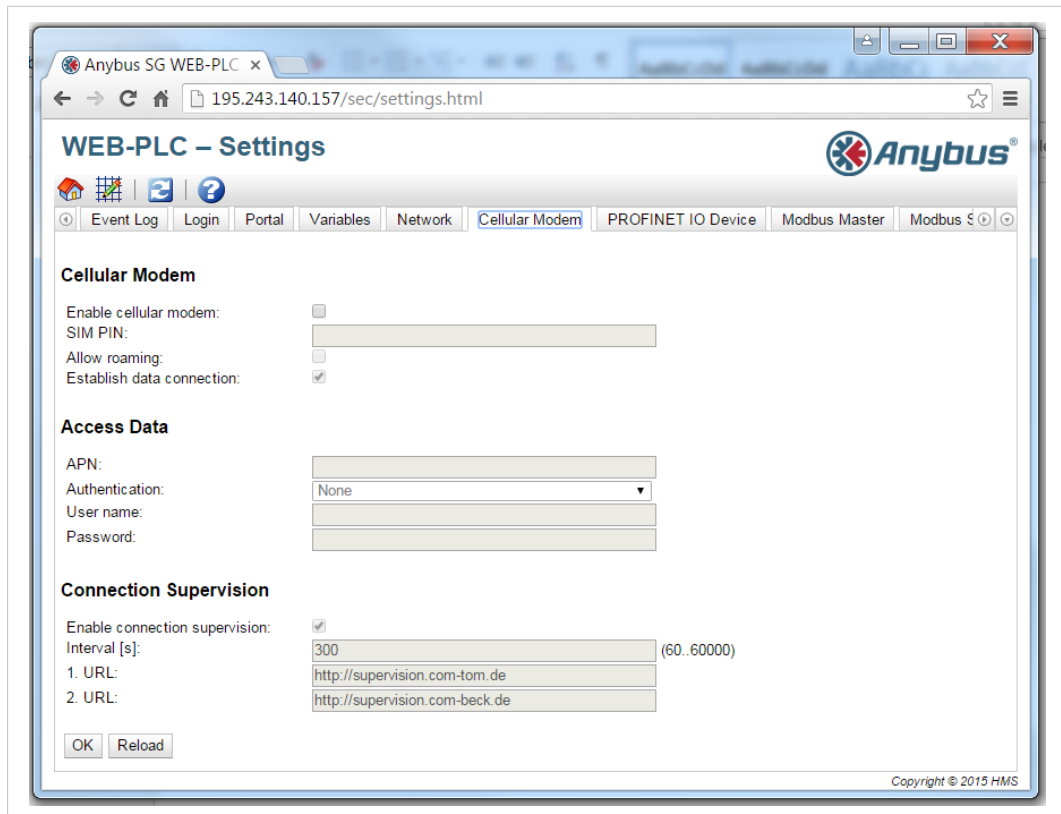


Fig. 20

Press **OK** to store your changes



Press **Reboot** to restart your device in order to apply your changes.

After a couple seconds the Modem LED will light up, indicating that the cellular modem has been initialized. After about one minute the GSM/GPRS LED should light up indicating that an internet connection has been established via the modem.

2.7.8 SMS Messaging

The SG-gateway is capable of sending and receiving messages. Currently only short messages via the mobile network (SMS) are supported.

Click the **Add** button below the empty **Send messages** list in order to define a message that the device should send. A new window will display. Enter the recipient of the message, i.e. the phone number composed of an optional leading + and up to 30 numerical digits (e.g. +491701234567). Define the text of the message, which must be composed of ASCII characters (latin characters, numbers, punctuation characters, no special signs, etc.). The input mask will not check the length of the text. If the text is too long for the transmission medium (SMS can contain up to 160 characters.), it will be cut. You can add references to variables, inputs or outputs to the text. Before a message is sent, the references will be replaced by the actual values.

In the **Receive messages** section you can configure up to ten messages that can be received by the device. For each message you have to configure a sender and a message text. For SMS, the sender must be a phone number. Note that the phone number must match exactly. Typically phone numbers are transmitted in international format (e.g. +491701234567), enter the phone number in this format. For the message text the same restrictions apply as for the send messages' text. If a short message with the defined text is received from the respective sender, the corresponding message receiving function will be triggered in your program.

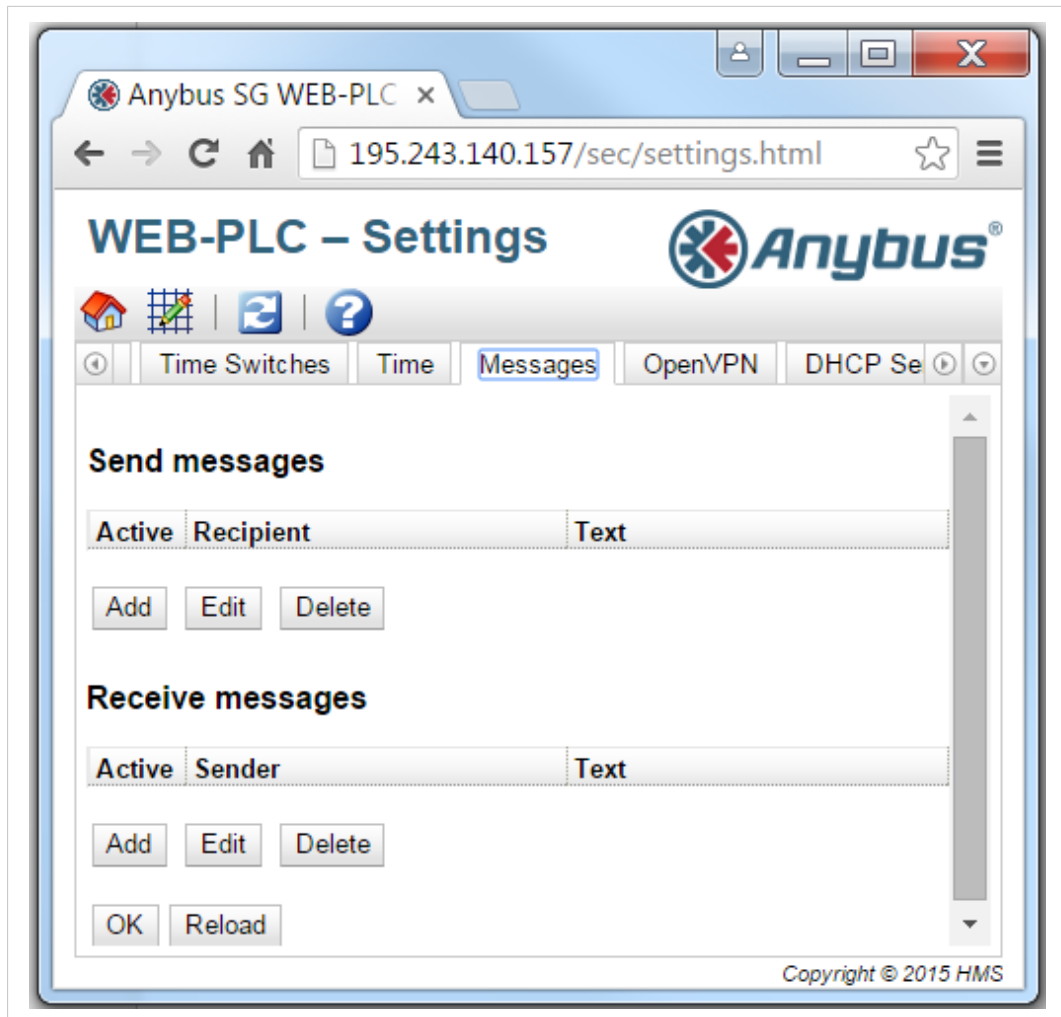


Fig. 21

Press **OK** to store your changes



Press **Reboot** to restart your device in order to apply your changes.

2.8 Protocol Settings

The Anybus SG-gateway family support multiple protocols. Please be aware that not all protocols are supported by each model. Read the corresponding chapter for your device model to learn which protocols are supported.

2.8.1 Modbus

All devices support Modbus TCP client/server and Modbus RTU master/slave protocols.

On the **Modbus Master** tab, all Modbus master/client parameters are configured. At the top there is a list of Modbus devices and their values. You can add, edit, delete or clone devices and values (input or output) using the buttons below the list. For each device or value, the list shows a name, the communication parameters, and an index. When adding or editing a device, a window will be displayed, where you can configure the following parameters:

- **Name:** The Modbus slave/server device's name, e.g. WAGO 750.

- **Type:** Select whether the device shall be accessed via Modbus TCP or RTU. The Modbus RTU option will only be available after you have enabled Modbus RTU.
- **Address** (only Modbus RTU): Modbus slave device address.
- **IP Address** (only Modbus TCP): Modbus server IP address, e.g. 192.168.1.173
- **Port** (only Modbus TCP): Modbus server TCP port number, typically 502.

When adding or editing an input/output register, another window with the following parameters will appear:

- **Name:** The register name.
- **Unit identifier** (only Modbus TCP servers): For Modbus TCP/RTU gateways this is the address of the RTU device to read/write from/to. For non-gateway devices this value should typically be 255.
- **Function:** Modbus function code used to read/write the value. The function code also defines whether the value is interpreted as an input or an output.
- **Start address:** Register address from where to start reading/writing. Note that addresses start at 0.
- **Quantity:** Number of registers/coils to read/write. If more registers/coils are read/written than fit into the selected data type (see below), the value will become an array. For example 2 registers (16 bit each) will fit into one 32 bit unsigned integer value. The value will be scalar (not array). 4 registers (64 bit in total) will make up an array with two 32-bit unsigned integer elements.
- **Data type:** Data type of the value.
- **Swap words:** Modbus transmits the two bytes of one register in network byte order (big endian). For multi-register values, the registers are expected to be in the same order. However, some devices store multi-register values in the opposite order. This option can be used to correct the word order.



Up to 32 devices and 128 values are supported. However, since values can become arrays when reading/writing several registers/coils, there is another limit. The number of all scalar (non array) values plus the size of all arrays must not exceed 512.

At the bottom of the page some general settings can be configured:

- **Interval:** Defines the interval in milliseconds in which all Modbus values will be read/written. Note that if the interval is too short to read/write all values, a warning message will be shown on the event log. In this case the interval should be increased.
- **Timeout:** Defines the maximum time in milliseconds to wait for the reply of a device when reading/writing one of its values or when connecting to a Modbus TCP device.
- **Enable RTU:** Enables Modbus RTU.
- **Mode:** Defines the mode for Modbus RTU. There are three possible options (RS232 with RTS/CTS flow control, RS232 without flow control, RS485).
- **Baud rate:** Defines the baud rate for Modbus RTU.
- **Parity:** Defines the parity (and stop bits) for Modbus RTU. There are four possible options (None -2 stop bits-, Odd, Even, None -1 stop bit-)

- **Minimum silent time between frames:** Defines the minimum time for which there has to be silence on the bus between two frames. The Modbus RTU driver calculates the silence time depending on the baud rate. Normally this should be sufficient, but this setting can be used to increase the silent time. If the time is less than the calculated time, it will be ignored.

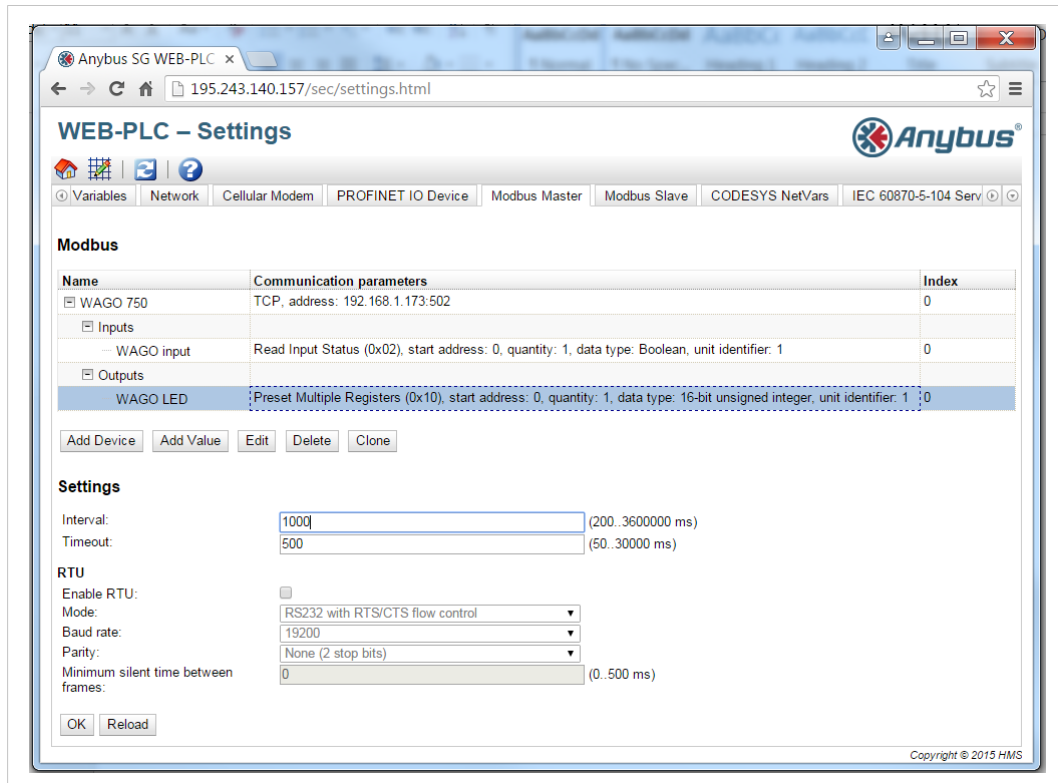



Fig. 22

Press **OK** to store your changes

 Press **Reboot** to restart your device in order to apply your changes.

On the **Modbus Slave** tab, all Modbus slave/server parameters are configured. At the top there is a list of Modbus registers offered by the SG-gateway acting as a Modbus slave. You can add, edit, delete, or clone inputs or outputs using the buttons below the list. For each I/O the list shows a name, the communication parameters, and an index. When adding or editing an input/output register, a window with the following parameters will appear:

- **Name:** The register name.
- **Function:** Modbus function code used to access the register. The function code also defines whether the value is interpreted as an input or an output.
- **Start address:** Register address from where to start reading/writing.
- **Quantity:** Number of registers/coils to read/write.
- **Data type:** The data type of the value.

At the bottom of the page, some general settings can be configured. The option Mode defines the mode for Modbus, either RTU or TCP. If you select Modbus TCP server, the following settings are available:

- **Port:** Modbus TCP server port number, typically 502.
- **Keep-alive enable:** Checkbox to generate a keep-alive message.

- **Keep-alive timeout:** Idle time in milliseconds after sending a keep-alive message.
- **Keep-alive interval:** Defines the time in milliseconds between keep-alive messages.
- **Keep-alive count:** Number of keep-alive messages before closing the TCP connection.

If you select the Modbus RTU slave mode option, the following settings are available:

- **Address:** Modbus slave device address.
- **Mode:** Defines the mode for Modbus RTU. There are three possible options (RS232 with RTS/CTS flow control, RS232 without flow control, RS485).
- **Baud rate:** Defines the baud rate for Modbus RTU.
- **Parity:** Defines the parity (and stop bits) for Modbus RTU. There are four possible options (None -2 stop bits-, Odd, Even, None -1 stop bit-)

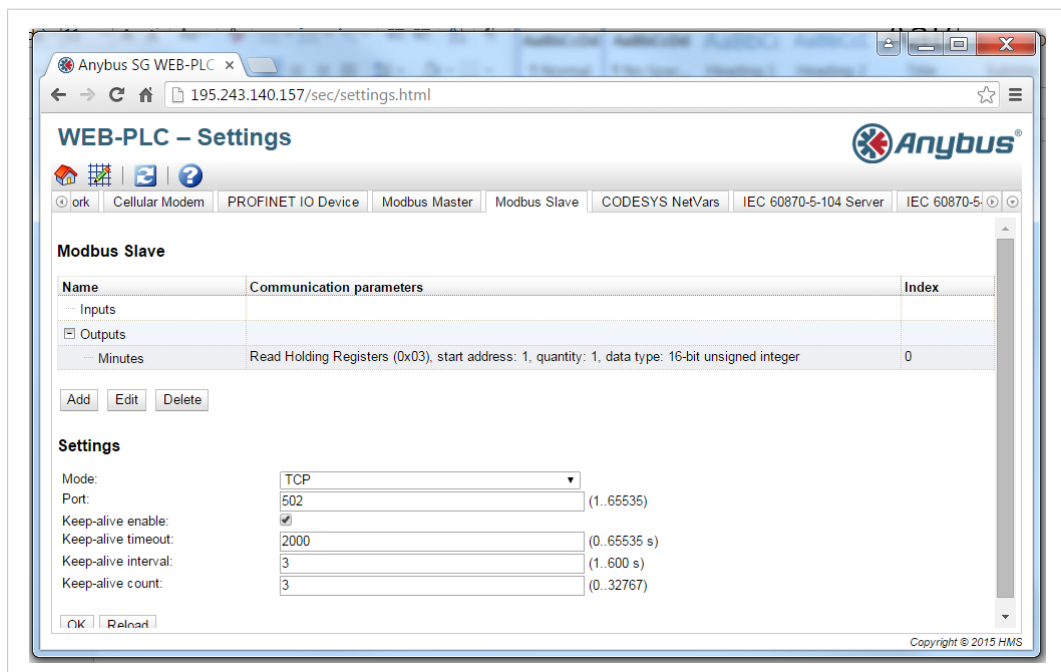


Fig. 23

Press **OK** to store your changes

 Press **Reboot** to restart your device in order to apply your changes.

2.8.2 M-Bus

Some devices, e.g. the SG-gateway M-Bus, support the M-Bus master protocol. On the **Metertab** you can configure all M-Bus parameters. At the top of the page you can configure these settings:

- **Baud rate:** Baud rate at which the M-Bus will operate.
- **Addressing mode:** Mode used to address the M-Bus slave devices (primary or secondary).
- **Request main page only:** If this option is set, only the main page of each M-Bus device will be requested. Typically the main page contains the most important values.
- **Maximum number of values per device:** Number of values to be read from each device.



The total number of values read from all devices is limited to 512. At least one value will be read from any device. Up to 32 devices are supported

- Readout interval: Interval in seconds in which the M-Bus devices will be read.

After changing the physical bus configuration, you will typically scan the bus by clicking **Scan** below the list. If you have chosen primary addressing, a window where you can set the address range to scan will be shown. After the scan has completed, the list will show the devices found. Save the new configuration to the device by clicking **Save** and reboot the device.

A list of supported M-Bus meters is available at www.anybus.com/support.

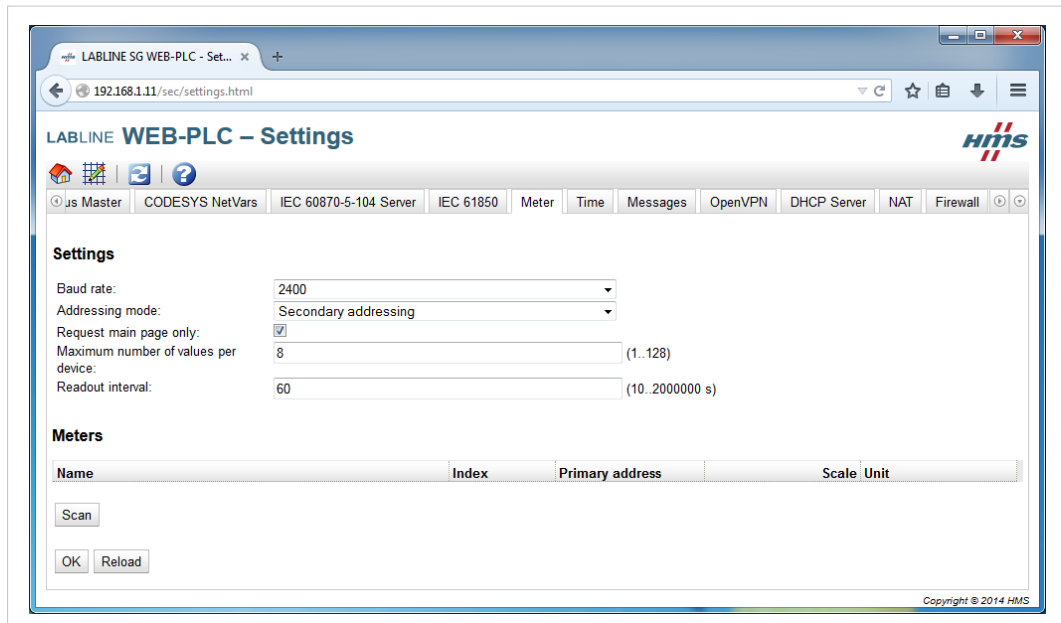


Fig. 24

Press **OK** to store your changes



Press **Reboot** to restart your device in order to apply your changes.

2.8.3 PROFINET

Some devices, e.g. SG-gateway Profinet support the PROFINET IO device protocol (i.e. PROFINET slave). On the **PROFINET IO Device** tab all PROFINET parameters are configured. At the top of the page there is a list where the modules and the values that are available inside these modules are defined. On a PROFINET network, a module represents the slot in a modular device as depicted in the picture below. Field devices are typically modular devices that can be extended with I/O cards on demand. Each module or slot contains several subslots or values, which represent the real I/O interfaces

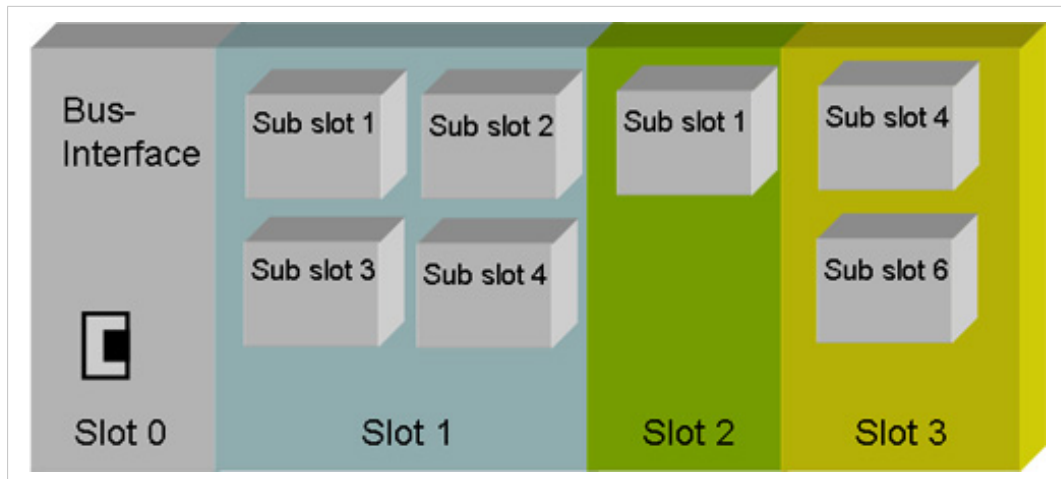


Fig. 25

All modules have a name and a module ID. Every value has a name, a data type and a length. Additionally the list shows an index for each module and value. The indexes are used internally to address the modules and their values. You can add, edit, delete or clone modules and values (input or output) via the buttons below the list.

When adding or editing a module, a window will appear where the following parameters can be configured:

- **Name:** The module name can be freely defined. It can consist of up to 32 printable ASCII characters. Please note that the same module name cannot be used more than once.
- **Module ID:** The module ID is used to address the module on the network. It is a numerical value between 1 and 65535. Note that the same module ID cannot be used more than once.

When adding or editing a value, a window will appear where you the following parameters can be configured:

- **Name:** The name of the value can be freely defined and can consist of up to 32 printable ASCII characters. Please note that the same value name cannot be used more than once inside the same module.
- **Data type:** The data type of the value.
- **Length:** If the length is greater than 1, an array will be defined. Arrays can have up to 255 elements.

General settings can be configured for the PROFINET interface:

- **Device ID:** If you have several Anybus SG-gateway with different configurations in your PROFINET network, the IO Supervisor (i.e. the PROFINET master, typically the PLC) must be able to distinguish these devices. Thus they need to have different device IDs. You can choose a device ID between 1000 and 1099.
- **Device name suffix:** Anybus SG-gateway with different configurations and device IDs should also have different names. A suffix can be configured that will be appended to the device name. The suffix can consist of up to 32 alphanumeric characters and/or hyphens. It must not start or end with a hyphen.

A GSD file will be generated dynamically with your settings. Using the **Download** button, you can download the GSD file including a corresponding graphic file. The GSD file can be imported into the IO Supervisor. The file includes the modules and values defined above.

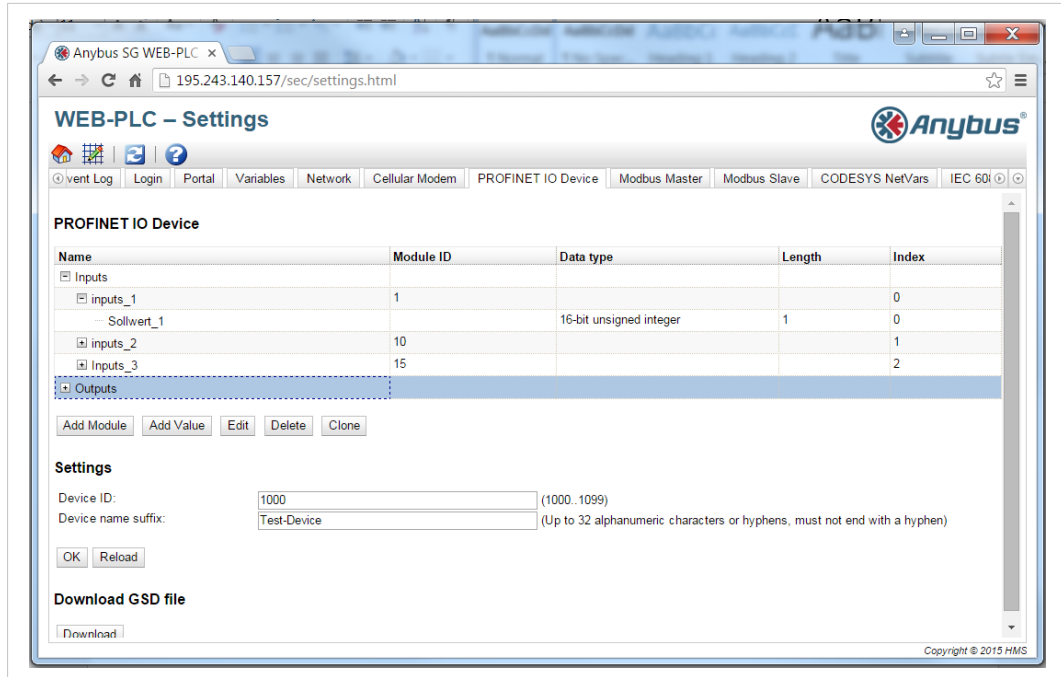


Fig. 26

Press **OK** to store your changes



Press **Reboot** to restart your device in order to apply your changes.

2.8.4 IEC60870-5-104

With the current firmware we support both client/server roles.

At the top there is a list of values (variables). You can add, edit, delete or clone values (input or output variables) via the buttons below the list. The list shows for each value a name, the type ID, information object address, range (number of consecutive objects), interrogation group, cyclic transmission time, and an index. The range setting can be used to configure a number of consecutive values. If the information object address is set to 1 and the range is set to 3, three values with the addresses 1, 2 and 3 will be created.



You can define up to 128 values. Since values can become array when reading/writing several objects, there is a limit on the total number of objects, which must not exceed 512.

At the bottom of the page these general settings can be configured:

- **Common Address:** The common address of the server.
- **K:** Number of unacknowledged I format ADPUs after which the connection will be closed.
- **W:** Number of received I format ADPUs after which reception will be acknowledged at the latest.
- **T1:** Time out of send or test APDUs in seconds.
- **T2:** Time out after which an S frame will be sent in seconds.
- **T3:** Time out after which a test frame will be sent in case of long idle state in seconds.
- **TCP Port:** TCP port number.
- **Short Pulse Time:** Short Pulse Time in milliseconds.

- **Long Pulse Time:** Long Pulse Time in milliseconds.
- **Buffer Size.**
- **Maximum number of connections.**
- **Generate activation termination.**

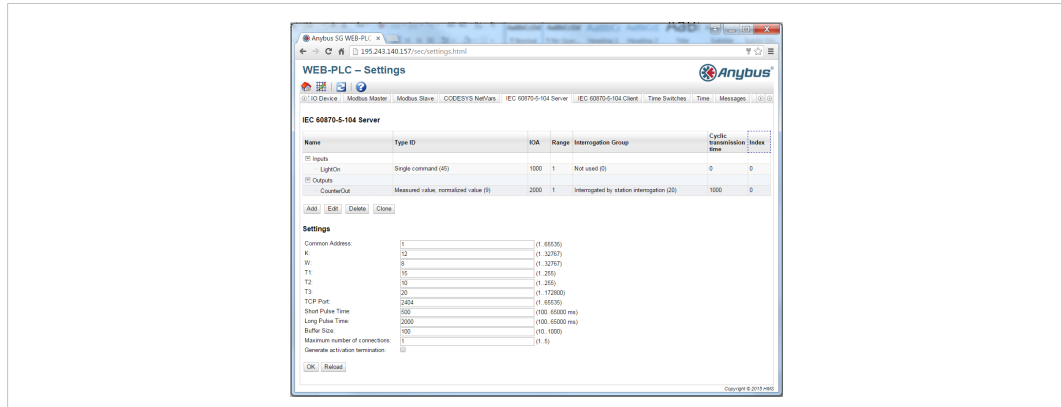


Fig. 27

Press **OK** to store your changes



Press **Reboot** to restart your device in order to apply your changes.

2.8.5 IEC61850

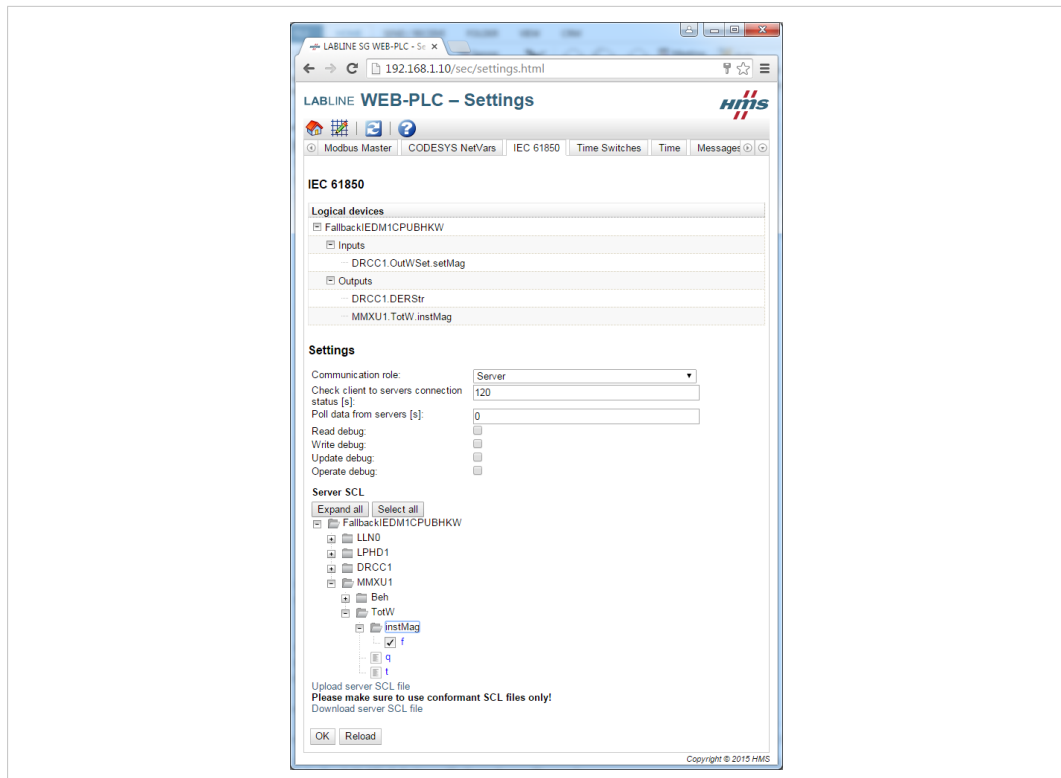
Some devices support an IEC61850 client/server.

This standard is more than a communication protocol, it is a whole information model. It means that in addition to the mechanisms to transport data between a client and a server, the IEC61850 specification also defines what data shall be exchanged between both communication partners. Therefore the specification defines objects (also known as logical nodes) to model the physical world, i.e. the switches, protections and additional equipment in an electrical substation.

Since the SG gateway cannot know what device is connected to it and what data this device offers to the other communication partner, it is the responsibility of the customer to define this in an SCL configuration file (an XML-based description of the communication capabilities).

Anybus SG gateways include a default SCL file with some common logical nodes as a start for a configuration. If the user uploads a corrupted SCL file that is not conform to the IEC61850 specification, the file will be discarded and the default SCL file will be used instead.

For additional information on IEC61850 configuration please watch the video tutorial available at <http://hms-networks.com/about/labs/smart-grid/labline-sg/sq-10>.

**Fig. 28**

Press **OK** to store your changes



Press **Reboot** to restart your device in order to apply your changes.

3 Anybus SG-gateway I/O

The connectors and the hardware interfaces available on this device is described below.

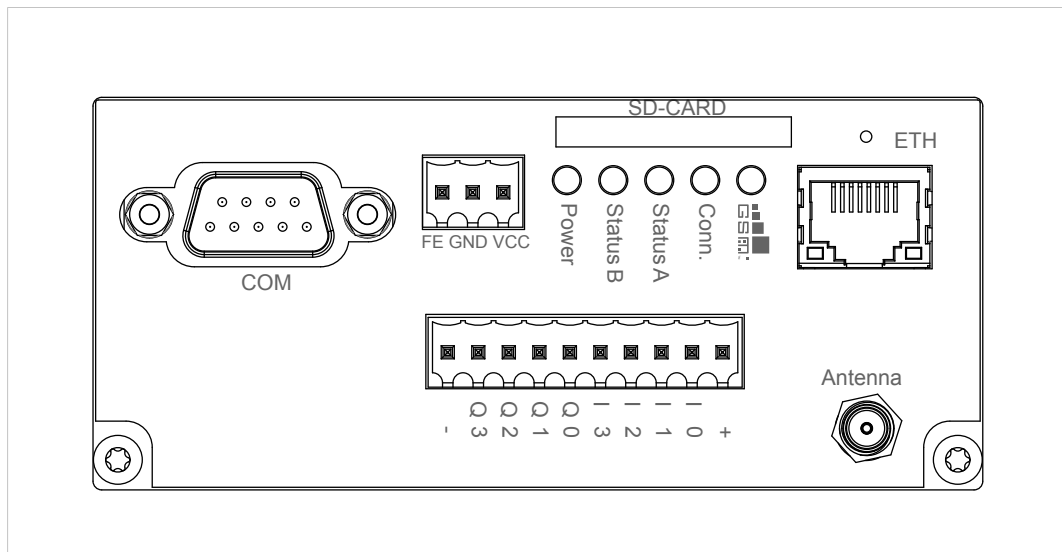


Fig. 29

3.1 General Data

Size (W x L x H)	46 x 105 x 70 mm
Operating temperature	0 — 55 °C
Electrical shock	Class III
Protection rating	IP20
EMC emission	IEC 61000-6-4
EMC immunity	IEC 61000-6-2
Compliance	CE, RoHS

3.2 Electrical Data

Supply voltage	24 VDC (±15 %)
Active current	< 0.12 A (without I/Os) ≤ 0.5 A / output

3.3 Power Supply

FE	Functional earth
GND	Ground
VCC	24 VDC

3.4 Digital I/Os

+	24 VDC
I0 - I3	Digital input, sink
Q0 - Q3	Digital output, source
-	Ground

3.5 Serial Interface

There are no resistors for line termination and line polarization in the device. The device itself does not need line polarization.

	RS232	RS485	RS422
Pin 1	NC	A(-/Y)	A(TxD)
Pin 2	RxD	NC	NC
Pin 3	TxD	NC	NC
Pin 4	NC	NC	A'(RxD)
Pin 5	GND	GND	GND
Pin 6	NC	B(+/Z)	B(TxD)
Pin 7	RTS	NC	NC
Pin 8	CTS	NC	NC
Pin 9	NC	NC	B'(RxD)
Housing	Connected to functional earth		

3.6 Ethernet Interface

Green LED	Link indication
Yellow LED	Activity indication

3.7 LEDs

Modem	Modem is initialized
GSM/GPRS	Internet Connection successful
Status A	n.a.
Status B	Diagram loaded (on) / executed (flashing)
Power	Device is powered

3.8 Other Interfaces

SD card interface	MMC/SD card
Antenna connector	SMA connector
SIM card interface	SIM card

3.9 SD Card

MMC and SD cards are supported. SDIO cards are not supported.

3.10 SIM Card

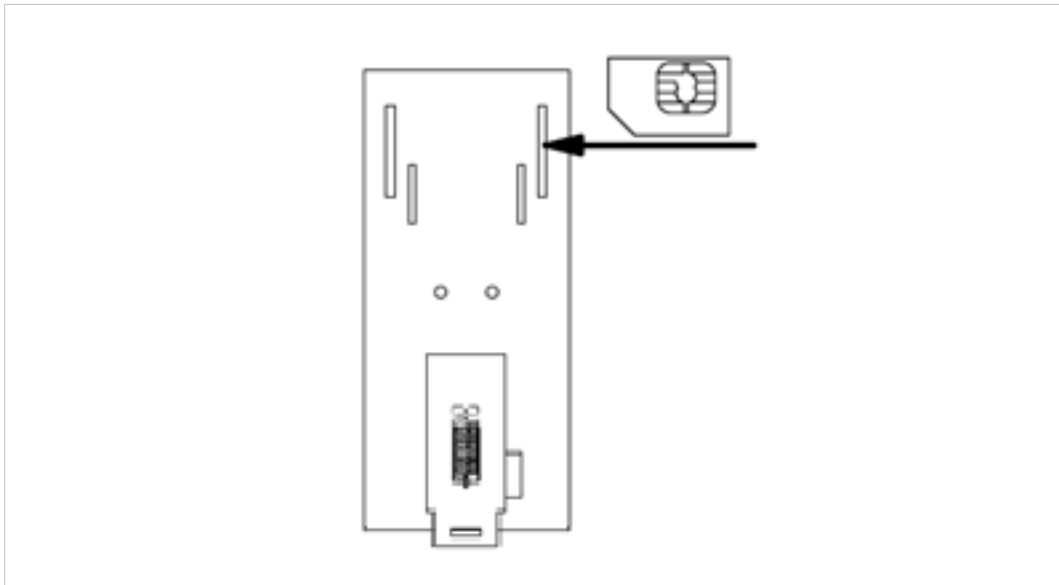


Fig. 30

Insert the SIM card at the rear of the device before the installation on the DIN rail. The device must be switched off.

In widely distributed systems or in environments without network infrastructure, wireless solutions are required for the simplest telecontrol/remote maintenance functions. The communication mechanism of the SG gateways ensures problem-free use in all wireless networks without the need for special SIM cards.



Never use the device in areas where the operation of wireless equipment is prohibited. The location for the antenna must guarantee the recommended radiological limits (distance to persons and other antennas must be at least 20 cm). When the antenna is installed outdoors, the lightning protection standard VDE V0185 must be complied with. The EMC lightning protection zone concept must be observed. The device must be switched off during work on the antenna. It cannot be guaranteed, that there will not be any harmful interference for other devices. In case of interferences install the device or the antenna in another location.

3.11 Reset Button

The reset button is used to restore back factory settings. It's externally accessible through a small hole next to the Ethernet connector with a pointed object such as a straightened out paper clip. Hold the reset button pressed while the device is starting. Release the button when the reset is acknowledged by flashing the Status A LED twice.



All settings will be lost!

3.12 Commissioning

The device may only be put into service and operated by qualified personnel. The device is designed for an installation on a grounded 35 mm DIN rail in dry rooms. After the installation the housing of the device is connected to functional earth.

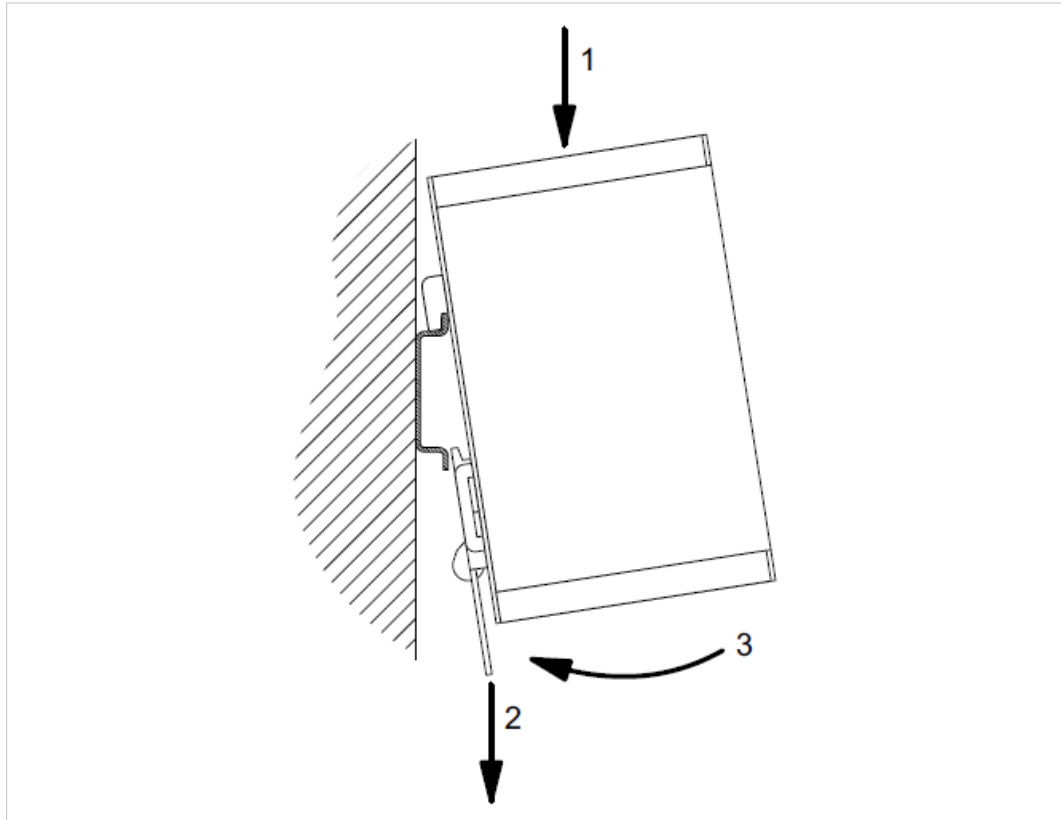


Fig. 31

The power supply must be a grounded circuit (PELV). The power supply must be a limited power source according to EN60950-1 Cap. 2.5 or the device must be provided with an anti-surge fuse of 2A. The digital I/Os are provided with a detached anti-surge fuse of 4A.

4 Anybus SG-gateway M-Bus

The connectors and the hardware interfaces available on this device are described below.

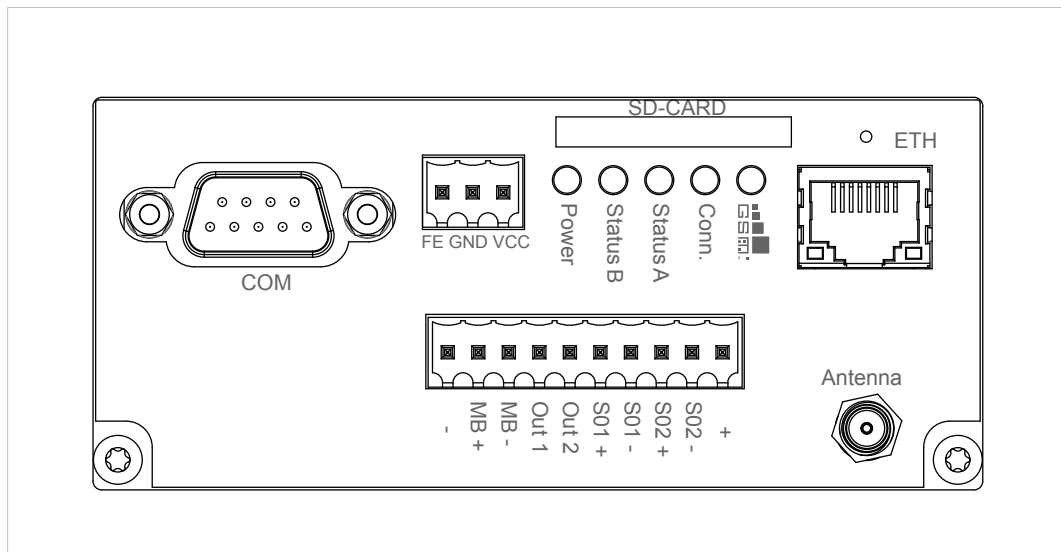


Fig. 32

4.1 General Data

Size (W x L x H)	46 x 105 x 70 mm
Operating temperature	0 — 55 °C
Electrical shock	Class III
Protection rating	IP20
EMC emission	IEC 61000-6-4
EMC immunity	IEC 61000-6-2
Compliance	CE, RoHS

4.2 Electrical Data

Supply voltage	24 VDC (±15 %)
Active current	< 0.12 A (without I/Os) ≤ 0.5 A / output

4.3 Power Supply

FE	Functional earth
GND	Ground
VCC	24 VDC

4.4 Digital I/Os

+	24 VDC
S01, S02	Digital pulse input, source
Out1, Out2	Digital output, source
MB+, MB-	M-Bus
-	Ground

4.5 Serial Interface

There are no resistors for line termination and line polarization in the device. The device itself does not need line polarization.

	RS232	RS485	RS422
Pin 1	NC	A(-/Y)	A(TxD)
Pin 2	RxD	NC	NC
Pin 3	TxD	NC	NC
Pin 4	NC	NC	A'(RxD)
Pin 5	GND	GND	GND
Pin 6	NC	B(+/Z)	B(TxD)
Pin 7	RTS	NC	NC
Pin 8	CTS	NC	NC
Pin 9	NC	NC	B'(RxD)
Housing	Connected to functional earth		

4.6 Ethernet Interface

Green LED	Link indication
Yellow LED	Activity indication

4.7 LEDs

Modem	Modem is initialized
GSM/GPRS	GPRS Internet Connection successful
Status A	n.a.
Status B	Diagram loaded (on) / executed (flashing)
Power	Device is powered

4.8 Other Interfaces

SD card interface	MMC/SD card
Antenna connector	SMA connector
SIM card interface	SIM card

4.9 SD Card

MMC and SD cards are supported. SDIO cards are not supported.

4.10 SIM Card

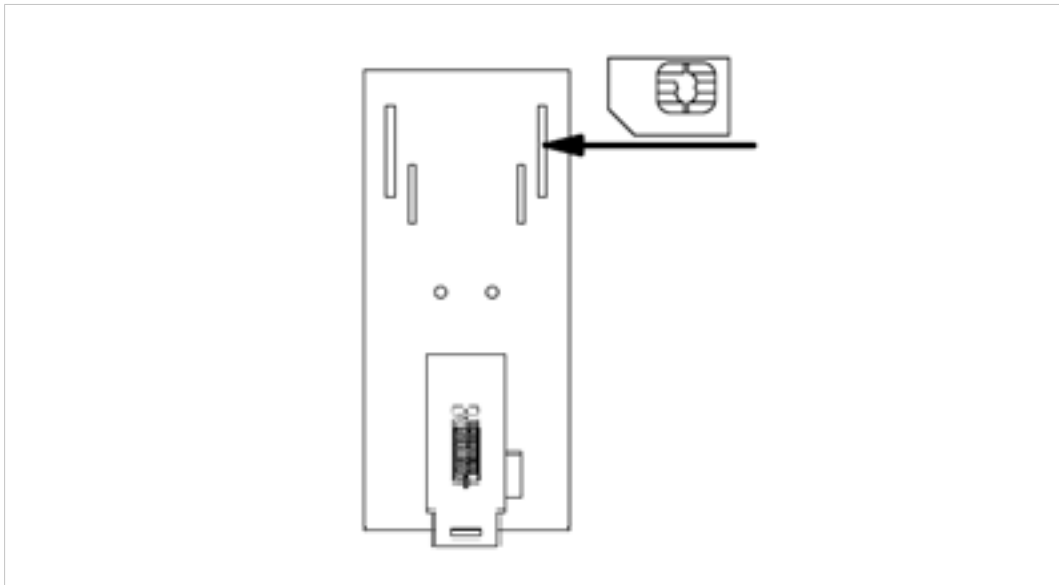


Fig. 33

Insert the SIM card at the rear of the device before the installation on the DIN rail. The device must be switched off.

In widely distributed systems or in environments without network infrastructure, wireless solutions are required for the simplest telecontrol/remote maintenance functions. The communication mechanism of the SG gateways ensures problem-free use in all wireless networks without the need for special SIM cards.



Never use the device in areas where the operation of wireless equipment is prohibited. The location for the antenna must guarantee the recommended radiological limits (distance to persons and other antennas must be at least 20 cm). When the antenna is installed outdoors, the lightning protection standard VDE V0185 must be complied with. The EMC lightning protection zone concept must be observed. The device must be switched off during work on the antenna. It cannot be guaranteed, that there will not be any harmful interference for other devices. In case of interferences install the device or the antenna in another location.

4.11 Reset Button

The reset button is used to restore back factory settings. It's externally accessible through a small hole next to the Ethernet connector with a pointed object such as a straightened out paper clip. Hold the reset button pressed while the device is starting. Release the button when the reset is acknowledged by flashing the Status A LED twice.



All settings will be lost!

4.12 Commissioning

The device may only be put into service and operated by qualified personnel. The device is designed for an installation on a grounded 35 mm DIN rail in dry rooms. After the installation the housing of the device is connected to functional earth.

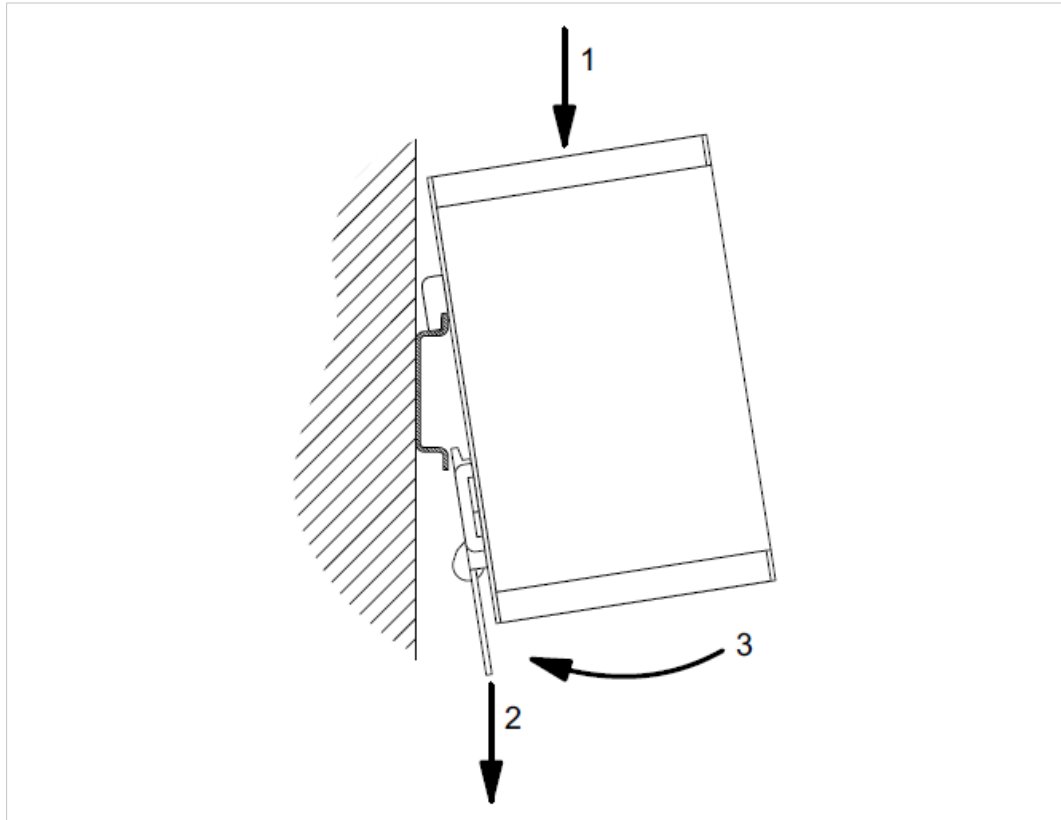


Fig. 34

The power supply must be a grounded circuit (PELV). The power supply must be a limited power source according to EN60950-1 Cap. 2.5 or the device must be provided with an anti-surge fuse of 2A. The digital I/Os are provided with a detached anti-surge fuse of 4A.

5 Anybus SG-gateway PROFINET

The connectors and the hardware interfaces available on this device are described below.

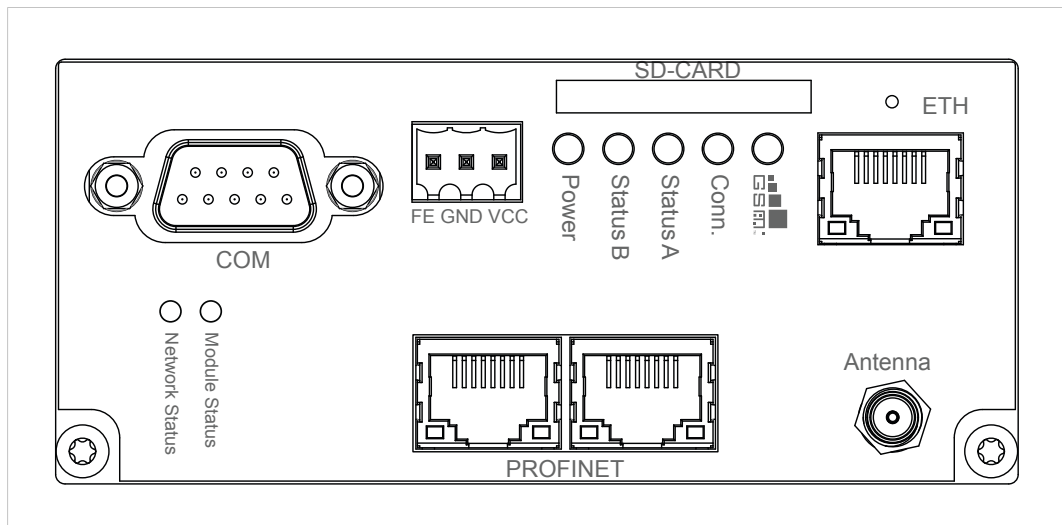


Fig. 35

5.1 General Data

Size (W x L x H)	46 x 105 x 70 mm
Operating temperature	0 — 55 °C
Electrical shock	Class III
Protection rating	IP20
EMC emission	IEC 61000-6-4
EMC immunity	IEC 61000-6-2
Compliance	CE, RoHS

5.2 Electrical Data

Supply voltage	24 VDC (±15 %)
Active current	< 240 mA

5.3 Power Supply

FE	Functional earth
GND	Ground
VCC	24 VDC

5.4 PROFINET Interface

Two 10/100BaseT RJ45 connectors and an integrated 2–port switch provide PROFINET I/O profile communication. LEDs show module and network status.

5.5 Serial Interface

There are no resistors for line termination and line polarization in the device. The device itself does not need line polarization.

	RS232	RS485	RS422
Pin 1	NC	A(-/Y)	A(TxD)
Pin 2	RxD	NC	NC
Pin 3	TxD	NC	NC
Pin 4	NC	NC	A'(RxD)
Pin 5	GND	GND	GND
Pin 6	NC	B(+/Z)	B(TxD)
Pin 7	RTS	NC	NC
Pin 8	CTS	NC	NC
Pin 9	NC	NC	B'(RxD)
Housing	Connected to functional earth		

5.6 Ethernet Interface

Green LED	Link indication
Yellow LED	Activity indication

5.7 LEDs

Modem	Modem is initialized
GSM/GPRS	GPRS Internet Connection successful
Status A	n.a.
Status B	Diagram loaded (on) / executed (flashing)
Power	Device is powered

5.8 Other Interfaces

SD card interface	MMC/SD card
Antenna connector	SMA connector
SIM card interface	SIM card

5.9 SD Card

MMC and SD cards are supported. SDIO cards are not supported.

5.10 SIM Card

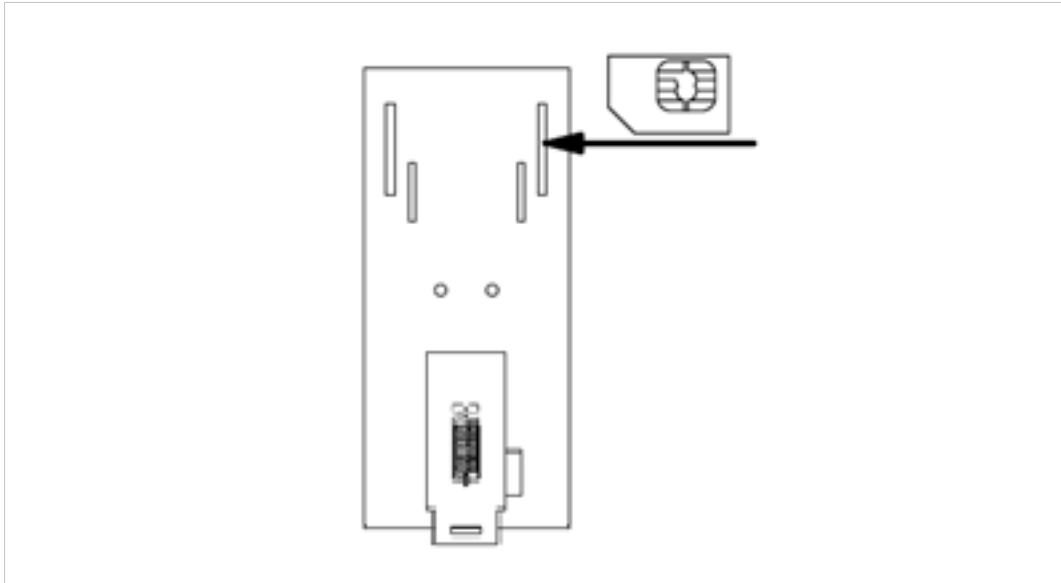


Fig. 36

Insert the SIM card at the rear of the device before the installation on the DIN rail. The device must be switched off.

In widely distributed systems or in environments without network infrastructure, wireless solutions are required for the simplest telecontrol/remote maintenance functions. The communication mechanism of the SG gateways ensures problem-free use in all wireless networks without the need for special SIM cards.



Never use the device in areas where the operation of wireless equipment is prohibited. The location for the antenna must guarantee the recommended radiological limits (distance to persons and other antennas must be at least 20 cm). When the antenna is installed outdoors, the lightning protection standard VDE V0185 must be complied with. The EMC lightning protection zone concept must be observed. The device must be switched off during work on the antenna. It cannot be guaranteed, that there will not be any harmful interference for other devices. In case of interferences install the device or the antenna in another location.

5.11 Reset Button

The reset button is used to restore back factory settings. It's externally accessible through a small hole next to the Ethernet connector with a pointed object such as a straightened out paper clip. Hold the reset button pressed while the device is starting. Release the button when the reset is acknowledged by flashing the Status A LED twice.



All settings will be lost!

5.12 Commissioning

The device may only be put into service and operated by qualified personnel. The device is designed for an installation on a grounded 35 mm DIN rail in dry rooms. After the installation the housing of the device is connected to functional earth.

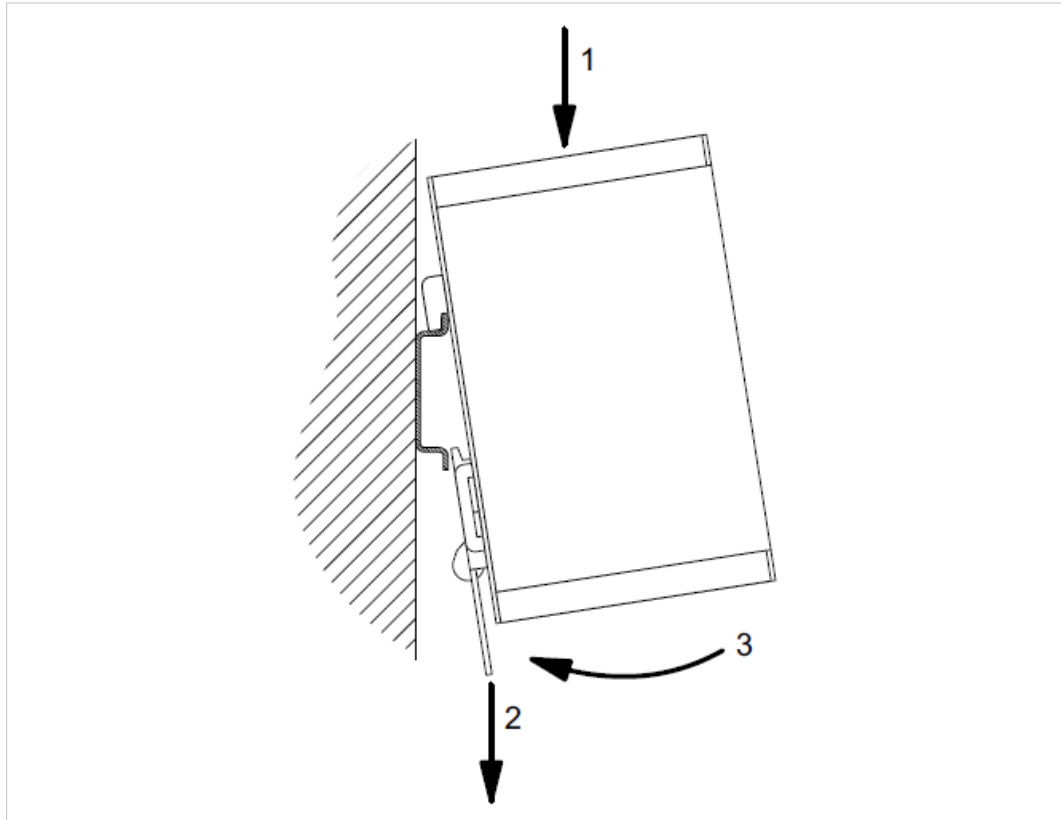


Fig. 37

The power supply must be a grounded circuit (PELV). The power supply must be a limited power source according to EN60950-1 Cap. 2.5 or the device must be provided with an anti-surge fuse of 2A. The digital I/Os are provided with a detached anti-surge fuse of 4A.

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