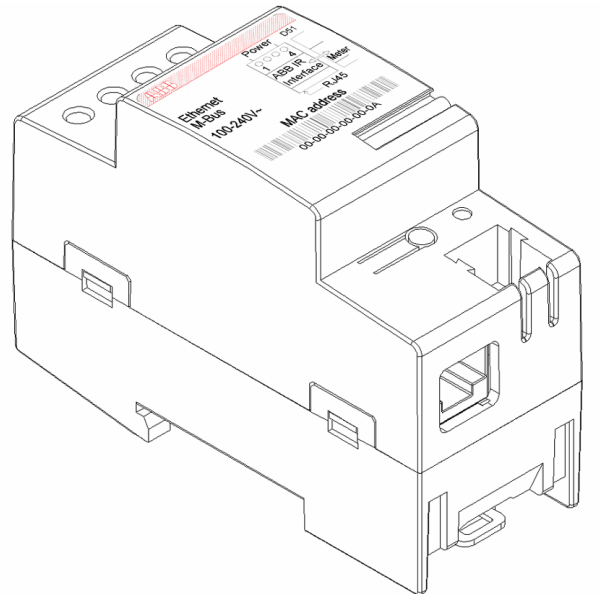


Ethernet Communication Adapter

CEM 05100

User's Manual

Rev A

Table of Contents

1 GENERAL

This manual contains information about the CEM 05100 Ethernet communication adapter, which is an adapter of the serial communication adapter (SCA) family for electronic electricity meters manufactured by ABB AB. Throughout this manual the CEM 05100 Ethernet communication adapter will be referred to as the SCA or the adapter.

The purpose of this manual is to give the user a good overview and understanding of the features the CEM 05100 Ethernet communication adapter offers.

WARNING! The voltages connected to the SCA are dangerous and can be lethal. Therefore it must be insured that the terminals are not touched during operation. When installing the SCA all voltages must be switched off.

Note: The adapter is equipped with a positive temperature coefficient (PTC) thermistor for overload protection.

2 PRODUCT DESCRIPTION

The CEM 05100 Ethernet communication adapter is an ABB serial communication adapter product that enables automatic meter reading (AMR) of an ABB electricity meter over an ethernet network using the standard TCP and UDP protocols. Like all other ABB serial communication adapters, the ABB Ethernet communication adapter have the size of 2 DIN-modules and follows the ABB's pro M-standard, which defines mechanical dimensions, way of mounting (35 mm DIN-rail) and design outlook. Furthermore the adapter follows and meets the safety requirements of DIN EN 50090-2-2. The ABB Ethernet communication adapter does also have a built-in web server which provides easy access of meter data and simple adapter configuration with an ordinary web browser.

2.1 PRODUCT OVERVIEW

The different parts of the SCA are depicted below.

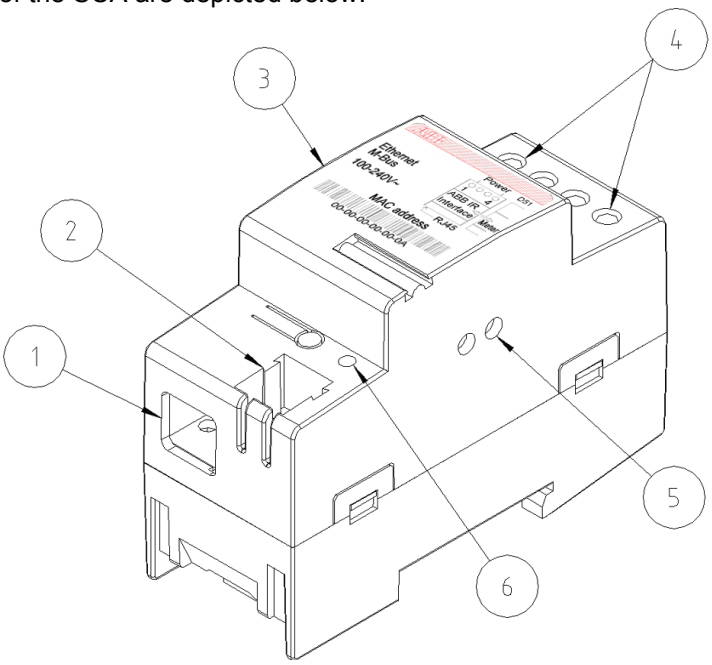


Figure 1: SCA parts.

1. RJ-45 Ethernet connector.
2. Reset port.
3. Label with the type designation and MAC address.
4. Terminal for connecting power.
5. Infrared communication port
6. Status LED

2.2 TYPE DESIGNATION

Below are tables with explanation for all positions in the type designation for the SCA.

Type						
Pos	1	2	3	4	5	6-8
Basic						
Serial Communication Adapters	C					
Media						
Power Line, Band A		A				
Power Line, Band C		C				
Ethernet		E				
GSM/GPRS		G				
RS 232		R				
Twisted Pair		T				
Protocol						
LonWorks			L			
M-Bus			M			
				0		
Supply voltage						
Powered by device					4	
100 - 240 V					5	
220 - 240 V					6	
Optional functionality						
No options						000
Functional upgrade						100

Table 1: Type designation of ABB Serial Communication Adapters.

3 INSTALLATION

1. Disconnect the power supply.
2. Strip the wires and connect them to the top terminals of the SCA.
3. Connect the Ethernet cable to the RJ-45 LAN interface of the SCA, which is located on the bottom of the SCA.
4. Place the SCA to the left of the meter and snap it on the DIN-rail.
5. Verify that the SCA is correctly wired and the voltage is according to the technical specification before the power is turned on.
6. Verify that the status LED is green to ensure power on and an active network link

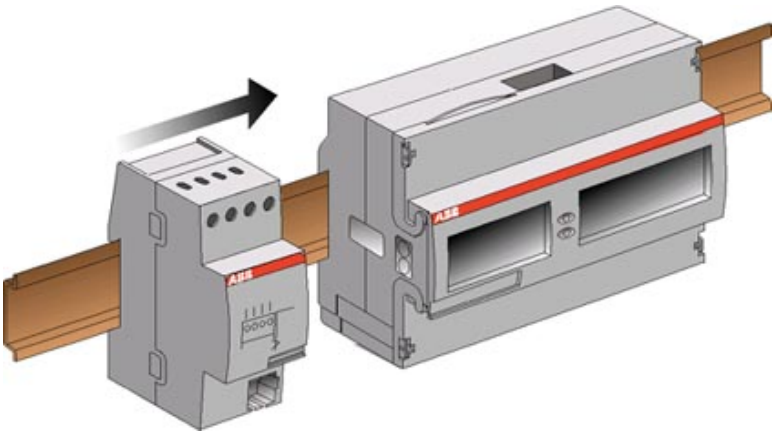


Figure 2: Installation of the SCA.

3.1 STATUS LED

The status LED, part 6 in figure 1, indicates the state of the SCA. The chart below describes the state of the SCA and how the status LED indicates this.

Status LED	SCA Status
Green	Link has been established and OK.
Flashing Green	Transferring data.
Off	No link established or power off
Red	Fatal Error.

Table 2: Table over the status LED indication.

4 TROUBLE SHOOTING

Status LED	Cause	Corrective actions
Off	No link.	Please check the connection of the network cable.
Off	No power to SCA.	Please check the connection of the power line.
Red	Fatal error.	Please contact your dealer.

Table 3: Trouble shooting guide.

4.1 RESET PORT

The SCA is also equipped with a Reset port, part 2 in figure 1, which can be used to perform a soft reset or a factory reset. Reset is performed by short circuit the two holes in the reset port. Below follows a description over the different reset procedures and how these are performed.

4.1.1 PREPARING FOR RESET

Find a piece of hard electric wire, a paper clip or a similar tool which will fit through the holes of the reset port. Make sure the tool enters the two holes in a straight line to a depth of approximately 7 millimeters from the entrance point.

4.1.2 SOFT RESET

Performing a soft reset means resetting the SCA without restoring the settings of the adapter to the default factory settings. To perform a soft reset, short circuit the reset port with e.g. a paper clip, until the status LED starts flashing red. Immediately remove the short circuit before the status LED stops flashing.

4.1.3 FACTORY RESET

Factory reset means the SCA restores the default factory settings of the adapter. To perform a factory reset, short circuit the reset port with e.g. a paper clip, until the status LED starts flashing red. Keep the short circuit active approximately ten seconds until the status LED stops flashing and starts outputting a steady red light.

5 TECHNICAL DATA

Network Protocol and Standards Compatibility

Data protocols:	TCP/IP, UDP, DHCP.

Power Supply

Nominal voltage:	100-240 V AC
Voltage range:	-20 % to +15 % of nominal voltage.
Frequency:	50/60 Hz ± 5 %
Power consumption:	0.80 VA at 230 V AC, 50 Hz.
Terminal wire area:	0 – 2.5 mm²
Recommended tightening torque:	0.5 Nm

Mechanical Data

Casing material:	Polyamide
Protection class:	IP 20
Weight:	90 g

Environmental Specifications

Operating temperature range:	-40 °C to +55 °C
Storage temperature range:	-40 °C to +70 °C
Humidity:	75% yearly average 95% on 30 days/year

Interface Specifications

LAN:	10BASE-T, 10 Mbps
Connection interface:	RJ-45

Standards

Safety:	DIN EN 50090-2-2.

5.1 DIMENSIONS

The physical dimensions of the SCA are displayed below.

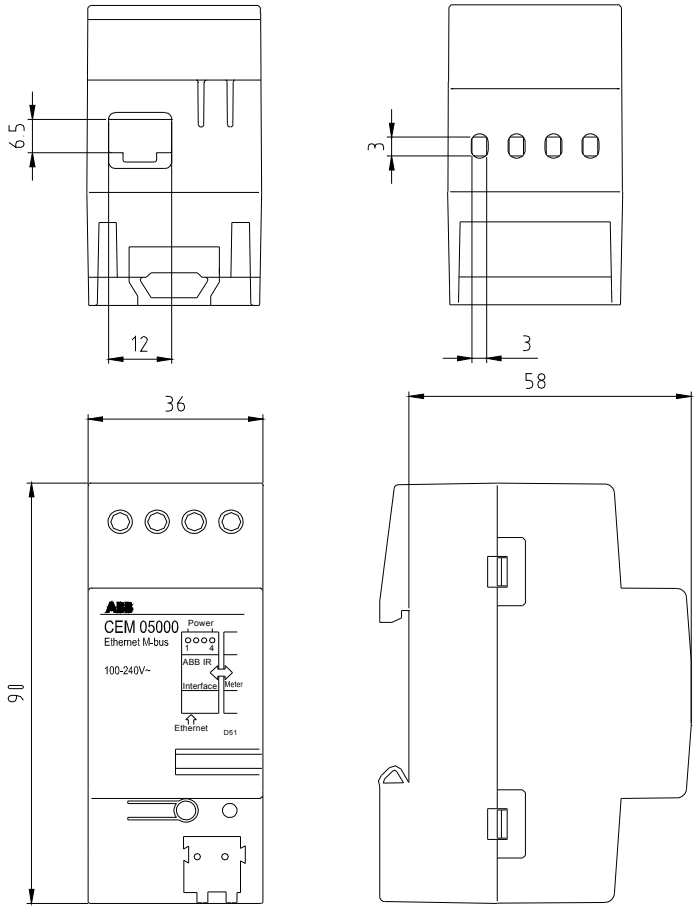


Figure 3: The physical dimensions of the SCA.

6 AUTOMATIC METER READING

The ABB Ethernet communication adapter provides Automatic Meter Reading (AMR) using M-Bus protocol over UDP or TCP over a network. This is done transparently without altering the original M-Bus telegrams. Please note that the shortest time between readouts is different depending on the type of the electricity meter; please refer to the User's Manual of the electricity meter for more information.

7 THE WEB SERVER

Besides providing communication with an AMR-system the ABB Ethernet communication adapter does also have a built-in Web-server that enables static meter reading over a network using an ordinary web browser. The web-server provides an easy interface to configure the settings of the adapter and its users and privileges. The adapter's IP-address can be assigned either statically or dynamically by a DHCP-server.

All quantities that can be readout by using the M-Bus protocol on the AMR part of the adapter can be readout on the built-in web server except the features that are listed below.

- Load Profile Values.

- Maximum Demand.
- Voltage Event Log.
- Current harmonics.

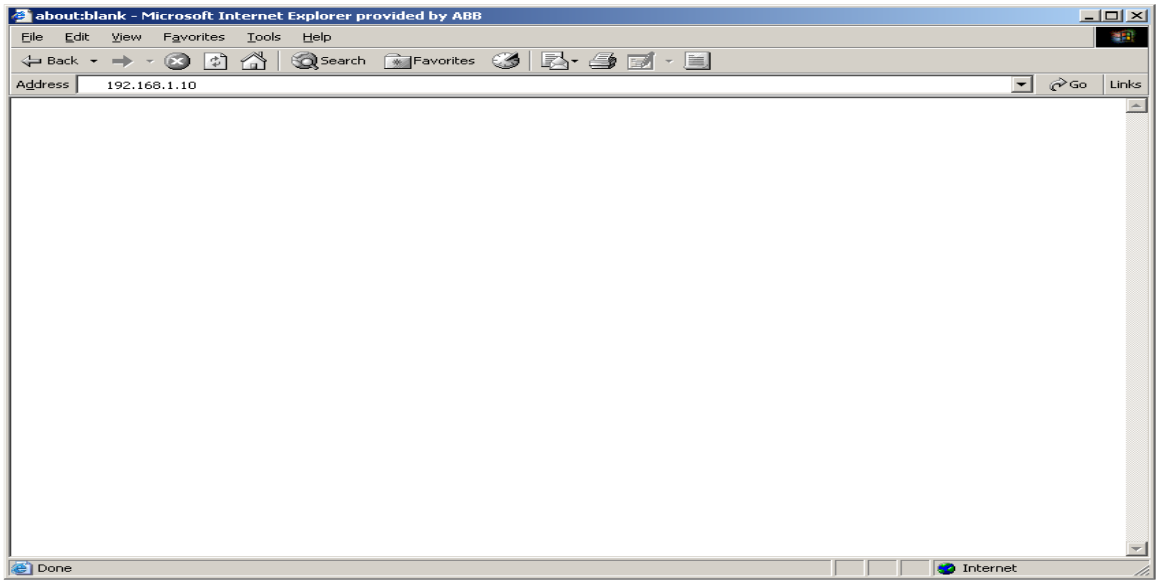
Please refer to the User's Manual of the electricity meter for more information of what quantities can be readout depending on the type of electricity meter.

7.1 ACCESSING THE WEB SERVER

This section will describe how to access the built-in web server in ABB Ethernet communication adapter.

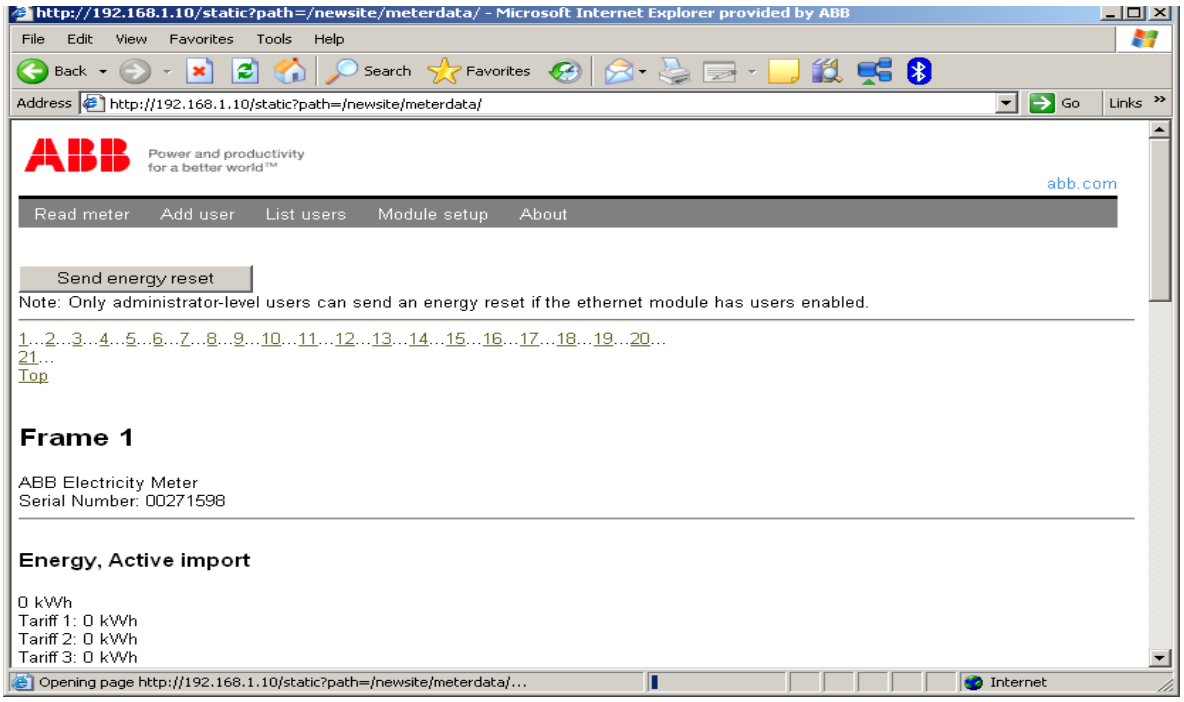
To access the SCA for the first time, the IP-range of the local area network used must be 192.168.1.x, with 192.168.1.10 free for the SCA to use.

Open a web browser and type the IP-address (default: 192.168.1.10) of the ABB Ethernet communication adapter in the web browsers address field.



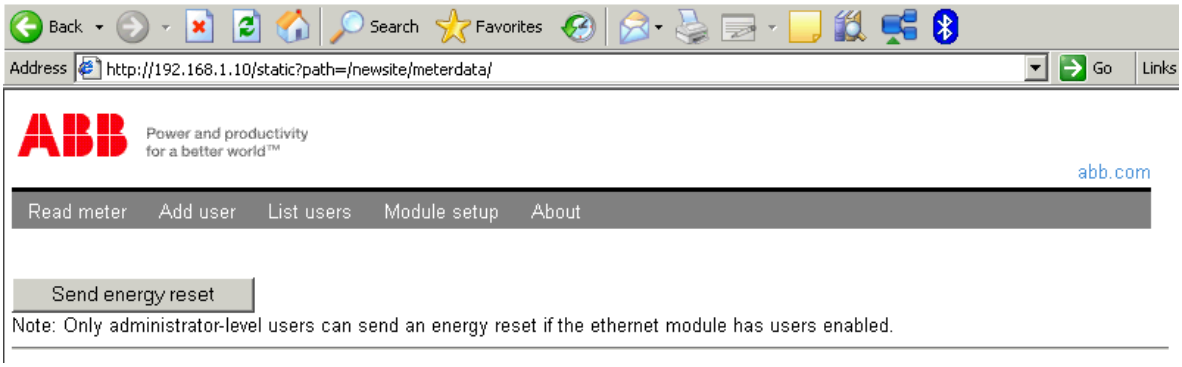
The page will appear like the one below. The quantities of the electricity meter are being loaded into one page. This process might take a few moments depending on how much data the electricity meter transmits. The quantities that appear will be different depending on the model of electricity meter.

A list of links to every frame received from the meter is located above each frame to make browsing larger amounts of data easier. A new meter-readout will only occur after a user clicks the *Read meter* link again, not while browsing the received meter-data through the list of links to the different frames.



7.2 ODINSINGLE ENERGY RESET

The Read meter-page of the SCA also has a button to reset the resettable energy-register in the ODINsingle electricity meter. This button only has an effect on electricity meters with resettable energy registers. Other meters will ignore the command.



If one or more users are added to the SCA, only an administrator can issue an energy-reset. If no users exist, then anyone can issue the command.

7.3 USER AND SECURITY MANAGEMENT

This section will deal with the user management feature in the ABB Ethernet communication adapter. It will discuss how to add and remove users and setting their privileges and settings.

Three kinds of users can be added to the SCA:

- Administrator
- Guest with login
- Guest without login

The administrator has full access to every webpage and function in the SCA. The other two types can only access the *Read meter* and *About* pages. The difference between the two guest types is that *guest with login* requires a username and password to access the SCA, while *guest without*

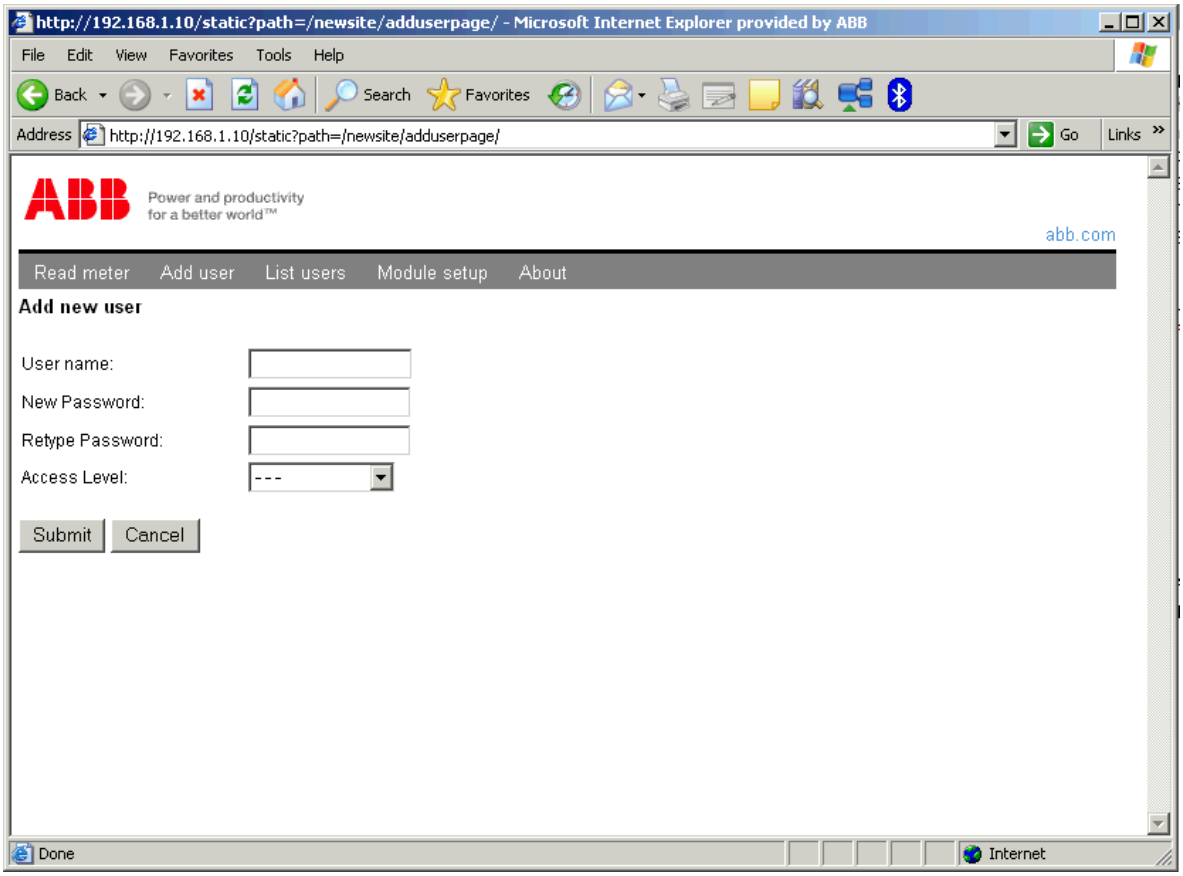
login requires neither. The *guest without login* type means that only an administrator can change settings, but anyone can access the meter-data readout.

7.3.1 SECURITY

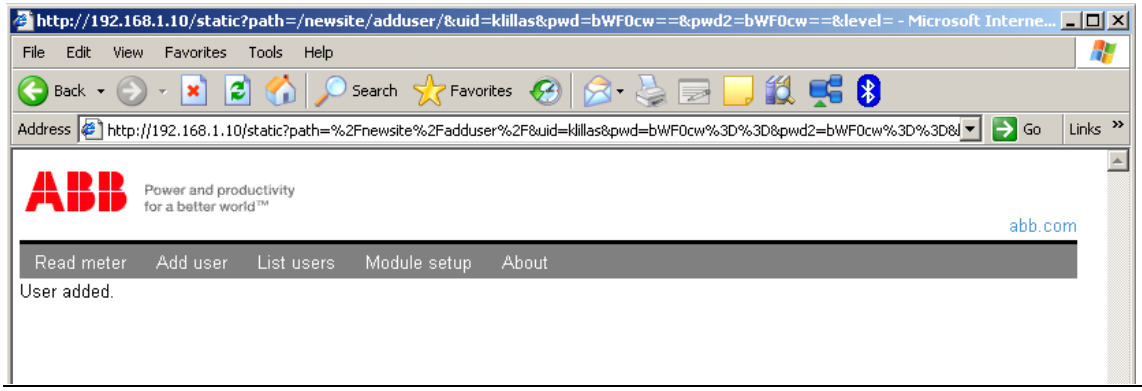
From a security-perspective, the SCA is designed to be used in a private network. It is not intended to be used in a public network like the Internet.

7.3.2 USER ADDING AND LOGGING IN

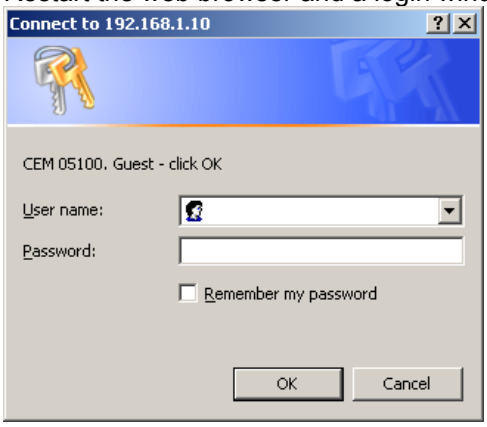
Enter the *Add user* menu and add a user by filling in the fields below and submit. Please note that once the password is set it is non-recoverable, therefore save the password and keep it in a safe place.



If everything is done correctly, the following message appears.

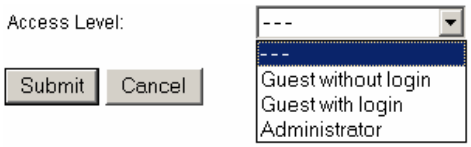


Restart the web browser and a login window will appear. Login with username and pass.

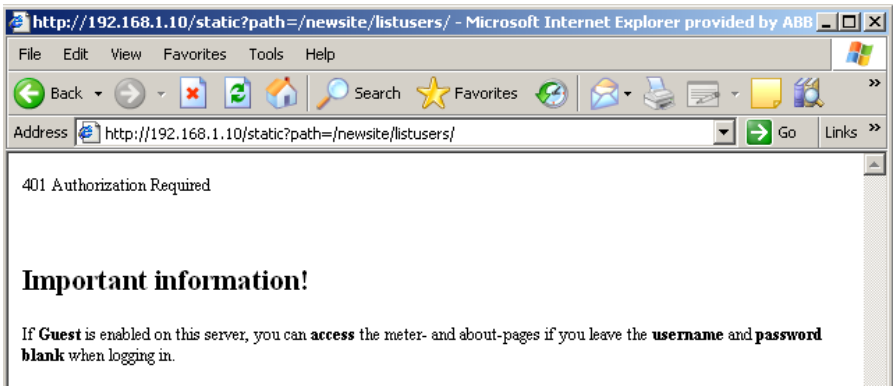


7.3.3 GUEST WITHOUT LOGIN USER-TYPE

A *guest without login*-type user can be added to the system, no username and password is required to be entered when creating this type of user.

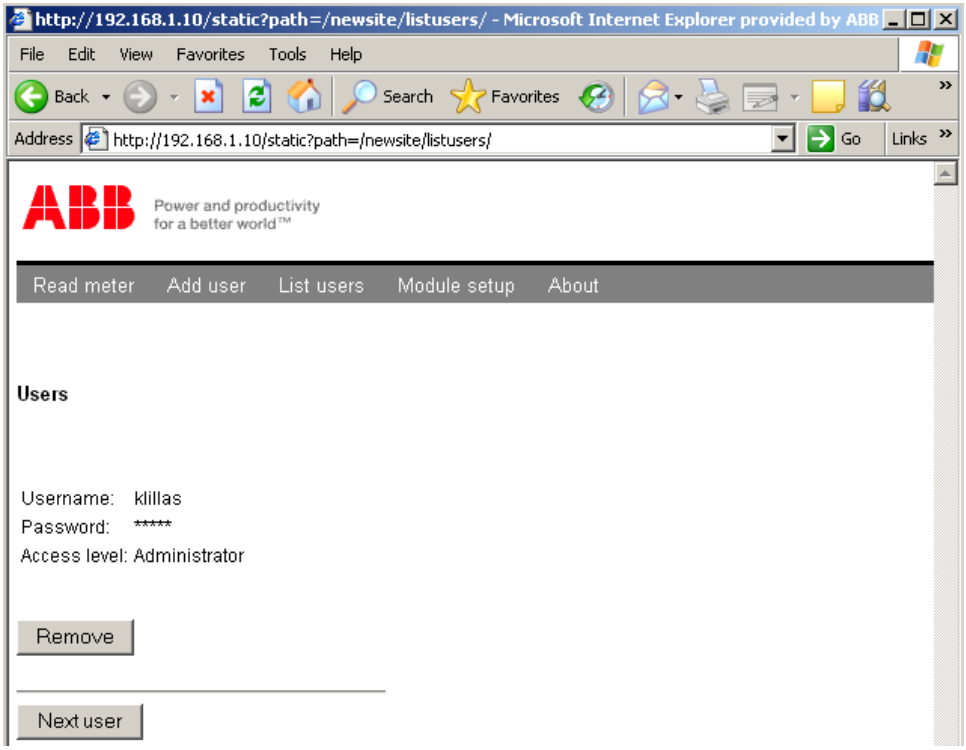


To login as this type of guest, click *OK* without entering any login information when prompted. If a user tries to login a few times, or if *Cancel* is pressed, then the following page appears, explaining how to login without a password. This page also appears even if the SCA only accepts users with login information.



7.3.4 REMOVING USERS

Click on the *List users* link, and use the *Next user* button until the correct user is shown. Click *Remove* to remove the selected user. The *List users* list will reload, but without the deleted user in it.

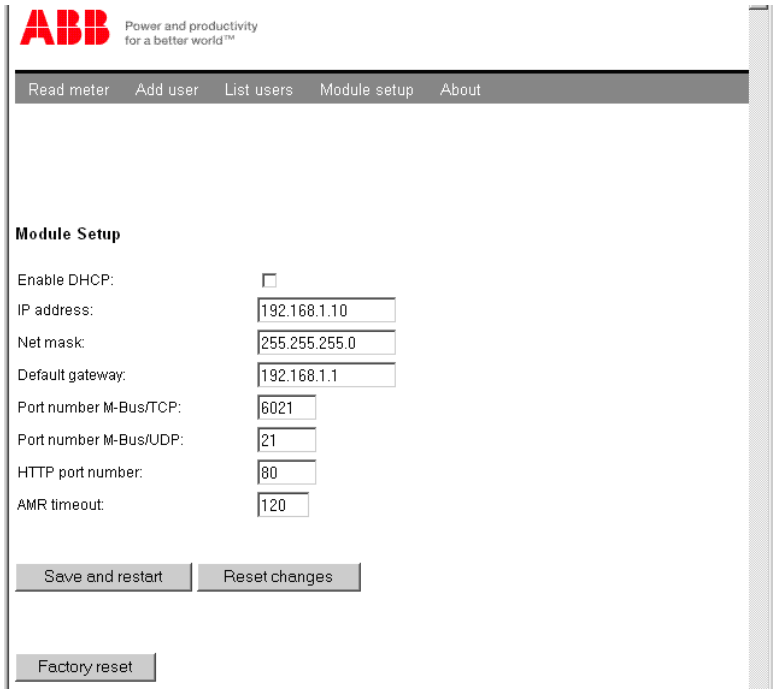


7.4 CONFIGURING ADAPTER SETTINGS

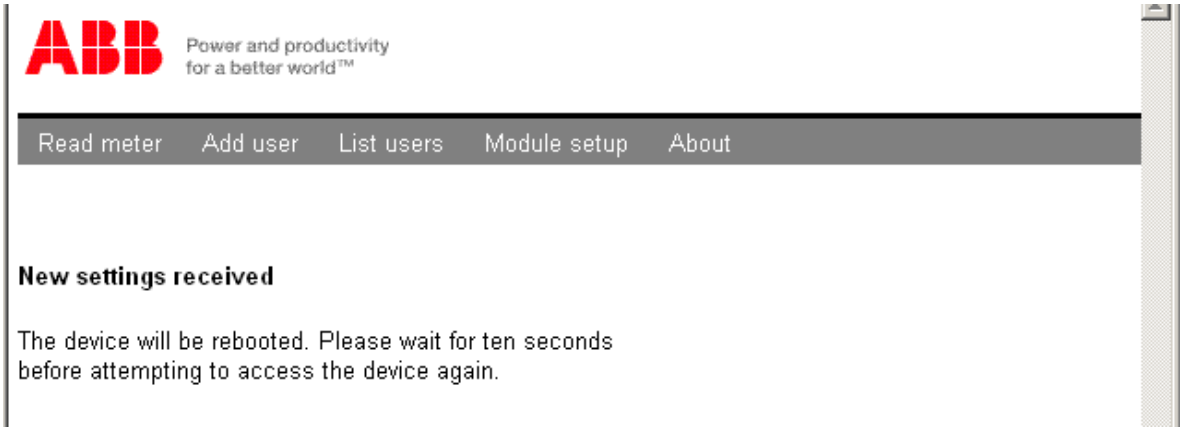
This section will describe how to configure the ABB Ethernet communication adapter's IP-address both statically and by a DHCP-server.

7.4.1 ASSIGNING IP-ADDRESS STATICALLY

Enter the *Module Setup* by clicking on the *Module Setup* tab. Uncheck the Enable DHCP check box and enter the information for static IP-address.

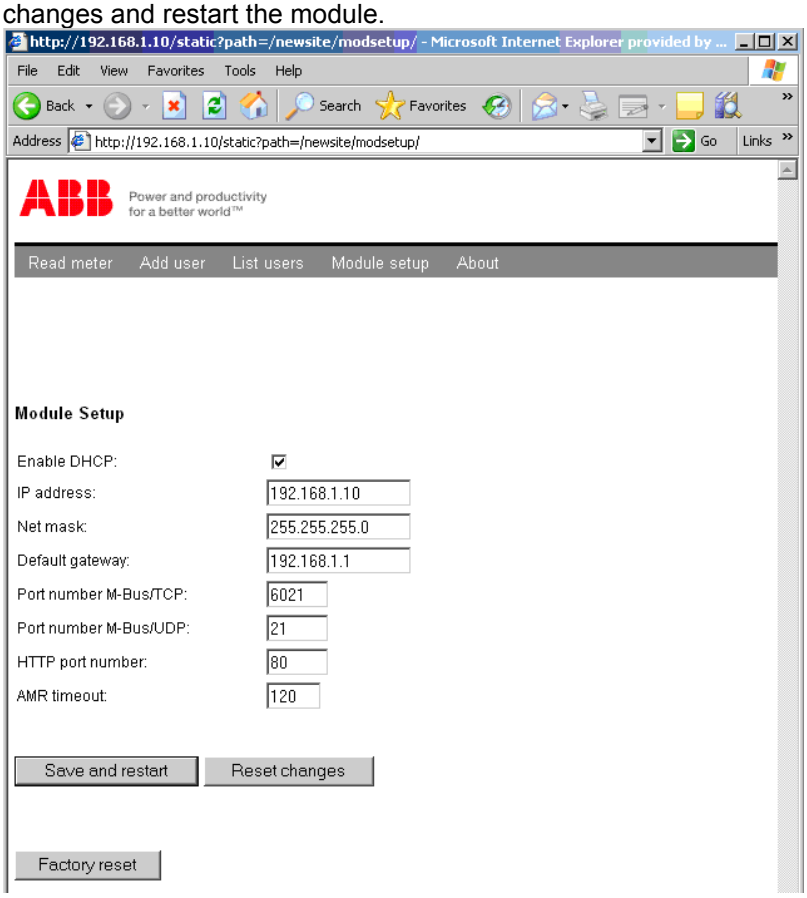


Click *Save and restart* to send the new settings to the SCA. The SCA reboots automatically and implements the new setup. Wait a few seconds before attempting to access the ethernet module again.

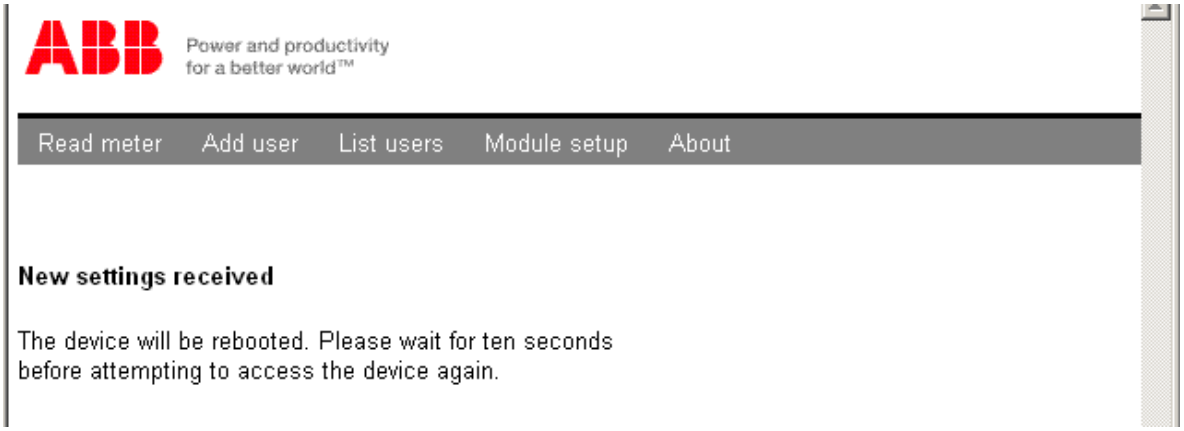


7.4.2 ASSIGNING IP-ADDRESS THROUGH DHCP-SERVER.

Click on the *Module Setup* link and check the DHCP checkbox. The IP settings will then be received from a DHCP server when the SCA is restarted. Click the *Save and restart* button to save changes and restart the module.



The following message appears if the setup was successful:



7.4.3 TIMEOUT CONFIGURATION

The *AMR timeout* in the *Module setup* page of the SCA is a way to ensure that a connected electricity meter communicates in only one way at any given time: UDP, TCP or via the web server. The timeout is locked to one protocol, and is released either when the protocol closes the connection or when the timeout limit is reached. If the AMR timeout is set to 120 seconds, then the maximum time which the SCA waits for more communication is 120 seconds. If the timeout is reached, the SCA closes the connection and returns to wait for new connection attempts.

A special setting in the timeout, 0 seconds, can be used to lengthen the timeout period to approximately 6 hours for UDP and TCP, and 255 seconds in case of an http connection.

8 ABBREVIATIONS AND ACRONYMS

10BASE-T IEEE 802.3 specification for 10 Mbps Ethernet over twisted pair wiring.

DHCP Dynamic Host Configuration Protocol, An Ethernet protocol specifying how a centralized DHCP server can assign network configuration information to multiple DHCP clients. The assigned information includes IP addresses, DNS addresses, and gateway (router) addresses.

IP Internet Protocol, The main internetworking protocol used in the Internet. Used in conjunction with the Transfer Control Protocol (TCP) to form TCP/IP.

IP Address A four-byte number uniquely defining each host on the Internet. Ranges of addresses are assigned by Internic, an organization formed for this purpose. Usually written in dotted-decimal notation with periods separating the bytes (for example, 192.168.1.10).

LAN Local area network. A communications network serving users within a limited area, such as one floor of a building. A LAN typically connects multiple personal computers and shared network devices such as storage and printers. Although many technologies exist to implement a LAN, Ethernet is the most common for connecting personal computers.

MAC address Media Access Control address. A unique 48-bit hardware address assigned to every Ethernet node. Usually written in the form 00:03:47:D8:AE:3A.

Mbps Megabits per second.

Netmask A number that explains which part of an IP address comprises the network address and which part is the host address on that network. It can be expressed in dotted-decimal notation or as a number appended to the IP address. For example, a 28-bit mask starting from the MSB can be shown as 255.255.255.192 or as /28 appended to the IP address.

SCA Serial Communication Adapter

UTP Unshielded twisted pair. The cable used by 10BASE-T and 100BASE-Tx Ethernet networks.

9 CONTACT INFORMATION

ABB AB
P.O. Box 1005
SE-611 29 NYKÖPING
Sweden
Tel: +46 - 155 295000
Fax: +46 - 155 288110

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