Operating instructions

AMBUS® Net

Software versions 1.01.xx

VD 9-905 e 04.2006

Table of contents

1 Introduction

AMBUS® Net is an integrated extension of AMBUS® ZS and enables intelligent M-Bus central units to be configured, operated and monitored by M-Bus plants as complete systems with state-of-the-art technology and customer-friendly operation.

The ¼ VGA touch screen display ensures easy-to-handle on-site operation without the need of a PC.

Because it contains a Web server, the instrument can also be remotely operated via either a direct telephone link (analog, ISDN or GSM) or an Intranet/Internet network. It can be operated with every Java-supported Web browser which reproduces the operating display of the instruments and allows protocol files to be downloaded (optional).

Existing plants can be updated very simply or else expanded as required, since AMBUS® Net is totally compatible with the earlier AMBUS® FA system and can also be updated to become an AMBUS® M-Bus central device.

Features

- M-Bus central device with integrated Web server
- Capacity for up to 120 or 250 M-Bus meters
- 5.7" LCD touch screen and plain text in various languages
- Data logger for optional plug-in data memory
- 10 MB Ethernet interface via RJ-45
- For integrating telephone modems (PSTN, ISDN, GSM) with RJ-45 / Antenna (optional)
- RS232 and RS485 interface
- 2 relay contacts for error handling and communication control
- Protocols: TCP/IP, ARP, ICMP, HTTP, HTML, PPP, LCP, IPCP, PAP, SOAP/XML, WSDL

1.1 Applications

The fields of applications of the AMBUS® Net range from analytical building management for invoicing services to facility management and domestic systems. It can be installed wherever a simple and cost-effective solution is required for on-site operation or remote monitoring.

AMBUS® Net is an Internet-compatible M-Bus central device with state-of-the-art technology for the following applications:

AMBUS® Net as a modern remote display

AMBUS® Net supplies on-site readings from all meters connected to an M-Bus (Meter-Bus) network. For the first time an instrument of this class is able to offer a 5.7" LCD touch screen with an easy, self-explanatory procedure in your own particular language.

Readings require no PC, no special reading program and no interface cable.

Using the data logger option:
The data can also be optionally recorded on a compact flash memory board for later evaluation on a PC.

AMBUS® Net as M-Bus Internet gateway

With AMBUS® Net your data is now online. The AMBUS® Net links M-Bus and Web technologies in an ideal combination. As an M-Bus/Internet gateway, the AMBUS® Net supplies M-Bus data in seconds to your workstation from meters recording water, heat, gas and electricity.

Using a standard Java Internet browser and a direct modem connection, the AMBUS® Net can be remotely operated or data can be downloaded as an Excel-compatible file and later exported to a billing system.

The data is also automatically read and processed using software with a SOAP (XML) interface.

1 Components

1.1 Housing and power supply

AMBUS® Net is protected by a rugged, red-lacquered aluminium pressure die-cast housing for wall or control cabinet mounting. The power supply is a 230 VAC mains voltage.

For information on installation refer to the installation instructions AMBUS® Net

The power supply is a 230 VAC/50 Hz mains voltage only.
An LED indicates stand-by after the instrument is switched on. As soon as AMBUS® Net is connected to the power supply, the device automatically runs through a start routine for initializing all integrated modules.

Display	5.7" LCD touch screen, grey scale
Power supply voltage	230 VAC (+10, -15 %) / 50..60 Hz
Max. power consumption	2..110 VA (depending on the number of M-Bus devices installed)
Ambient temperature	5 ... 50 °C
Housing	Cast aluminium, red lacquered
Dimensions	B x H x D = 240 x 160 x 66 mm
Weight	Approx. 3.3 kg
Ingress Protection class	IP 20

Table 1: Specifications of housing and power supply

1.2 Processor

As an "embedded controller", AMBUS® Net is a high-performance device with a 32-bit RISC controller, 25 MHz, 380 KB of flash memory and 2 MB RAM. A certified, real-time operating system monitors the correct functioning of the unit. AMBUS® Net is also equipped with a real-time clock and a buffer with a button cell battery to secure data against power failure.

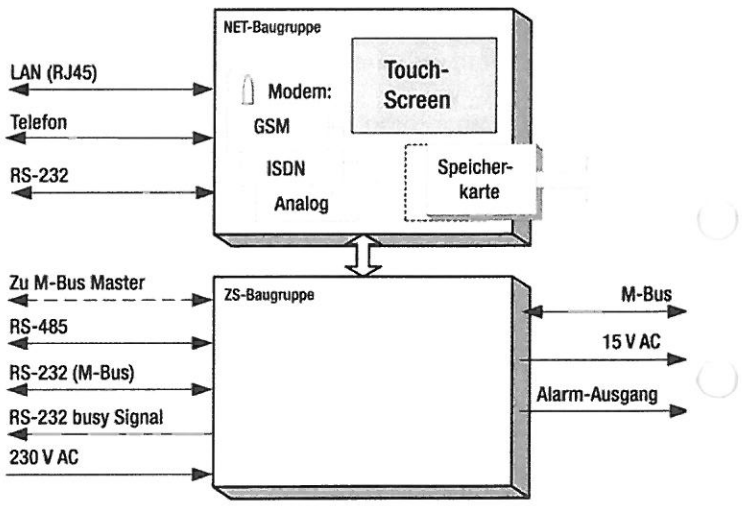
1.3 Interfaces

AMBUS® Net is composed of the ZS and the Net module.

The ZS module has an M-Bus level converter, a power supply for the M-Bus network with (2- or 4-wire) auxiliary power supply and the M-Bus repeater. It has interfaces to the M-Bus, to any higher M-Bus master, one RS232 output, one RS485 output and 2 relay outputs.

See also the installation instructions for AMBUS® Net

The Net module consists of the display (touch screen), the processor for evaluating the data and slots for an optional modem and memory board. Each is equipped with an Ethernet, telephone and RS232 interface.



Ethernet network

AMBUS® Net is an Internet-supported device and can be connected to a network (LAN, Local Area Network) via the Ethernet RJ-45 interface. It works at a speed of 10 Mbit/s.

Two LEDs on the pc board indicate if it is linked to the network (for diagnosis and only visible when the instrument is opened):

LED	Significance
LINK	Network correctly connected
LAN	Data being transmitted

Modem

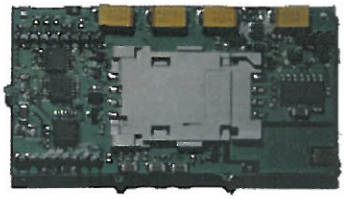
AMBUS® Net is a modular system. It may be fitted with the following modems: PSTN modem (analog), ISDN modem and GSM modem.

The analog and ISDN modem can be connected to a telephone network via the RJ 45 socket. For the antenna of the GSM modem a screw connection comes from the housing (type FME / quasi standard of cellular phones in vehicles).

Analog modem

ISDN modem

GSM modem
Front and rear view of the modem: The SIM board is located on the back in the SIM board reader



GSM modem antenna
The enclosed adhesive antenna with approx. 3 m cable is suitable for mounting in a location with good radio reception (e.g. at a window).

1.4 Technical data of interfaces

M-Bus installation	2- or 4-wire system
Meter power supply (4-wire M-Bus)	15 VAC, ± 20 %
M-Bus data transmission rate	300, 2400, 9600 Baud; combination also possible
M-Bus repeater	yes, 1 M-Bus load
Ethernet	10 MB, RJ-45
Telephone modem	PSTN V.92, RJ-45 (analog modem), 56 kBit/s ISDN, RJ-45, 64 kBit/s GSM (dual band 900/1800 MHz) 9.6 kBit/s
Memory board	Compact flash card type 1 with 16 MB - 2 GB storage capacity
M-Bus direct connection	RS232, RS485
Service connection	RS232
Alarm and Busy relay	Semiconductor relay, potential-free, 50 V / 100 mA AC / DC

Table 2: Overview of interfaces

1.5 Memory board and serial flash

CF card

CF card

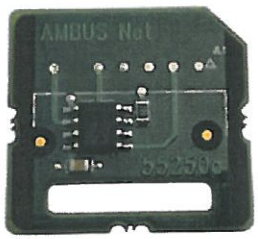
AMBUS® Net with the "data logger" option can record plant and meter data at periodical intervals. This requires e CF card being used as a removable data carrier between the AMBUS® Net and a PC.

The size of the memory card determines the extent of the memory available for AMBUS®Net; a reduction of the memory card size is limited only by the actual storage area, the File Allocation Table (FAT16), which contains a maximum of 2 GB.

All logger files are stored exclusively in CSV format (Microsoft Excel / ASCII-File / *.CSV). The semicolon (;) is thus used for column formatting and the carriage return (CR) for a new line.

A safety lock is supplied with the "data logger" option in order to prevent the CF card from being removed.

Serial flash



Serial flash

AMBUS® Net stores all plant-specific parameters on a removable data carrier, or serial flash. This is plugged onto the pc board attached to the front of the instrument. The housing must be opened in order to replace it.

When changing the device, this means that all settings and parameters are adopted in the new device.

The serial flash also contains the Java driver and language information.

1.6 Multilingual feature with HTML tags

With consistent use of World Wide Web technology, AMBUS® Net supports the simple changeover to various operating languages located on the serial flash. This means that any change requires another language file in the serial flash.

Example 1 : Before start-up:	Changing the language is relatively easy by simply ordering a new serial flash and replacing the old one.
Example 2 : After start-up:	Changing the language is more difficult as the plant data in the serial flash should not be lost. Please contact Aquametro Customer Service.

The following languages are at present available (other languages on request):

- German
- French
- English

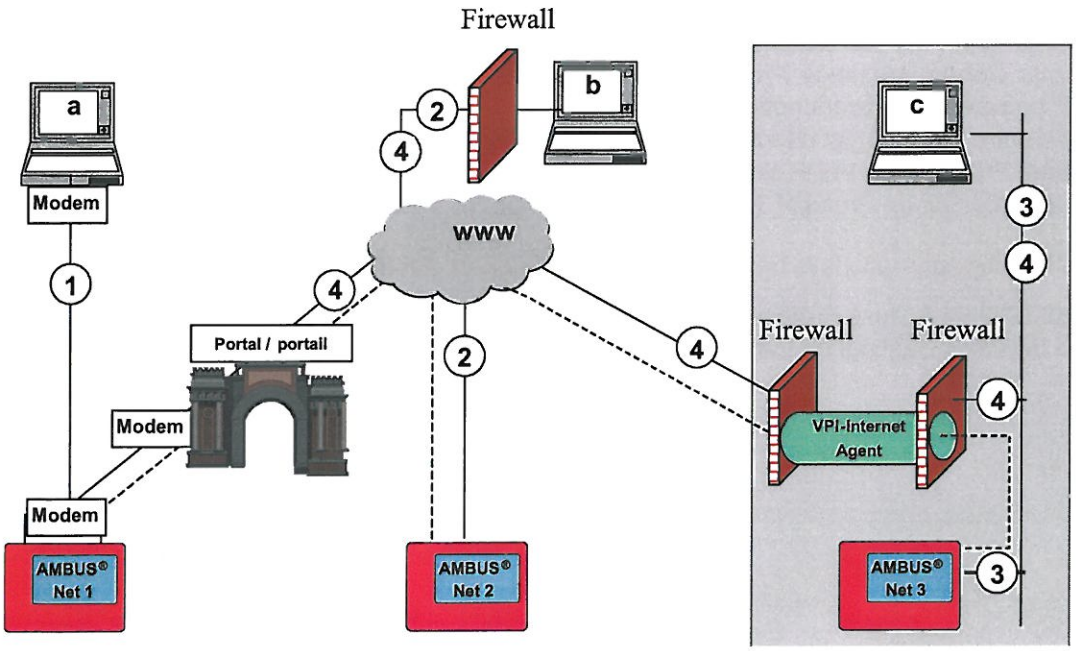
1.7 Communication and security

Four versions of the AMBUS® Net are available: AMBUS® Net LCD120 and AMBUS® Net LCD250 have a touch screen and are therefore to be used when a local display and on-site operation are required.

The gateway versions AMBUS® Net 120 and AMBUS® Net 250 do not have touch screens and are therefore to be installed in plants where remote readout and operation are required and where a more rapid network connection is available.

Channel	PC	AMBUS® Net No.	Connection	Access protection
①	A	1	Point-to-point connection with modem, safe from unauthorized access.	• Private telephone connection • Access code
②	b	2	PC and AMBUS® Net are connected to the Internet. The PC is protected by a firewall. AMBUS® Net is operated using a dedicated IP address supplied by the Internet provider.	• IP address not openly known • Access code
③	c	3	As ②, but within an Intranet protected by a firewall.	• Firewall • Protected LAN connection • Access code
④	b,c	1,2,3	Access to AMBUS® Net via an Internet portal which has the following tasks: • Monitoring access • Communicating with AMBUS® Net via configured channels (with modem, direct IP address or VPI agent, see dotted lines) • Carrying out application-specific functions, e.g. data conversion or database-specific evaluations.	• Access protection by portal • Access code
④	b	3	VPI*) technology also provides secure access to an AMBUS® Net device within a VPI-protected network. The portal and VPI agent in the DMZ**) ensure that only a portal server has access.	• Access protection by portal • VPI • Access code

Table 3: Communication and security



*) VPI: Virtual Private Infrastructure ensure maximum access preotetion
**) DMZ: Demilitarised Zone

1.8 Versions

Four versions of the AMBUS® Net are available: AMBUS® Net LCD120 and AMBUS® Net LCD250 have a touch screen and are therefore to be used when a local display and on-site operation are required.

The gateway versions AMBUS® Net 120 and AMBUS® Net 250 do not have touch screens and are therefore to be installed in plants where remote readout and operation are required and where a more rapid network connection is available.

Designation	Number of M-Bus units	LCD	Internet server Ethernet RJ-45	Telephone modem	Data logger with CF card	RS-232 & RS-485	Art. No.
AMBUS® Net LCD120	120	●	●	optional	optional	●	93178
AMBUS® Net LCD250	250	●	●	optional	optional	●	93179
AMBUS® Net 120	120		●	optional	optional	●	93180
AMBUS® Net 250	250		●	optional	optional	●	93181

Table 4: Specifications for versions

Options, accessories and services:

Designation	Description	Art. No.
Data logger	Data logger with theft-proof and CF memory card	93182
PSTN modem (analog)	Integrated PSTN telephone modem (analog)	93183
ISDN modem	Integrated ISDN telephone modem	93184
GSM modem	Integrated GSM telephone modem	93185
CF Card	CF memory card	19879
Languages	Please state operating language when ordering. Languages available: German, French, English (others on request).	

Table 5: Specifications for options

1.9 Open architecture

AMBUS® Net is based on an open architecture and is compatible with the following standards:

- HTTP *Hypertext Transfer Protocol* (transport medium)
- HTML *Hypertext Markup Language* (format)
- TCP/IP *Transmission Control Protocol / Internet Protocol*
- ARP Address Resolution Protocol (network command)
- PPP *Point-to-Point Protocol* (for communication via a modem)
- ICMP *Internet Control Message Protocol* (for transmitting the status of the protocols IP, TCP and UDP between IP network nodes)
- LCP *Link Control Protocol* (connecting, configuring, testing and disconnecting a PPP connection)
- IPCP Internet Protocol Control Protocol (for IP-connections via PPP)
- PAP *Point Authorization Protocol* (authenticating method for the PPP protocol)

Communication with other applications is based on the following open standards:

- SOAP Simple Object Access Protocol (software interface with XML syntax)
- WSDL Web Services Description Language (describing the interfaces of the Web service)

2 Commissioning

2.1 Power supply and display

Connecting the power supply

Check that the power supply cable is connected to the correct terminals and switch on the power supply.

Refer to the installation instructions AMBUS® Net for connecting the power supply correctly

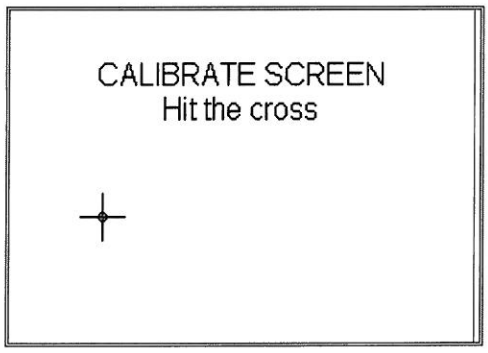
The display lights up. After 2 minutes of idle operation the background lighting is switched off. When touching the screen, backlighting is switched on again and the default page (see section 2.2) is displayed.

⏻ The operating lamp ("Power" / "Alarm") remains it.

⚠
- *Installation and maintenance work may only be carried out when the device is not connected to the power supply.*
- The grounding cable must be connected to the ground terminal of the housing.
- Work on the 230 V power supply may only be carried out by authorized specialists in accordance with all regulations currently in force.
- *The power supply cable may only be connected to the terminals "L" and "N". Any other connections may endanger life and may also permanently damage all meters connected to the bus system.*

Calibrating the touch screen display

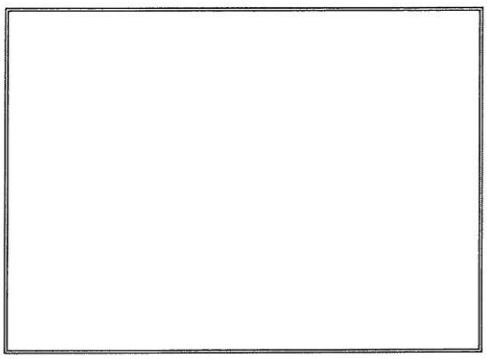
Once the device has been switched on, the IP address is first displayed then a prompt shown for approx. 10 seconds to calibrate the display. This should only be done if operation is poor (that is, if the sensitive fields do not align well with the displayed fields or if it is necessary to press hard)
If calibration is necessary, then press the cross hairs with a blunt object until the menu is shown in the default display.



2.2 Basic setting of AMBUS® Net

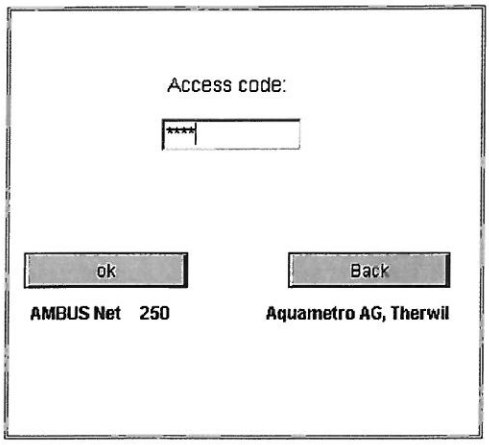
Default display

The menu is now in the default display. You see:
- At the bottom left, the maximum number of meters to be processed, e.g. "AMBUS® Net 120"
- At the center top: the system designation (for programming see *2.2 System* menu)
- At the center bottom: Status of the system (active only after reading the connected meters)



By pressing the display the following are called up:

Access code



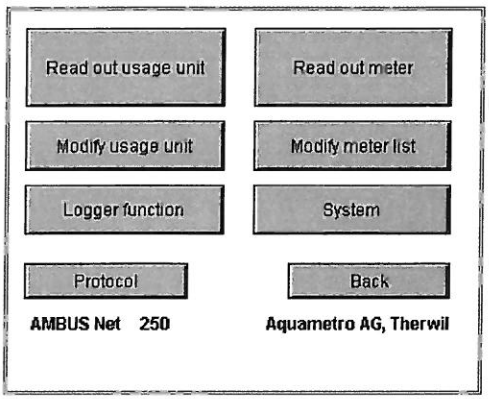
AMBUS® Net differentiates between two access authorizations, both of which are protected by a coded number.

1. System access code (shown on the right)
2. Usage unit access code (see sect. 3.4 The usage units)

When touching the field "Access-Code", a keyboard is displayed; enter code ***"3132"***(factory settings) and confirm with ***OK.***
The main menu is displayed.

(The code must be re-entered if there is no operation after several minutes.)

Main menu

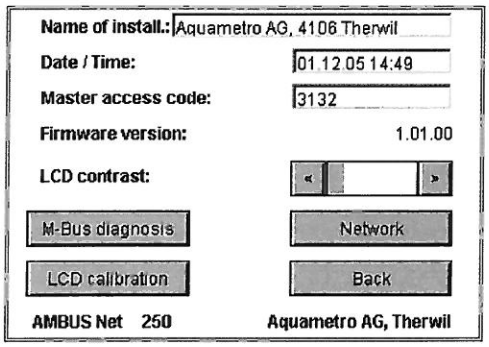


Select "System" in the main menu for carrying out the basic settings of the device:

For other menu points see:
For read out meter / Modify meter list: see section 2.3 read out meter
For Modify usage unit and Read out usage unit see section 3.4 The usage units

- For Logger function (option) see:
  Fehler! Kein gültiges Resultat für Tabelle.

System menu



Check/correct the following basic settings:

- **Name of the installation**: Touch the field, a keyboard is displayed; you can enter a name of max. 40 characters.
- **Date and time**: Setting the system time in the form of: dd.mm.yy.hh.mm
- **Access code:** This can be a maximum of 8 characters

⚠ It is necessary to contact Aquametro Customer Service if the access code is lost!!

- Details of the current firmware version of the device
- LCD contrast
  Adjust the contrast using the "<" and ">" keys so that there is sufficient contrast on the screen but no shading.*)

The calibration routine of the touch screen is done via the menu "LCD calibration" as described above.

*) The LCD balance and contrast cannot be set over the remote control.

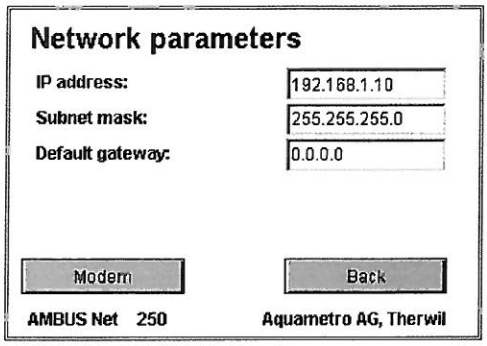
The communication parameters are checked and set via the menu "System / Network":

System / Network menu

Settings of the Ethernet interface:

- IP address, subnet mask and standard gateway are described in greater detail in Section: *2.4 Network (Windows)*.

Entries are only required when using the network.



✓ AMBUS® Net is now ready for operation!
Follow the instructions 2.3 Meter list, commissioning the M-Bus and automatic meter search.

2.3 Meter list, commissioning the M-Bus and automatic meter search

System requirements

- All M-Bus meters to be processed by AMBUS® Net must be wired up correctly according to the installation instructions AMBUS® Net.
- All meters must have previously been assigned a unique primary address (M-Bus EN 1434-3). (Please refer to the operating instructions of the meters used in the system.)
- Select addresses in the range 1...250.

⚠ Ensure that the same address is not assigned to different meters otherwise no communication to those meters will be possible!

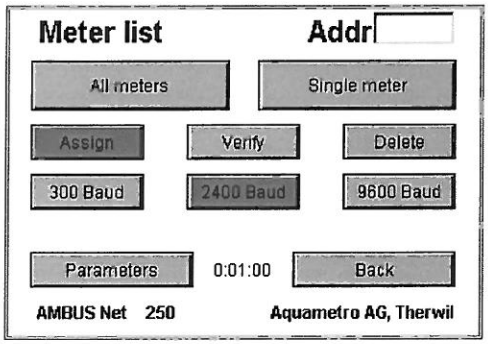
When in the main menu select:

Modify meter list

Use the automatic meter search function in order to enter meters in the AMBUS® Net as follows:

- Select ***Delete – All meters*** if meters from a previous application have been entered incorrectly

  AMBUS® Net indicates: *"All meters deleted"*



Start with the highest baud rate to automatically differentiate between meters with different baud rates:

Assign – 9600 Baud – All meters
Assign – 2400 Baud –All meters
Assign – 300 Baud –All meters

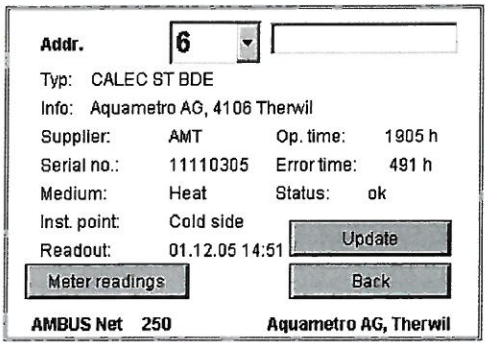
After completing a search, the AMBUS® Net indicates the number of meters found e.g. ***"15 meters detected"***

ⓘ AMBUS® Net can administer plants with mixed baud rates!

Select the meters to be read from the main menu:

Read out meter

- Select the appropriate address in the drop-down list to read out a specific meter
- An additional text field is available for more detailed identification. More information is given in *3.3 Reading the* meter

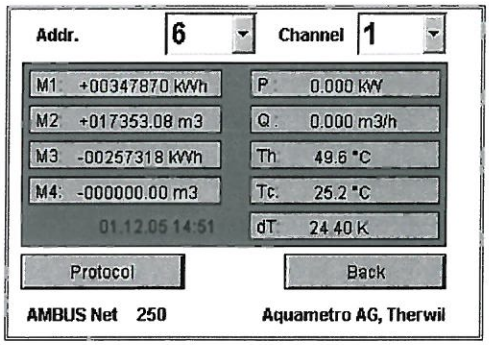


⚠ AMBUS® Net shows meter readings from an internal memory, i.e. at the time of the last reading. If the meters are to be read again, then select ***update.***

To read out the latest meter reading, select:

Read out meter / Meter readings:

- AMBUS® Net displays a maximum of 4 meter readings and 5 actual values per device (address) and channel.
- 3 channels are available.
- Tariffs are dealt with exactly like channels.



✓ AMBUS® Net can now read out and administer the asigned M-Bus meters!

Protocolling meters

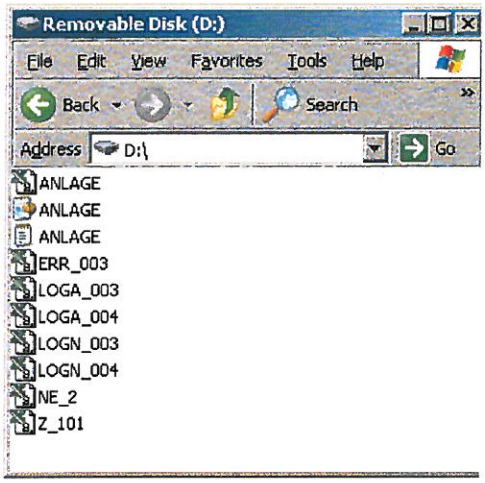
A meter protocol can be stored for every meter available using the option "data logger" and the CF card (see also *2.6* Data logger / CF card*)*:

After selecting e.g. the meter with the primary address 123, press ***Protocol***

- AMBUS® Net creates the file Z_123.CSV (example)

Select ***Protocol*** in the main menu (see section 2.2) to protocol the entire plant:

- AMBUS® Net creates ANLAGE.CSV



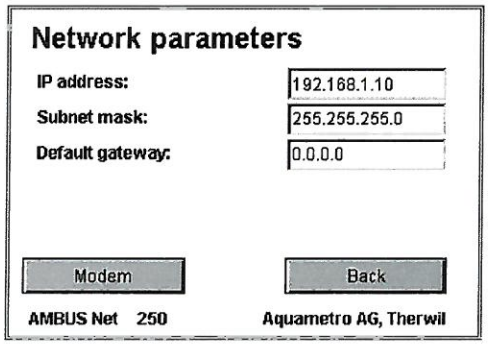
CF card read out via PC

CF The indicator lamp lights up for at least 2 seconds every time the CF card is accessed.

⚠ Never remove the CF card during a write operation as data could be destroyed!

2.4 Network (Windows)

For configuring the network, you require the following instrument data that are found in the system / network:



Parameter	Factory settings
Subnet mask	255.255.255.0
Standard gate-way	-
Mac address	In range 00 0A FF F0 00 00 ... 00 0A FF F0 FF FF

Parameter	Factory settings

If AMBUS® Net is connected to the Internet via a gateway/router, the IP address for the **standard gateway** is to be set here.

The AMBUS® Net can be uniquely identified in the network via the **MAC address** (Media Access Control, or LAN address). If this is required by the network administrator, the particular instrument can be read out from the network via a PC:

1. Response of the instrument, e.g. with : ***ping "IP address"***
   → AMBUS® Net must respond
2. Listing the "Address Resolution Table" with: ***arp –a***
   → Your PC displays the IP address list with the appropriate MAC address list

after the device has been successfully connected to the network. If this is not the case, then contact Aquametro Customer Service stating the serial number.

> ⚠ Start the device again after reprogramming the IP address, the subnet mask or the standard gateway address!

If the network parameters of your network are correctly set according to your system and the device restarted, the AMBUS® Net can be connected to your Ethernet network using a standard RJ 45 network cable.

The following settings must be made on the PC so that the network connection functions correctly:

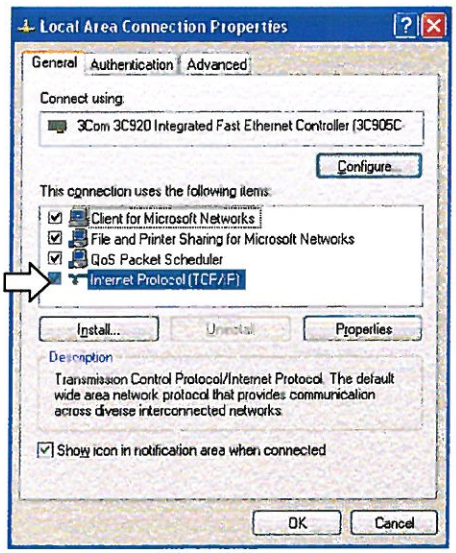
Network setting on the PC

All components must be located in the same network group for a communications link via the Ethernet.

AMBUS® Net requires a fixed IP address.

(Example shown in Windows XP)

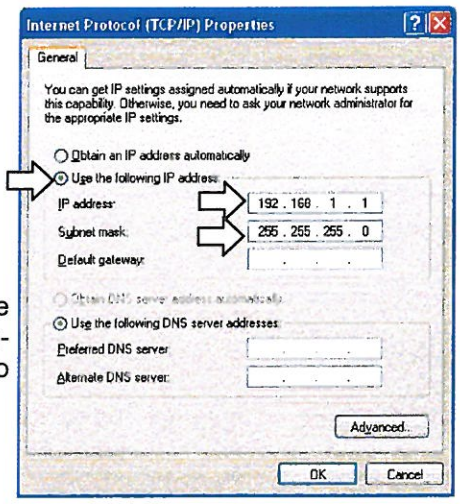
- Select in:
  Control Panel / Network connections
  'LAN/Local Area connection'
- Select Properties of:
  'Internet Protocol (TCP / IP)'



> ⚠ Request a permanent IP address for the AMBUS® Net for your network or Internet operator as this does not support DHCP (Dynamic Host Configuration Protocol).

Select an IP address that is located in the same group: (The first 3 bytes must be identical.)

- ***'Use the following IP address:'***
- ***IP address: 192.168.1.1***
  (AMBUS® Net is delivered with 192.168.1.10 as standard)
- ***Subnet mask: 255.255.255.0***



If the AMBUS® Net is operated in a major network, then the system administrator will assign a fixed IP address for operating the device. In this case network settings have not to be changed on the PC!

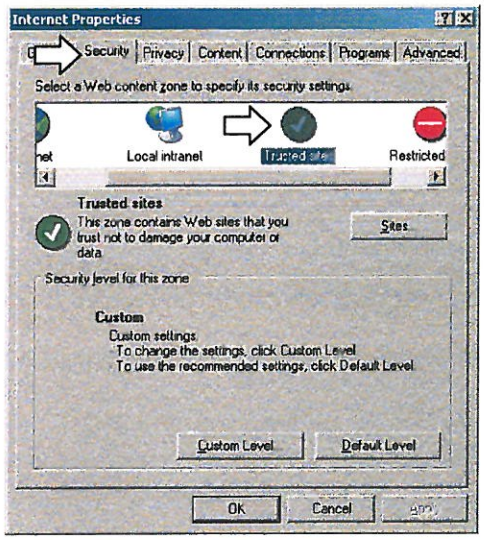
The PC must again be started up if network settings are made on the PC!

Java settings on the PC

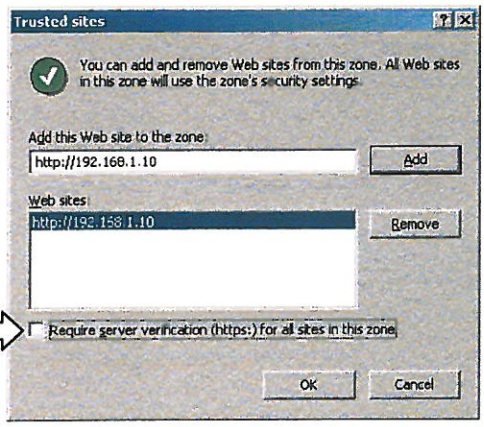
Java is a programming language that permits programs to be transmitted over the Internet which are then carried out. This presents a risk since Java functions on most network PCs are deactivated as standard. In order for the AMBUS ® Net remote control to function correctly, these Java applications must be made available to the particular device.

The following settings are thus required:

- In Control Panel:
  Internet Options select the label "***Security***"
- Select **Trusted Sites**:
  "Sites..."



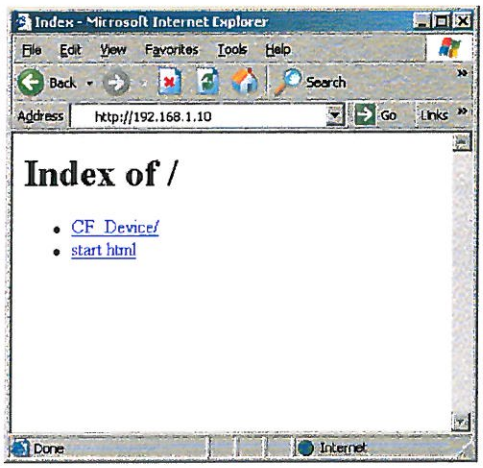
- Insert the page (IP address) for the AMBUS® Net, <u>without</u> requiring server verification (https: bottom left)
  <u>http://192.168.1.10</u>
- End with OK
- Click on ***custom level*** in the previous window:
  and select in "Reset custom settings": ***"low"***



All settings on the PC have now been completed!

Start your Internet browser and select:

http://192.168.1.10 *)



The AMBUS® Net offers two options that can be selected:

- ***CF Device / (Access the files on the CF card)***
- ***start.html (remote operation, start page)***

If AMBUS® Net has been equipped with the option: "data logger", then select:

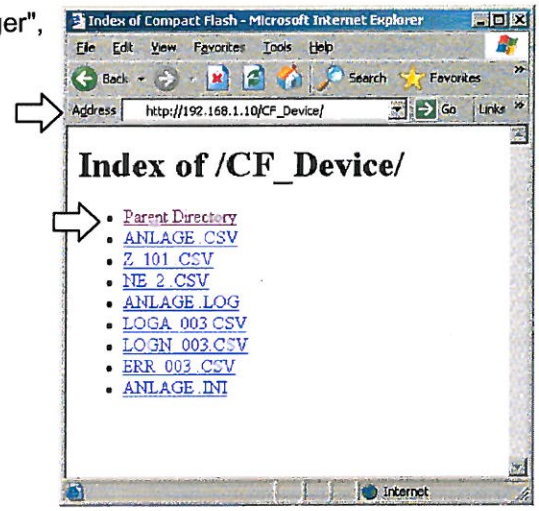
- ***CF Device /***

For direct access to the logger files of your CF card.
By clicking the particular file, you can:

- either ***open it***
- or ***save it to a disk***

To jump back to the start menu, select:

- ***Parent Directory***



Select

- ***start.html***

for direct remote operation of AMBUS® Net.
This starts a Java application, which must be uploaded by AMBUS® Net.

ⓘ	Be patient as the time to load the application is strongly dependent on your network capability and performance of the PC!

✓	AMBUS® Net can now be remotely operated using Ethernet!

*) Delivery address

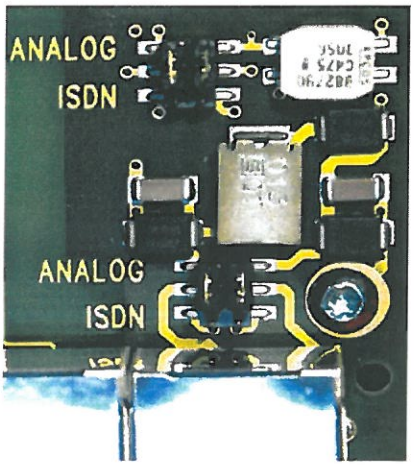
2.5 Communication via modem

Modem settings on the AMBUS® Net

Communication between the PC and AMBUS® Net can also be made using a telephone connection.

Step	Type of modem:	Analog	ISDN	GSM
1	Plug in bridges for analog or ISDN modem			any
2	Select type of modem	Analog	ISDN	GSM
3	Set MSN No.	-	✓	-
4	Connect telephone cable (symbol for connector ->)	☎	☎	-
5	Secure and connect the GSM antenna	-	-	✓

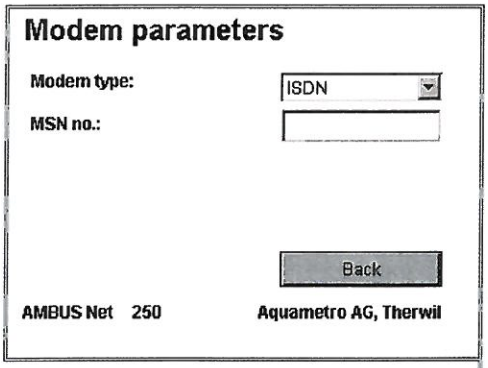
Step 1: Jumpers for analog or ISDN modem



Ensure that the position of both pin strips on the circuit board in the cover of the AMBUS® Net correspond to the figure shown. For the pin strips the jumpers are to be plugged in vertically.

- The figure shows the position of the jumpers for the analog modem (marked ANALOG)
- The jumpers must connect the lower pin with the centre pin for the ISDN modem (marked ISDN).
- The jumpers have no relevance for the GSM modem.

Step 2 – 3: Modem settings



The following entries are required for data transmission with the AMBUS®Net:

Network settings – Modem settings

- ***Type of modem***
- ***MSN No.*** (Multiple Subscriber Number) for ISDN modem only

With the ISDN connection, the relevant part of the telephone number (MSN) must also be entered on the page system / network. The MSN No. is mostly the telephone number without the area code, please refer to the instructions of your telephone switchboard.

> ⓘ An MSN (Multiple Subscriber Number) does not consist of the complete telephone number but instead of as many integers as are required for differentiation. As a rule, this is the telephone number without the area code.

Step 4: Connect the telephone cable

Connect the AMBUS® Net to the telephone connection using the modem cable supplied.

☎ AMBUS® Net connection system modem / RJ-45

Step 5: Secure and connect the GSM antenna

Attach the stick-on antenna supplied to where the best possible GSM reception is obtained (check this out beforehand using a cellular phone from the same provider). Connect the plug of the antenna to the socket for the antenna on the top of the housing and screw tightly.

GSM-Modem

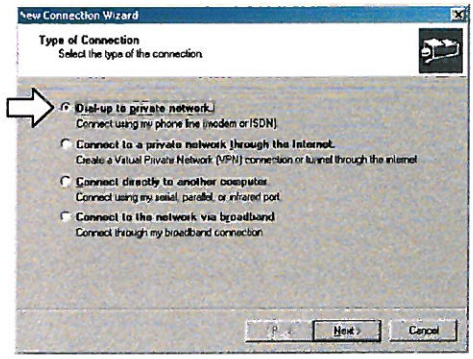
For activating the GSM modem, an SIM board with a contract for data communication is needed.
Aquametro recommends the contract: ***NATEL®data basic*** from Swisscom for Switzerland. This SIM board enables data only to be transmitted. Speech (voice) over the cellular phone is not possible.
No other services are required.

> ⓘ The PIN code of the SIM board is not supported by AMBUS®Net. It must be deactivated when in operation. (Deactivation is possible with most cellular phones).

Modem setting on the PC (data transmission network)

A data transmission connection to the plant must be created for communicating via a modem:
(An example is given in Windows XP)

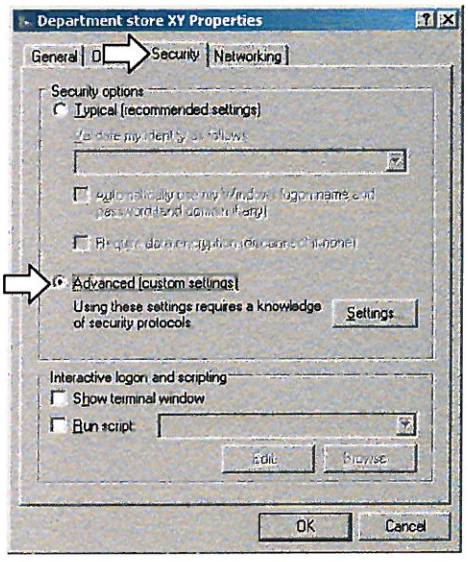
- Create with:
  Control Panel / Internet options
  a new connection:



- Select: ***Dial-up to private network***
- Enter the telephone number of the plant and the type of PC modem
- Enter a name for the connection (plant designation)
- The Wizard will now make the connection

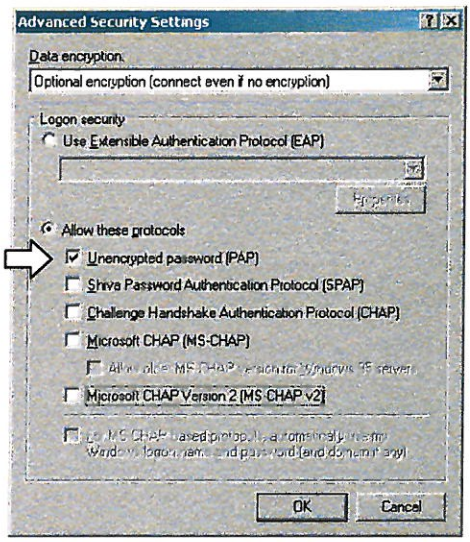
The connection is now available as an icon with Control Panel / Network Connections.

- Change the properties (right mouse button) and select with:
  Security the ***Advanced Settings***



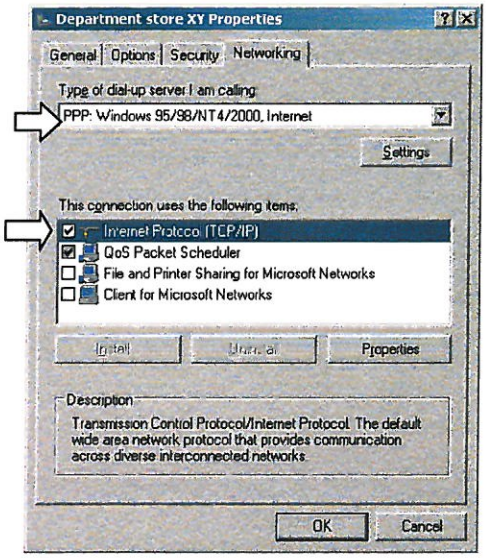
Select with Data encryption:

- ***Optional encryption (connect even if no encryption)***
- With ***Allow these protocols*** only:
  Unencrypted password (PAP)
  - End with ***OK***
  - Confirm the following security messages with ***Yes***

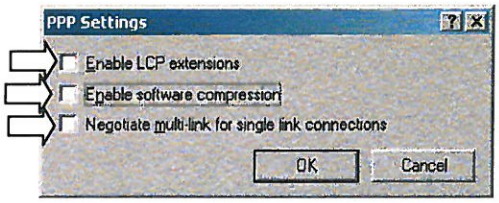


Select the label ***Networking***

- Select as Type of dial-up server:
  PPP: Windows 95/98 NT4 2000, Internet
- and activate among the items used for this connection only
  Internet Protocol (TCP / IP)

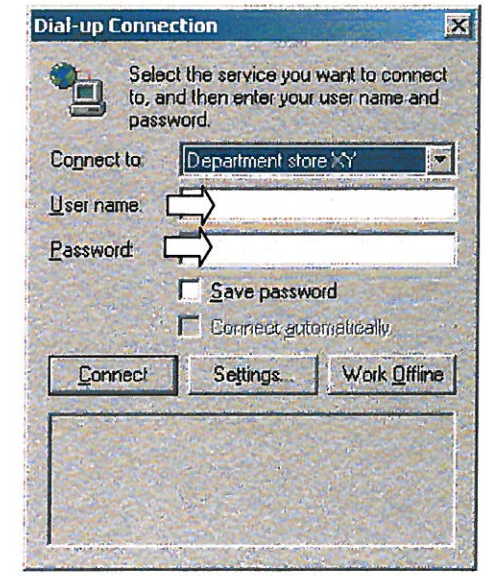


Under ***Settings*** deactivate all PPP-settings



The user name and password are requested when creating a link.
Select:

User name: ***user***
Password: ***password***



IP address for Modem

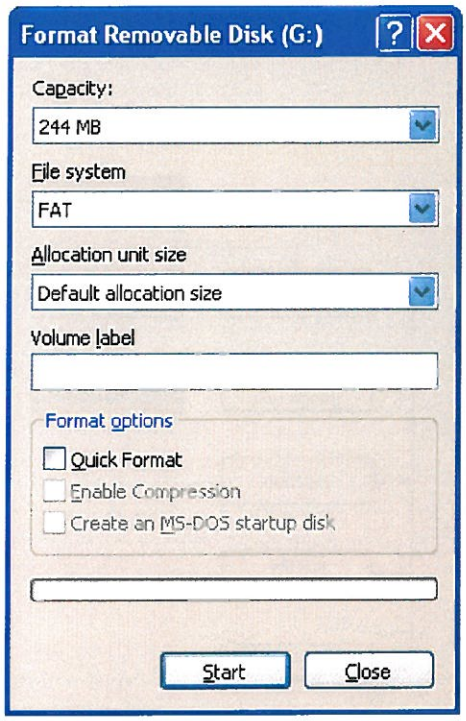
✓ AMBUS® Net can now be remotely operated using a modem connection!

2.6 Data logger / CF card

AMBUS® Net can record the data in the network on a compact flash card (type 1) data.

Compact flash cards can be read or deleted by any PC with a suitable disk drive / reader. They are displayed just like a disk drive.

The card can be formatted with a PC if it is already written on or is full from another application.



⚠ Format CF cards with FAT / FAT16 only!

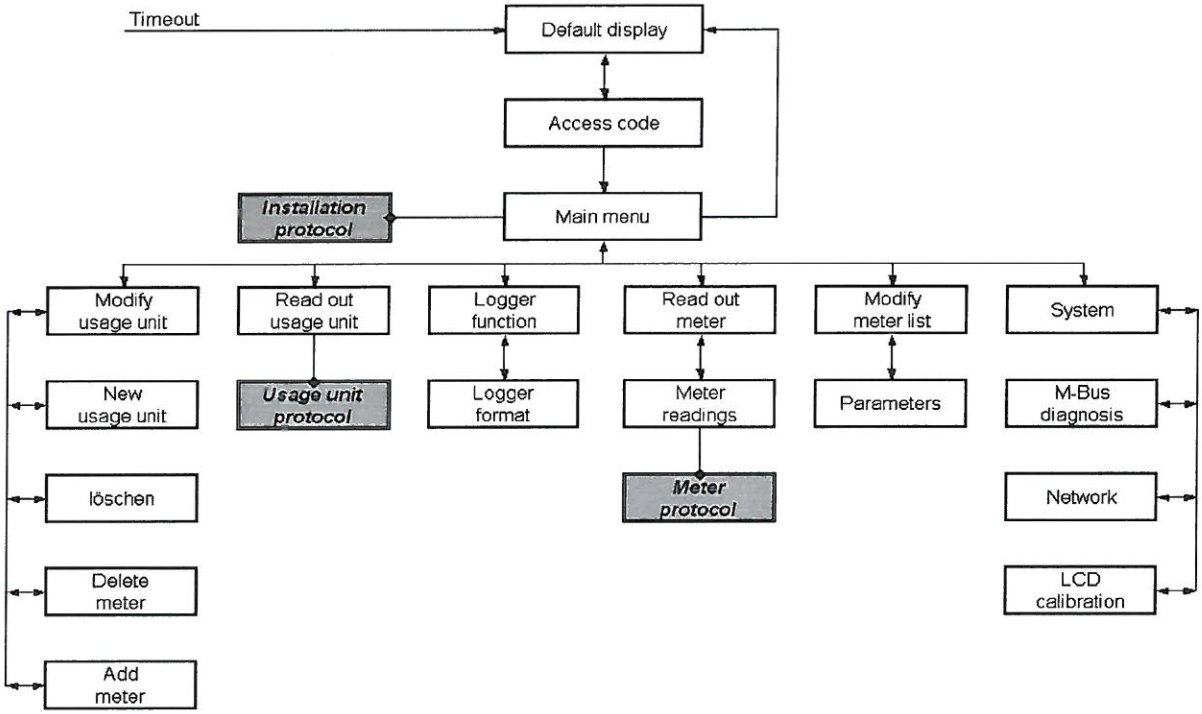
⚠ Only use cards for this between 16 MB and 2 GB!

3 Operation

The large touch screen display has made it possible to achieve a high degree of operating skill never previously found with an instrument of this class. The plain text in a language of your choice enables the device to be easily operated. AMBUS® Net is the natural choice wherever operating procedures have to be quickly learnt.

The section 2 Commissioning has already explained the first steps to take in operating procedures. This section describes the individual functions in greater detail for specific tasks.

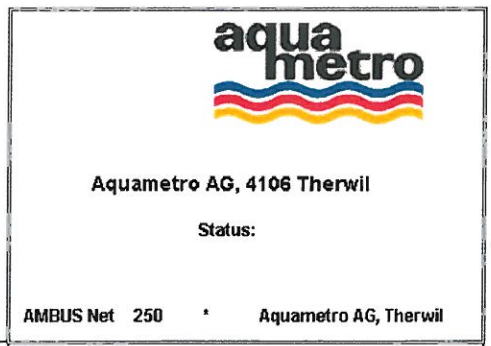
3.1 Summary of menu



3.2 Status message and general alarm

The default window opens with a status message after switching on or if there has been no operation for a few minutes.

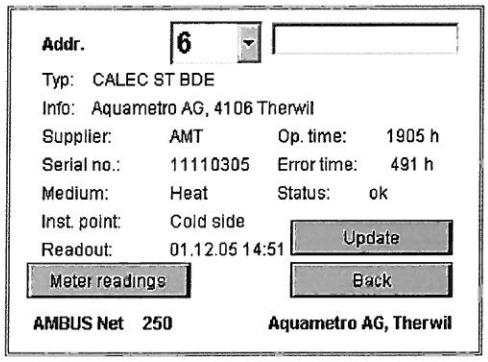
A message of the level "Alarm" or higher will be output to the alarm relay (see installation instructions AMBUS® Net).



Status message (based on priority)	Alarm	Remark
Initialization of modem has failed !	Yes	On commissioning
Please insert memory card	Yes	CF board not present
Logger interval too short!	Yes	See sect.2.6
No answer	Yes	Meter does not reply
Error	Yes	Meter error
Alarm	Yes	Meter alarm
Ok	No	Message: No fault

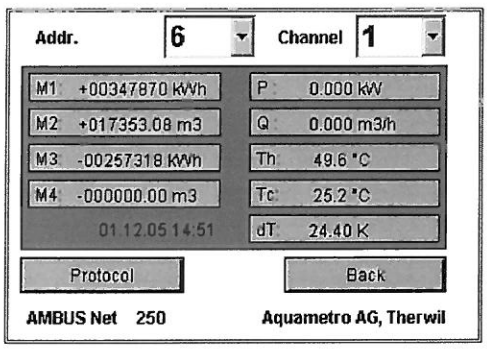
⏻	The standby light ("Power" / "Alarm") flashes with continuous alarm.
⚠	An update of the status message is only possible once the specific meter has been read!

3.3 Reading the meter



The basic features for reading the meter are described in Section 2.3 Meter list, commissioning the M-Bus and automatic meter search.

- **Selecting the meter:**
  The meter is selected with a drop-down list, which lists all meters by their address.
- **Meter data:**
  Values such as: Type, Info, Supplier, Serial No, Medium, Installation point, Operating time, Error time and Status are values that AMBUS® Net reads directly from the meter using the M-Bus.
- **Updating:**
  The date of the last readout is indicated by "Readout".
  Press ***update*** to read the most current value.
- ***Designation:***
  A 10-character designation can also be assigned to each meter.
  This designation is stored in the serial flash card.



The button Meter readings calls up the list of readings and instantaneous values which are sorted according to address and channel.

- The pages are sorted according to the meter address (0...250)
- 3 channels per address are possible (units and tariff as per M-Bus)
- A maximum of 4 meter readings and 5 instantaneous values are possible per address and channel. Sorting the values is according to the sequence in the M-Bus protocol.

See Section 2.3 for storing a meter protocol in the memory card or downloading a meter protocol via remote control / Ethernet. For typical data, see section 2 Appendix.

3.4 The usage units

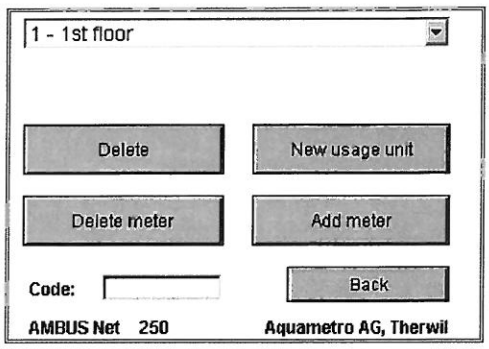
It is often useful to group readings from various meters. Creating usage units simplifies future invoicing when invoicing refer to groups of meters

AMBUS® Net is able to group together any meter readings of similar or different meters. Such groups are called usage units. Any meter reading assigned to a usage unit can be allocated a text for designation purposes.

Select from the main menu to create a usage unit:

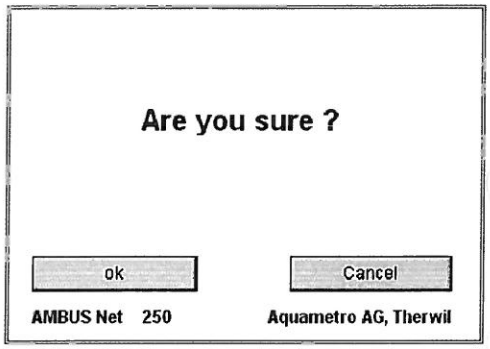
Modify usage unit

- With the button "New usage unit", the designation of a new Usage Unit (UU) can be entered via the keypad which is then displayed.
  To the left, near the designation is the internal number of the UU. This is important for protocols.
- The number of usage units available can be selected in the scroll-down list.



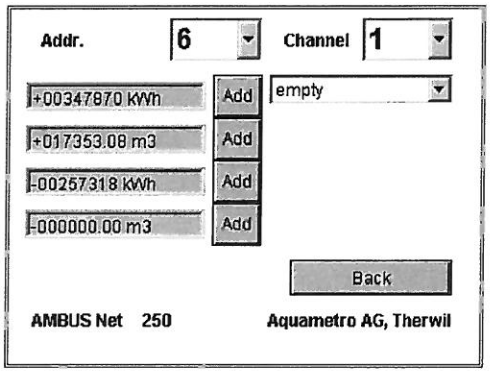
Modify usage unit / Delete (security prompt)

- Usage units that are incorrectly entered or no longer required can be deleted using the button "Delete". Since this process cannot be reversed, the prompt requires confirmation (ok / Cancel).



Modify usage unit / Add meter

- The button "Add meter" enables any meter readings be assigned to the selected usage units.
- Find the address of the particular meter to select (0…250). All meter readings known to AMBUS® Net are available over the additional channel selection (3 channels per address).
- A common media designation (heating, heat, hot water, cold water, gas, electricity …) can be added to each meter reading to be assigned using the drop-down list.
- Press "Add" to assign a meter reading: AMBUS® Net confirms: "Meter ‚n' added where n stands for meter reading 1...4.

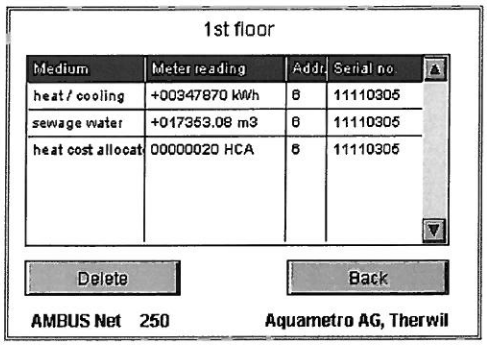


⚠ The number of usage units and the number of assigned meters are limited.
Note: Number of UU times number of meters must be < 250.

Modify usage unit / Delete meter

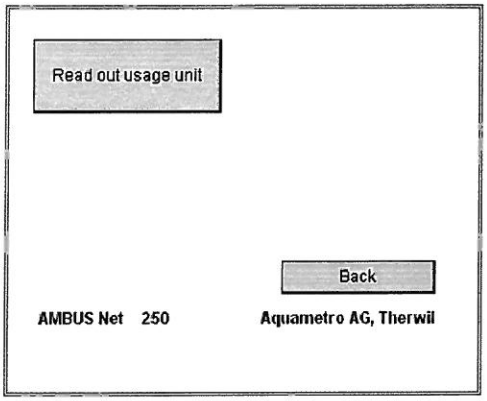
Meter readings that are incorrectly entered or no longer required can be removed from the usage unit.

- The button "Delete meter" calls up the delete menu:
- Select the meter reading to be deleted,
- And confirm with "Delete".



Access code for usage unit

- A separate 8 numerical character access code can be assigned at system level to each usage unit. Users with no system access have separate access to the usage unit by entering the usage unit code.
- A user has access to several usage units by entering the same code a number of times (authorization groups).
  If a user is in the system having entered the usage unit code, then only those usage units with the same code are visible. Direct access to the meters or to the system settings is not possible.
- Users with the usage unit code cannot alter the code.

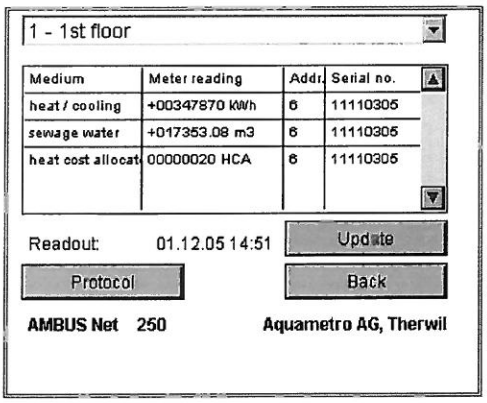


All data concerning usage units are stored on the serial flash card.

Select from the main menu to read out a usage unit:

Read out usage unit

- The number of usage units available can be selected in the scroll down list.
- Each line displays the medium, the meter reading, address and serial number of the meter.
- **Updating:**
  Updating the data is indicated by: "Readout:". Press "update" to read the most current values.
  - In addition, with the "Data logger" option it is possible to store a protocol on the CF card or store it directly on the PC remotely. Typical data are given in Section 2 Appendix.



3.5 Monitoring the meters: the analysis usage unit

It may be seen that, in the scroll-down list of usage units, there is one with the name "Analysis." One (optional) logger function is able to analyse one particular usage unit: The meters of the analysis usage unit are protocolled in a fixed time raster for 15 minutes (see also section

3.6 Data logger (optional)

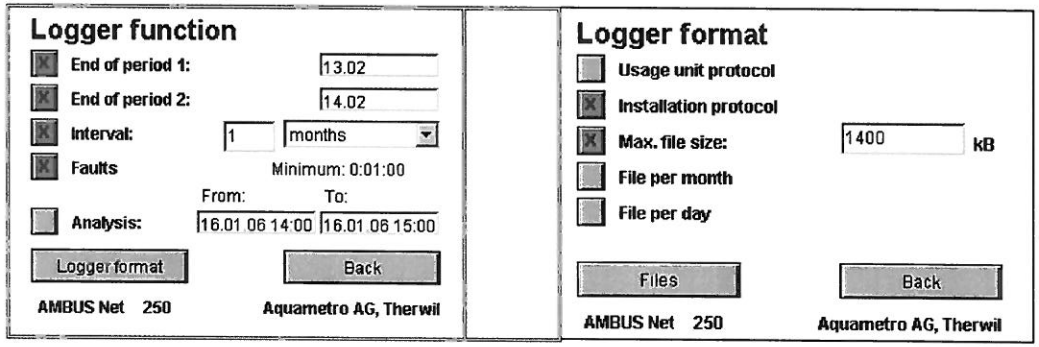
The optional data logger records event- or time-controlled data and stores these in the plug-in data memory (CF card).The time interval can be set to between 1 minute and 12 months. If the AMBUS® Net is not equipped with the logger function option, then the update rate is fixed at once per day. The reading is carried out shortly before 24.00.

The logger function (optional)

The keys on either side are used to determine:

1. Which data are to be recorded.
2. In which time interval the data are to be read and recorded.
3. the sequence of data by meters or usage units
4. Whether the data are partitioned according to size or time.

The following table describes the functions of the keys and the names of the logger data:



		Settings of the **Logger format**			
		Usage units protocol		**Plant protocol**	
Settings of the **Logger function**	Description	**Max. size of data (size-controlled)**	**Data per month/ data per day (time-controlled)**	**Max. size of data (size-controlled)**	**Data per month/data per day (time-controlled)**
Billing date 1,	Billing date protocols, readout is made at 23:30 on the given day	**MEMN**_nnn.CSV	**MN**yymmdd.CSV	**MEMA**_nnn*.CSV	**MA**yymmdd.CSV
Interval	Logger data, data recording within the preset time interval	**LOGN**_nnn.CSV	**LN**yymmdd.CSV	**LOGA**_nnn.CSV	**La**yymmdd.CSV
Fault	Error protocols. The following status messages from a meter are regarded as faults: ***No answer, Error, Alarm***	**ERR**_nnn.CSV	**Er**yymmdd.CSV	**ERR**_nnn.CSV	**Er**yymmdd.CSV
Analysis	Analysis data: 5 selected meters can be read in parallel to the logger function in 15 minute intervals for a defined time period (see sect. 0 Monitoring the meters: the analysis usage unit.)	**AN**_nnn.CSV	**AN**yymmdd.CSV	**AN**_nnn.CSV	**AN**yymmdd.CSV
Logger format					
Usage unit protocol	Meters are arranged according to usage units, meters not assigned to usage units are not shown.				
Plant protocol	All meters are listed according to their address.				
Max. fle size	Exceeding the file size causes the creation of a new data file **(size-controlled)**				
Files per month	A new data file is created at the beginning of each month **(time-controlled).** For logger intervals typically between 1 hour and n days				
Files per day	A new data file is created at the beginning of each day **(time-controlled).** For logger intervals typically between 1 minute and n hours				

* 'nnn' between 000 and 999
** 'yymmtt' year, month, day, e.g. 061231

„...A..." Plant protocol, i.e. meters are displayed according to their address
„...N..." Usage units protocol, I.e. meters are displayed according to the structured usage units

Setting the logger time interval

The logger time interval can be entered in the entry field on centre screen to the right. This value determines the time intervals in which the meters are to be read. It can be set to the following ranges:

Minutes	Hours	Days	Months
1 ... 59	1 ... 23	1 ... 28	1 ... 12

Important: Reading out an M-Bus plant can take from several seconds to over 1 hour depending on the number of meters, the baud rate and the amount of data to be transmitted. The following conditions must therefore be met:

Readout interval > M-Bus readout time

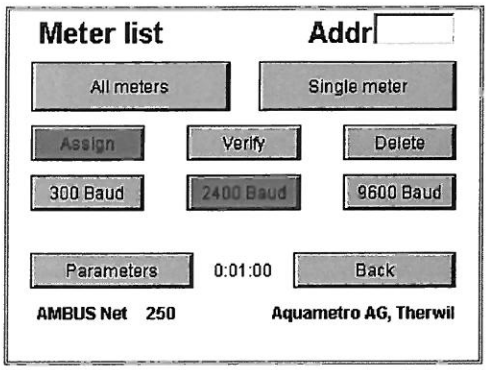
In cases of overflow the data can no longer be stored and the status message: ***Logger interval too short!*** *will appear in the default window*

Measuring the M-Bus readout time

The time required for all M-Bus devices to be read out can be measured as follows:

1. Select **Meter list** in the field
2. Press the **Control** button
3. Press the **All meters** button

AMBUS® Net now reads all meters and shows the time in the default window at the bottom of the field.:



Contents and format of the logger data are found in *section 2* Appendix.

Note: Time-controlled data sizes are generally more advantageous because:
1. the time periods can be more easily limited,
2. an overflow of the memory board is automatically prevented (see below).

Logger: memory size, overflow

The size of the memory board limits the amount of data that can be stored.

Time-controlled logger data are a self-checking function and prevent the system creating an overflow since the oldest data are automatically deleted.

Size-controlled logger data must be be prevented by the user by one of the following procedures otherwise the data can no longer be stored in the memory:

- Select the size of the logger data so that:

  the size of the memory board > 1000 x size of the data created periodically + other data
  If the file index 999 is reached, the system then resets the index to 000 so that the oldest data are overwritten

- If this is not possible, the data must first be transferred to another data carrier and the data in the board deleted.

Note the stipulation above in order to prevent an overflow of the memory board!
(Typical memory requirement in the logger file: 150 – 200 Bytes per meter and reading).

Checking the logger interval

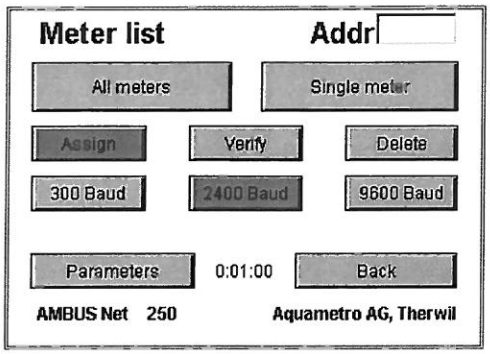
To check the logger interval, first read all meters and proceed as follows:

1 Activate the button "Check" in the field "Meter list"

2 Activate the button "All meters"

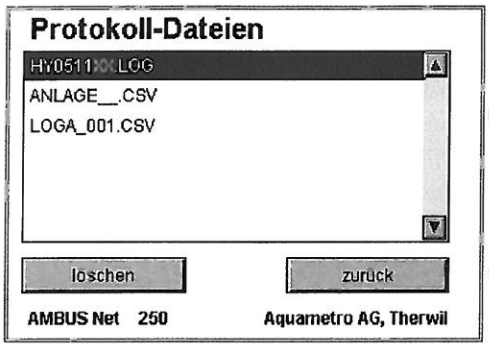
3 Wait until the reading time is shown in the field in the centre at the bottom (example "0:00:25“)

4 Set the logger interval time to at least this time in the field "Logger function"



Protocol files

The button "Data" shows a directory of all files stored on the memory card.



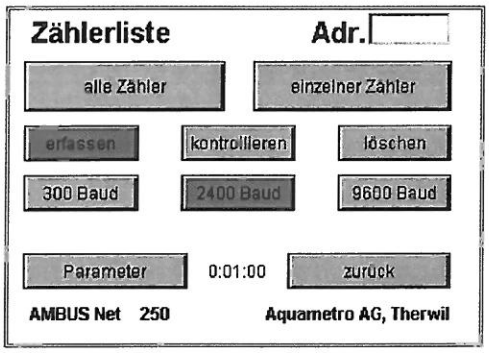
If no memory card is available then the following error message is shown:
„Insert memory card please!“

3.7 Meter list, manual meter readings

Manual meter readings

Section 2.3 Meter list, commissioning the M-Bus and automatic meter search described, how meters, e.g. are automatically looked for and entered via:
Assign – 2400 Baud – all meters.

This search procedure checks the address range in the selected baudrate from 1 to 250 and enters the addresses in the instruments found.



Meters can also be entered manually, by which the appropriate address is entered in field: ***Adr.***
and the search procedure is started with: ***Baud – assign – single meter***
AMBUS® Net displays, e.g.: ***"0 meters detected"*** or ***"Meter detected"***

Meters with an address from 0 to 250 can be entered manually.

Removing meters

To delete the entire list, select:

- ***Delete – all meters***

If individual meters are to be removed, select:

- ***Delete – single meter*** (having first entered the address to be deleted in field "Adr")
- AMBUS® Net displays, e.g.: "***all meters deleted*** or ***Meter deleted"***

Checking meters

All meters entered, along with their baud rates, can be checked. Select:

- ***Verify – all meters***

If individual meters are to be checked, select:

- ***Verify – single meter*** (having first entered the address to be checked in field "Adr")

This command enables all meters or individual meters to be read and thus checked.

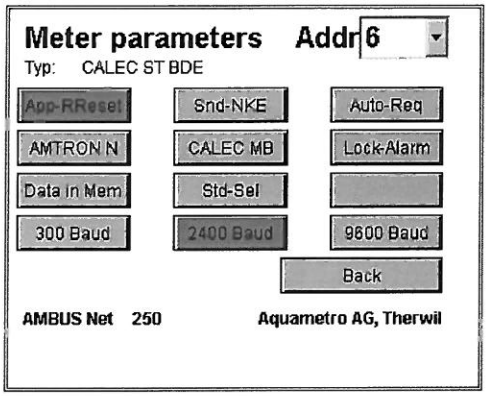
- AMBUS® Net display, e.g. "***All meters available***" or for example "***1 Meter not available!"***

The time required to read the meters is shown in the display field in the centre at the bottom.

Modify meter list / Meter parameters

When recording, the AMBUS® Net tries to identify every meter found and to set down the appropriate parameters of the meter driver. These parameters are and stored in the serial flash card structured by meters.

If the parameters found for a particular meter are to be checked or changed, then select: ***Modify meter list / Meter parameters*** by entering the address of the meter in the field: ***Adr.***
The features of the meter are indicated by displaying the appropriate flags in a darker grey tone. By pressing the button, a feature can be changed, if the meters allow to do so.



Baud rate
The 3 buttons at the bottom show the baud rate for which the meter was entered. If the meter can use another baud rates, this can be modified at this point.

Aquametro meters
The 3 buttons *"AMTRON N"*, "*CALEC MB*", "*Lock alarm*" activate special functions in these Aquametro meters, e.g. reading the text field. The button Lock alarm suppresses an error message which the meters send if the Lock level is not correctly set (to protect calibration parameters).

⚠ These flags are to be changed only by specialists with appropriate training or contact Aquametro Customer Service for further information.

App-Reset (Application Reset)
When this button is activated, AMBUS® Net carries out an *"Application reset"* before a readout in the M-Bus command procedure. This command initializes the meter protocol according to the M-Bus standard.

Snd_NKE (Send NKE)
When this button is activated, AMBUS® Net carries out a *"Snd_NKE"* command after every reading. This command resets the address selection of the meter.

⚠ Not all meters respond correctly to the commands: "*Application Reset*" or "*Snd_NKE*". Check for correct reading of the meters after a switchover!

Auto-Req
Certain meters inform the master with the command REQ_UD2 that more information is available than can be called up by further read commands. When this button is activated, AMBUS® Net responds to this command by reading out all existing protocols.

⚠ This option can cause the readout to be considerably delayed. Select the "Auto-Req" option only if other important data are to be read!

Data in Mem(ory)

Parameters for meters which store the actual meter reading in memory 1 (e.g. EAM current meter).

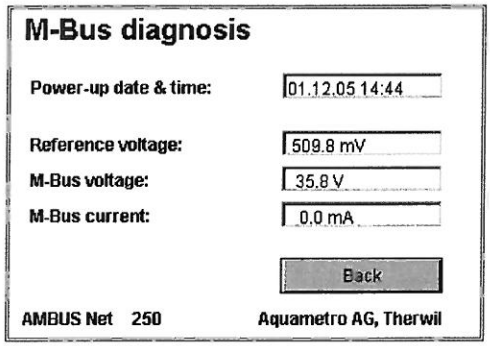
Std-Sel (Standard Selection)

Activates the option Any VIF (alternative method for App Reset).

System / M-Bus diagnosis

The menu "M-Bus diagnosis" can be called up via the system menu in order to show electric information about the M-Bus plant.

AMBUS® Net measures the system current, the M-Bus terminal voltage and an internal reference voltage and then displays them.



Value	Description		Remark
Power-up date	The date field shows when the AMBUS® Net was last booted up. Interruptions in voltage are of fundamental importance when monitoring plants.		
Reference voltage	Information on the reference voltage is for function monitoring of AMBUS®ZS modules. The voltage is about 500mV.	⚠	Please contact Aquametro Customer Service is the voltage varies by more than 30%!
M-Bus voltage	The M-Bus voltage is the terminal voltage of the M-Bus network (terminals 26 / 27). The voltage is just below 36V.	ⓘ ⚠	The voltage can vary slightly during communication. • If the value is 24 V when measured over several seconds, then there is an "Auto-break" error. • If the value is near 0, then there is a short circuit in the system. Please contact Aquametro Customer Service!
M-Bus current	The current of the M-Bus plant. The value is proportional to the number of M-Bus units connected. The theoretical value is about 1.5mA per unit (1 M-Bus load).		

4 Remote operation and system integration

4.1 SOAP: Creating a client with .Net

SOAP is an XML-based interface that enables direct data connections to be created between clients over the Internet, e.g. management software and servers (AMBUS® Net).

AMBUS® Net makes available data from meters and the usage units via a SOAP interface.

These instructions describe how to create a SOAP client for an AMBUS® Net plant.

> ⚠ The document does not claim to be an introduction into SOAP or .Net.

The code extracts are written in the programming language C#.

General description of the Web service

The Web service of AMBUS® Net provides two functions:

`getMeter(PrimAddr As unsignedByte) As Meter`	
PrimAddr	The primary address of the meter
Returned value	The returned data are features of the meter with the primary address *"PrimAddr"*

`getUsageUnit(index As int) As UsageUnit`	
index	The index number of the usage unit
Returned value	The returned data are the features of the usage unit with the index number ***"index"***

Features of a meter

If a meter is loaded with the function "getMeter(…)", then it is possible to use it like a local instance. A meter has various features and is structured as follows:

```
Public class Meter
{
   public byte primAddr;
   public string deviceName;
   public string desc;
   public string type;
   public string info;
   public string supplier;
   public string serial;
   public string medium;
   public string instPoint;
   public string readout;
   public string status;
   public Display opTime;
   public Display errorTime;
   public Channel[] channel;
   public Meter()
   {
       channel = new Channel[3];
       // …
   }
}
```

```
public class Channel
{
   public Display P;
   public Display Q;
   public Display Th;
   public Display Tc;
   public Display dT;
   public Display[] M;
   public Channel()
   {
       M = new Display[4];
       // …
   }
}

public class Display
{
   public string value;
   public string unit;
   public Display() {   }
}
```

Features of a usage unit

If a usage unit is loaded with the function "getUsageUnit(...)", then it is possible to use it like a local instance. A usage unit has various features and is structured as follows:

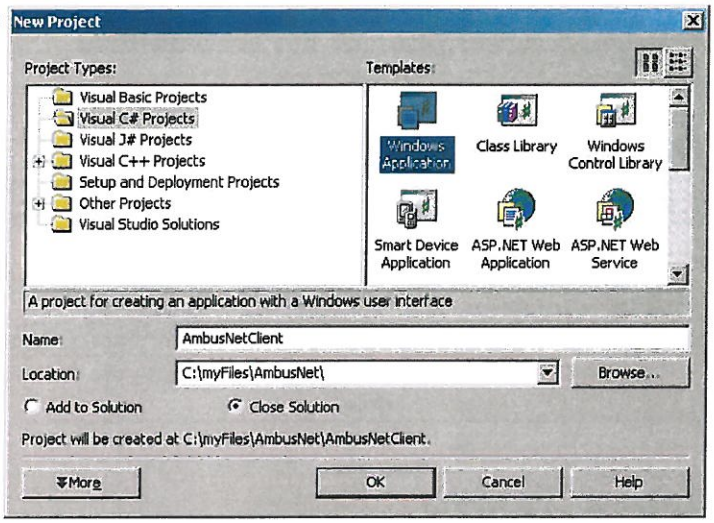
```
public class UsageUnit
{
      public int    index;
      public string name;
      public string readout;
      public string deviceName;
      public int    size;
      public Entry[] entries;
      public UsageUnit()   {   }
}
```

```
public class Entry
{
      public byte primAddr;
      public byte channelNr;
      public byte meterNr;
      public string medium;
      public Entry()   {   }
}
```

Linking the Web service to a network

The three steps below following describe how the Web service of AMBUS® Net is linked to a C# project.

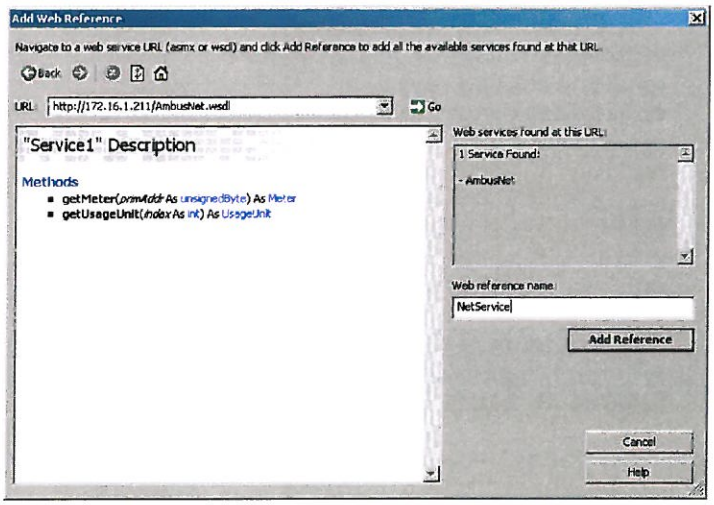
1. The first step involves creating a new C# Windows Application project in MS Visual Studio .Net.



2. The next step involves creating a Web Reference in the file AmbusNet.wsdl. This file is in AMBUS® Net and describes the Web service.

The following address is to be entered as a URL:
http://xxx.xxx.xxx.xxx/AmbusNet.wsdl.
where „xxx.xxx.xxx.xxx" is the IP address of the AMBUS® Net device. In this example AMBUS® Net has the IP address: "172.16.1.211".

The name of the reference can be freely selected but is still used in the code.



3. The final step is to link the SOAP service to the code. In the example given, the Web reference is called "NetService". If another name is selected then this name must be used in the code. Note that a timeout of approx. 100 ms should be set between two SOAP prompts. This pause guarantees that AMBUS® Net is again ready for the next prompt and that no error occurs. However, if there is an error, then it might take some minutes until the SOAP service is working correctly again in the AMBUS® Net device. The example below shows how the Web service is linked up:

```
namespace AmbusNetClient
{
    public class AmbusNet : System.Windows.Forms.Form
    {
        public AmbusNet()
        {
            InitializeComponent();
        }
        [STAThread]
        static void Main()
        {
            Application.Run(new AmbusNet());
        }
        //...
        // Function get single meter (m).
        public void GetMeter(byte PrimAddress)
        {
            AmbusNetClient.NetService.Service1 ambus = new
                                        AmbusNetClient.NetService.Service1();
            ambus.Proxy = new System.Net.WebProxy();      // empty Proxy
            ambus.Url = "http://172.16.1.211/";
            AmbusNetClient.NetService.Meter m;
            try
            {
                m = ambus.getMeter(PrimAddress);    // remote call
                if (m != null){
                    String deviceName = m.deviceName;
                    //...
                }
            }
            catch (System.Exception ex)
            {
                // Error when loading the meter
            }
        }
```

```
        // Function get one usuage unit (u).
        public void GetUsageUnit (int UnitNr)
        {
            AmbusNetClient.NetService.Service1 ambus = new
                                        AmbusNetClient.NetService.Service1();
            ambus.Proxy = new System.Net.WebProxy();      // empty Proxy
            ambus.Url = "http://172.16.1.211/";
            AmbusNetClient.NetService.UsageUnit u;
            try
            {
                u = ambus.getUsageUnit(UnitNr);     // remote call
                if (u != null){
                    String unitName = u.name;
                    //...
                }
            }
            catch (System.Exception ex)
            {
                // Error when loading the usage unit
            }
        }
    }
}
```

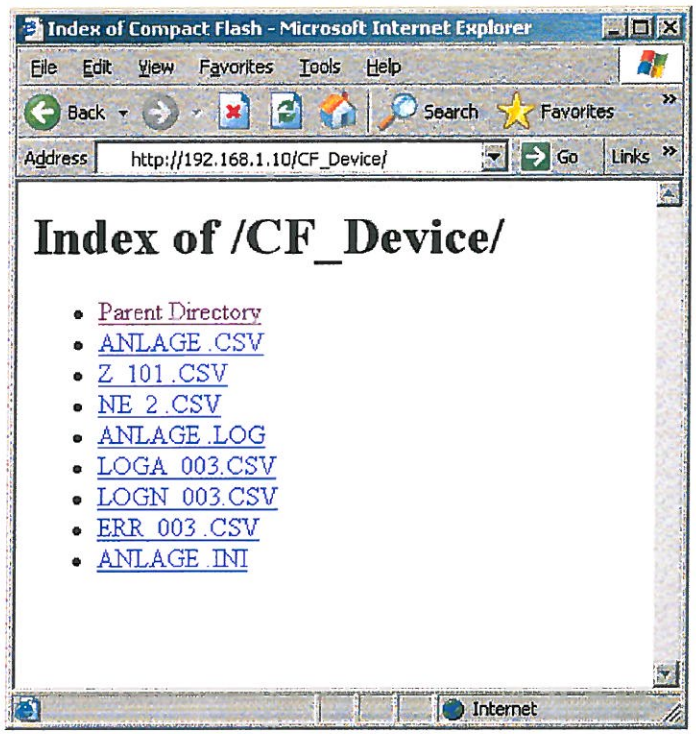
4.2 Download protocol

Section *2.4 Network (Windows)* explained how all protocol files that AMBUS® Net stored on the CF card *) can be saved to the PC using a network.

By entering the address:

http://192.168.1.10/CF_Device/ **)

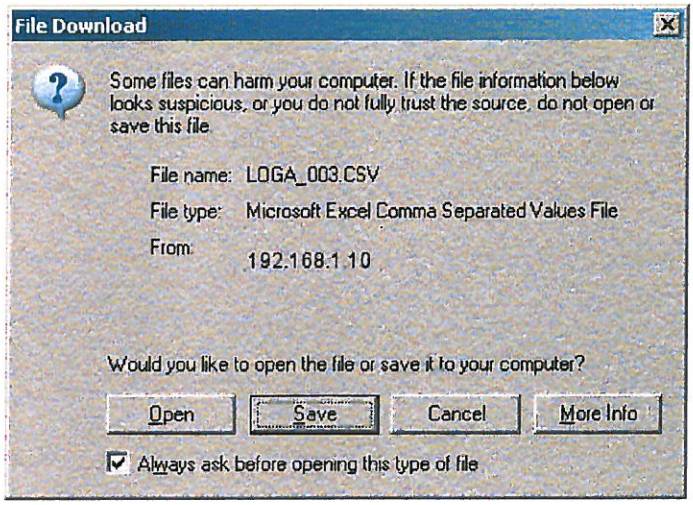
you get the file directory of the protocol files from AMBUS® Net From which you can select.



*) With data logger option only'
**) Address when delivered

Click the individual file to:

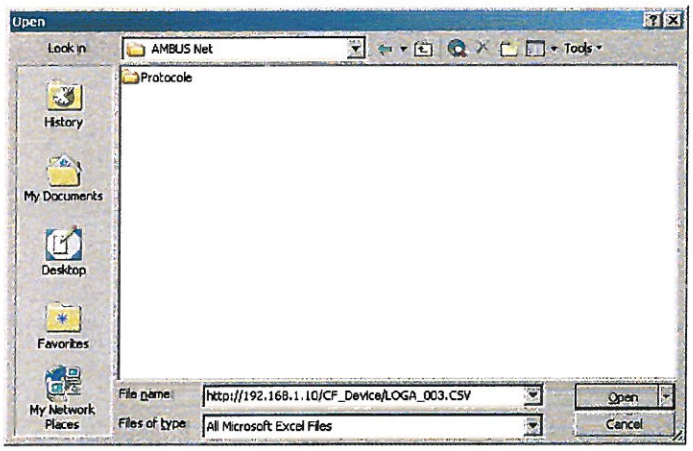
- either ***open it***
- or ***save it to a disk***



The files can also be opened directly from the application by entering the complete path with the URL.

The figure to the right also shows an example from the Office application: "Excel"

Open File / File name (example):
http://192.168.1.10/CF_Device/LOGA_003.CSV



5 Troubleshooting

Symptom	Cause	Remedy
Power symbol ⏻ does not light	• No power supply	Check power supply including power isolating terminal acc. to installation instructions
	• Short-circuit in the M-Bus	Check the M-Bus (4-wire) acc. to installation instructions AMBUS® Net.
Power symbol ⏻ lights up but the display cannot be operated or else remains dark	• Display not connected	Display should be connected with three cables to the electronics. Check the cables.
	• Serial flash incorrectly mounted or is defective	Check the seating and position of the serial flash in its holder.
Power symbol ⏻ flashes	• Error in M-Bus power supply	The AMBUS® Net has identified an error in at least one meter (sect. *3.2*). Check the affected meters (sect. *3.3)* and remove the error at the meter itself.
No further operation after entering the access code	• Incorrect access code	Enter the code acc. to sect. *2.2.*
	• Instruments incorrectly operated	The code must be entered in the entry field and confirmed on the access side with OK.
Status message *"Initialization of modem has failed !"*	• Incorrect setting • Modem not plugged in correctly • Modem faulty	Verify modem settings and restart device! Verify telephone connection Verify modem connection or exchange modem.
Status message *"Please insert memory card"*	• Memory card not plugged in (correctly)	Plug in memory card.
Status message "*Logger interval too short!* "	• Logger interval shorter than time required for readout	Determine readout time (see section 3.6) and set logger interval at a higher value.
Status message "*No answer*"	• At least 1 meter does not respond	Verify meter: power supply, M-Bus-connection, temperature-sensor-connection…
Status message "*Error*"	• At least 1 meter detected an error	Verify meter: Meter display, temperature-sensor-connection.
Status message "*Alarm*"	• At least 1 meter detected an alarm	Verify meter: Meter display, temperature-sensor-connection.
Status message "*Serial-Flash not....*""	• Serial flash new or faulty	Verify position of serial flash in holder. Restart device.
Status message "*unlocked*"	• AMBUS®IS was not electronically locked	This is no error. The locking is optional.
Menu *read meter* cannot be selected. The message "No meter recorded" is displayed	• AMBUS® Net has not identified meters	Proceed acc. to sect. 2.3.
	• Serial flash new or defective	Check the seating and position of the serial flash in its holder.
AMBUS® Net does not find any meters	• No or incorrectly connected meters	Check the M-Bus (4-wire) acc. to installation instructions AMBUS® Net.
	• Incorrect baud rate selected	Check the selected baud rate when entering the meter acc. to sect. 2.3.
AMBUS® Net does not find all meters	• Addresses entered twice	Check the M-Bus network with a suitable M-Bus tool for bus numbers entered twice.
	• Poor M-Bus network	Check the M-Bus (4-wire) acc. to installation instructions AMBUS® Net.
	• Meter with incorrect baud rate	Check the baud rate of the meter or select a lower baud rate, if possible.
AMBUS® Net does not find meters with the address 0	• Address 0 is not automatically supported.	Proceed acc. to sect. 3.7 Meter list, manual meter readings Enter the meter manually or change the address of the meter.
Menu *logger function* cannot be selected.	• Data logger option missing	Logger functions are an option (sect. 1.8); please contact Aquametro Customer Service.
Status message indicates: "Serial Flash not...."	• Serial flash new or defective	Check the seating and position of the serial flash in its holder and restart the instrument.
CF card remains empty	• Data logger option missing	Logger functions are an option (sect. 1.8); please contact Aquametro Customer Service.
	• Card wrongly formatted	Reformat the card acc. to sect. *2.6.*
	• Incorrect parameters	Check the card acc. to sect: *2.6*
	• CF card defective	Use a new CF card

Status message "unlocked"	• AMBUS®IS not locked	No error: AMBUS® IS was not locked when using the parameter setting software at start-up.
Modem does not function	• Modem incorrectly installed	Check the installation of the modem.
	• Incorrect jumper position on pc board	Check the rider position acc. to sect. *2.5*
	• RJ-45 cable incorrect	Check the cable and the power outlet.
Analog modem does not function	• MSN No. was erroneously entered	Do not enter a MSN No. with analog modem!
ISDN modem does not function	• MSN No. incorrect	Check the MSN No. acc. to sect. *2.5* .
GSM modem does not function	• Poor reception	Change the position of the adhesive antenna.
	• Incorrect SIM card	Check Natel subscription acc. to sect. *2.5.*
	• PIN not deactivated	Deactivate PIN with Natel.
Ethernet connection does not function	• Incorrect cable	There are1:1 and crossed cable available!
	• IP address / Subnet mask is wrongly or else not initialized	Check the network settings or ask your network supervisor. See sect.: *2.4*

Table 6: Troubleshooting

2 Appendix

Meter protocol

Meter protocol				
Date of protocol:	30.09.2004 08:46			
Installation:	Aquametro AG, 4106 Therwil			
Type:	CALEC ST			
Manufacturer:	AMT			
Designation:	Staircase 1			
Comment:	Aquametro AG, 4106 Therwil			
Primary address:	2	Nbr operating hours:	3942	h
Secondary address:	4313074	Nbr hours on alarm:	1	h
Medium:	Heat	Status:	ok	
Installation side flow meter:	cold Side			
Channel 1				
Read out:	30.09.2004 08:42			
Meter 1:	854033	kWh		
Meter 2:	15288.9	m3		
Meter 3:				
Meter 4:				
Power:	0	kW		
Flow:	0	m3/h		
Temperature hot side:	129.8	°C		
Temperature cold side:	76.8	°C		
Temperature difference:	52.99	K		
Channel 2				
Read out:	30.09.2004 08:42			
Meter 1:	0	HCA		
Meter 2:				
Meter 3:				
Meter 4:				
Power:				
Flow:				
Temperature hot side:				
Temperature cold side:				
Temperature difference:				
Channel 3				
Read out:	30.09.2004 08:42			
Meter 1:	0	HCA		
Meter 2:				
Meter 3:				
Meter 4:				
Power:				
Flow:				
Temperature hot side:				
Temperature cold side:				
Temperature difference:				
made out with AMBUS Net, Aquametro AG, Therwil				

Table 7: Example of meter protocol

Usage unit protocol

Usage unit protocol

Date of protocol: 30.09.2004 08:58
Installation: Aquametro AG, 4106 Therwil

Usage unit:	Primary address:	Serial Nr:	Designation:	Meter:	Channel	Medium:	Comment:	Status:	Read out:	Meter reading:		Power:	
Appt 1st floor	2	4313074	Distributor 1	1	1	Heating	H-106	ok	30.09.2004 08:48	854033	kWh	0	kW
Appt 1st floor	7	22222222	Distributor 2	2	1	Hot water	W-170	ok	30.09.2004 08:48	1.014	m3	0	kW
Appt 1st floor	7	22222222	Distributor 2	4	1	Cold water	W-170	ok	30.09.2004 08:48	-4.432	m3	0	kW

Made out with AMBUS Net, Aquametro AG, Therwil

Flow:		Temp. hot side:		Temp. cold side:		Temp. difference:		Nbr operating hours:		Nbr hours on alarm:		Type:	Manufacturer:
0	m3/h	129.8	°C	76.8	°C	52.99	K	3942	h	1	h	CALEC ST	AMT
0	m3/h	30.9	°C	3.7	°C	27.23	K	5532	h	81	h	CALEC ST BDE	AMT
0	m3/h	30.9	°C	3.7	°C	27.23	K	5532	h	81	h	CALEC ST BDE	AMT

Table 8: Example of Usage unit protocol

Installation protocol

Installation protocol

Date protocol: 30.09.2004 08:48
Installation: Aquametro AG, 4106 Therwil

Prim. address:	Serial Nr:	Chan.	Designation:	Comment:	Medium:	Status:	Read out:	Meter reading 1:		Meter reading 2:		Meter reading 3:	
2	4313074	1	Device 1	Second. circuit	Heat	ok	30.09.2004 08:48	854033	kWh	15288.9	m3		
2	4313074	2	Device 1	Second. circuit	Heat	ok	30.09.2004 08:48	0	HCA				
2	4313074	3	Device 1	Second. circuit	Heat	ok	30.09.2004 08:48	0	HCA				
7	22222222	1	Device 2	Main circuit	Heat	ok	30.09.2004 08:48	0.142	kWh	1.014	m3	-13.001	kWh
7	22222222	2	Device 2	Main circuit	Heat	ok	30.09.2004 08:48	0.204	kWh				
7	22222222	3	Device 2	Main circuit	Heat	ok	30.09.2004 08:48	54321	HCA				

Made out with AMBUS Net, Aquametro AG, Therwil

Meter reading 4:		Power:		Flow:		Temp. hot side:		Temp. cold side:		Temp. difference:		Nbr operating hours:		Nbr hours on alarm		Type:	Manufacturer
		0	kW	0	m3/h	129.8	°C	76.8	°C	52.99	K	3942	h	1	h	CALEC ST	AMT
												3942	h	1	h	CALEC ST	AMT
												3942	h	1	h	CALEC ST	AMT
-4.432	m3	0	kW	0	m3/h	30.9	°C	3.7	°C	27.23	K	5532	h	81	h	CALEC ST BDE	AMT
												5532	h	81	h	CALEC ST BDE	AMT
												5532	h	81	h	CALEC ST BDE	AMT

Table 9: Example Installation protocol

Notes:

Notes:

Notes:

Art.-No. 20292

Aquametro AG	Aquametro SA	Aquametro Messtechnik GmbH	Aquametro BELGIUM SPRL	Aquametro s.r.o.
Ringstrasse 75	Rue du Jura 10	Zum Panrepel 24	Dallaan, 67	Prosecká 811 / 76a
CH-4106 Therwil	CH-1800 Vevey	D-28307 Bremen	B-1933 Sterrebeek	CZ-190 00 Praha
Phone 061 725 11 22	Phone 021 923 51 30	Phone 0421 / 871 64-0	Phone 02 / 241 62 01	Phone 02 / 86 88 77 78
Fax 061 725 15 95	Fax 021 922 58 44	Fax 0421 / 871 64-19	Fax 02 / 216 22 63	Fax 02 / 86 88 95 59
info@aquametro.com	info@aquametro.com	info.amd@aquametro.com	info.amb@aquametro.com	info.amc@aquametro.com