Landis+Gyr

manage energy better

.MAP110

User Manual

Revision history

Version	Date	Comments
a	28.02.2005	First edition
b	31.05.2005	Changes to release 1.1
c	22.09.2005	Changes to release 1.2
d	05.12.2006	Changes to release 2.2
e	14.12.2006	Field strength indication for GSM installation support changed
f	14.01.2010	Changes to release 3.3 New document number D000011475 replaces H 71 0200 0332 (version index continued)
g	29.01.2009	Changes to release 3.4
h	06.03.2010	Sections 1 "Overview" and 2 "Installation" updated. All communication surveys new with photos. All communication screenshots adapted to changed software. Designation "meter" generally replaced with "device". Section 5.8 "Command Tree" expanded with user command tree. Section 7.2.5 "Generating Export Files for MAP100" new. Section 7.3.2 "Firmware Update AD-xP/xG" new. Section 7.5.6 "Setting MAP100 File Export" new. Section 7.5.7 "Checking for Updates" new. Section 10 "Short Description of Device Security System" updated Several minor changes (text, layout, screenshots, index).
k	20.12.2010	Changes to .MAP110 release 4.0
m	12.01.2011	Adaptation to tool changes: progress bar no longer in status bar, command tree command name changes, several minor changes (text, layout, screenshots).
n	30.05.2011	Changes to .MAP110 release 4.1
p	02.11.2011	Changes to .MAP110 release 4.2
q	02.03.2012	Changes to .MAP110 release 4.3
r	21.05.2012	Changes to .MAP110 release 4.4; New Licensing.
s	12.10.2012	Changes to .MAP110 release 4.5; New command tree structure with generic and device specific commands; Time base selection for profile readout for devices supporting this feature.
t	22.11.2013	Changes to .MAP110 release 4.8; Support for Windows 8, command used is shown in result window, check for update can be called up from "About" window. Several minor changes (text, figures, screenshots, index).
u	31.01.2014	Windows XP screenshots replaced by Windows 7 screenshots. Section 6.4.4 "Network connection via the Internet" and section 7.4.5 "Load profile analysis" removed.
v	04.12.2014	Changes to .MAP110 release 5.0 (see also read-me file); Communication with message security and additional access mechanisms (authentication), individual passwords and keys per device, enhanced storage policy for keys and passwords, enhanced character set for passwords.
w	26.10.2015	Changes to .MAP110 release 5.3 (see also read-me file); Operating System Windows 10 supported, "Uninstall" removed from start menu, block transfer for write, set and action services can be enabled/disabled in the dlms application layer settings, firmware update E450, E570 and E35C 4.x changed, command tables in section 12 updated, several minor changes (text, screenshots, index).

Version	Date	Comments
x	07.09.2016	Changes to .MAP110 release 5.5 (see also read-me file); New version of communication settings, TCP and UDP supported in network layer, Update to Microsoft .NET framework 4.6. About box extended with license information, firmware update also for E460.
y	31.05.2017	Changes to .MAP110 release 5.6 (see also read-me file); New section 2.3 for required setting when operating .MAP110 on high resolution displays, new version of communication settings, extended access levels, new level authentification using SHA-256, several minor changes (text, screenshots), table "functional range per user group" updated.
z	18.07.2019	Changes to .MAP110 release 6.1 (see also read-me file); adaptation to changed communication user interfaces. Section 12 "Functional range per user group" removed.
z1	13.01.2020	Changes to .MAP110 release 6.2 (see also read-me file); adaptation to changed communication user interfaces. New screenshots with Windows 10 operating system.

Introduction

Scope   The present user manual is designed for the Landis+Gyr .MAP110 Service Tool
                     Version 6.2 and higher.

Purpose   This user manual contains all information required for the use of the Landis+Gyr
                     .MAP110 Service Tool. It not only provides explanations concerning functionality
                     and general procedures, but also gives detailed, illustrated instructions on how to
                     use the software.

Target group   The contents of this user manual are intended for technically qualified personnel
                     of energy supply companies responsible for service tasks (installation, readout
                     and maintenance) for Landis+Gyr devices.

Conditions   The Landis+Gyr .MAP110 Service Tool runs on PCs with Windows operating sys-
                     tem. To understand this user manual, you need basic knowledge of Windows and
                     its terms, as well as a general idea of how to operate a PC. Furthermore, you need
                     to be familiar with the functional principles of the various devices supported by
                     the Landis+Gyr .MAP110 Service Tool, which are described in the corresponding
                     user manuals and functional specifications.

Conventions   The following conventions are used in this manual:

                     1. 2. 3.   Ordinal numbers are used for individual steps in the instructions.

                     Extra   Buttons, menu names and individual menu items appear in bold
                                     text.

                     [F1]   Keys are shown in square brackets.

                     [Ctrl]+[V]   Key combinations are shown with a plus sign (e.g. [Ctrl] key kept
                                     pressed while pressing [V] key)

                     "Options"   Names of windows and elements appear in quotation marks.

Table of contents

1   Overview

The Landis+Gyr .MAP110 Service Tool supports services needed to install Landis+Gyr devices (meters, communication modules and communication units), to read billing and diagnostic values and to perform maintenance operations.

The following diagram illustrates the various fields of application of the Landis+Gyr .MAP Tools.
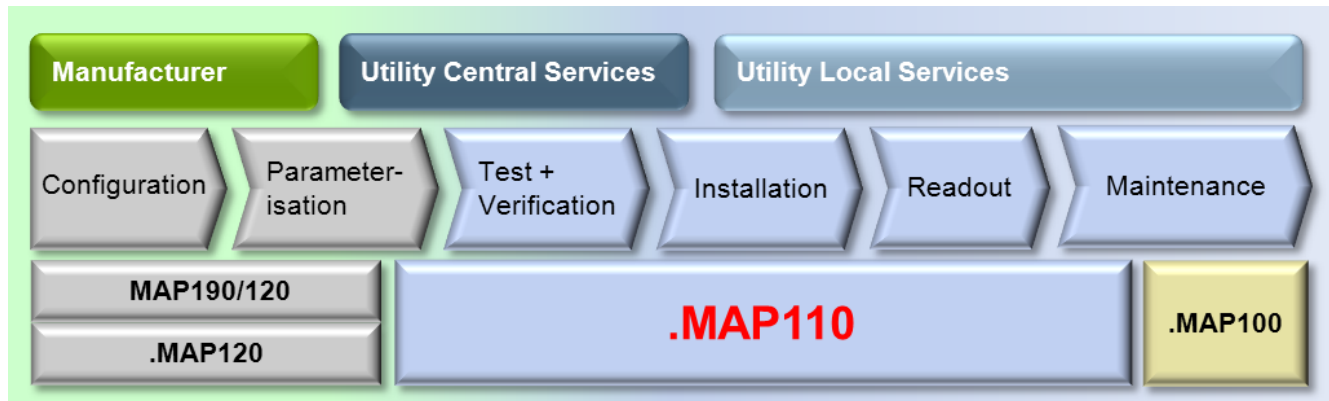
1.1   Functions

The Landis+Gyr .MAP110 Service Tool supports the following range of functions:

- **Installation:**
  setting of clock and ID numbers, reset of registers and profiles, communication test functions, vector diagram, primary data adaptation

- **Reading of data:**
  billing values, diagnostic values, profiles, export data

- **Maintenance:**
  readout and modification of time of use, of all communication parameters or of selected parameters (e.g. various thresholds), visualization of the security system, firmware update

1.2   Communication channels

The Landis+Gyr .MAP110 Service Tool can communicate with the devices via the following communication channels:

- **Serial:** Optical reading head, Bluetooth reading head, RS232, RS485, CS, M-Bus

- **Modem:** PSTN, GSM

- **Network:** GPRS, Ethernet

1.3 Communication protocols

The Landis+Gyr .MAP110 Service Tool supports the following communication protocols:

- dlms / HDLC

- dlms / TCP (wrapper) with IPv4 and IPv6

- dlms / UDP (wrapper) with IPv4 and IPv6

- IEC 62056-21 (formerly known as IEC 1107)

1.4 dlms security

The Landis+Gyr .MAP110 Service Tool supports the following dlms security features:

- dlms access security (low level and high level security)

- dlms message security (security suite 0)

1.5 Editions

To ensure the maximum possible flexibility for users of the Landis+Gyr .MAP110 Service Tool, the software can be licensed for various user groups with different functionality:

- Standard (full functionality, currently the same as Certification)

- Certification (certification authority)

- Engineering (laboratory use)

- Installation (field use)

- Reader (local and remote)

- Field Inspection (installation check)

- Consumer (final customer)

The edition is determined by the licence data (see section 3 "Licensing").

1.6 Supported devices

Please refer to the read-me file (see section 8.11 "Displaying release notes") for a list of supported devices.

2   Installation and uninstallation

This section describes the installation of the Landis+Gyr .MAP110 Service Tool on the hard disk of your PC and its uninstallation if it is no longer used.

2.1   Installation

System requirements   To be able to run the Landis+Gyr .MAP110 Service Tool, your PC must be equipped with the operating system Windows 10, Windows 8, Windows 7 or Windows Vista.

For 64 bit operating systems dedicated hardware drivers (e.g. for the optical head or other communication equipment) might be needed. Please contact the vendor of your devices to obtain a driver update, if necessary.

Additionally, the following system components, which are not part of the Landis+Gyr .MAP110 Service Tool, must be installed on your PC:

- .NET Framework Version 4.6.1 or later

- MS Excel 2003 or later (for enhanced diagnostic functions)

Administrator privileges   Administrator privileges on your computer are required for the installation and the licensing.

Installation software   The installation software for the Landis+Gyr .MAP110 Service Tool can be downloaded to your PC via the Internet from the Landis+Gyr homepage www.landisgyr.eu. Please contact your sales representative to receive the required username and password for the download.

Language   The required language must be selected at installation time. It can be changed again at any time in the Landis+Gyr .MAP110 Service Tool.

Preparation   Please read the file "dMAP110_ReadMe.txt" with current information about the present release of the Landis+Gyr .MAP110 Service Tool.

First installation   Start the installation file "Setup.exe" and then follow the instructions of the setup wizard.

Upgrades   Close the Landis+Gyr .MAP110 Service Tool, if it is in use. Then start the installation file "Setup.exe" and follow the instructions of the setup wizard.

When **upgrading a former release 6.2** to the latest release 6.2, the former release will be automatically replaced by the newer one. All data including the license and the communication settings is kept.

When **upgrading a former release 4.x, 5.x, 6.0 or 6.1** to the latest release 6.2, the new release can be installed in parallel to a former release in a separate directory. All data including the license and the communication settings is kept.

Former releases 1.x, 2.x and 3.x can't be upgraded.

Landis+Gyr recommends to remove older releases since they will no longer be supported.

2.2   Uninstallation

If the Landis+Gyr .MAP110 Service Tool is no longer needed, it should be uninstalled.

To do so, open the Windows Control Panel and use "Uninstall a program" from the "Programs" category.

2.3   Required setting when operating .MAP110 on high resolution displays

On computers with high resolution displays (e.g. UHD with 3840 x 2160 pixels) or in general when using a Windows display scale factor of more than 150% a special setting is required to operate the Landis+Gyr .MAP110 Service Tool. Without this setting the tool will appear very small with a scale factor of 100% and can hardly be used.

The Landis+Gyr .MAP110 Service Tool must be started using a link in which the "Disable fullscreen optimizations" checkbox is ticked in the "Compatibility" tab:
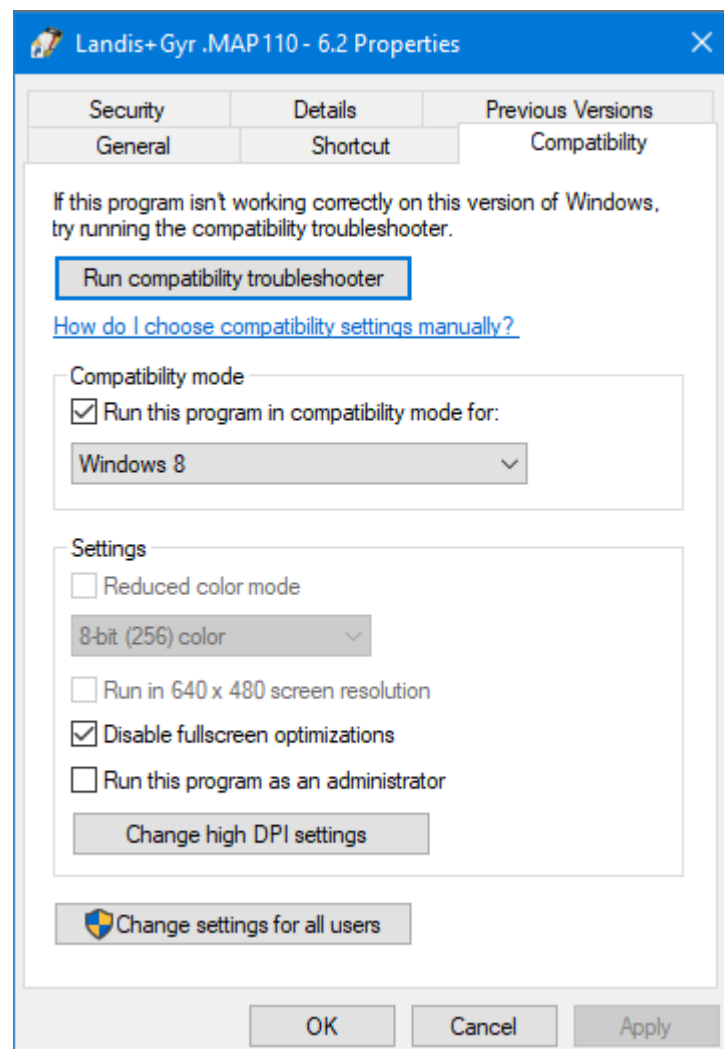
Furthermore the "Override high DPI scaling behaviour." checkbox in the additional window which appears after clicking the button Change high DPI settings must be ticked:
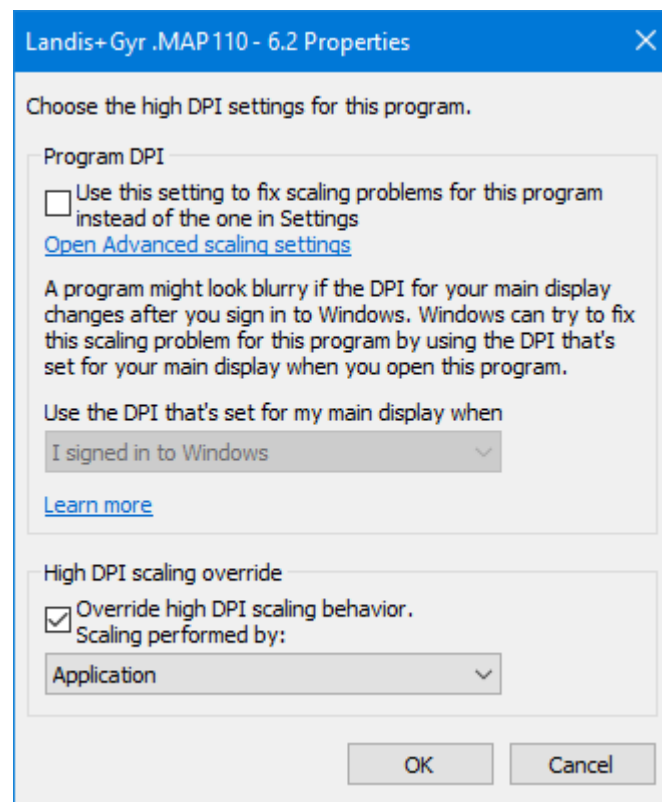
Nevertheless a few icons in the application tool bar still will be shown minimized. But this doesn't affect the usability of the Landis+Gyr .MAP110 Service Tool.

It is planned to modify the program so that it will work properly in the future without this setting.

3   Licensing

This section explains the licensing concept and describes the steps necessary for licensing the Landis+Gyr .MAP110 Service Tool.

3.1   Licensing concept

After installation, the Landis+Gyr .MAP110 Service Tool is in the unlicensed state, i.e. it can only be used as demo version with reduced range of functions. In order to permit the use of the Landis+Gyr .MAP110 Service Tool without restrictions, it must be licensed for the intended use (available editions see section 1.5 "Editions"). For this purpose, the following licensing data can be obtained from the Landis+Gyr representative responsible, which must be entered in the Landis+Gyr .MAP110 Service Tool:

- User Name
- User Group
- License Key

The procedure is described in section 3.2 "Entering license data".

The license of the Landis+Gyr .MAP110 Service Tool release 4.4 or later is handled individually per Windows user and per .MAP110 main release on a single PC. If several persons share the same PC, the required .MAP110 user group with its specific functionality can therefore be individually assigned to each Windows user (with former releases the same license was used for all Windows users of a single PC and all .MAP110 releases).

When upgrading a former .MAP110 release 4.0, 4.1, 4.2 or 4.3 to release 4.4 or later the current license is kept, i.e. it is copied once for each Windows user of the PC from the former release.

From release 4.4 any license change or a new license only affects the current Windows user and the current .MAP110 main release.

The license conditions remain unchanged, i.e. all existing and new licenses can be further used by one or several Windows users on one or several PCs. Please note, that normally the user name in the .MAP110 licence and the Windows user name are different.

3.2   Entering license data

This section describes the licensing procedure required for unrestricted use of the Landis+Gyr .MAP110 Service Tool. The license data received from Landis+Gyr following your order is required for this purpose.

ⓘ   **Administrator privileges required**
Administrator privileges on your computer are required for the licensing.


Procedure:

1.   Click on **Start** and then under **All programs** select the **Landis+Gyr** program group.

2.   Right click on the **Landis+Gyr .MAP110 - 6.2** command and then select the entry "Run as administrator" in the popup menu appearing.
The Landis+Gyr .MAP110 Service Tool is started.

3.   Select **License** from the **Tools** menu.
The "License" window appears.

4.   Enter the user name provided by Landis+Gyr in the "User Name" entry box.

5.   Select the user group provided by Landis+Gyr in the "User Group" drop down list.

6.   Enter the licence key provided by Landis+Gyr in the "License Key" entry box.

7.   Click on **OK**.
The licence data is checked and a success message is displayed.

8.   Click on **OK**.
The licensing procedure is terminated. The accessible commands or device

---

types, respectively, can be selected in the drop down list above the command tree and the available commands are displayed in the command tree.
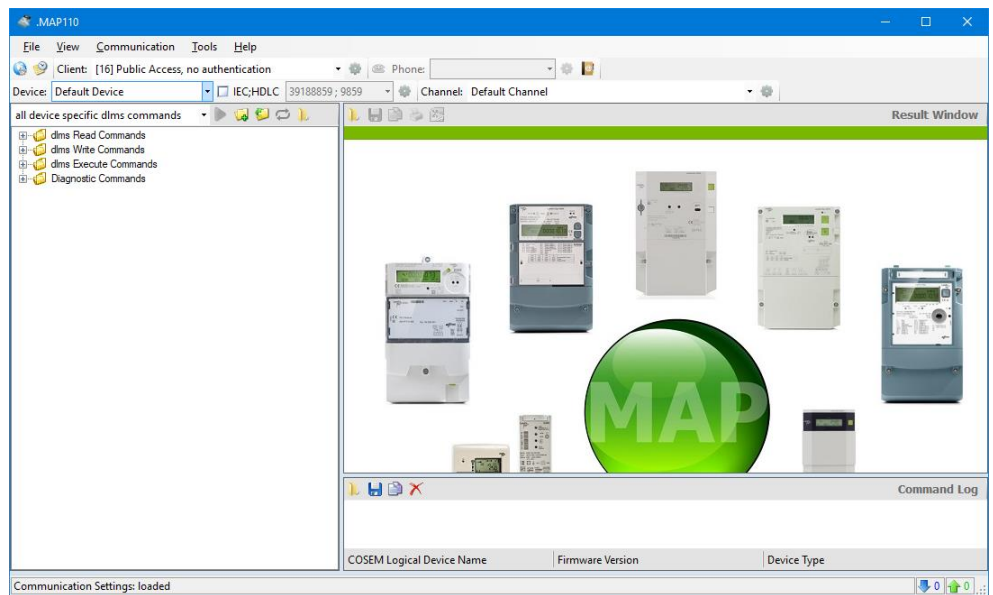
The Landis+Gyr .MAP110 Service Tool is now ready for use according to the instructions given in sections 4 "First steps" or 7 "Commands", respectively.


ⓘ   **Keep the license key in a safe place**
Please note that due to security reasons the license key is not shown anymore if the "License" window is reopened. Keep the license key in a safe place for further use.

3.3   Changing the license

The license can be changed by requesting new license data from Landis+Gyr and entering this in the "License" window (see section 3.2 "Entering license data").

4   First steps

This section gives an introductory example of how a communication connection is made to a device with the Landis+Gyr .MAP110 Service Tool and how data can be read from the device.
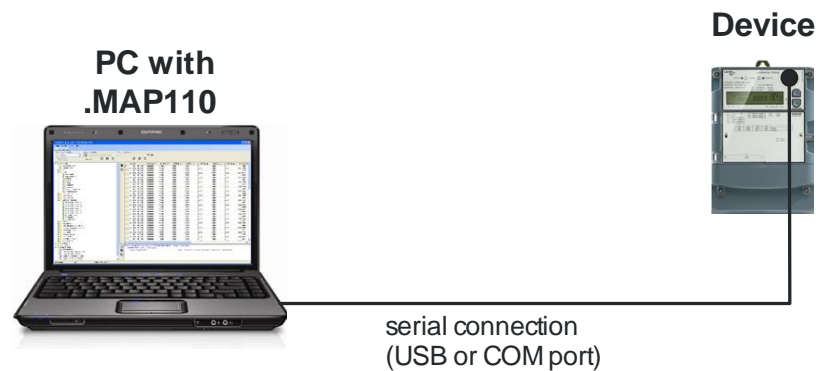
A device ready for operation and an optical reading head for connection to a serial interface (USB or COM port) are required for this purpose. The Landis+Gyr .MAP110 Service Tool must also be installed on the PC and licensed, e.g. for user group "Installation".

Procedure:

1.   Connect the optical reading head to the PC and install the required drivers.

2.   Click on **Start** and then under **All programs** in the **Landis+Gyr** program group select the **Landis+Gyr .MAP110 - 6.2** command.
      The Landis+Gyr .MAP110 Service Tool is started.

3.   Click on [⚙] in the communication channel toolbar (see red arrow in above figure).
   The "Communication Channel" window appears.

4. In the "Interface type" drop down list select the "Serial (optical head or 3-wire)", "Bluetooth optical head (PMR_1)" or "Bluetooth optical head (PMR_1A)" type depending on the optical reading head used.

5. In the "Physical interface" drop down list select the serial interface to which the optical reading head is connected.

6. According to the features of the used meter, in the "Template for lower layer settings" drop down list select the template "Serial - dlms" (e.g. for E450, E570, E850) or "Serial - IEC" (e.g. for E230, E350, E550, E650) and then click on "Apply".

7. Click on "OK".
    The communication settings will be saved and the "Communication Channel" window will be closed.

8. In the drop down list above the command tree select either the entry "all dlms commands" or the device series connected.

9. Open the "dlms Read Commands" folder in the command tree.
    For this purpose click the ⊞ icon before the "dlms Read Commands" folder or double-click on the folder icon 📁.
   The available commands for the selected device type are displayed:
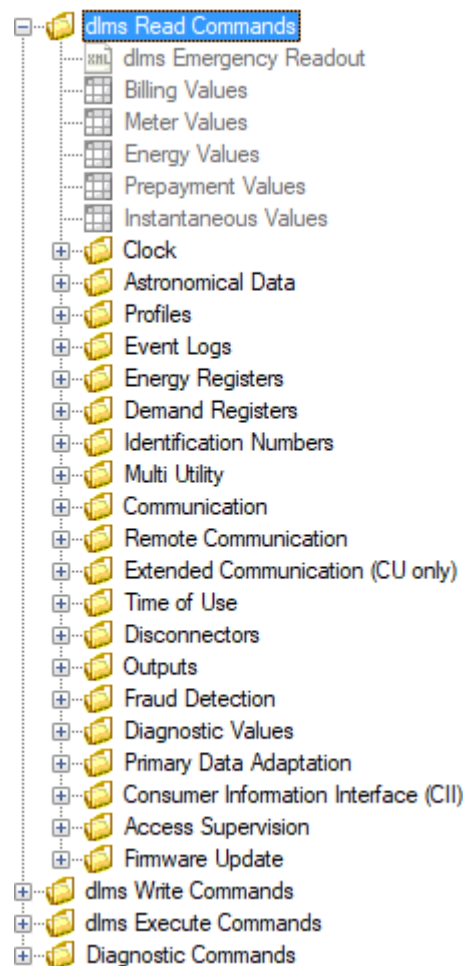
10. Mark the "Billing Values" command in the command tree under "dlms Read Commands" by clicking it.

11. Click on the button above the command tree to execute the "Billing Values" command.

    Communication begins after selecting the command and the device data are read from the device connected. During this process, which can take several minutes depending on the number of items to be read, the "Command" window is displayed.
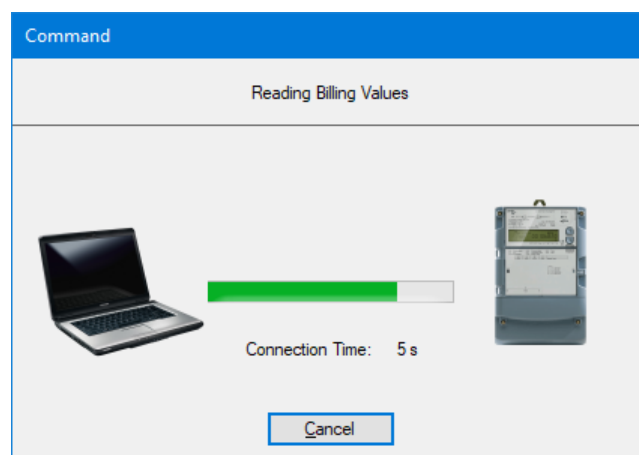
    After completing the readout the device data is displayed in the display area of the Landis+Gyr .MAP110 Service Tool.
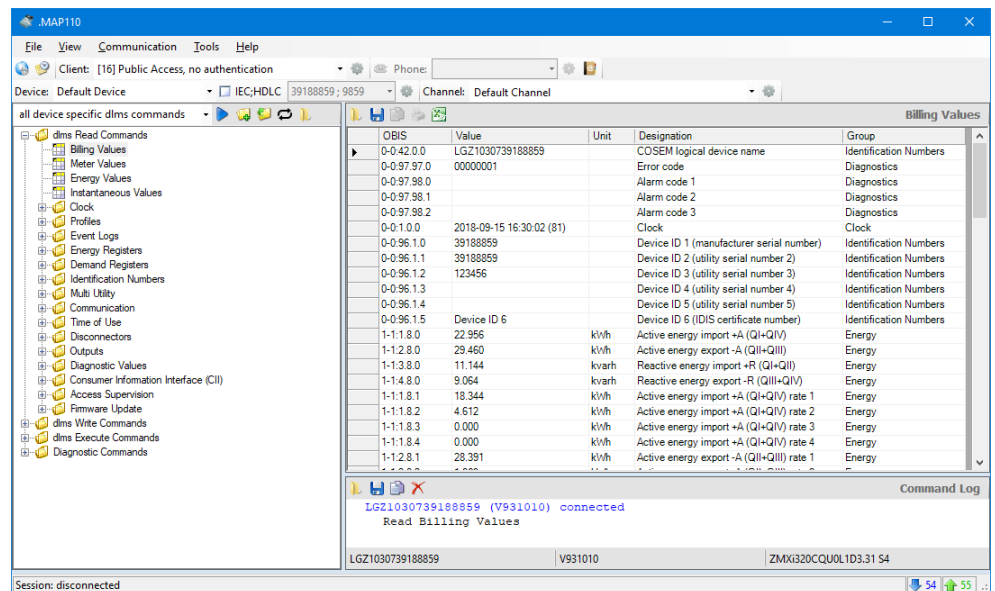
12. Examine the data read out in the table in the display area.

By clicking the data read out can be saved in an XML or text file.

By clicking the data read out can be transferred to the Microsoft Excel table calculation program.

This concludes the introductory example. Further instructions with more detailed explanations are provided in the following sections.

# 5	Description of user interface

This section describes the user interface of the Landis+Gyr .MAP110 Service Tool.

## 5.1	Overview

The user interface of the Landis+Gyr .MAP110 Service Tool comprises the following areas:

- Menu bar (1) with the "File", "View", "Communication", "Tools" and "Help" menus to select functions.

- Toolbars (2):
	- Application toolbar
	- Client toolbar
	- Address toolbar (either phone number or IP address is visible)
	- Device toolbar
	- Communication channel toolbar

- Command tree (3)

- Result window (4)

- Command log (5) for recording events, results, error messages, etc.

- Communication log (6) for recording and analysing communication activities

- Status bar (7) for displaying characteristic data of the device connected.
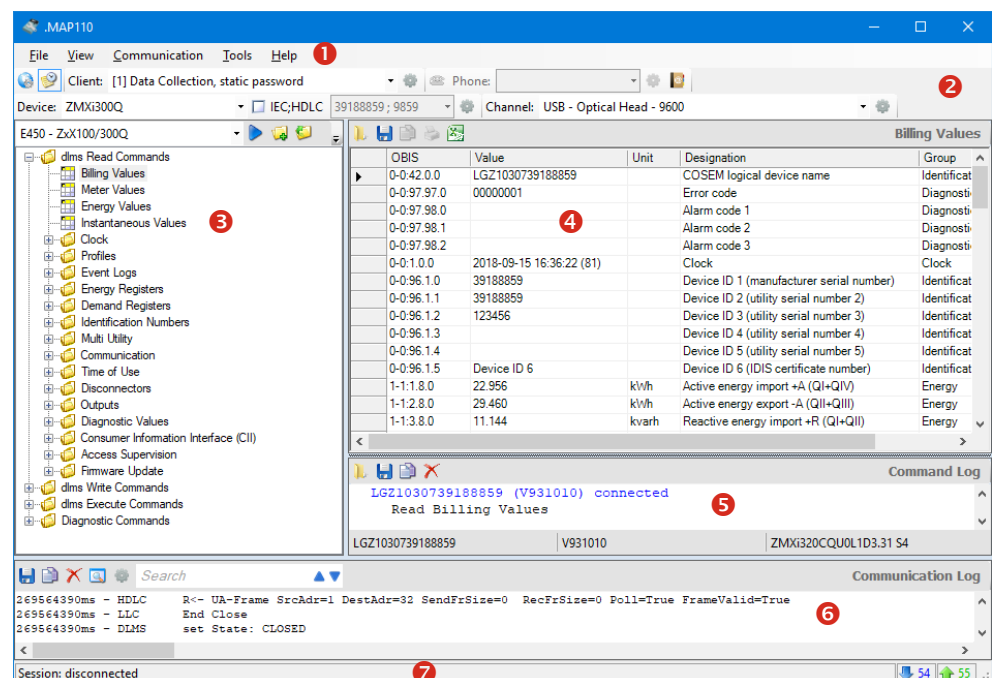
The sizes of the areas for the command tree, result window and command log window can be set individually with the movable separator situated in between (click separator and move with mouse button pressed).

The items in the selection area can be arranged individually by moving to another position (click dotted line and move with mouse button pressed).

The status bar and the communication log can be faded in or out using the menu points of the "View" menu.

5.2   Menu bar

The menu bar of the Landis+Gyr .MAP110 Service Tool contains the following menus for selecting functions:

- **File** menu for saving result or log window data, for opening data saved in the result or log windows and for ending the application.

- **View** menu to fade in or out the status bar and the communication log.

- **Communication** menu to connect and disconnect devices and to make communication settings.

- **Tools** menu to select functions for licensing, startup language setting and option setting.

- **Help** menu to select online help, release notes and release display and to check for available updates.

5.3   Toolbars

5.3.1   Application toolbar

The application toolbar contains the following buttons for direct selection of functions frequently required:
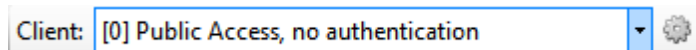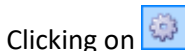
opens the communication settings window

fades the command log window in or out

5.3.2   Client toolbar

The client toolbar allows selection of the required access level. Only fully defined access levels are displayed, a level can occur more than once with different settings.

Clicking on ⚙ in the client toolbar displays the access level settings (see section 6.2.3.3 "Access levels").
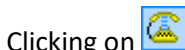
5.3.3   Address toolbar

The phone number or IP address drop down lists displayed depending on the communication settings allow selection of the corresponding entry in the address book.
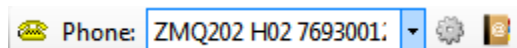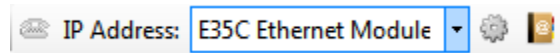
The phone number of the required modem can be selected in the "Phone" drop down list if a modem is selected as communication channel.
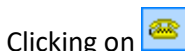
Clicking on ☎ in the address toolbar makes the connection to the selected phone number. When the connection is made, the drop down list is blocked and the icon on the button changes its appearance.

Clicking on ☎ in the address toolbar interrupts the modem connection.

The IP address and port number of the required device can be selected in the "IP Address" drop down list, provided a network card is selected as interface in the communication profile settings. The phone icon is deactivated.

Clicking on [icon] in the address toolbar displays the selected address definition in the "Address Book" window, where it can be modified.

Clicking on [icon] in the address toolbar displays the address book (see section 6.2.4 "Address data").

5.3.4 Device toolbar

The device toolbar allows the selection of devices with predefined settings (device series and device addresses).

With the checkbox "IEC;HDLC" you can deactivate and again activate the device address and in the drop down list you can select all defined device addresses.

Clicking on [icon] in the device toolbar displays the device settings (see section 6.2.3 "Device data").

5.3.5 Communication channel toolbar
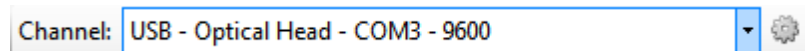
The communication channel toolbar allows the selection of communication channels with predefined settings (e.g. interface, transmission protocols etc.).

Clicking on [icon] in the communication channel toolbar displays the channel settings (see section 6.2.2 "Communication channel data").

5.4   Command tree

All available commands for the licensed user group are displayed in a tree view corresponding to the device selected in the drop down list on the top left side of the window. Instead of a specific device, selection of all IEC commands or of all dlms commands is also possible.
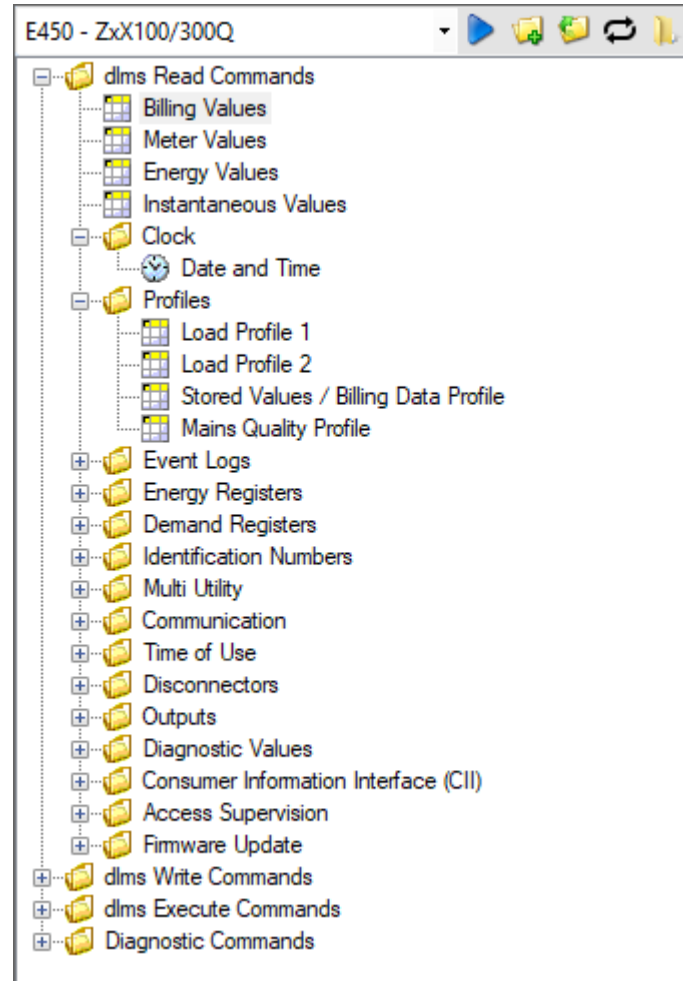
Instead of a specific device type it is also possible to choose one of the following command groups in the command tree:

- all generic dlms commands

- all device specific dlms commands

- all generic IEC commands

- all device specific IEC commands

Generic commands work with all devices, with new, not yet supported Landis+Gyr devices as well as with devices of other manufacturers. There are only few generic dlms commands available but many generic IEC commands.

Device specific commands only work with Landis+Gyr devices supporting the corresponding command. All commands not available for the connected device are marked in colour in the command tree (see paragraph "Display of disabled commands in the command tree".

When selecting a device in the device toolbar the command tree is automatically switched to the corresponding device type.

Toolbar   The toolbar of the command tree contains the following buttons:

▶	Executes the selected command of the tree
	Expands all folders of the tree
	Collapses all folders of the tree
↻	Continuously executes the selected command
	Loads data from file into the evaluation window

Drop down list   In the drop down list of the command tree it is possible to choose command sets
                           for all supported Landis+Gyr devices and also the generic and device specific com-
                           mand groups described above:

```
E450 - ZxX100/300Q                    ▾

all generic dlms commands
all device specific dlms commands
all generic IEC commands
all device specific IEC commands
E850 - ZxQ200
E650/S650 - ZxD300/400
E570 - ZxY400G
E570 - ZxY400P
E570 - ZxY400Q
E550 - ZxG300/400
E460 - MxA100/300
E450 - ZMX300G
E450 - ZxX100/300P
E450 - ZxX100/300Q
E350 - ZxF100
E230 - ZxR100xC
E230 - ZxR100xR
E65C - CU A/B/M/G/D/E/P/U/Lx
E35C - AD-xP/xG
E35C - AD-xU
E35C - AD-xE
ZxD100AR
ZxD100AP
L540 - QOA41
```
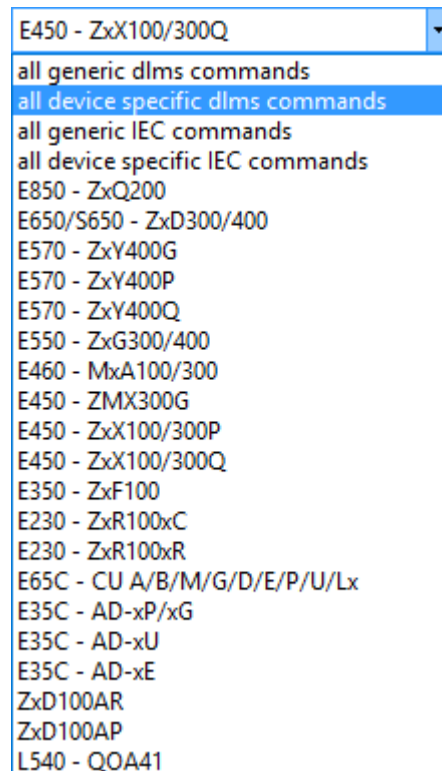
Tree view   A tree view, e.g. as generally familiar from the file system tree of Windows
                          Explorer, is ideally suited for navigating in ordered structures with folders and
                          subfolders.

Tree items   For the Landis+Gyr .MAP110 Service Tool the command tree consists of a hierar-
                          chic arrangement of tree items (folders and commands).

                          Tree items are shown as follows:

📁	Folders
▦	Read commands for values (device values, profiles, etc.)
🕙	Read or write commands for date and time
↥	Read commands for parameters (e.g. read identification number)
↧	Write commands for parameters (e.g. write identification number)
↓	Execute commands (e.g. reset register)

Excel evaluation (e.g. load profile analysis)

GSM installation support

Vector diagram

DIP table

Emergency readout

Folder handling

Each folder can be expanded and collapsed individually.

Collapsed folder items are preceded by an expansion sign ⊞, expanded folder items by a collapse sign ⊟.

Use the buttons [icon] or [icon] of the command tree toolbar to expand or collapse all folders. Clicking the right mouse button inside the command tree and then selecting the "Expand all" or "Collapse all" entry in the pop-up menu appearing has the same effect.

To expand or collapse individual folders there are the following possibilities:

Using the mouse:

- Clicking on the expansion sign ⊞ of a folder expands this folder (the expansion sign changes to a collapse sign ⊟).

- Clicking on the collapse sign ⊟ of a folder collapses this folder (the collapse sign changes to an expansion sign ⊞).

- The relevant folder is opened or closed by double-clicking [icon] or the text following.

Using the keyboard:

- Pressing the **[*] key** of the numerical keyboard expands the whole tree below the selected folder (i.e. all subfolders and commands will be visible).

- Pressing the **[+] or [−] key** of the numerical keyboard toggles between the expanded and collapsed tree view.

Command execution

A command can be executed in various ways:

- double-clicking on the command or

- marking the command by clicking and then clicking on the [icon] button of the command tree toolbar or

- clicking the right mouse button on the command and then selecting the "Execute selected command" entry in the pop-up menu appearing.

Continuous Command execution

To continuously execute a marked command, click on [icon].

Loading tree from file

To load data from a file into the evaluation window, click on [icon] and then select the file in the "Open" dialog which appears.

Display of disabled commands in the command tree

All commands not available in the connected device are marked in colour (grey in the example below) in the command tree. The identification colour can be set under **Options** in the **Tools** menu (see section 8.2 "Setting colour for disabled commands").
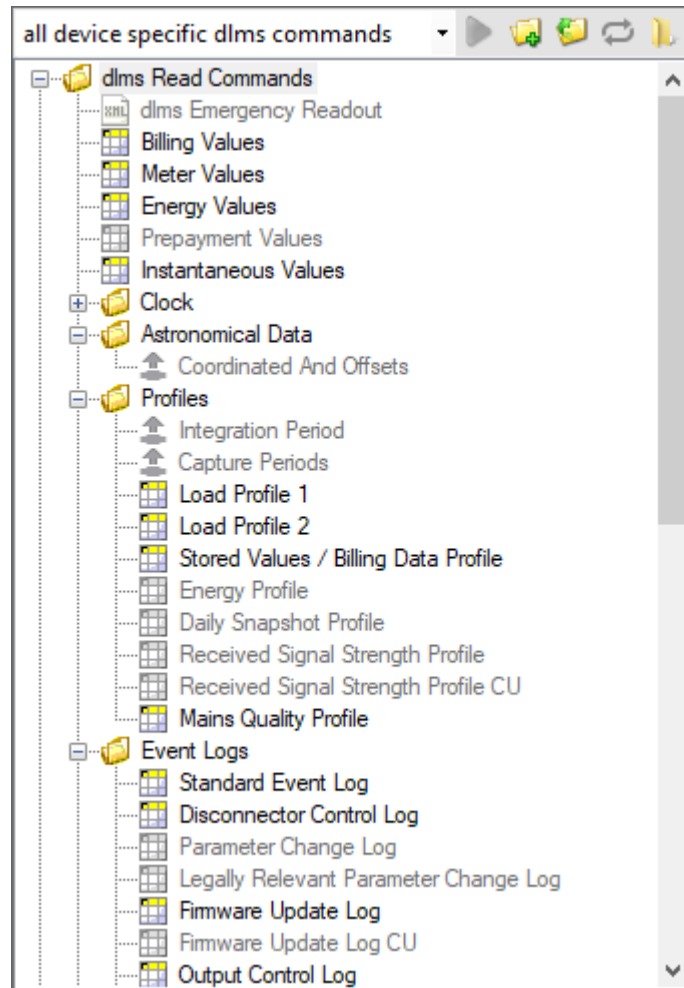
If there is no connection to a device, all commands are shown unavailable. The commands can be selected, however, e.g. read out a value. Once a connection to the meter has been set up, the commands available are then displayed correctly corresponding to the connected device.

5.5 Result window

Readout results (device values, profiles, etc.) are shown in tabular form or as graphic evaluation (e.g. DIP table) in the result window. The following example shows current device values.

The data can either be displayed by readout from a device with the corresponding command or by opening a previously saved file.

The column widths of tables can be changed with the mouse (click edge of column and move while holding down the mouse button).

Clicking on in the result window toolbar opens the "Open Result File" dialogue window to display result files previously saved again in the result window.

Clicking on in the result window toolbar opens the "Save as" dialogue window to save the data displayed in a freely selected directory either as XML file (default) or as text file. Clicking the right mouse button in the result window followed by selection of the **Save as** menu item in the pop-up menu appearing has the same effect.

Clicking on in the result window toolbar exports the data displayed for any desired further processing in the Excel table calculation program. Clicking the right mouse button in the result window followed by selection of the **Open with Excel** menu item in the pop-up menu appearing has the same effect.

Provided no data is yet shown in the result window, e.g. after starting the Landis+Gyr .MAP110 Service Tool, the following background picture can be seen in the result window.

5.6   Command log

In the command log window, all activities are logged.
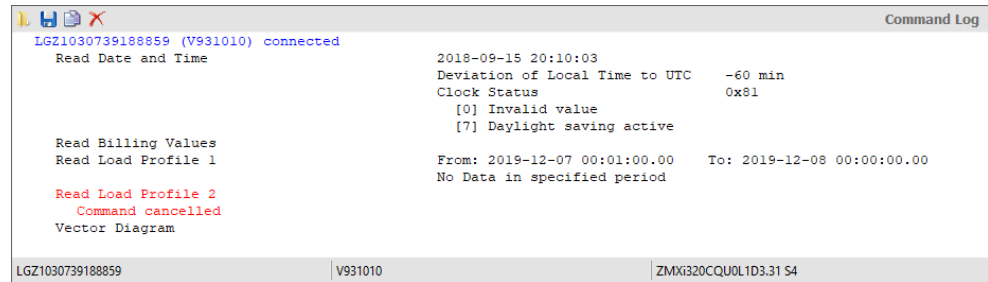
This includes connection messages (blue), command execution messages (black) and error messages (red).

For the command execution messages the result is displayed immediately afterwards if it is not displayed as a table in the result window (e.g. readout of current values) or as evaluation in its own window (e.g. vector diagram).

Clicking on [icon] in the command log toolbar opens the "Open Command Log" dialogue window to display protocols previously saved again in the command log window. Clicking the right mouse button in the command log window followed by selection of the **Open** menu item in the pop-up menu appearing has the same effect.

Clicking on [icon] in the command log toolbar opens the "Save as" dialogue window to save the log displayed in a freely selected directory either as RTF file (default) or as text file. Clicking the right mouse button in the command log window followed by selection of the **Save as** menu item in the pop-up menu appearing has the same effect.

Clicking on [icon] in the command log toolbar copies the content of the command log window to the Windows clipboard, from where it can be inserted into another application (e.g. in a word processing program). Clicking the right mouse button in the command log window followed by selection of the **Copy all** menu item in the pop-up menu appearing has the same effect.

Clicking on [icon] in the command log toolbar deletes the command log. Clicking the right mouse button in the command log window followed by selection of the **Clear** menu item in the pop-up menu appearing has the same effect.

The contents of the command log window can be processed as required, e.g. by inserting comments, deletion of individual points, marking of points and copying these with [Ctrl]+[C] to the Windows clipboard, etc.

By selecting the **Open** entry in the **File** menu protocols previously saved can be displayed again in the command log window.

The following device data is displayed in the status bar of the command log window as soon as a connection is made to the device and at least one command has been executed:

- Logical device name (left)

- Software identification (centre)

- Device configuration (hard and software) (right)

5.7 Communication log

> ⓘ **Additional knowledge required**
> Additional knowledge is required to analyse communication activities.

Clicking on 🕐 in the application toolbar shows or hides the communication log window, where all communication activities can be traced and analysed.

First, the trace level has to be adjusted for each trace type supported as follows:

1. Click on ⚙ in the communication log toolbar.
   The "Communication Tracers" window appears.
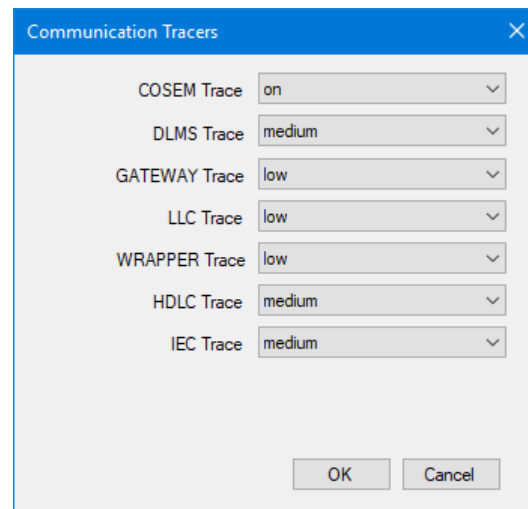
2. Select in the "COSEM Trace" drop down list whether the COSEM Trace shall be on or off.

3. Select in the other drop down lists the resolution of the DLMS, GATEWAY, LCC, WRAPPER, HDLC and IEC tracers (low, medium, high) or switch them off.

4. Click on **OK**.

All communication activities are traced in the communication log according to the settings made.
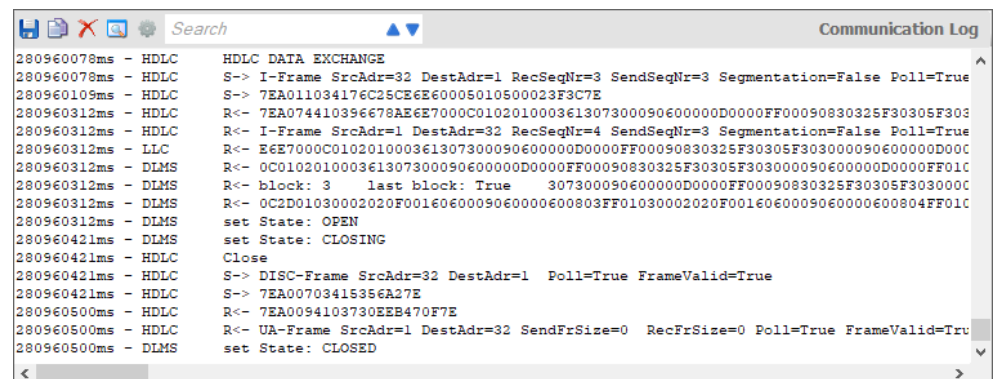
To analyse a specific string, mark it and click on 🔍 in the communication log toolbar. This opens the "Protocol Analyzer" window.
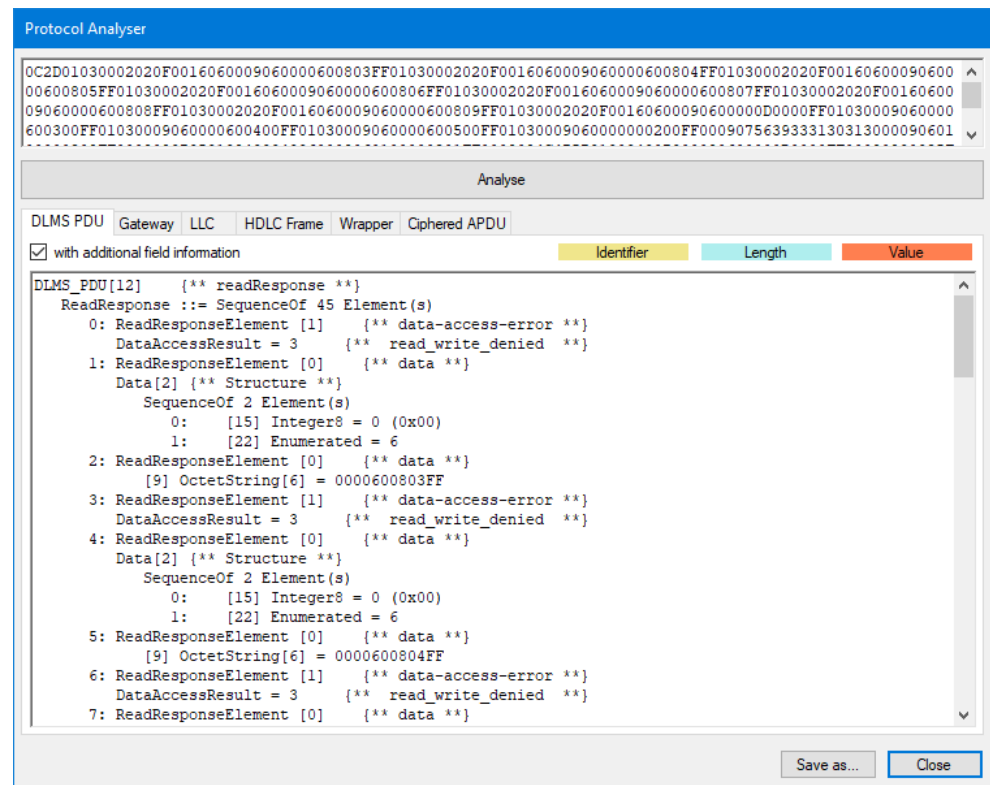
Clicking on ![icon] in the communication log toolbar opens the "Open Communication Log" dialogue window to display logs previously saved again in the communication log window. Clicking the right mouse button in the communication log window followed by selection of the **Open Log File** menu item in the pop-up menu appearing has the same effect.

Clicking on ![icon] in the communication log toolbar opens the "Save as" dialogue window to save the log displayed in a freely selected directory either as RTF file (default) or as text file. Clicking the right mouse button in the communication log window followed by selection of the **Save as** menu item in the pop-up menu appearing has the same effect.

Clicking on ![icon] in the communication log toolbar copies the content of the communication log window to the Windows clipboard, from where it can be inserted into another application (e.g. in a word processing program). Clicking the right mouse button in the command log window followed by selection of the **Copy all** menu item in the pop-up menu appearing has the same effect.

Clicking on ![icon] in the communication log toolbar deletes the communication log. Clicking the right mouse button in the communication log window followed by selection of the **Clear** menu item in the pop-up menu appearing has the same effect

5.8   Status bar
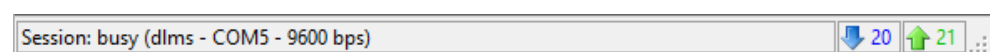
The following data is displayed in the status bar:

- Session information, e.g. busy or disconnected (left)

- Protocol, port and transmission rate (in parentheses)

- Number of objects sent (blue) and received (green)

5.9   Evaluation window

Diagnostic commands such as "GSM Installation Support" or "Vector Diagram" are displayed in separate evaluation windows.
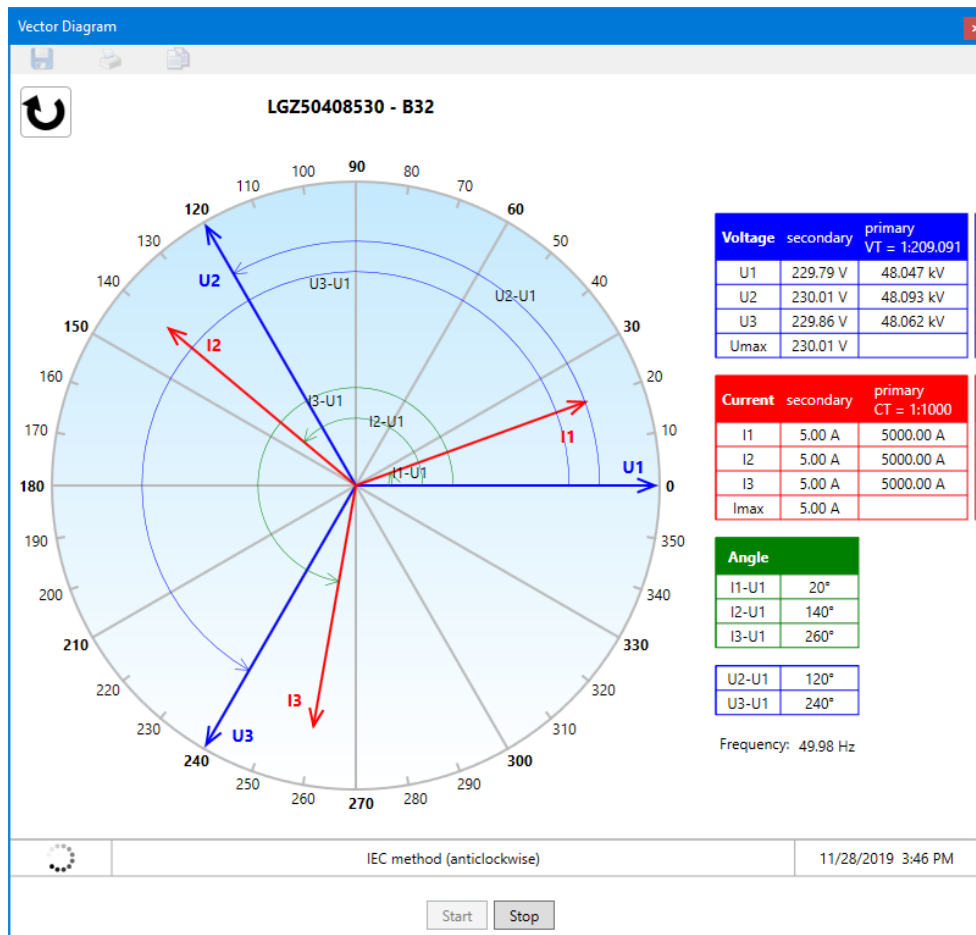
6   Communication with the devices

This section describes all aspects of communication with devices, in particular the communication settings in the Landis+Gyr .MAP110 Service Tool for various applications.

6.1   Basic principle

The communication between the Landis+Gyr .MAP110 Service Tool and a device via a communication channel is strictly client/server based. The client is part of the .MAP110 Service Tool, the server is located in the end device (e.g. the meter).

Communication Channel
- physical layer (interface)
- link layer protocol
- application layer protocol
- address book

Access Level (Client)
- application process ID
- security mechanisms
- user ID
- security material

Device (Server)
- device series
- logical device
- physical device address
- security material
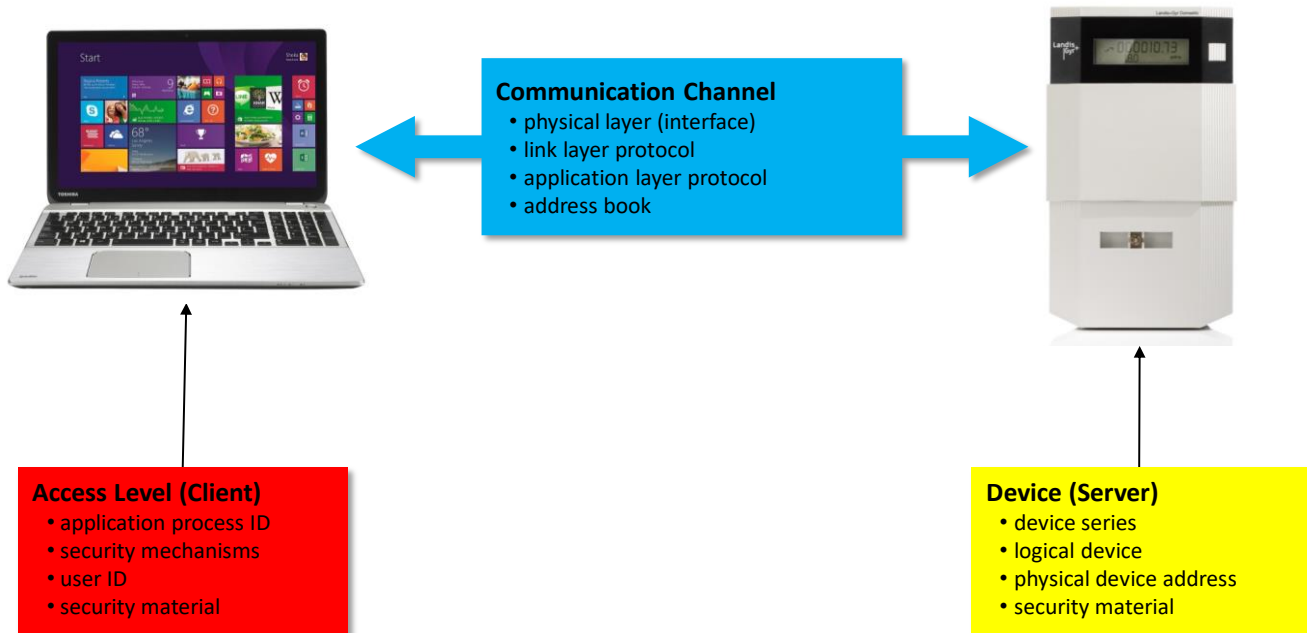
The required settings in the Landis+Gyr .MAP110 Service Tool comprise the following three main areas:

- Communication channel

- Device (Server)

- Access level (Client)

6.1.1   Communication channel

The communication connection from the Landis+Gyr .MAP110 Service Tool to one or more devices can be made in various ways:

- With a **serial** connection to a device.

    – With an optical reading head placed at the optical interface of the device (only point-to-point connection to a device possible).

    – With a Bluetooth reading head (radio transmission over short distances, only point-to-point connection to a device possible).

    – With a direct connection to a device, e.g. via an RS232, M-Bus, CS or network interface as used in various communication units. If the communication unit has a second interface (e.g. RS485), multiple connections are possible to further devices.

- With a **modem** connection to a device or several devices, if these are con-nected together by a multiple connection by RS485, CS or M-Bus. Note: the modem must first have been installed and configured on the PC.

- With a **network** connection over a network interface or the Internet to one or several devices, if these are connected together by a multiple connection by RS485, CS or M-Bus.

In addition to the physical communication channel also various other settings are stored here, e.g. used protocol variants, transmission rates, delays, timeouts, etc.

6.1.2   Device

In this area, optional device-specific data can be specified. This mainly includes the device type or the device series as well as some address information to address the device (server) via a multiple connection.

6.1.3   Access level

An access level defines all settings required on the Landis+Gyr .MAP side (client). This includes in particular the identification of the client as well as the algorithms used for the access and message security. If desired, the necessary keys and pass-words can also be stored.

From release 5.0 also device-specific access levels can be specified in addition to the access levels available for all devices.

6.2   Communication settings

All communication settings can be defined and modified in the "Communication Settings" window.

Click on [icon] in the application toolbar or select **Communication settings** from the **Communication** menu.
The "Communication Settings" window appears with selected "Connections" tab.
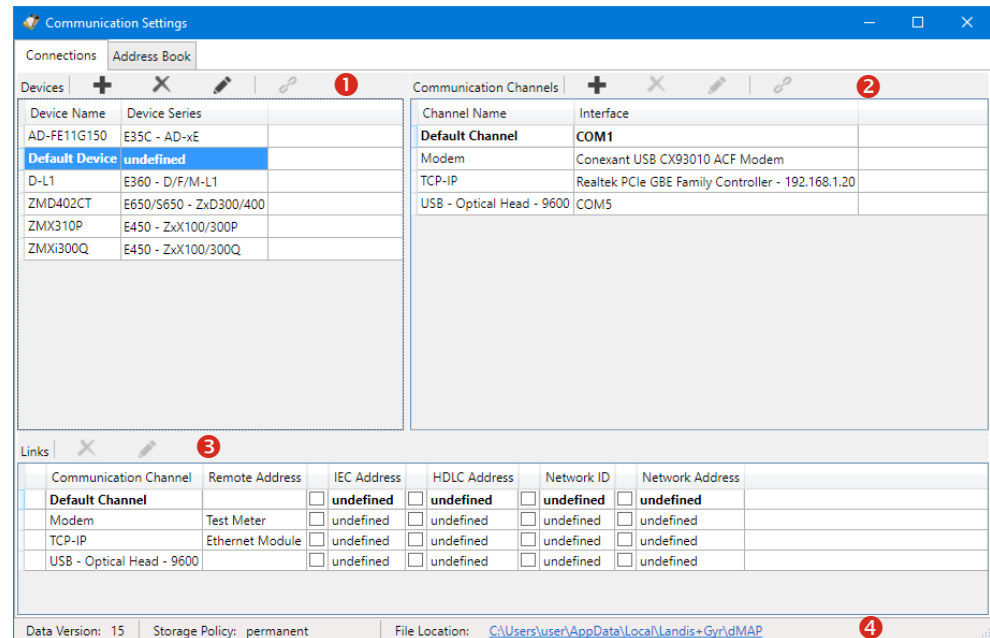
The "Communication Settings" window is subdivided into the following areas:

- List of devices (1) with their names and the associated device series.

  – The list can be sorted by any column in ascending or descending order, by default the devices are displayed in ascending order by name.

  – The currently selected device is highlighted and the selection is not changed by a new sorting.

- List of communication channels (2) with their names and the associated interface, e.g. COM port, modem or network card.

  – The list can be sorted by any column in ascending or descending order, by default the communication channels are displayed in ascending order by name.

  – The currently selected communication channel is highlighted and the selection is not changed by a new sorting.

- List of links (3) between devices and communication channels with the possible additional information, particularly with addresses and phone numbers. The items displayed depend on the selected device or communications channel (see also section 6.2.5 "Links between devices and communication channels").

- Status bar (4), in which the currently used version of the communication data and their location (see section 8.4 "Defining storage location of communication settings") can be seen as well as the current storage policy of passwords and keys (see section 8.5 "Defining storage policy for keys and passwords").

In the following figure a device (highlighted blue) is selected in the list of devices. All the communication channels not linked are greyed out in the list of communication channels and the links with their attributes are shown in the list of links.
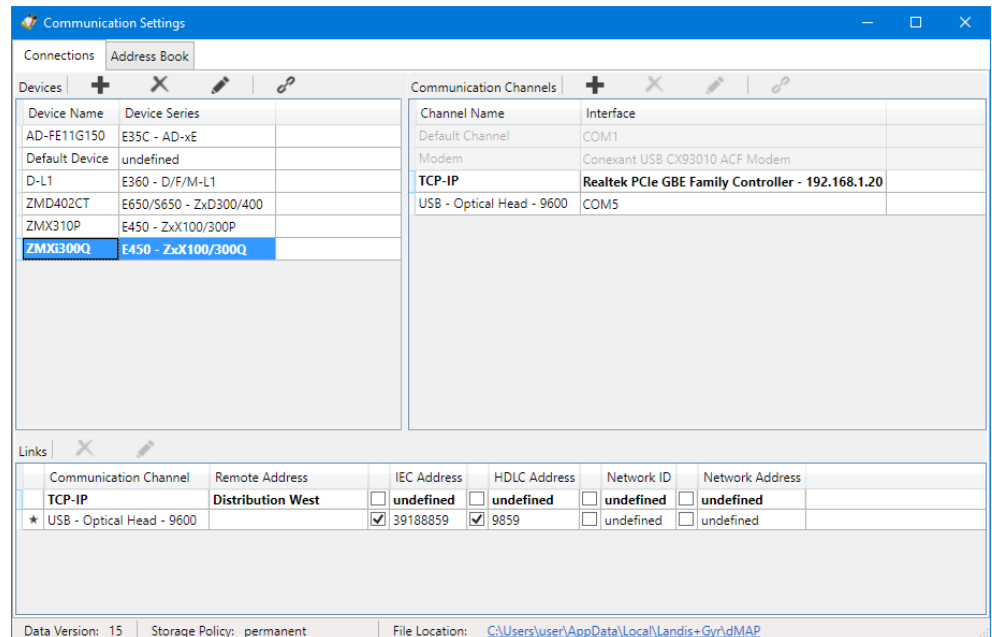
In the figure below a communication channel (highlighted blue) is selected in the list of communication channels. All the devices not linked are greyed out in the list of devices and the links with their attributes are shown in the list of links.
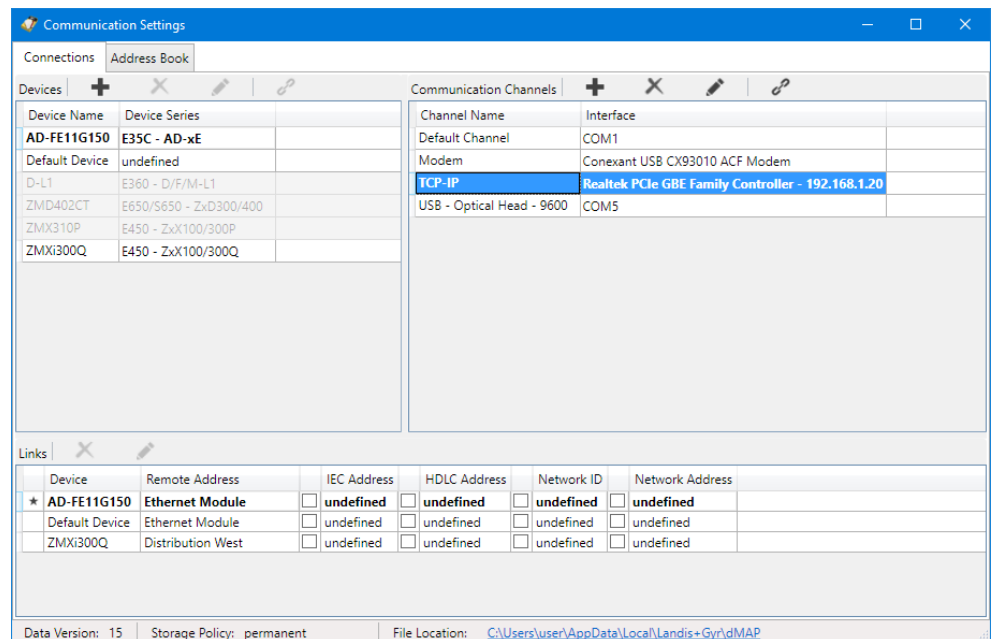
6.2.1   Recommended input sequence

Landis+Gyr recommends to define the required data in the following sequence:

1. Communication channels (see section 6.2.2 "Communication channel data")

2. Devices including the corresponding access data (see section 6.2.3 "Device data")

3. Addresses (see section 6.2.4 "Address data")

4. Links between devices and communication channels including the relevant attributes (see section 6.2.5 "Links between devices and communication channels"

6.2.2 Communication channel data

After the installation of the .MAP110 Service Tool only a default device named "Default Device" and a default communication channel named "Default Channel" are defined. These default communication settings are the basis for a local read-out of a meter with an optical reading head connected to the serial interface. At least the serial interface (COM port) has to be adapted in most cases (see section 4 "First steps").

The following basic procedure should be adopted to create and store a new communication channel definition (specific examples are given in section 6.5 "Communication examples"):

1. Click on [icon] in the application toolbar or select **Communication settings** from the **Communication** menu.
The "Communication Settings" window appears with selected tab "Connections" (as shown here with the default communication settings or with additional data, if already defined).

2. Highlight a communication channel in the communication channel list (default channel or any other communication channel, if already defined).
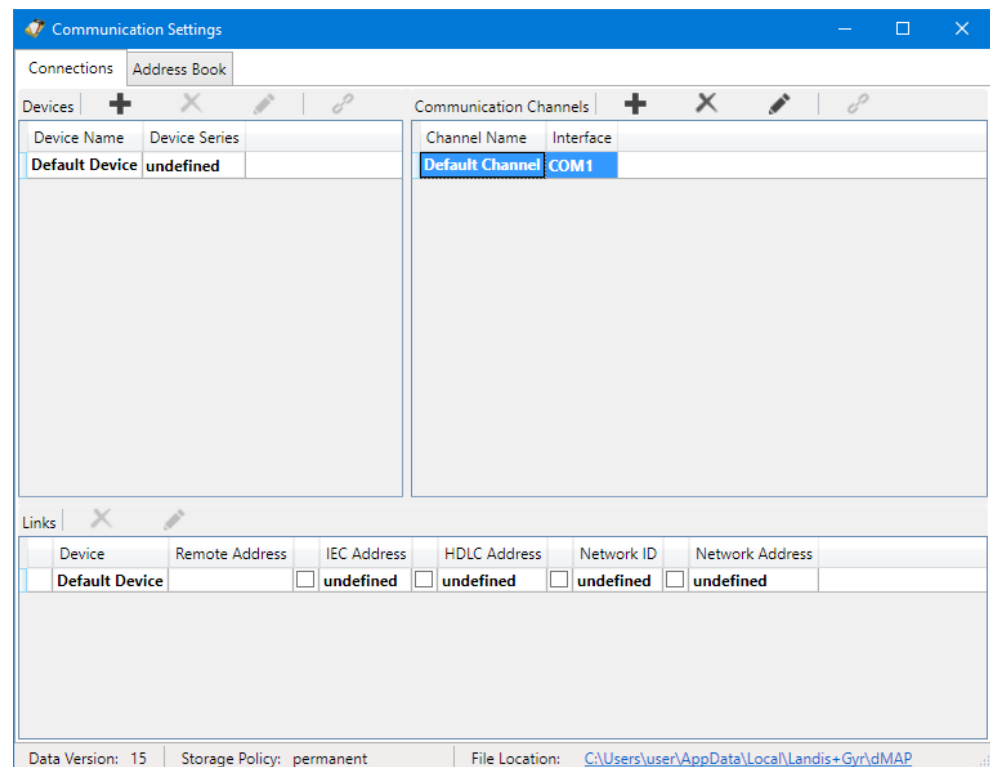
3. Click on [icon] in the window toolbar in the "Communication Channels" area.
The "Communication Channel" window appears. The entry box "Name" contains the placeholder name "CommunicationChannel", all other fields contain a copy of the data of the selected communication channel and can now be modified.

4. Enter a name for the new communication channel definition in the entry box "Name".

5. Select the interface type of the connected device in the "Interface type" drop down list:

    -   Serial (optical head or 3-wire)

    -   Bluetooth optical head (PMR_1)

    -   Bluetooth optical head (PMR_1A)

    -   Modem

    -   Network

6. Select the used interface in the "Physical interface" drop down list:

    -   an available COM port if "Serial" or "Bluetooth optical head" was selected as interface type (the COM port number of a serial interface can be found in the Windows device manager),

    -   an available modem if "Modem" was selected as interface type or

    -   an available network adapter if "Network" was selected as interface type.

7. Select the suitable template for the communication channel settings in the "Template for lower layer settings" drop down list. The following templates are available (selection possibilities dependent on the selected physical interface and interface type):

    -   Serial - IEC
        (start protocol IEC with 300 bps)

    -   Serial - dlms
        (dlms/HDLC protocol with 9600 bps)

    -   M-Bus - dlms
        (dlms/HDLC protocol with 9600 bps and 9 Bit transmission)

- Bluetooth - IEC
  (same as "Serial – IEC", but with special control of the Bluetooth reading head)

- Bluetooth - dlms
  (same as "Serial – dlms", but with special control of the Bluetooth reading head)

- PSTN Modem
  (dlms/HDLC protocol with extended timeouts of 5 s)

- GSM Modem
  (dlms/HDLC protocol with extended timeouts of 10 s)

- Wired - HDLC
  (dlms/HDLC protocol via wired network, e.g. Ethernet)

- Wired - Wrapper
  (dlms/Wrapper protocol via wired network, e.g. Ethernet)

- Wireless - HDLC
  (same as "Wired – HDLC", but with extended timeouts since the transmission times can be significantly higher e.g. with GPRS)

- Wireless - Wrapper
  (same as "Wired – Wrapper", but with extended timeouts since the transmission times can be significantly higher e.g. with GPRS)

After selection of a template the button "Apply" is activated. If you click on it, all communication channel settings are set automatically according to the template.

8. Now you can directly continue according to subsection 6.2.2.5 "Terminating the communication channel definition" or check the settings on each tab according to the following subsections.

6.2.2.1   Physical Layer

1. Select the "Physical Layer" tab.
   Depending on the interface type selected the setting possibilities are different.

If interface type "Serial" or "Bluetooth optical head" is selected:

2. Select the transmission rate corresponding to the device in the "Transmission speed" drop down list for local communication.

3. Select the required communication port settings in the "Port settings" drop down list:

   - **8 Bit (8 data bits / no parity)** (default), to be used normally

   - **9 Bit (8 data bits / even parity)**, to be used if the connection to the serial interface of the PC is made via an USB M-Bus converter

4. Tick the "Idle time after connection" checkbox if you want to modify the default initial delay (IEC standard value = 0 ms). Then enter the required value in the "Idle time after connection" entry box.

If interface type "Network" is selected:

5. Select the required communication protocol in the "Protocol" drop down list:

   - **TCP** (Transmission Control Protocol)

   - **UDP** (User Datagram Protocol)

6. If required enter a source port number (only if IPv6 is used) otherwise do not change the default setting "0" (automatic selection).

7. Tick the "Idle time after connection" checkbox if you want to modify the default initial delay (IEC standard value = 0 ms). Then enter the required value in the "Idle time after connection" entry box.

If interface type "Modem" is selected:

Communication Channel

Name: Modem

Interface

Interface Type	Modem
Physical Interface	Conexant USB CX93010 ACF Modem
Template for Lower Layer Settings	select template

Apply

Physical Layer | dlms Link Layer | dlms Application Layer | IEC

☐ Idle time after connection   0   ms

OK   Cancel

2. Tick the "Idle time after connection" checkbox if you want to modify the default initial delay (IEC standard value = 0 ms), e.g. with GSM networks. Then enter the required value in the "Idle time after connection" entry box.

6.2.2.2   dlms Link Layer

1. Select the "dlms Link Layer" tab.
   The settings on this tab apply if the dlms protocol is used.

2. Select the required protocol for the planned activity in the "dlms Link layer protocol" drop down list. Possible settings:

   - **HDLC**, if the HDLC protocol must be used

   - **HDLC via IEC mode E** (default), if the IEC protocol must be used for opening the communication

   - **COSEM Wrapper**, if the COSEM Wrapper over the TCP protocol must be used

3. Depending on the selected link layer protocol, the IEC Mode E, HDLC or COSEM Wrapper areas are displayed to make the required settings.

   In the **IEC Mode E** area (only displayed if "HDLC via IEC mode E" is selected as link layer protocol):

   - Transmission Speed Switching: Select the required maximum transmission rate (default = 9600 bps). Untick the checkbox if you don't want to allow transmission rate switching.
     Note: In case of modem or network connections no real change is made but only the transmission rate character in the protocol is altered.

   - Intercharacter Timeout: After expiration of the set time the transmission is automatically ended if no further data is transmitted. If you untick the checkbox, no automatic termination of the transmission occurs.

   - Maximum Number of Retries: Select the number of retries (default value = 3). If you select 0, no retries occur.

In the **HDLC** area (only displayed if "HDLC" or "HDLC via IEC mode E" is selected as link layer protocol):

- Maximum HDLC Buffer Size: Tick the checkbox if you want to modify the default value (128 bytes). The HDLC buffer size determines how many useful data can be transmitted in one data packet. Reduce the value in case of communication problems.

- Message Timeout: If you untick the checkbox, no automatic termination of the transmission occurs.

- Maximum Number of Retries: Select the number of retries (default value = 3). If you select 0, no retries occur.

In the **COSEM Wrapper** area (only displayed if "COSEM Wrapper" is selected as link layer protocol):

- Message Timeout: If you untick the checkbox, no automatic termination of the transmission occurs.

6.2.2.3 dlms Application Layer

1. Select the "dlms Application Layer" tab.
   The settings on this tab apply if the dlms protocol is used.

2. Select "Short Name (SN) referencing" or "Logical Name (LN) referencing" method. The command set supported by LN referencing is very limited. The .MAP tools only work with short names. Therefore SN referencing is the preferred choice unless otherwise instructed.

3. Tick the "Maximum Number of Elements in Lists" checkbox to activate the use of lists for read and write operations. Enter the maximum number of elements in lists. In case of readout problems this value (default = 45) can be reduced down to 1. It should be noted that this slows down the readout significantly.

4. If required, modify the "Single Request Firmware Releases". This entry box contains all releases (separated by semicolons), for which automatically single requests will be used, i.e. no list requests are used.

5. Tick the "Maximum dlms Buffer Size" checkbox if you want to limit the maximum buffer size in the .MAP tool for writing of data (default value = 0). Then enter the required value in the "Maximum dlms Buffer Size" entry box. Principally the buffer sizes for writing and reading reported from the device are used. If a maximum buffer size is determined, this size is not exceeded during writing, even if the device reports a bigger write buffer size. If you untick the checkbox, the buffer size is unlimited, i.e. buffer size indicated by the device is used.

6. Tick the "Block transfer with set, write and action services supported" checkbox if you want to allow write operations with blocks and if your device also supports block transfers. The use of blocks for writing depends on the data quantity, the maximum number of list items and the dlms buffer size. It is recommended to disable this setting in case of transmission problems.

7. Keep alive interval: After this time an "Alive-Packet" is to be sent in order to maintain the connection. The value must be greater than the message time-out value (default = 30 s). If you untick the checkbox, the function is switched off.

8. Tick the "Use release service to close Association Application" checkbox if a release request shall be sent before closing the HDLC connection (with COSEM Wrapper a release request is always sent).

6.2.2.4 IEC

1. Select the "IEC" tab.
   The settings on this tab apply for devices that support solely the IEC protocol.

2. Select the required maximum transmission rate (default = 9600 bps) in the "Transmission Speed Switching" drop down list. Untick the checkbox if you don't want to allow transmission rate switching.
   Note: In case of modem or network connections no real change is made but only the transmission rate character in the protocol is altered.

3. Intercharacter Timeout: After expiration of the set time the transmission is automatically ended if no further data is transmitted. If you untick the "Intercharacter Timeout" checkbox, no automatic termination of the transmission occurs.

4. Select the number of retries (default value = 3) in the "Maximum Number of Retries" entry box. If you select 0, no retries occur.

5. Enter the required static password (8 characters) for R5/W5 commands in the "Password for R5/W5 Commands" entry box.

6. Enter the maximum length in bytes of the R1/W1 commands in the "Maximum R1/W1 Command Size" entry box.
   This value limits the block size for the transmission of large amounts of data, e.g. display lists or tables of use. Values greater than 16 bytes are not supported by all devices. Please refer to the respective device documentation to find out which values are supported by your device.

6.2.2.5   Terminating the communication channel definition

1. Click on **OK**.
   The new communication channel definition is saved. A new entry with the defined name appears in the communication channel list.
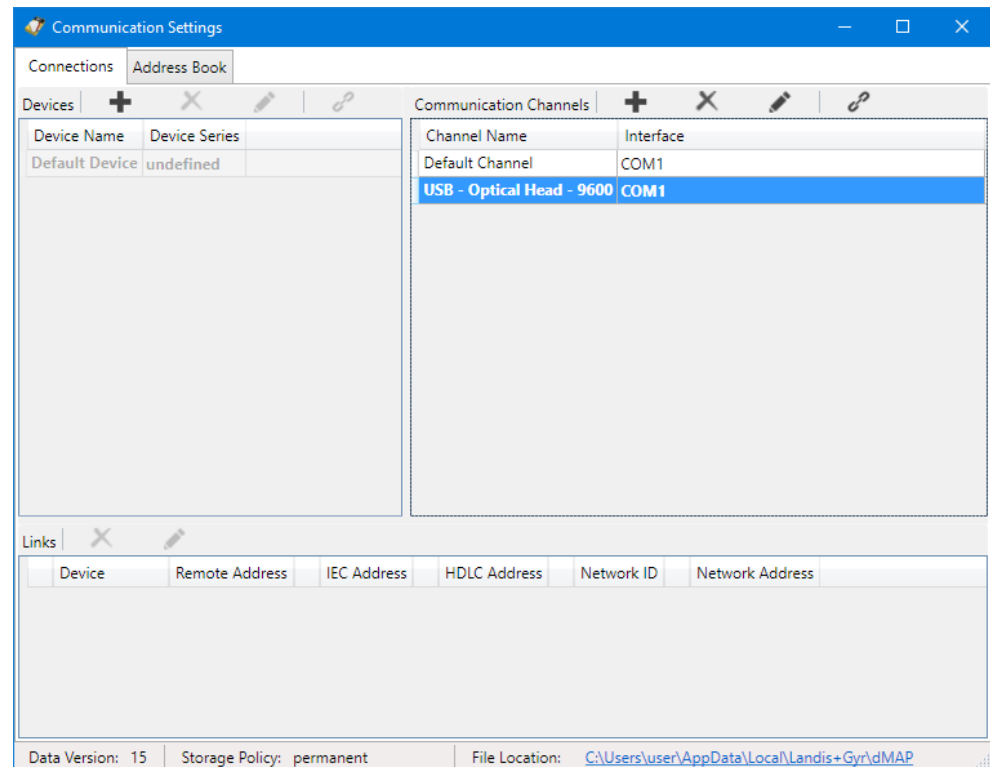
2. Define further required communication channels in the same way.

3. Close the "Communication Settings" window.

ⓘ   **Modifying or deleting communication channel definitions**

If you intend to modify or delete a communication channel definition, mark the corresponding entry in the communication channel list and then

- click on [pencil icon] in the window toolbar in the "Communication Channels" area to modify the marked entry of the communication channel list or double click on the entry.

- click on [X icon] in the window toolbar in the "Communication Channels" area to delete the marked entry of the communication channel list (deletions must be confirmed).

6.2.3 Device data

After the installation of the .MAP110 Service Tool, only a default device named "Default Device" and a default communication channel named "Default Channel" are defined. These default communication settings are the basis for a local read-out of a meter with an optical reading head connected to a serial interface (see section 4 "First steps").

Additionally, other device-specific properties can be defined here, if required.

The following basic procedure should be adopted to create and store a new device definition (specific examples are given in section 6.5 "Communication examples"):

1.   Click on [icon] in the application toolbar or select **Communication settings** from the **Communication** menu.
     The "Communication Settings" window appears with selected tab "Links".

2.   Highlight a device in the device list (any device or other device, if already defined).
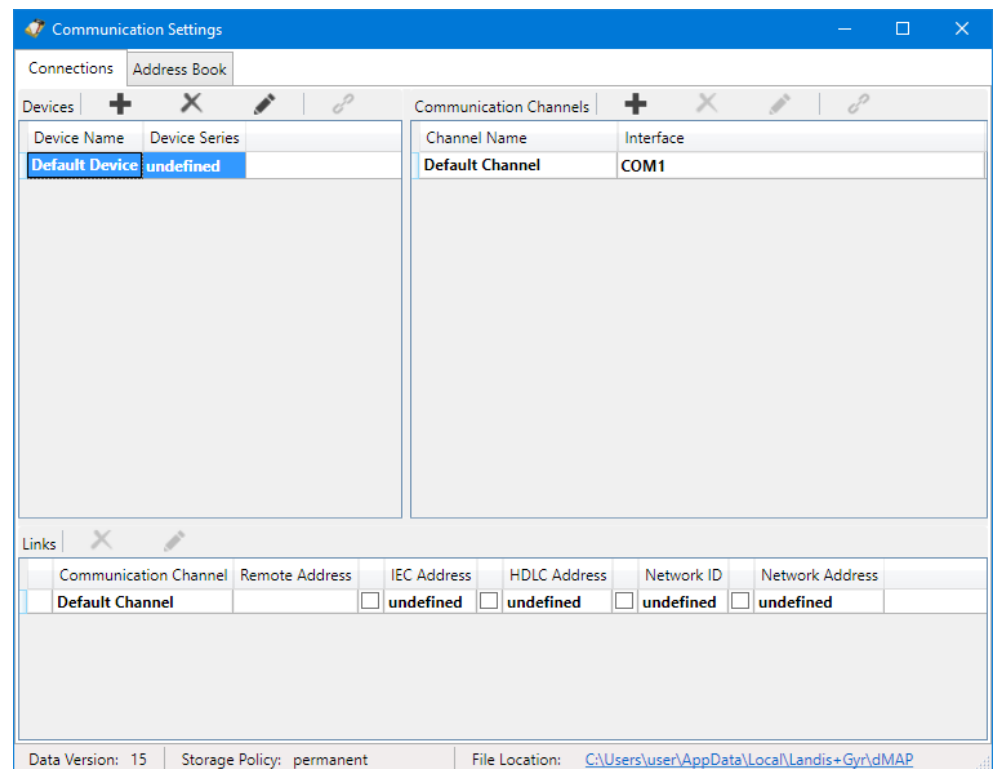
3.   Click on [icon] in the window toolbar in the "Devices" area.
     The "Device" window appears. The entry box "Name" contains the place-holder name "Device", all other boxes contain the data of the selected device and can now be modified.

4.   Enter a name for the new device definition in the entry box "Name".

6.2.3.1   Type

1.   Select the "Type" tab.

2.   Select the device series in the "Device Series" drop down list.
       The selected device series has the effect, that the command tree will be
       changed accordingly, if the device is selected in the device toolbar. If you
       leave "undefined", no adaptation of the command tree occurs.

3. If required, enter the manufacturer serial number with a maximal length of 20 characters and a restricted character set ('0'..'9', 'A'..'Z', 'a'..'z') in the "Manufacturer Serial Number" entry box.
Please note that this entry has currently no meaning but may be used for extended device management in the future.

4. Select the device type in the "Logical Device" drop down list: "Base Meter / Module" (=1) or "Communication Unit" (=17) or "user defined" for devices from third party suppliers (in this case, you must enter the logical device number according to the manufacturer information).
Note that this selection is only possible if the device series is set to "undefined". Otherwise it is fix set to "Base Meter / Module" (=1) or "Communication Unit" (=17), depending on the selected device series. Also note that the logical device may be overridden by a command in some cases, if the command is implemented only for a specific logical device (e.g. communication unit).

6.2.3.2 Address

1. Select the "Address" tab, if a device address shall be used.

2. Set a tick to the "IEC address" and/or "HDLC address" checkbox and enter the address(es).
If you enter an IEC address first and then click on the arrow button behind the two entry boxes, the HDLC address is automatically calculated and entered (see section 6.3 "Addressing devices").

6.2.3.3 Access levels

The various access levels and their fields of application are described in section 10 "Short description of device security system".

1. Select the "Clients" tab to define the device-specific access levels.
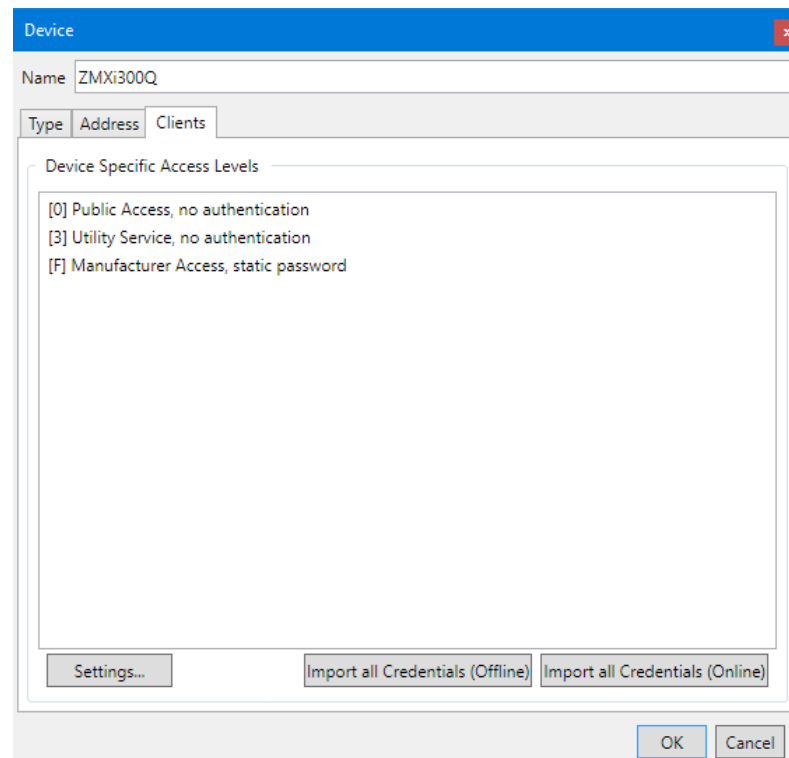
After the installation of the .MAP110 Service Tool no passwords for the different access levels are defined. Therefore only the access levels without password protection, e.g. "[0] Public Access" or with fix set password as "[F] Manufacturer Access" can be used. They are shown in the list of device specific access levels by default. For all other required access levels the credentials have to be entered as described below or imported (see section 6.2.3.4 "Importing keys").

2. Click on **Settings**.
   The "Access Levels" window appears for the specified device.
   The device name is displayed in the top left corner.
   The window contains a list of all access levels with "Client AP" (User ID, UID), authentication, additional requisites, message security policy, security setup and supported protocols that can be used for any device.

   An ⚠ icon is displayed in the first column as long as the access level is not correctly defined (e.g. missing or incomplete password). Accordingly marked access levels will not be shown in the Client toolbar.

Access Levels - ZMXi300Q

Access Level	Client AP	Authentication	Additional Requisites	Message Security Policy	Supported Protocols
[0] Public Access	16	no authentication		no ciphering	IEC and dlms
⚠ [1] Data Collection	32	low level authentication using a static password		no ciphering	IEC and dlms
⚠ [1] Data Collection	32	high level authentication using SHA-256		no ciphering	dlms only
⚠ [2] Utility Field Service	48	low level authentication using a static password		no ciphering	IEC and dlms
⚠ [2] Utility Field Service	48	high level authentication using SHA-1		no ciphering	dlms only
⚠ [2] Utility Field Service	48	high level authentication using GMAC		no ciphering	dlms only
⚠ [2] Utility Field Service	48	high level authentication using SHA-256		no ciphering	dlms only
[3] Utility Service	64	no authentication	service menu required	no ciphering	IEC and dlms
⚠ [G] Management Access	1	low level authentication using a static password		no ciphering	dlms only
⚠ [G] Management Access	1	high level authentication using SHA-1		no ciphering	dlms only
⚠ [G] Management Access	1	high level authentication using GMAC		no ciphering	dlms only
⚠ [G] Management Access	1	high level authentication using SHA-256		no ciphering	dlms only
⚠ [] Security Auditor	5	high level authentication using GMAC		no ciphering	dlms only
⚠ [] Calibration Lab	6	high level authentication using GMAC		no ciphering	dlms only
⚠ [] Communication Module	7	high level authentication using GMAC		no ciphering	dlms only
⚠ [] Local Operator	9	high level authentication using GMAC		no ciphering	dlms only
⚠ [L] Access Administrator	2	low level authentication using a static password		no ciphering	dlms only
⚠ [L] Access Administrator	2	high level authentication using SHA-1		no ciphering	dlms only
⚠ [L] Access Administrator	2	high level authentication using GMAC		no ciphering	dlms only
⚠ [L] Access Administrator	2	high level authentication using SHA-256		no ciphering	dlms only
[F] Manufacturer Access	104	low level authentication using a static password	hardware switch required	no ciphering	dlms only
[X] User Defined 1	0	no authentication		no ciphering	IEC and dlms

OK   Cancel

3.   Specify the access levels to be used by double clicking the corresponding entry (or by selecting it and clicking on the edit icon ✏) and then making the necessary entries in the appearing "Access level Definition" window.

Depending on the access level to be defined and other inputs, the individual fields can be modified or are set immutable.

Access Level Definition - ZMXi300Q

[2] Utility Field Service

Client Application Process ID   48   ☐ User ID   0

Access Security

Authentication   low level authentication using a static password ∨
Additional requisites   -

Message Security

☐ Authenticated   ☐ Encrypted   ☐ Signed

Credentials

Password (secret)   ✏ [   ] ✕
Global Authentication Key (GAK)   ✏ [   ] ✕
Global Unicast Encryption Key (GUEK) ✏ [   ] ✕

Import Credentials (Offline)   Import Credentials (Online)

Supported protocols   IEC and dlms

OK   Cancel

4.   Only for user defined access levels: Enter a "Client Application Process ID" (default is 16).
For all other access levels the "Client Application Process ID" is fix assigned in a range from 1 to 255 and cannot be changed.

5.   Tick the "User ID" checkbox if you want to send additional information about the user to the device and then enter a user ID in the range from 1 to 255 (0 = don't use a user ID). The device only allows to establish a connection if this user ID is also enabled there.

A user ID is currently only supported by a few devices. Please refer to the respective device documentation to find out whether this is supported by your device or not (not to be selected as default).

6. Only for user defined access levels: Select the type of authentication in the "Authentication" drop down list.
    The selection is described in section 10.2 "Security attributes" under "Access authentication"). For all other access levels the authentication is fix assigned and cannot be changed.
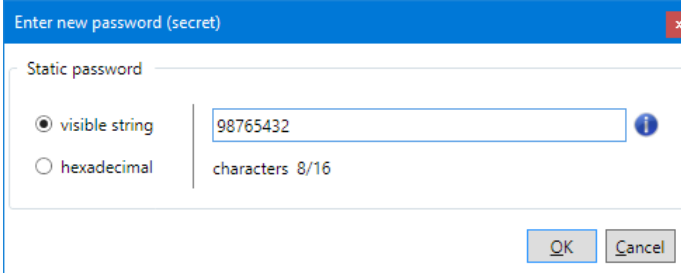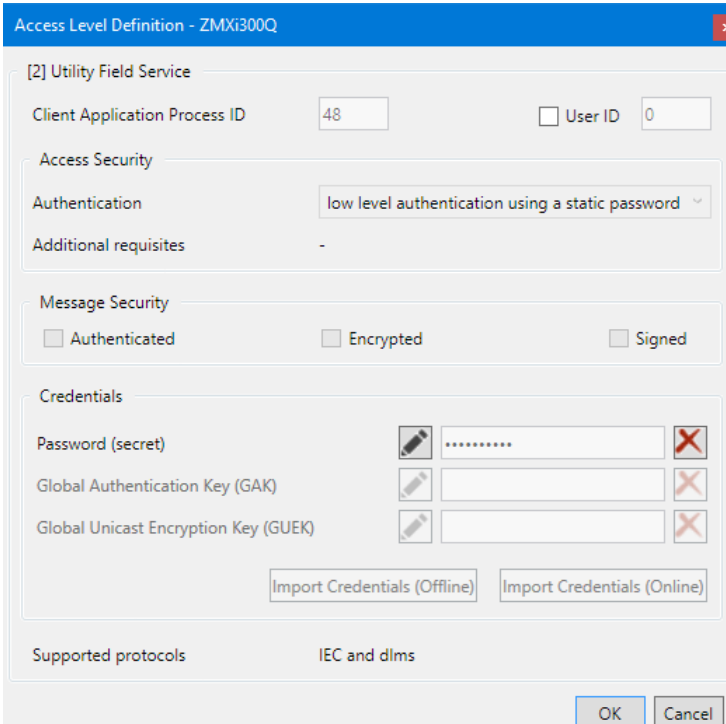
    The unchangeable display "Additional requisites" shows information about specific access levels as "service menu required" or "hardware switch required".

7. Only for access levels with high level authentication using GMAC and SHA-256: Tick the "Authenticated" and or "Encrypted" checkboxes for the corresponding message security (for both request and response).
    "Signed" is reserved for future use and can therefore not be selected.

8. Only for access levels with low level authentication or with high level authentication using SHA-1:

    Click on the edit icon ✎ and then enter the password or key in the appearing "Enter new password (secret)" window either as visible string or hexadecimal and then confirm the entry with **OK**.

For security reasons, the password (secret) is only visible as you type it in. After entering a placeholder is shown with asterisks. In case of a future modification, it must be re-entered.

Click on the [×] icon behind the password entry box if you want to delete a previously defined password (secret).

9.   Only for access levels with high level authentication: Either import the required authentication and/or encryption keys (GAK and GUEK) from a received key file (see section 6.2.3.4 "Importing keys") or

click on the corresponding edit icon [✏] and type in the key in the "Enter new key" window either as visible string or hexadecimal and then confirm the entry with **OK**.
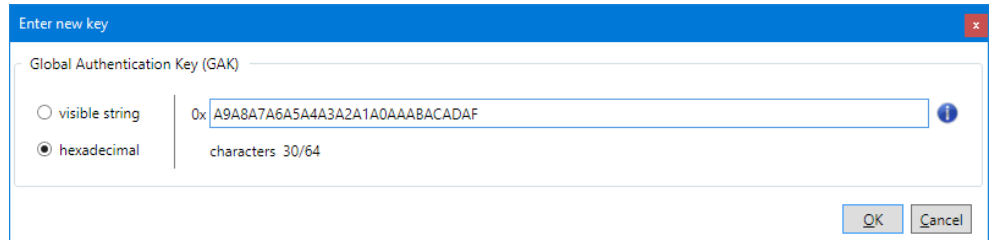

For security reasons, the key is only visible as you type it in. After entering a placeholder is shown with asterisks. In case of a future modification, it must be re-entered.
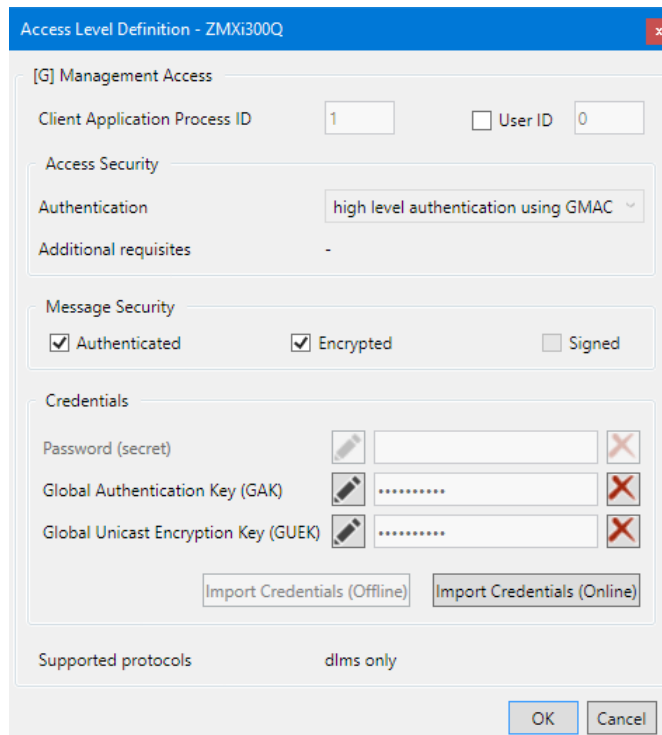

The fixed display "Supported protocols" shows the supported protocols for the access level. Possible values are "IEC and dlms" and "dlms only".

10. Click on **OK**.

The "Access Levels" window appears again.

No ⚠ icons are displayed in the first column of the newly defined access levels.

| Access Level	Client AP	Authentication	Additional Requisites	Message Security Policy	Supported Protocols
[0] Public Access	16	no authentication		no ciphering	IEC and dlms
[1] Data Collection	32	low level authentication using a static password		no ciphering	IEC and dlms
⚠ [1] Data Collection	32	high level authentication using SHA-256		no ciphering	dlms only
[2] Utility Field Service	48	low level authentication using a static password		no ciphering	IEC and dlms
⚠ [2] Utility Field Service	48	high level authentication using SHA-1		no ciphering	dlms only
⚠ [2] Utility Field Service	48	high level authentication using GMAC		no ciphering	dlms only
⚠ [2] Utility Field Service	48	high level authentication using SHA-256		no ciphering	dlms only
[3] Utility Service	64	no authentication	service menu required	no ciphering	IEC and dlms
⚠ [G] Management Access	1	low level authentication using a static password		no ciphering	dlms only
⚠ [G] Management Access	1	high level authentication using SHA-1		no ciphering	dlms only
[G] Management Access	1	high level authentication using GMAC		authentication and encryption	dlms only
⚠ [G] Management Access	1	high level authentication using SHA-256		no ciphering	dlms only
⚠ [] Security Auditor	5	high level authentication using GMAC		no ciphering	dlms only
⚠ [] Calibration Lab	6	high level authentication using GMAC		no ciphering	dlms only
⚠ [] Communication Module	7	high level authentication using GMAC		no ciphering	dlms only
⚠ [] Local Operator	9	high level authentication using GMAC		no ciphering	dlms only
[L] Access Administrator	2	low level authentication using a static password		no ciphering	dlms only
⚠ [L] Access Administrator	2	high level authentication using SHA-1		no ciphering	dlms only
⚠ [L] Access Administrator	2	high level authentication using GMAC		no ciphering	dlms only
⚠ [L] Access Administrator	2	high level authentication using SHA-256		no ciphering	dlms only
[F] Manufacturer Access	104	low level authentication using a static password	hardware switch required	no ciphering	dlms only
[X] User Defined 1	0	no authentication		no ciphering	IEC and dlms

11. Click on **OK**.

On the "Clients" tab of the "Device" window the defined device-specific access levels are displayed.

Device

Name: ZMXi300Q

Type | Address | Clients

Device Specific Access Levels

[0] Public Access, no authentication
[1] Data Collection, static password
[2] Utility Field Service, static password
[3] Utility Service, no authentication
[G] Management Access, GMAC authentication
[L] Access Administrator, static password
[F] Manufacturer Access, static password

Settings... | Import all Credentials (Offline) | Import all Credentials (Online)

All these fully defined access levels can be selected in the "Client" drop down list in the client toolbar if the corresponding device is selected in the "Device" drop down list.
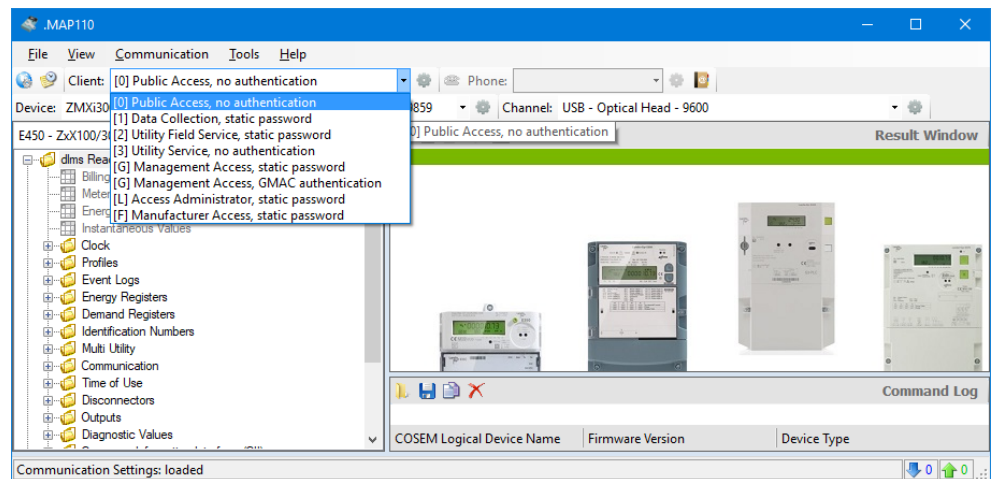
12. Continue as described in section 6.2.3.5 "Terminating the device data definition".

6.2.3.4   Importing keys

If the authentication and/or encryption keys are not available in a legible form, you can import them from key files (offline) or from a remote key management system (online).

Offline key import

ⓘ   **Required key files**
      The required key files will be supplied to you by your Landis+Gyr representative.
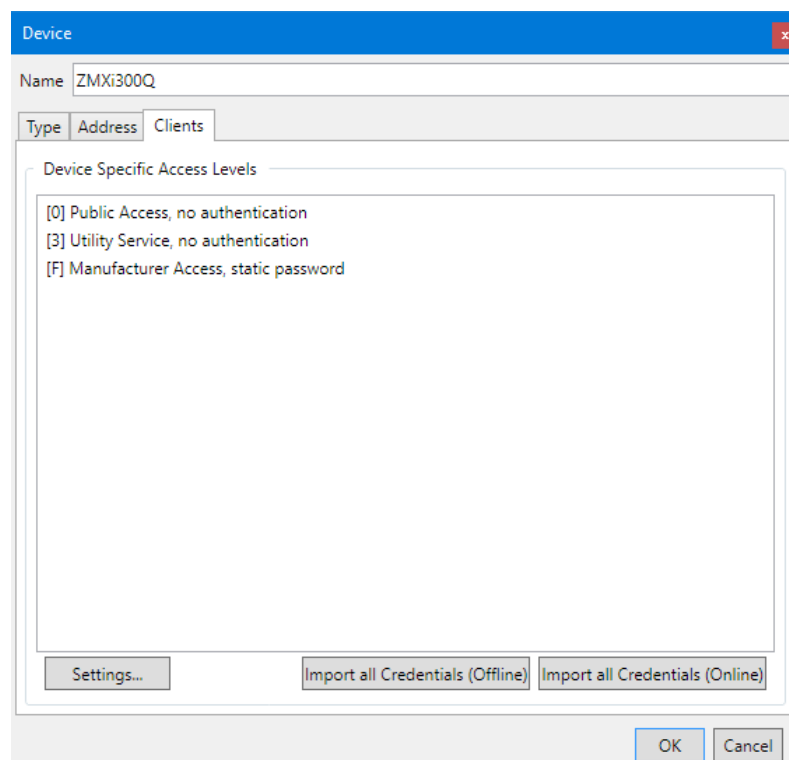
Proceed as follows to import keys from key files:

1. Click on **Import all Credentials (Offline)**.
   The "Import Keys" window appears.
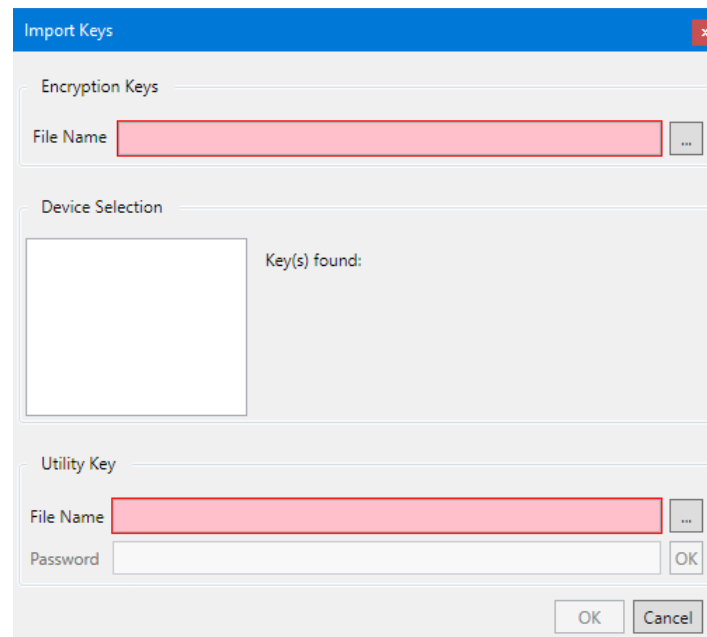
2. Click on [...] in the "Encryption Keys" area.
   The "Open" window appears.

3. Select the directory where the encryption key file is stored in the displayed tree.

4. Select the encryption key file you want to import.
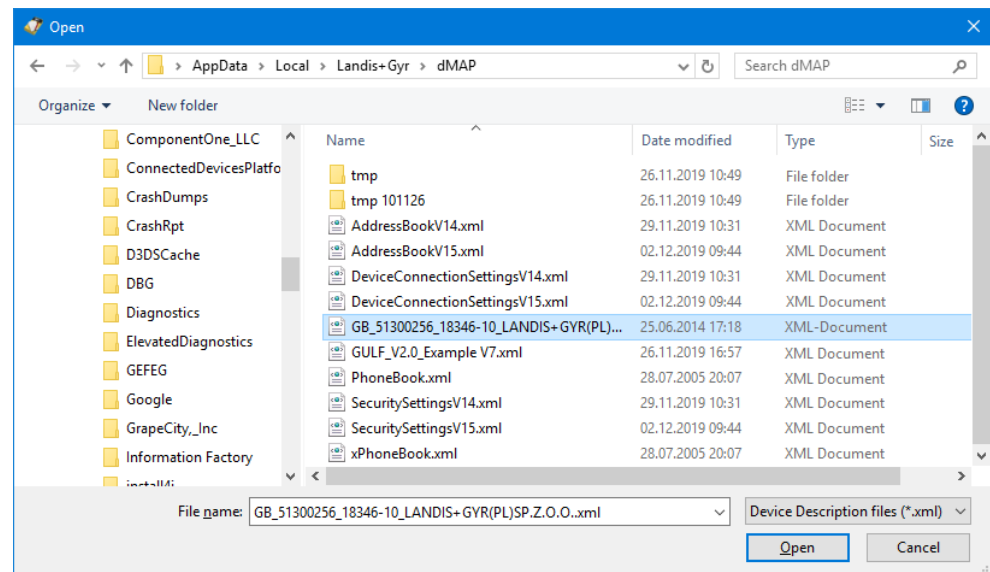
5. Click on **Open**.
   The keys are imported from the encryption key file and the available device serial numbers will be listed in the "Device Selection" area.
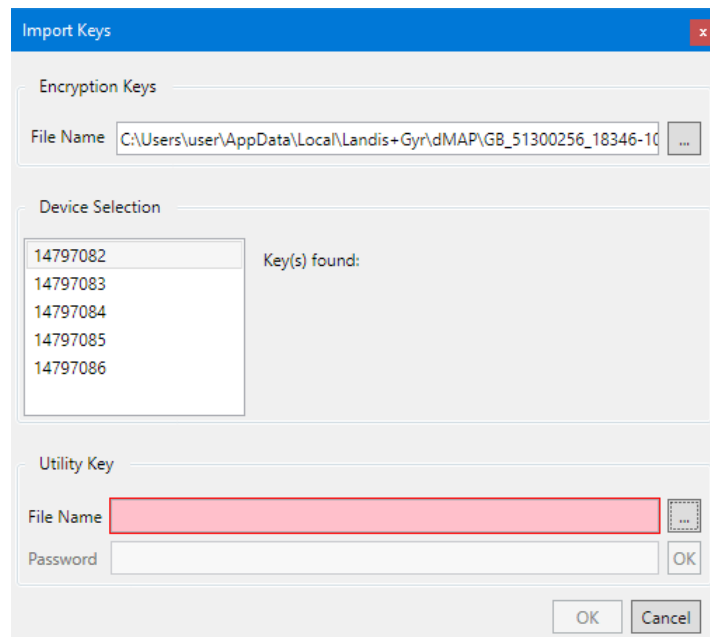
6. Click on [...] in the "Utility Key" area.
   The "Open" window appears.

7. Select the directory where the utility key file is stored in the displayed tree.

8. Select the utility key file you want to import.
   This file is required to decrypt the key file.
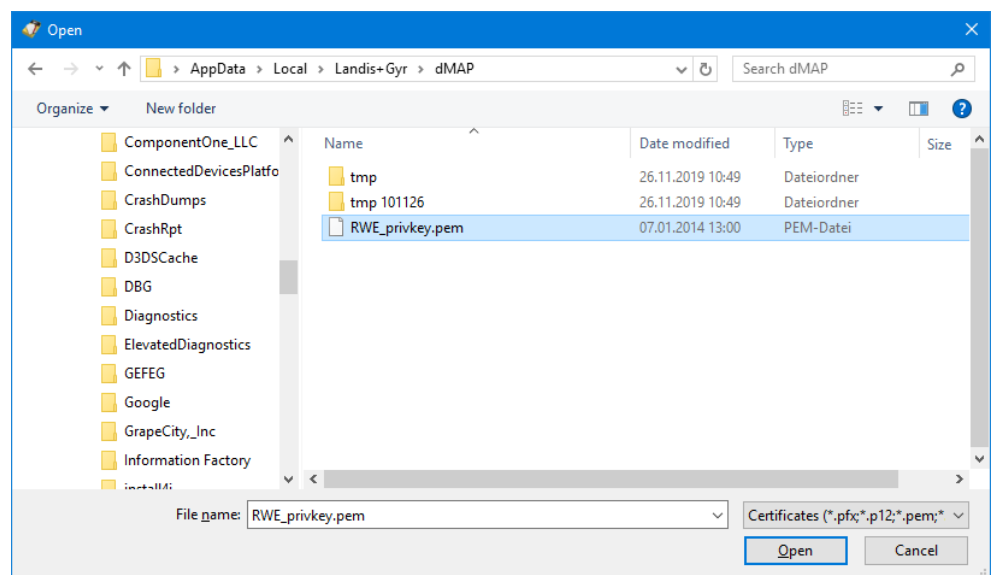
9. Click on **Open**.
   The utility key is imported from the key file.

10. Click on **OK**.
    The "Import Keys" window disappears and the associated device-specific access levels are displayed.

Online key import

ⓘ **Required prerequisites**
    Before you can import keys online from a remote key management system the required credentials must have been entered on tab "Key Management system" in the "Options" window (see section 8.9 "Defining the key management system").
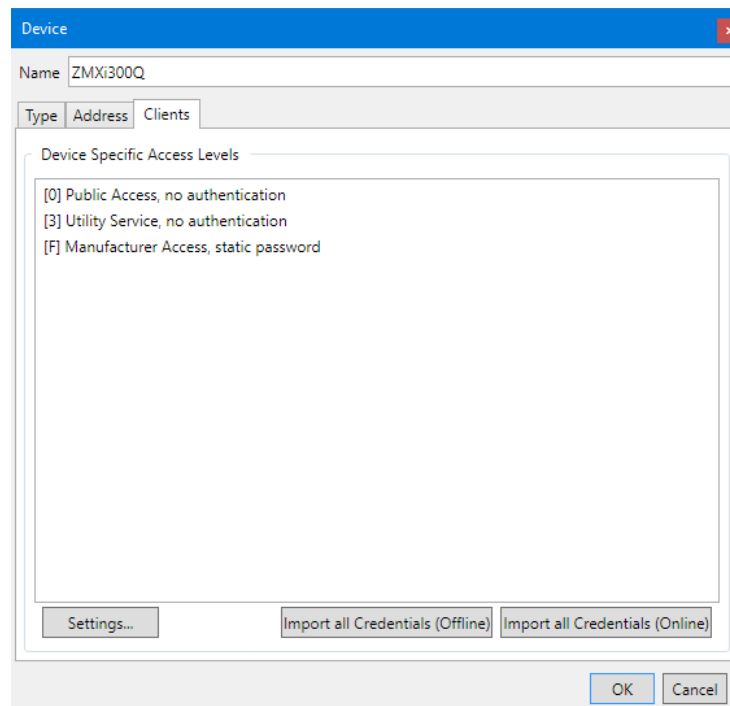
Proceed as follows to import keys from a remote key management system:

11. Click on **Import all Credentials (Online)**.
    The "Import Keys" window appears.
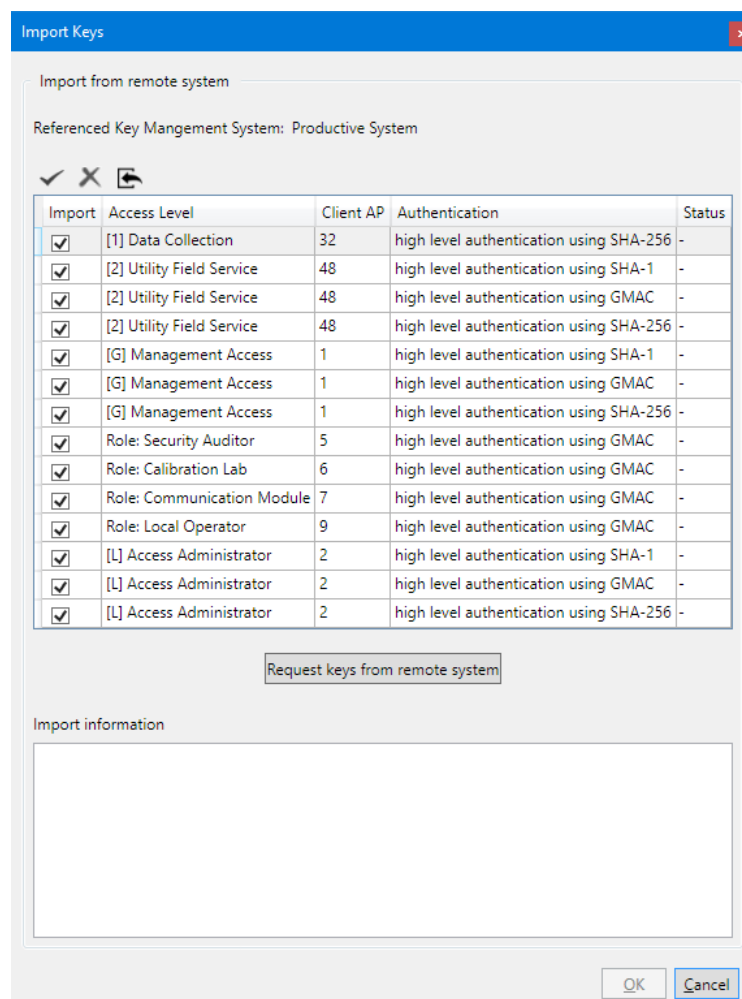
12. In column "Import" set a tick to all access levels for which you want to import keys from the remote key management system.

✓ in the window toolbar selects all checkboxes and

✗ in the window toolbar unselects all checkboxes.

13. Click on 🔄 in the window toolbar or on **Request keys from remote system**.
If the keys are available on the remote key management system they will be imported. This is indicated with "Success" in column "Status" and with "Import succeeded" in the "Import information" area.
If a key is not available on the remote key management system this is indicated with "Missing" in column "Status" and with "No appropriate data in response" in the "Import information" area (in this case the **OK** button is not released; untick the checkbox for the corresponding access level and repeat the request).

Import	Access Level	Client AP	Authentication	Status
☐	[1] Data Collection	32	high level authentication using SHA-256	-
☑	[2] Utility Field Service	48	high level authentication using SHA-1	Success
☑	[2] Utility Field Service	48	high level authentication using GMAC	Success
☑	[2] Utility Field Service	48	high level authentication using SHA-256	Success
☑	[G] Management Access	1	high level authentication using SHA-1	Missing
☐	[G] Management Access	1	high level authentication using GMAC	-
☐	[G] Management Access	1	high level authentication using SHA-256	-
☐	Role: Security Auditor	5	high level authentication using GMAC	-
☐	Role: Calibration Lab	6	high level authentication using GMAC	-
☐	Role: Communication Module	7	high level authentication using GMAC	-
☐	Role: Local Operator	9	high level authentication using GMAC	-
☑	[L] Access Administrator	2	high level authentication using SHA-1	Success
☑	[L] Access Administrator	2	high level authentication using GMAC	Success
☑	[L] Access Administrator	2	high level authentication using SHA-256	Success

Import Keys

Import from remote system

Referenced Key Mangement System: Productive System

Request keys from remote system

Import information

[2] Utility Field Service - high level authentication using SHA-1
  - Import succeeded

[2] Utility Field Service - high level authentication using GMAC
  - Import succeeded

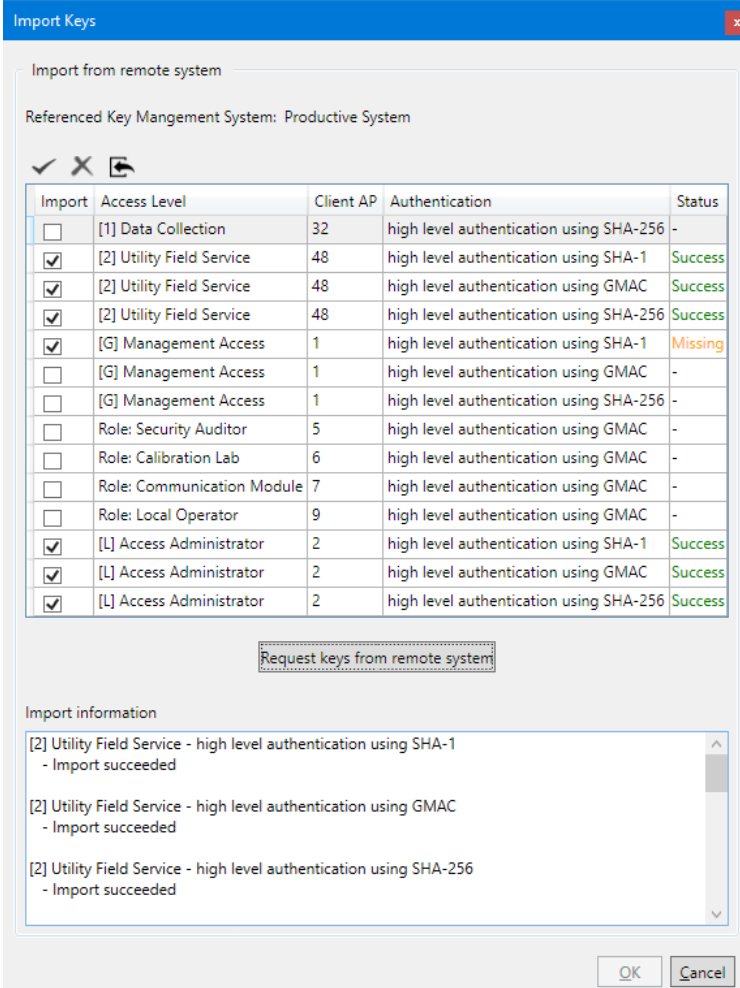[2] Utility Field Service - high level authentication using SHA-256
  - Import succeeded

OK   Cancel

14. Click on **OK**.
The "Import Keys" window disappears and the associated device-specific access levels are displayed.
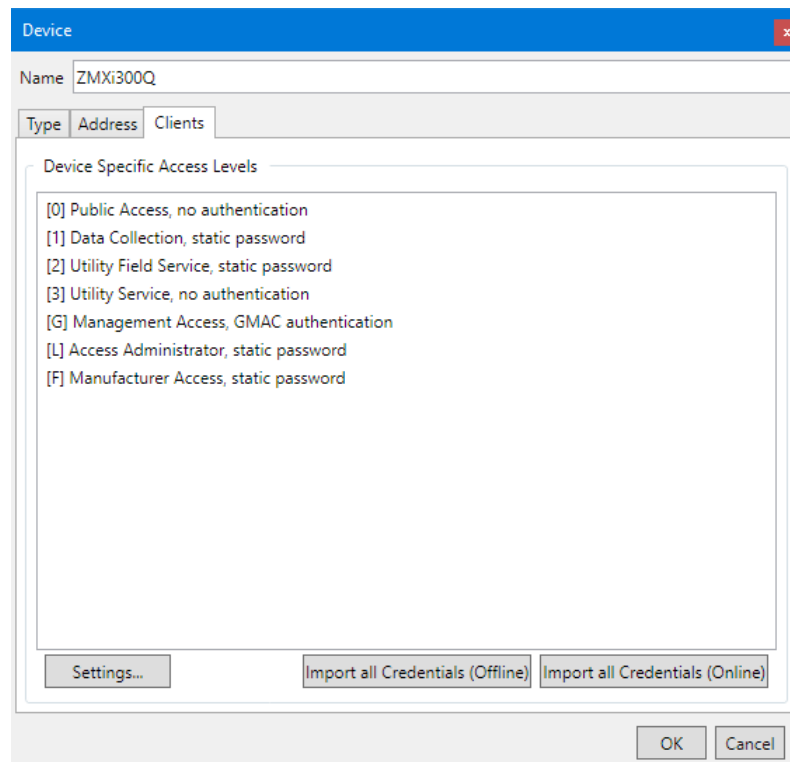
6.2.3.5   Terminating the device data definition

1. Click on **OK**.
   The new device definition is saved. A new entry with the defined name appears in the device list.
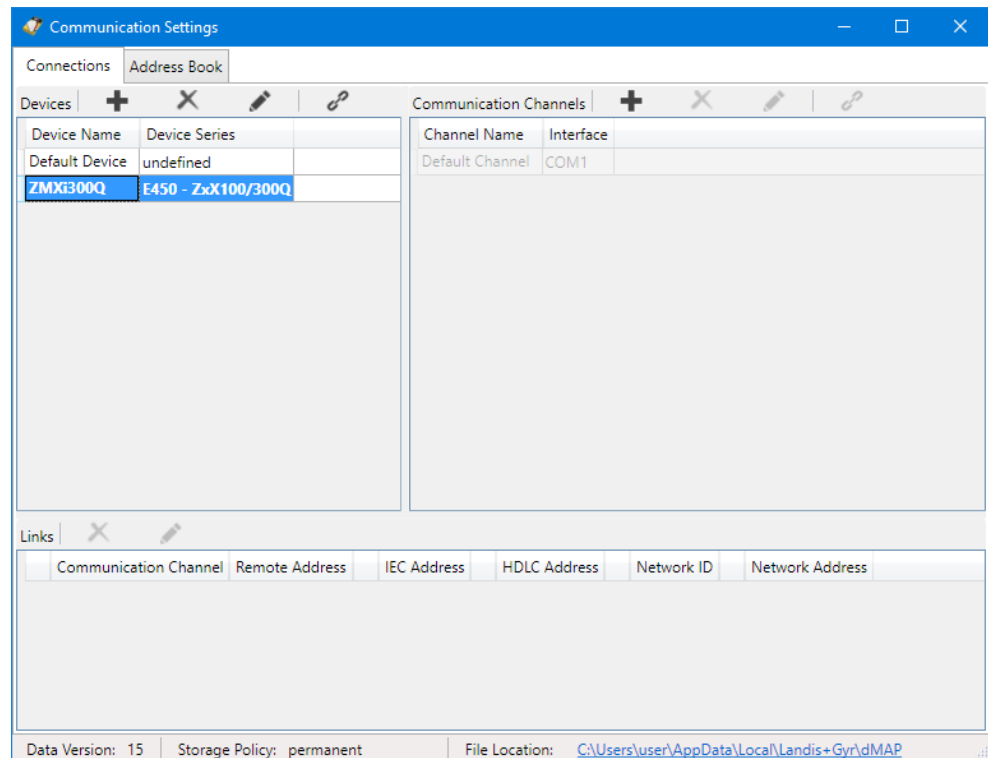
2. Define further devices in the same way, if required.

3. If you have imported address data from a MAP110 phone book, modify the "undefined" device series to the appropriate device series and delete imported devices which are not required.

4. Close the "Communications settings" window.

ⓘ   **Link to communication channel is required**
Each device must be linked to at least one communication channel (see section 6.2.5.1 "Defining link between device and communication channel"), so that it can be used.

ⓘ   **Modifying or deleting device definitions**

If you intend to modify or delete a device definition, mark the corresponding entry in the device list and then

- click on [✏] in the window toolbar in the "Devices" area to modify the marked device definition or double click on the device definition.

- click on [✕] in the window toolbar in the "Devices" area to delete the marked device definition. Deletions must be confirmed.
  The default device definition "any device" can't be deleted.

6.2.4   Address data

After the installation of the .MAP110 Service Tool, no address data (IP addresses and phone numbers) are defined.

Proceed as described in the following subsections to generate address book entries.

6.2.4.1   Phone numbers

Define the phone numbers required for modem connections as follows:

1.   Click on [icon] in the application toolbar or select **Communication settings** from the **Communication** menu.
      The "Communication Settings" window appears with selected tab "Connections".

2.   Select the "Address Book" tab.
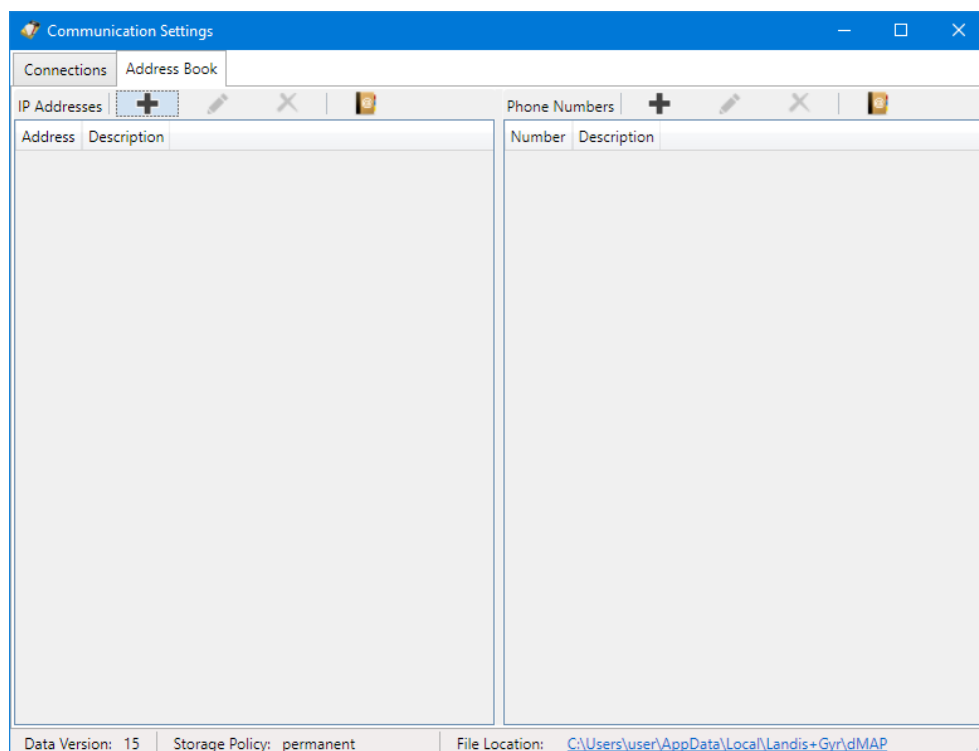
3.   Click on [icon] in the window toolbar for phone numbers (right window). The "Address Book" window appears.

4.   Enter a clear designation of the device in the "Name" entry box and the phone number of the desired device in the "Phone number" entry box.
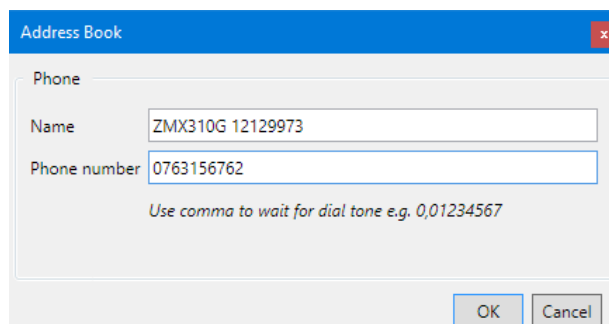
5.	Click on **OK**.
The "Address Book" window disappears. The phone number is saved and then appears as entry in the address book.
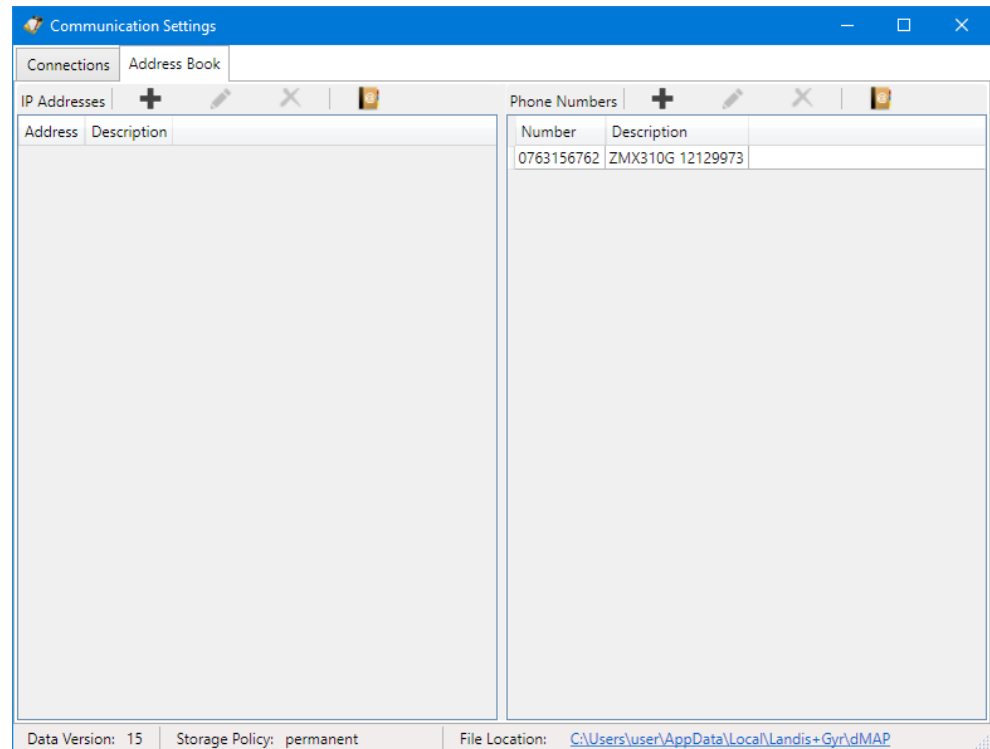
6.	Define further phone numbers in the same way, if required.

7.	Close the "Communications settings" window.

Modifying or deleting phone numbers

If you intend to modify or delete a phone number, select the corresponding entry in the phone number list and then then

- click on [pencil icon] in the window toolbar in the "Phone Numbers" area to modify the marked entry of the address book or double click on the entry.

- click on [X icon] in the window toolbar in the "Phone Numbers" area to delete the marked entry of the address book (deletions must be confirmed).

6.2.4.2   IP addresses

Define the IP addresses required for TCP/IP connections as follows:

1.   Click on [icon] in the application toolbar or select **Communication settings** from the **Communication** menu.
The "Communication Settings" window appears with selected tab "Connections".

2.   Select the "Address Book" tab.
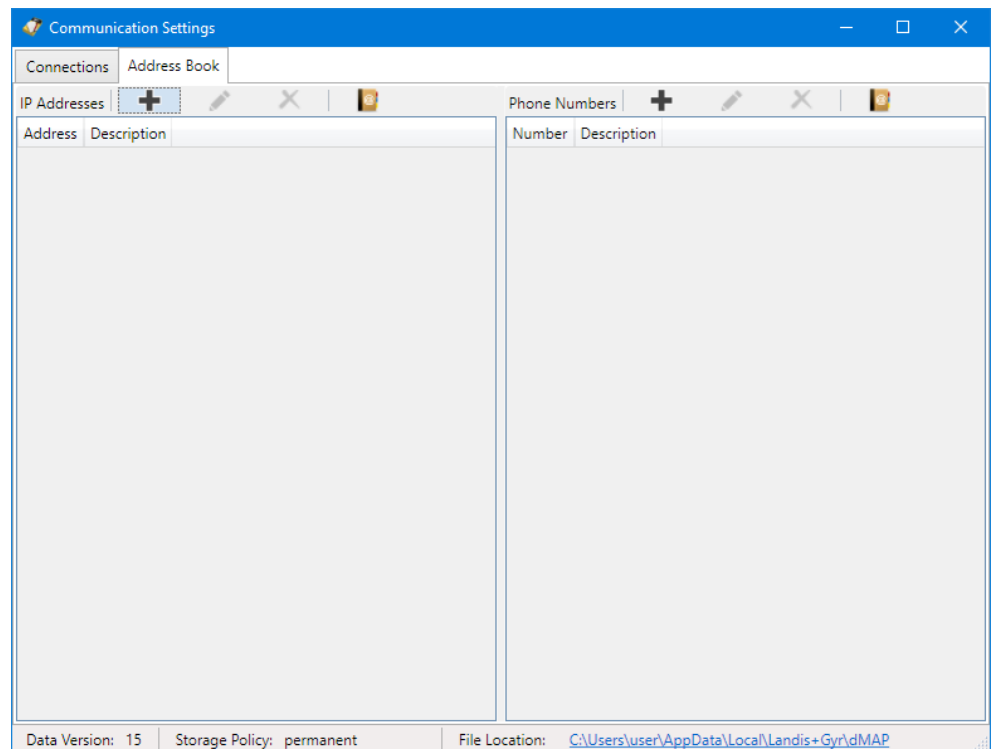
3.   Click on [icon] in the window toolbar for IP addresses (left window).
The "Address Book" window appears.

4.   Enter a clear designation of the device location in the "Name" entry box.

5.   Select with the corresponding radio button whether an IPv4 address or an IPv6 address or an URL shall be entered. Enter the IPv4 or IPv6 address or the URL in the corresponding entry box and the port number of the desired device in the "Port" entry box.
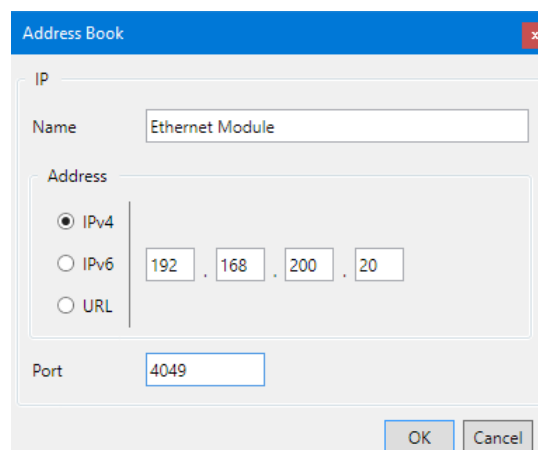
Please note that when you use an URL, a corresponding service must be active (e.g. dyn DNS), which forwards the requests to the correct address in the underlying network.

6. Click on **OK**.
   The "Address Book" window disappears. The IP address is saved and then appears as entry in the address book.
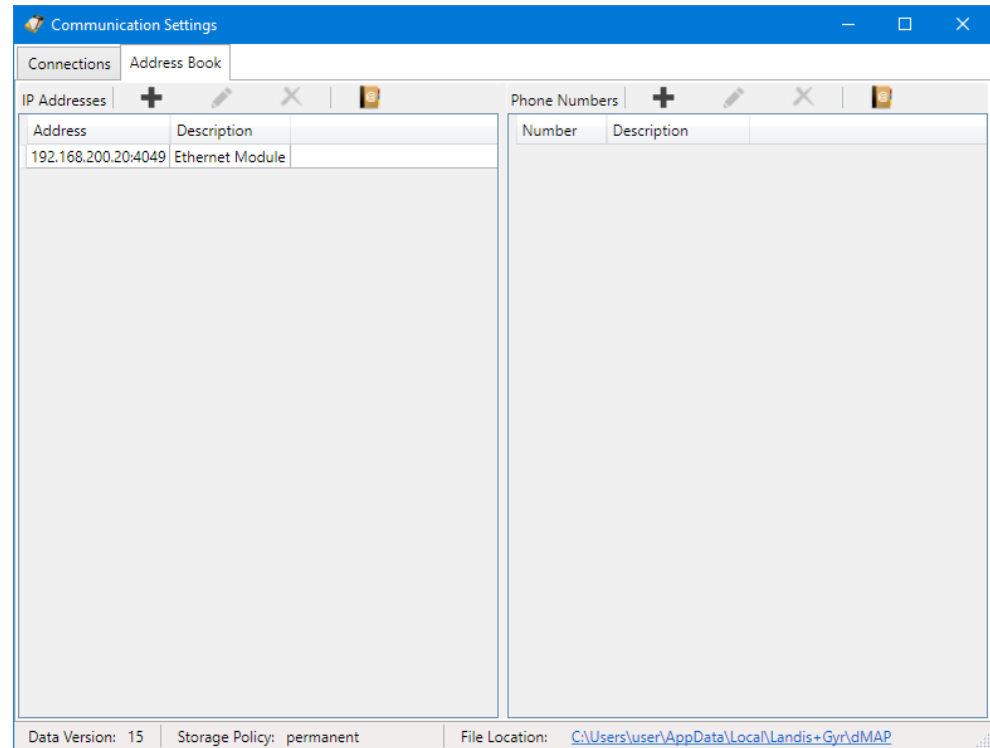
7. Define further IP addresses in the same way.

8. Close the "Communications settings" window.

Modifying or deleting IP addresses

If you intend to modify or delete an IP address, select the corresponding entry in the IP address list and then then

- click on [pencil icon] in the window toolbar in the "IP Addresses" area to modify the marked entry of the address book or double click on the entry.

- click on [X icon] in the window toolbar in the "IP Addresses" area to delete the marked entry of the address book (deletions must be confirmed).

6.2.4.3 Importing address book

If the Landis+Gyr MAP110 Service Tool is already installed on the PC, its phone book can be imported. Likewise, the address book of a Landis+Gyr .MAP tool from another source (e.g. from another PC or another directory) can be imported.

Import an existing address book as follows:

1. Click on [icon] in the application toolbar or select **Communication settings** from the **Communication** menu.
    The "Communication Settings" window appears with selected tab "Links".

2. Select the "Address Book" tab.
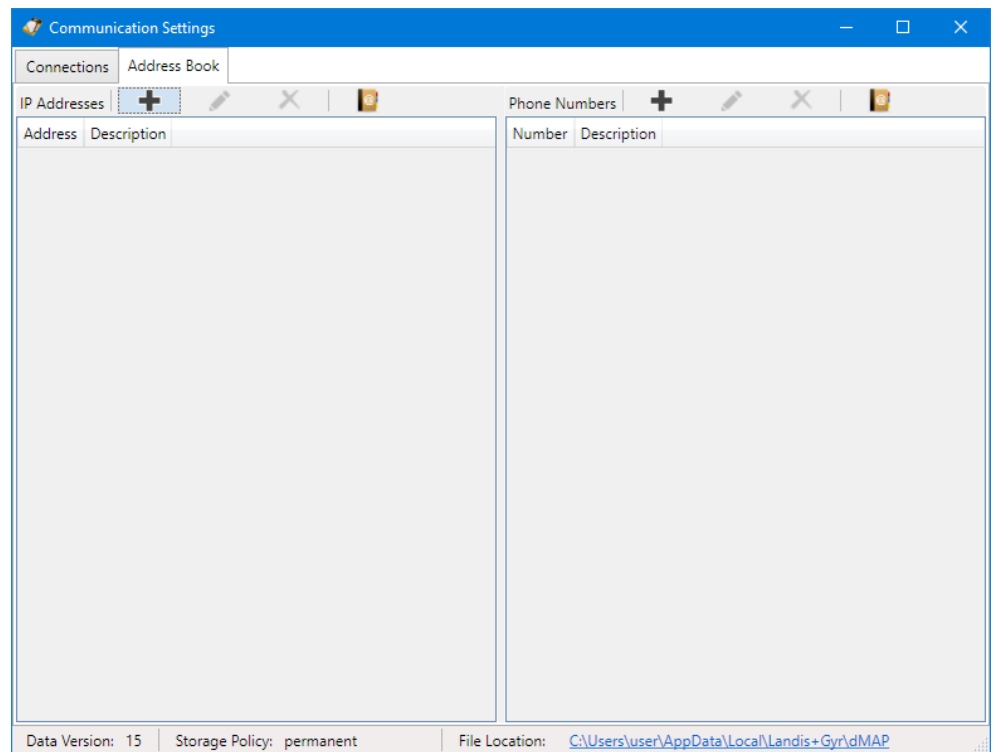
3. Click on [icon] in the window toolbar for IP addresses or phone numbers. The "Open" window appears.

4. Select in the "Open" window the phone book file to be imported (the corresponding directory of the latest installed MAP110 release 3.x will be selected by default, to directories of other .MAP releases you must navigate yourself):

    - "PhoneBook.xml" for importing a MAP110 phone book or

    - "AddressBookVxx.xml" (xx = data version) for importing a .MAP phone book.

5. Click on **Open**.
    All IP addresses and phone numbers are imported from the selected address book if not already existing in the .MAP110 address book. The imported data appear as entries in the IP addresses list and in the phone number list.
    When a MAP110 phone book "PhoneBook.xml" has been imported, additionally all device addresses are converted into devices.
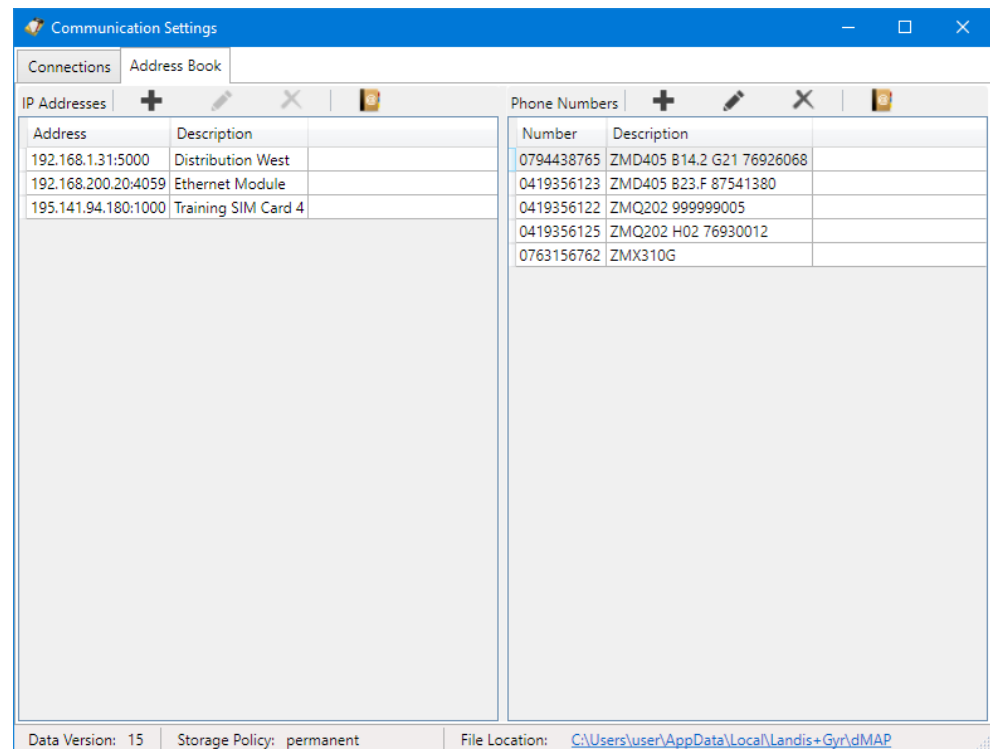
6.   Close the "Communications settings" window.

7.   If you have imported address data from a MAP110 phone book "PhoneBook.xml",
      check the device settings (see section 6.2.3 "Device data") again, since device
      addresses from the imported phone book have been converted into devices.
      Before you can use the device definitions created that way these have to be
      linked manually with a communication channel (see section 6.2.5 "Links
      between devices and communication channels").

ⓘ   **Modifying or deleting address book entries**

      If you intend to modify or delete an address book entry, select the corresponding
      address book entry in the IP address or phone number list and then then

      •   click on [✎] in the window toolbar in the "IP Addresses" or "Phone
          Numbers" area to modify the marked entry of the address book or double
          click on the entry.

      •   click on [✕] in the window toolbar in the "IP Addresses" or "Phone
          Numbers" area to delete the marked entry of the address book (deletions
          must be confirmed).

6.2.5 Links between devices and communication channels

Device and communication channel are connected by a link in an appropriate manner to each other (see the overview below) to allow a flexible and convenient use.

Device (Server)
- device series
- logical device
- physical device address
- encryption keys

Communication Channel
- physical layer (interface)
- link layer protocol
- application layer protocol

Link
- use of physical address
- remote address
- gateway

Address Book
- IP addresses (IPv4, IPv6, URL)
- phone numbers
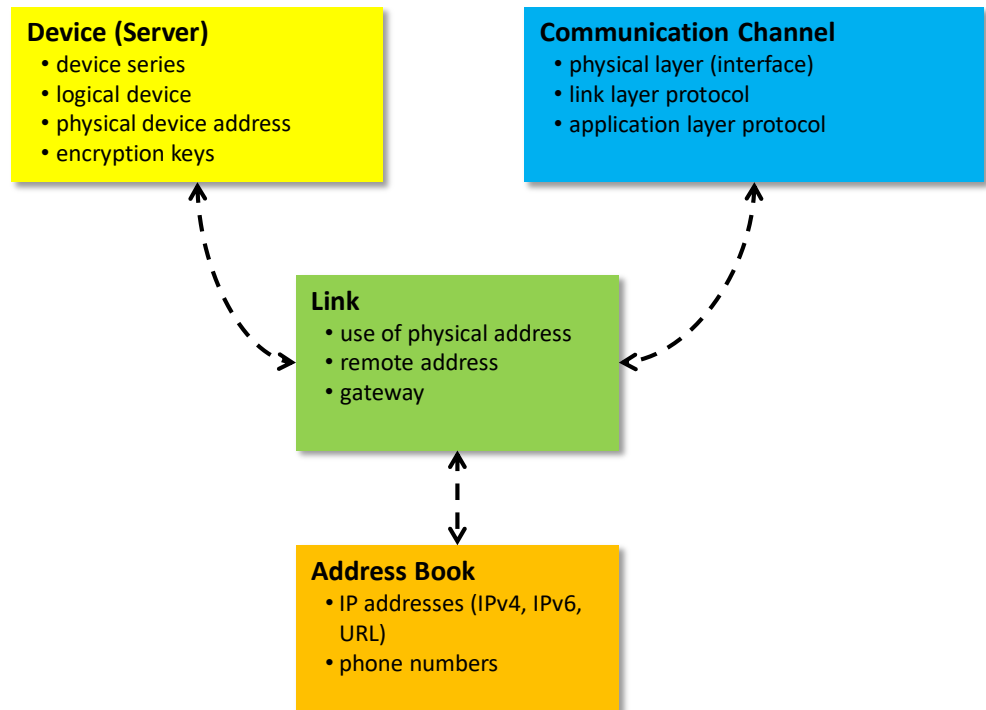
The link determines how a device can be reached via a communication channel.

Each device must be linked to at least one communication channel, so that it can be used.

Only the available (linked) communication channels can be selected in the "channel" drop down list (see section 5.3.5 "Communication channel toolbar") for a specific device.

For each device/communication channel link the following attributes can, if required, be defined:

- IEC address (if defined for the device)

- HDLC address (if defined for the device)

- Phone number (for modem communications channels only)

- IP address and port number (for TCP/IP communication channels only)

- dlms gateway network ID and network address

    If a dlms device in a local network is not directly accessible, a dlms gateway must be used (e.g. Zigbee device via Ethernet gateway). The dlms gateway requires additional information in order to forward dlms requests to the correct device in the local network.

Each defined device can be linked to one or more defined communication channels and each communication channel with one or more devices.

6.2.5.1   Defining link between device and communication channel

Procedure:

1. Click on [icon] in the application toolbar or select **Communication settings** from the **Communication** menu.
    The "Communication Settings" window appears with selected tab "Connections". The device list and the communication list are displayed.
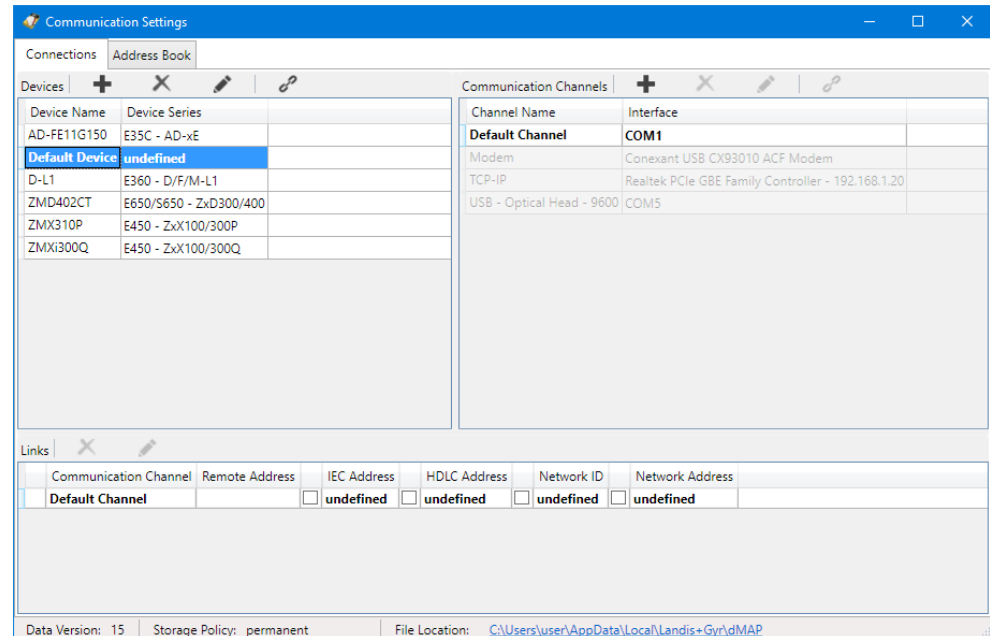
2. Select a device from the device list (or alternatively a channel from the communication channels list).

3. Click on [icon] in the window toolbar in the "Devices" area (or alternatively in the "Communications Channels" area).
    The "Device/Communication Channel Link" window appears with the device fixed and the communication channel selectable:
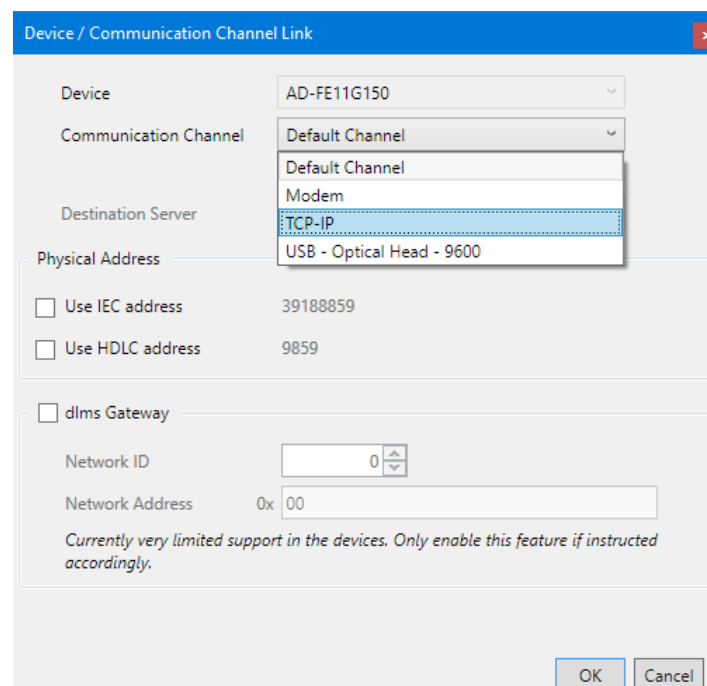
or alternatively with the communication channel fixed and the device selectable:

4. In the "Communication Channel" drop down list select one of the defined communication channels (or alternatively in the "Device" drop down list one of the defined devices).

5. If more than one communication channel is defined for a device, one channel can be determined as preferred channel. When selecting this device the preferred channel is always selected as default channel. Tick for this the checkbox "This is the preferred channel for this device". The preferred channel is then marked with a yellow star in the "Communication Settings" window.

6. Only for modem communication channels: in the "Phone Number" drop down list select one of the defined phone numbers.

7. Only for TCP/IP communication channels: in the "Destination Server" drop down list select one of the defined IP addresses.

8. If the IEC or HDLC address defined for the device shall be used: set a tick to the "Use IEC address" or "Use HDLC address" checkbox. See also section 6.3 "Addressing devices").

9. If a dlms gateway shall be used: set a tick to the "dlms Gateway" checkbox, select a network ID and define the additional information in order to forward dlms requests to the correct device in the local network:

    –   the network must be identified by a number (network ID) and

    –   the address of the device in the local network must be specified in the correct format (network address).

ⓘ   **dlms Gateway feature not yet supported by Landis+gyr devices**
Please note that the dlms gateway feature is for future expansion only and not yet supported by the Landis+Gyr devices. For the time being make sure to disable it.

6.2.5.2   Terminating the link definition

1. Click on **OK**.
   The "Device/Communication Channel Link" window disappears and the new defined link is displayed in the communication channel links list.

2. If more than one communication channels shall be usable to access the device (or alternatively if more than one device shall be accessible via the communication channel), define another link the same way.
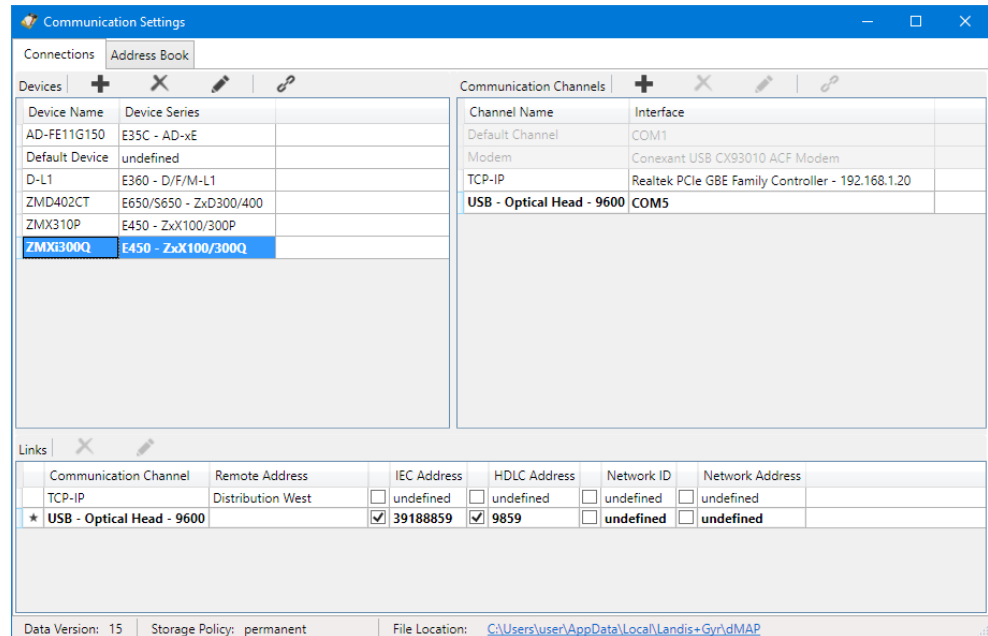
3. Define the links for all devices (or alternatively for all communication channels) the same way.

4. Close the "Communications settings" window.

ⓘ   **Modifying or deleting links**

If you intend to modify or delete a link, select the corresponding entry in the link list and then

- click on ✎ in the window toolbar in the "Links" area to modify the marked entry of the link list or double click on the entry.

- click on ✕ in the window toolbar in the "Links" area to delete the marked entry of the link list (deletions must be confirmed).

Note: Links related to the default device "Default Device" can't be deleted, they only can be edited.

6.3   Addressing devices

For point-to-point connections, the device does not need to be specially addressed. However, with multi-drop, all devices connected to a bus system (RS485 or CS) must have their own address for individual access. This address is called the **physical device address**. In fact, even two physical device addresses are used, one for the IEC protocol (IEC device address) and the other for the DLMS protocol (HDLC device address).

Unless otherwise specified on the order, the following parameter values are set as defaults for these physical device addresses:

- Physical **IEC** device address = serial number (printed on face plate of device), e.g. 73852799.

- Physical **HDLC** device address = last 4 digits of serial number plus 1000 (because with dlms the range of addresses is limited and some addresses are reserved), e.g. 3799 for a serial number 73852799 (2799 + 1000 = 3799).

The physical device addresses are saved as parameters of the basic meter and not in the possibly used E65C communication unit. A change of the E65C communication unit does therefore not affect the addressing. With the Landis+Gyr .MAP110 Service Tool, the physical device addresses of the devices can be read with the read commands under "Communication" or modified with the write commands under "Communication".

6.4   Establishing the communication with devices

Once the communication settings have been made (see section 6.1 "Basic principle") the communication with a device can be established as follows:

- Select (optional) the required device from the "Device" drop down list or use the setting "any device".

- Select the required communication channel from the "Channel" drop down list.
  Only those communication channels linked to the selected device are available. In the case of "any device" all communication channels are available.

- Select the required access level from the "Client" drop down list (for modem connections the predefined access level is used and the drop down list is inhibited until the connection is established, then the selection is possible). Only access levels, which have been defined completely in the communication settings, are displayed for selection (see also section 6.2.3.3 "Access levels"). The device-specific access levels appear with attached device name at the top of the list.

- Only for modem connections: select the required phone number from the "Phone" drop down list.

- Only for modem connections: click on in the address toolbar to establish the connection to the device.

- Only for network connections: select the required IP address number from the "IP Address" drop down list.

- Execute the required command from the command tree.

6.5   Communication examples

This section provides some examples to show how communication connections are made to devices via various communication paths and for various applications:

- Serial connection via the optical interface (see section 6.5.1)

- Serial connection to a local bus (see section 6.5.2)

- Modem connection (see section 6.5.3)

- Network connection via a LAN (see section 6.5.4)

- Network connection via a WLAN and the Internet (see section 6.5.5)

It is assumed in all examples that the physical connections (e.g. cable or modem connections) have already been made and the Landis+Gyr .MAP110 Service Tool has already been started.

6.5.1   Serial connection via the optical interface

This example shows how a local connection is made to a device via the optical interface. Depending on the device series used dlms or IEC is used as communication protocol.

PC with .MAP110

Device

Serial connection
(USB or COM port)

Procedure:

1. In the "Device" drop down list select the device you want to communicate with and in the "Channel" drop down list the corresponding channel (if more than one channel is assigned to this device) or create a new device with the following settings (for procedure see section 6.2.2 "Communication channel data" and section 6.2.3 "Device data"):

    - Physical interface = COM-Port assigned to the serial interface

    - Interface type = Serial (optical head or 3-wire)

    - Template for lower layer settings = Serial – dlms or "Seriell – IEC" according to the device used.

2. In the "Client" drop down list select the required access level for the intended activity e.g. "[1] Data Collection".

3. Select the required command in the command tree.
   The command is executed.

6.5.2 Serial connection to a local bus

This example shows how a multiple connection is made to several devices mutually connected via RS485 interfaces. dlms is used as communication protocol. In the layout diagram below, the device numbers are given for addressing.
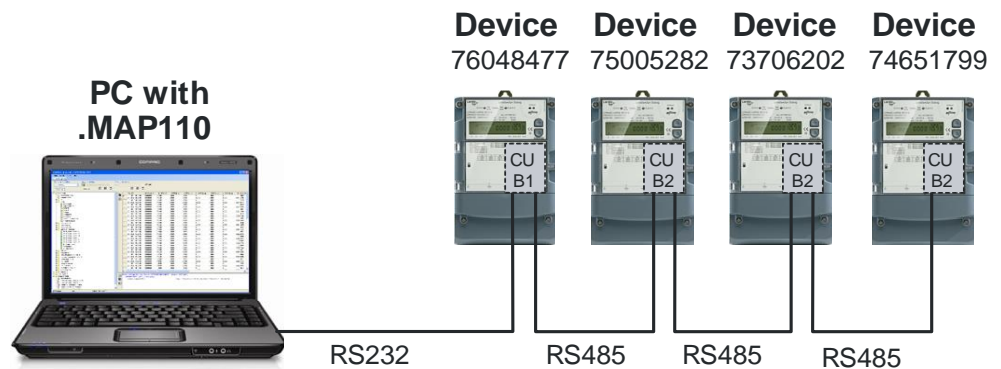

Procedure:

1. In the "Device" drop down list select the device you want to communicate with and in the "Channel" drop down list the corresponding channel (if more than one channel is assigned to this device) or create a new device with the following settings (for procedure see section 6.2.2 "Communication channel data" and section 6.2.3 "Device data"):

    - Physical interface = COM-Port assigned to the RS232 interface

    - Interface type = Serial (optical head or 3-wire)

    - Template for lower layer settings = Serial - dlms

    - Activated HDLC address = 9477 (this is calculated from the last 4 digits of the serial number 76048477 plus 1000 (see section 6.3 "Addressing devices"). Note: to address another meter change the device address accordingly in the device definition.

2. In the "Client" drop down list select the required access level for the intended activity e.g. "[2] Utility Field Service".

3. Select the required command in the command tree.
    The command is executed.

6.5.3   Modem connection

This example shows how a point-to-point connection is made for remote communication with a single device fitted with a communication unit with PSTN modem (CU-M2x) or with GSM modem (CU-G3x). dlms is used as communication protocol.

If further devices are connected to the device (multiple connection), their addressing has to be done with the physical device addresses as shown in the example in section 6.5.2 "Serial connection to a local bus".
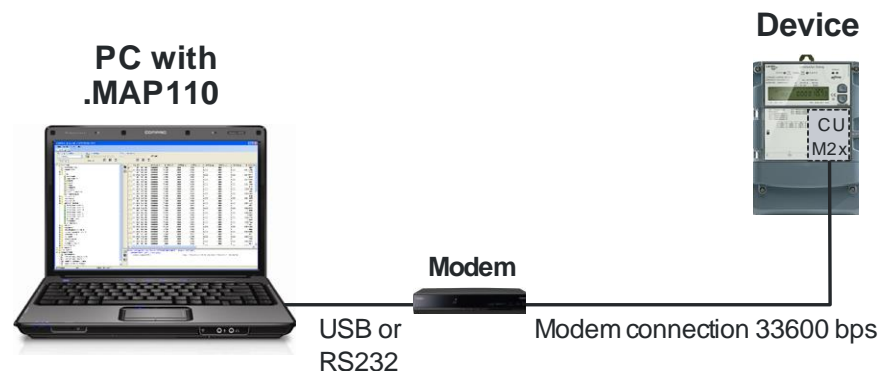
Procedure:

1.   In the "Device" drop down list select the device you want to communicate with and in the "Channel" drop down list the corresponding channel (if more than one channel is assigned to this device) or create a new device with the following settings (for procedure see section 6.2.2 "Communication channel data" and section 6.2.3 "Device data"):

-    Physical interface = The available PSTN (or GSM) modem

-    Template for lower layer settings = PSTN (or GSM) Modem

2.   In the "Client" drop down list select the required access level for the intended work e.g. "[6] Remote Data Colection".

3.   In the "Phone" drop down list select the required phone number of the connected device. If not already predefined, define it (for procedure see section 6.2.4 "Address data").

4.   Click on ⌨ in the address toolbar to make connection to the modem. While making the connection the "Command" window is displayed with a progress indication.

When the connection is made, it is indicated in the command log window and in the status bar.

5.   Select the required command in the command tree.
      The command is executed.

6.   Click on ⌨ in the address toolbar to conclude the modem connection.

6.5.4   Network connection via a LAN

This example shows how a point-to-point connection is made via a LAN to a single device equipped with a communication unit CU-E2x.
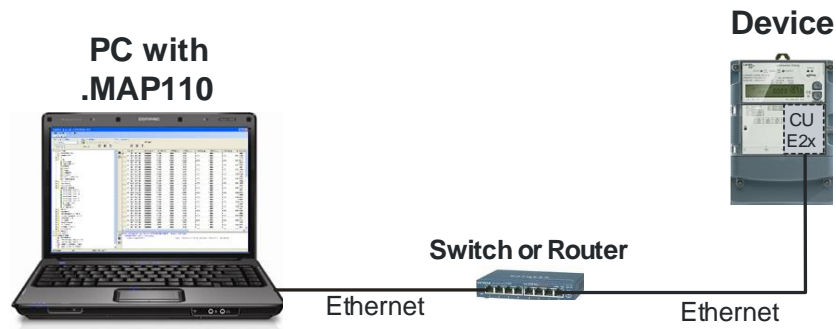

If further devices are connected to the device (multiple connection), their addressing has to be done with the physical device addresses as shown in the example in section 6.5.2 "Serial connection to a local bus".

Procedure:

1. In the "Device" drop down list select the device you want to communicate with and in the "Channel" drop down list the corresponding channel (if more than one channel is assigned to this device) or create a new device with the following settings (for procedure see section 6.2.2 "Communication channel data" and section 6.2.3 "Device data"):

   - Physical interface = The available network card
   - Template for lower layer settings = Wired - HDLC

2. In the "Client" drop down list select the required access level for the intended activity e.g. "[2] Utility Field Service".

3. In the "IP Address" drop down list select the required IP address of the connected device. If not already predefined, define it (for procedure see section 6.2.4 "Address data").

4. Select the required command in the command tree.
   Communication is started and the command executed.

6.5.5   Network connection via a WLAN and the Internet

This example shows how a point-to-point connection is made via a WLAN and the Internet to a single device equipped with a communication unit CU-P3x.
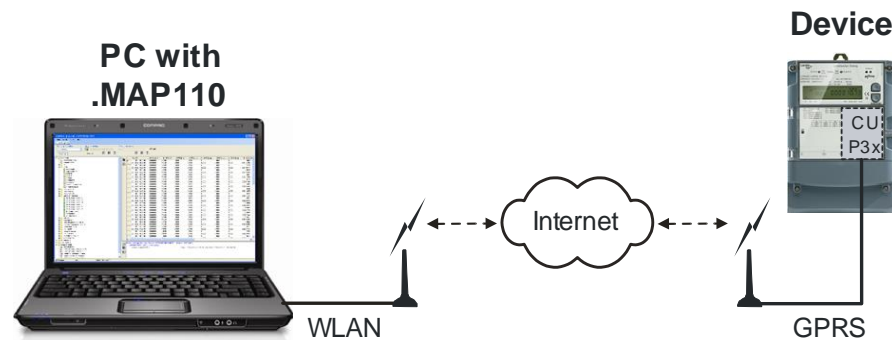

If further devices are connected to the device (multiple connection), their addressing has to be done with the physical device addresses as shown in the example in section 6.5.2 "Serial connection to a local bus".

Procedure:

1. In the "Device" drop down list select the device you want to communicate with and in the "Channel" drop down list the corresponding channel (if more than one channel is assigned to this device) or create a new device with the following settings (for procedure see section 6.2.2 "Communication channel data" and section 6.2.3 "Device data"):

   - Physical interface = The available WLAN network card

   - Template for lower layer settings = "Wireless – HDLC" or "Wireless – Wrapper" according to the device used.

2. In the "Client" drop down list select the required access level for the intended activity e.g. "[7] Remote Service".

3. In the "IP Address" drop down list select the required IP address of the connected device. If not already predefined, define it (for procedure see section 6.2.4.2 "IP addresses").

4. Select the required command in the command tree.
   Communication is started and the command executed.

6.6   Reference to other documents

Detailed information about Landis+Gyr Dialog communication solutions can be found in the following documents.

- **Data sheets** for the various communication units or modules

- **User manuals** for the various communication units or modules

- **Functional descriptions** of communication units or modules

- Detailed **application notes** for numerous reference applications with various communication units or modules for different transmission media

All these documents as well as advisory services are available from the competent representative of Landis+Gyr.

7 Commands

This section contains instructions for the use of commands (functions of the Landis+Gyr .MAP110 Service Tool) and for interpretation or further processing of results.

The selection of commands and their execution is described in section 5.4 "Command tree" under "Command execution".

7.1 Read commands

The following read commands are explained as examples:

- Simple read commands for parameters and values

- Extended read commands

- Read commands for event logs

- Read commands for load profiles

Other read commands can be used in a similar way.

7.1.1 Simple read commands

Simple read commands read out an individual parameter or value from the device which is displayed in the trace window.

For execution, select the corresponding read command in the command tree marked with the 🔼 or 🕐 icon.
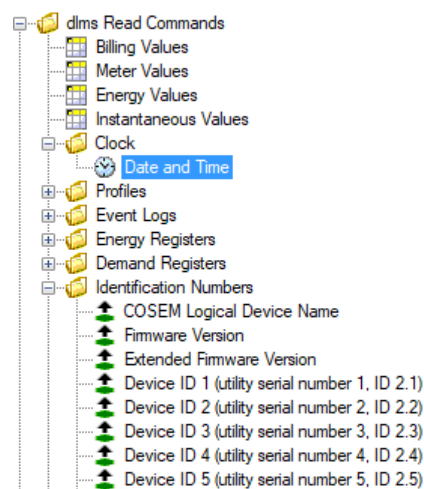
The parameters or values read out each appear in a line in the command log window (command left, result right):

7.1.2   Extended read commands

For extended read commands, a table of values and parameters is read out from the device and displayed in the result window.

To execute, select the "Billing Values", "Meter Values", "Energy Values" or "Instantaneous Values" read command (dlms devices) or "Data Readout" (IEC devices) in the command tree.

The table read out is shown in the result window. The designation of the command used is shown in the top row of the result window (also if a saved file is displayed). Each column of the table can be sorted in increasing or decreasing order by clicking on the relevant column heading. The table is sorted alphanumerically and the selected sorting sequence indicated in the column heading with an arrow pointing upwards for increasing or downwards for decreasing sequence.

For readout according to dlms, the Billing Values table contains the OBIS code for every value or parameter (see section 11 "OBIS identification codes"), the display value, the unit, exact designation and the group.

OBIS	Value	Unit	Designation	Group
0-0:42.0.0	LGZ1030739188859		COSEM logical device name	Identification Numbers
0-0:97.97.0	00000000		Error code	Diagnostics
0-0:97.98.0	00002000		Alarm code 1	Diagnostics
0-0:97.98.1	00000000		Alarm code 2	Diagnostics
0-0:97.98.2	00000000		Alarm code 3	Diagnostics
0-0:1.0.0	2019-12-20 12:06:55 (00)		Clock	Clock
0-0:96.1.0	39188859		Device ID 1 (manufacturer serial number)	Identification Numbers
0-0:96.1.1	39188859		Device ID 2 (utility serial number 2)	Identification Numbers
0-0:96.1.2	123456		Device ID 3 (utility serial number 3)	Identification Numbers
0-0:96.1.3			Device ID 4 (utility serial number 4)	Identification Numbers
0-0:96.1.4			Device ID 5 (utility serial number 5)	Identification Numbers
0-0:96.1.5	Device ID 6		Device ID 6 (IDIS certificate number)	Identification Numbers
1-1:1.8.0	22.956	kWh	Active energy import +A (QI+QIV)	Energy
1-1:2.8.0	29.460	kWh	Active energy export -A (QII+QIII)	Energy
1-1:3.8.0	11.144	kvarh	Reactive energy import +R (QI+QII)	Energy
1-1:4.8.0	9.064	kvarh	Reactive energy export -R (QIII+QIV)	Energy
1-1:1.8.1	18.344	kWh	Active energy import +A (QI+QIV) rate 1	Energy

With readout according to IEC the Data Readout table contains the code (identification value) for every value or parameter, the main value and where present an auxiliary value (e.g. date and time for demand values).

Code	Main Value	Auxiliary Value
F.F	00000000	
0.0.0	96096439	
1.2.0	0001.007 kW	
1.4.0	04	00.000 kW
1.6.0	00.000 kW	
1.6.0*01	00.000 kW	
1.6.0*10	00.000 kW	
1.6.0*10	00.000 kW	
1.8.0	000000.57 kWh	
2.2.0	0000.717 kW	
2.4.0	04	00.000 kW
2.6.0	00.000 kW	
2.6.0*01	00.000 kW	
2.6.0*10	00.000 kW	
2.6.0*10	00.000 kW	
2.8.0	000000.12 kWh	

The table can be saved as XML or text file for further processing or exported directly to the Excel table calculation program (see section 5.5 "Result window").

7.1.3   Read commands for profiles

With read commands for profiles (event logs, load profiles etc.) the profile memory is read from the device and shown in the result window.

For execution, select a "Profiles" or "Event Logs" read command in the command tree.

The profile range to be read out can be specified in a dialogue window:

- all

- last x days (with x entered)

- last x months (with x entered)

- from a specific starting date to a specific final date

For devices that support this feature, the desired time base (with or without daylight saving time) can be chosen additionally:
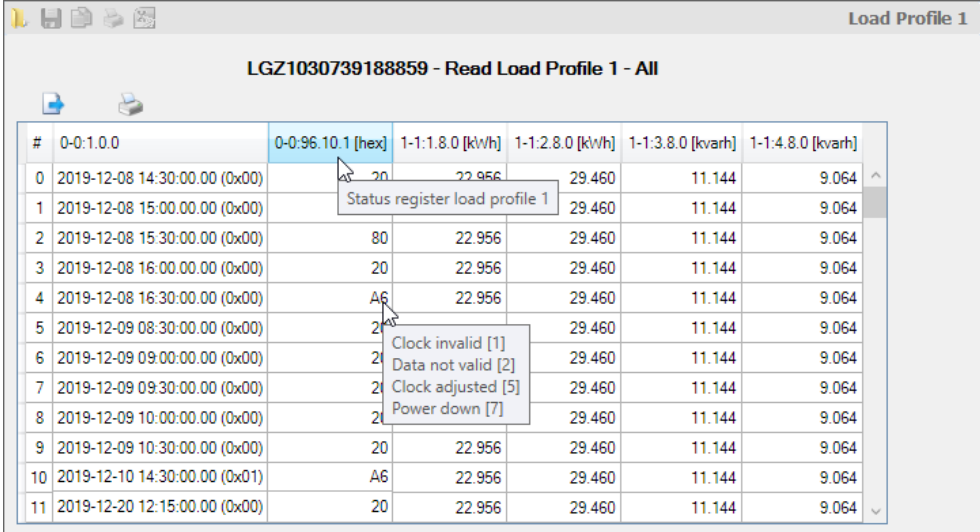
ⓘ   **Shortening readout time by data selection**
It is highly recommended to perform a data selection before readout of load profiles, since readout of the entire profile can take a considerable time (above all if the device has a short integrating period).

The profile data read out is shown as a table in the result window. With readout by dlms, the table contains for instance for a load profile the date and time-of-day, profile status word and the register status recorded for every integrating

period. An explanatory text is displayed by positioning the mouse pointer on a column heading or cell. For example the significance of the coded profile status word are decoded directly and all individual events displayed.

Example 1: Readout according to dlms of a load profile (time base: local normal time without DST).

For devices that do not transfer all the data in order to save communication time, the missing values are supplemented by the Landis+Gyr .MAP110 Service Tool (shown in italics in the readout).

With readout according to IEC the table contains the same data for every profile entry as for readout under dlms, although they are shown slightly differently (e.g. preceding zeros).

Example 2: Readout according to IEC of an event log.

The table can be saved as XML or text file for further processing or exported directly to the Excel table calculation program (see section 5.5 "Result window").

Event types and event numbers

A complete list with details, which event types can be recorded under which event number in the event log, is contained in the functional descriptions of the devices.
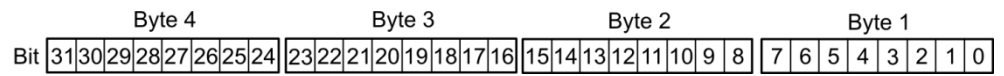
Profile status word

A complete list with details, which individual events are displayed under what numbers (corresponding to the bit of the status word) is also contained in the functional descriptions of the devices.

The profile status word indicates the current status of the device and the network it is connected to.

The profile status word has a size of 4 bytes and can be restricted to 2 bytes by para-meterisation with the Landis+Gyr .MAP120. In this case only the bytes 1 and 2 (bits 0 to 15) are available. In the IEC readout only the bytes 1 and 2 will be in-cluded no matter the parameterisation.

Bit assignment in profile status word:

Byte 4	Byte 3	Byte 2	Byte 1
Bit	31 30 29 28 27 26 25 24	23 22 21 20 19 18 17 16	15 14 13 12 11 10 9 8	7 6 5 4 3 2 1 0

7.1.4   Emergency readout

With the read command for emergency readout the device data can be read out into a XML file, e.g. if communication between the central system and the device fails (for IEC protocol only). This XML file can be imported later on into the Landis+Gyr automatic device reading system "Converge".

For execution, select the read command for emergency readout in the command tree marked with the [XML] icon.
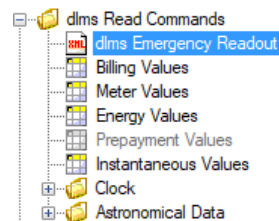
The following data can be specified in a dialogue window:

- read out only billing data or billing data and load profile in the range specified

- device identification automatically by OBIS code contained in the billing data or manually

- working folder, where the XML file shall be saved

After clicking **OK** the selected data will be saved into a XML file in the working folder specified.

The file name corresponds to the device identification, the extension is xml, e.g. "77708190.xml". If the same device is read out several times, the previous file is overwritten without warning.

7.2   Write commands

For execution, select the corresponding write command in the command tree marked with the ⬇ or 🕗 icon.
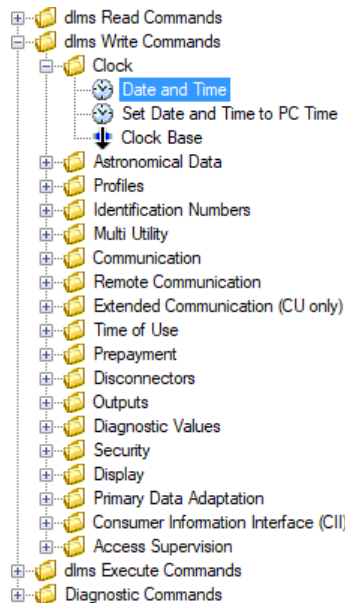
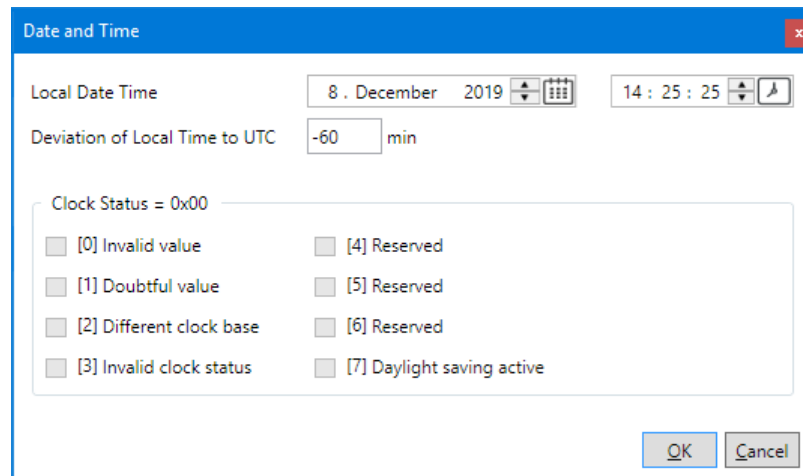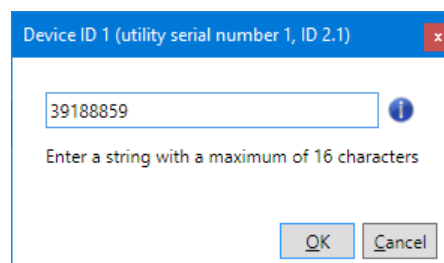With write commands, the current parameter or value is always read out first from the device and displayed in a dialogue window for modification, e.g. for setting time and date:

or for writing an identification number:

Modify the data displayed and then click on **Ok**. The modified data is written in the device and recorded in the command log window (command left, value right):

Further write commands are explained as examples in the following subsections.

With the execution of the following write commands, a MAP100 export file in MAP100 V2.0 format is generated and saved in the directory defined in the .MAP110 option settings (see section 8.8 "Enabling .MAP100 file export"), if the function is activated:
- Parameterisation ID
- Passwords level 1, 2 and E
- Time of use (TOU)
- Billing period reset.
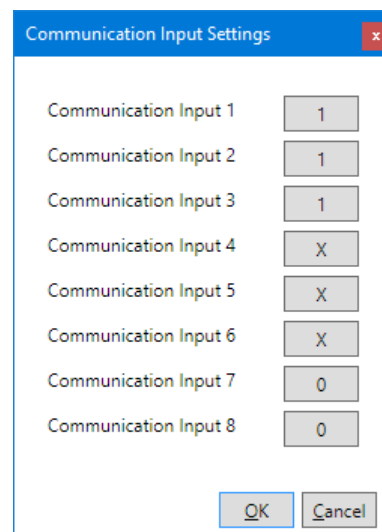
These write commands are recognisable in the command tree from the green plus sign added to the icon, e.g. Parameterisation ID.

7.2.1   Set communication inputs

For execution, select the "Communication Input Settings" write command in the "Communication" folder of the command tree.
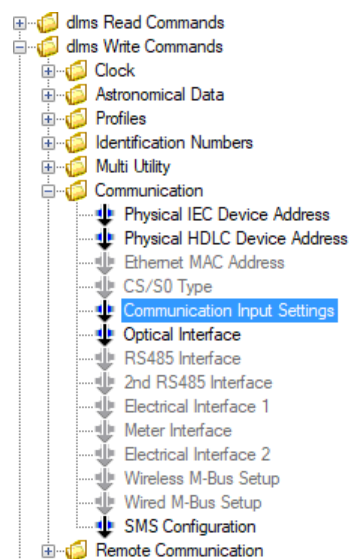
All communication inputs are displayed in the dialogue window. By clicking on a field you can toggle between 0, 1 and X (value remains the same).

Click on **OK** to write the values set into the device.

7.2.2 Modify SMS configuration settings

For execution, select the "SMS Configuration" write command in the "Communication" folder of the command tree.
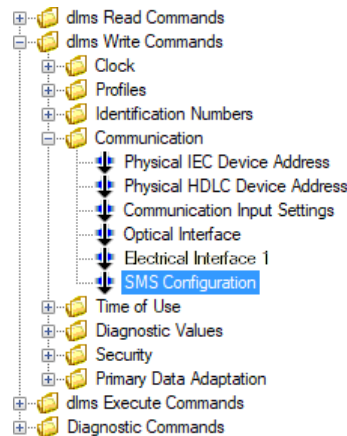
The SMS configuration data is displayed in the dialogue window. You can modify the phone number, the message text, the initialisation string and the transmission parameters.

Click on **OK** to write the values set into the device.

You can check the settings with the execute command "SMS Test" (see 7.3.1 "SMS test transmission").

7.2.3   Modify communication unit settings

The write commands in the folder "Extended Communication (CU only)" of the command tree allow you to modify the settings of communication units and communication unit adapters (ADP).
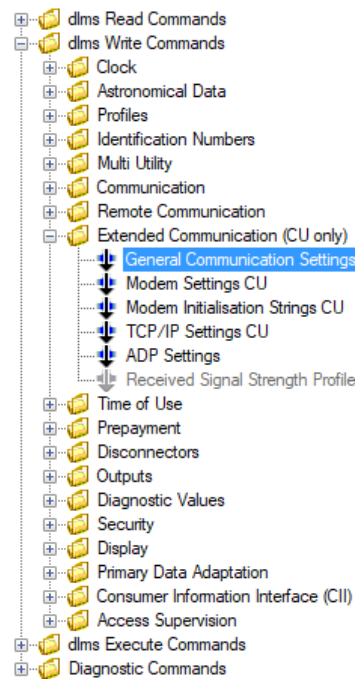
In the dialogue window you can modify the corresponding communication settings, e.g. the modem configuration of a communication unit with GPRS modem, as shown in the following figure.
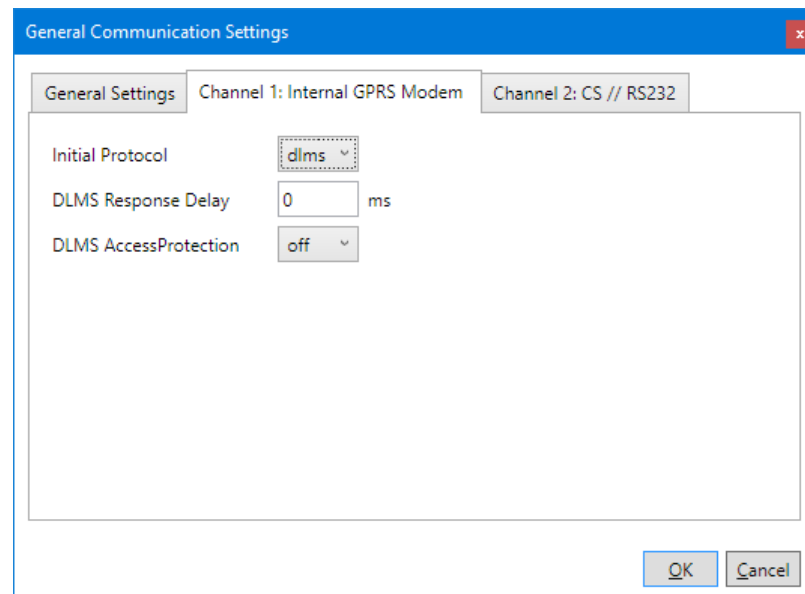
Click on **OK** to write the values set into the communication unit.

7.2.4   Modify time of use

For execution, select the "Time of use (TOU)" write command in the "Time of Use" folder of the command tree.
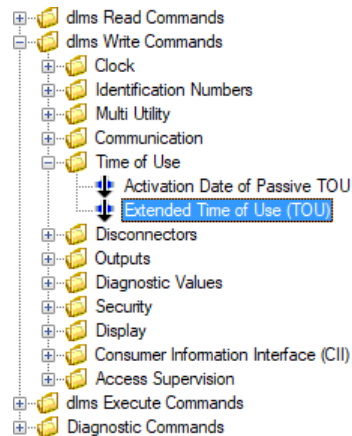
In the dialogue window "Time of use (TOU)" you can modify the TOU read out from the device and write it back again into the device. You can also save a read out TOU in a XML file or load a saved XML file into the .MAP110 to write it into the device.

Clicking on [icon] opens the "Save as" dialogue window to save the TOU in a freely selected directory as XML file.

Clicking on [icon] opens the "Open File" dialogue window to load a TOU saved in a XML file.

Clicking on [icon] copies the active TOU into the passive TOU.

You can also copy the entire TOU or an individual table to the Windows clipboard to paste it afterwards into the TOU of another device connected to the .MAP110 and write it into this device. The TOU of the different device families are thereby exchangeable among themselves.

Clicking on [icon] copies the entire TOU from the .MAP110 to the Windows clipboard.

Clicking on [icon] copies an individual table from the Windows clipboard into the .MAP110.

To copy an individual table to the Windows clipboard or to paste it from the Windows clipboard, click in the "Time of use (TOU)" dialogue window on a table and then select the corresponding copy or paste command in the pop-up menu appearing.
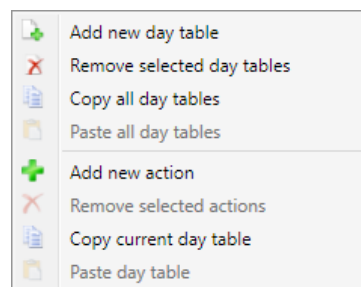
Via the Windows clipboard it is also possible to import an entire TOU from a Landis+Gyr .MAP120 Parameter Editor. The transfer in the opposite direction from .MAP110 to .MAP120 is however not supported.

Click on **OK** to write the modified or imported TOU into the device. Afterwards the "Time of use (TOU)" dialogue window disappears again.

7.2.5   Primary values adaptation

For execution, select the "Primary Data Adaptation" write command in the "Primary Data Adaptation" folder of the command tree.
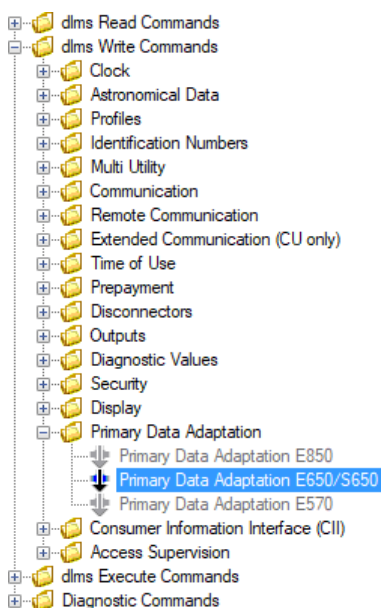
In the dialogue window you can modify the primary value adaptation settings of transformer connected devices.

Click on **OK** to write the values set into the device.

7.3   Execute commands

For execution, double click the relevant execution command in the command tree marked with the ⬇ icon.
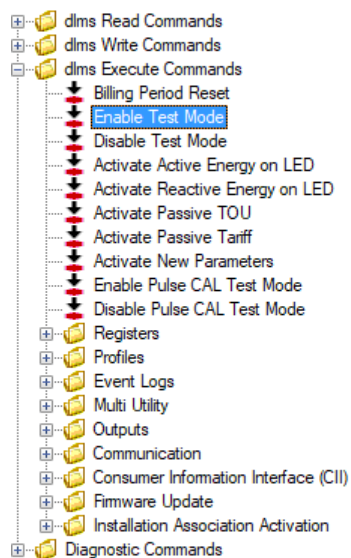
The execute command is normally transmitted to the device without additional dialogue (exception: see 7.3.1 "SMS test transmission") and executed there. The commands executed are recorded in the command log window:

7.3.1 SMS test transmission

For execution, select the "SMS Test" execute command of the command tree.
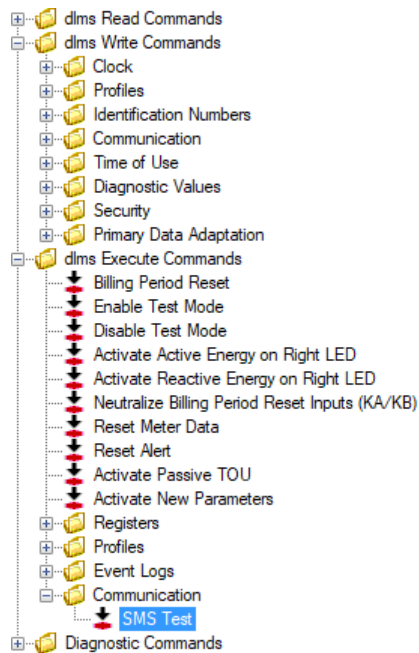
The "SMS Test" dialogue window appears. In this window you can enter the phone number to be called and the message text of the test SMS.

Click on **Send Test SMS** to send the Test SMS.

By clicking on **Read SMS Status** you can display the SMS status.

7.3.2   Firmware update

This execute command is only applicable for meters of the E450, E460, E570 and L540 device series and for E35C V4.x communication modules.

ⓘ   **Additional knowledge required**
Additional knowledge is required to apply this execute command. The following information provides only an overview about this command.
Please contact your sales representative to receive further information about this command.

ⓘ   **Required firmware file**
An image file with the new firmware release of the device is required for the firmware update. This image file provided by Landis+Gyr has to be stored in any directory of your computer.

For execution, select the "Firmware Update Metering Application" execute command of the command tree.

```
⊞ 📁 dlms Read Commands
⊞ 📁 dlms Write Commands
⊟ 📁 dlms Execute Commands
      ↓ Billing Period Reset
      ↓ Enable Test Mode
      ↓ Disable Test Mode
      ↓ Activate Active Energy on LED
      ↓ Activate Reactive Energy on LED
      ↓ Activate Passive TOU
      ↓ Activate Passive Tariff
      ↓ Activate New Parameters
      ↓ Enable Pulse CAL Test Mode
      ↓ Disable Pulse CAL Test Mode
   ⊞ 📁 Registers
   ⊞ 📁 Profiles
   ⊞ 📁 Event Logs
   ⊞ 📁 Multi Utility
   ⊞ 📁 Outputs
   ⊞ 📁 Communication
   ⊞ 📁 Consumer Information Interface (CII)
   ⊟ 📁 Firmware Update
         ↓ Firmware Update Metering Application
         ↓ Firmware Update M-Bus Driver
         ↓ Firmware Update PLC Modem Driver
         ↓ Activate New Firmware
   ⊞ 📁 Installation Association Activation
⊞ 📁 Diagnostic Commands
```

The Update Wizard "Firmware Update" appears.
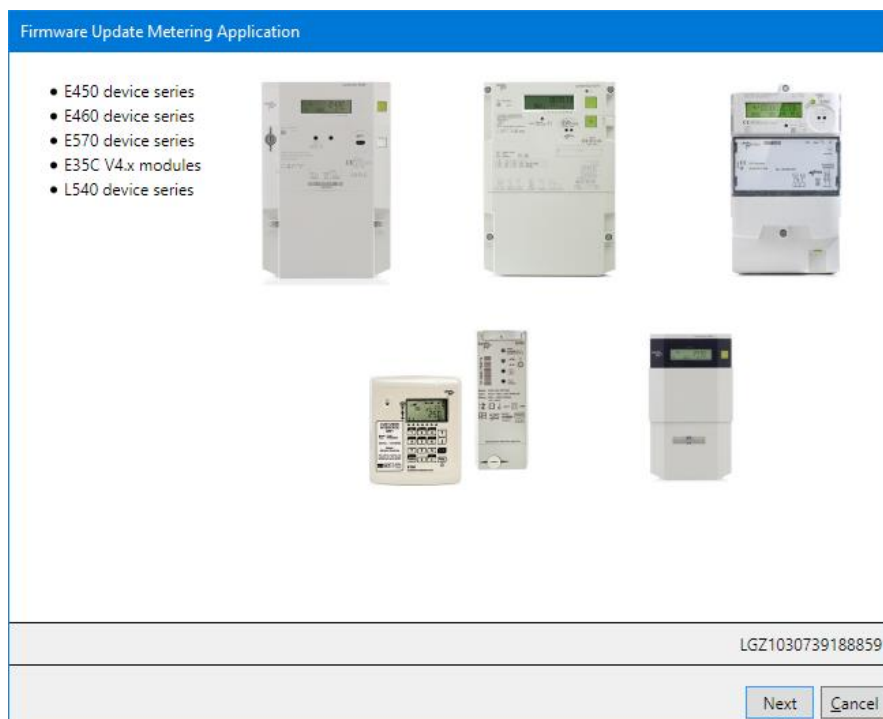
This Wizard guides you through the update process:

1. Click on **Next >**.
    The screen "Step 1: Selection of firmware" appears.

2. Click on in the "Image File" area and in the appearing "Open" window select the image file received from Landis+Gyr and stored on your computer. The path and name of the selected file will be displayed.
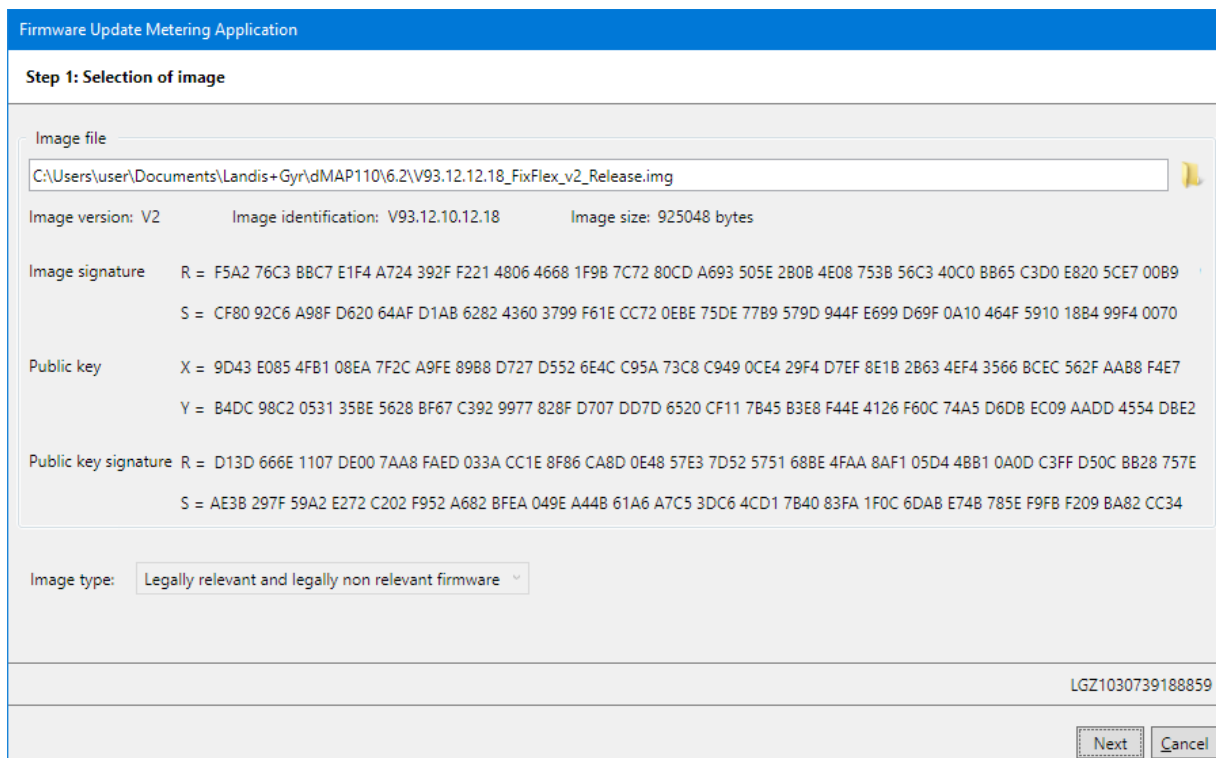
3. Click on **Next >**.
   The screen "Step 2: Initialisation of transfer" appears.
   The following data about the firmware will be displayed:

   - Identification of the currently loaded firmware in the device
   - Identification of the new firmware
   - Total size, block size and number of blocks of the new firmware

4. In the "Activation" area select whether the firmware shall be activated immediately after the transfer or at a later point in time to be entered.

5. Click on **Next >**.
   The screen "Step 3: Transfer, verification and activation" appears.

6. Click on **Start new transfer**.
   The new firmware is transferred to the device. The progress is indicated in the "Progress" area.
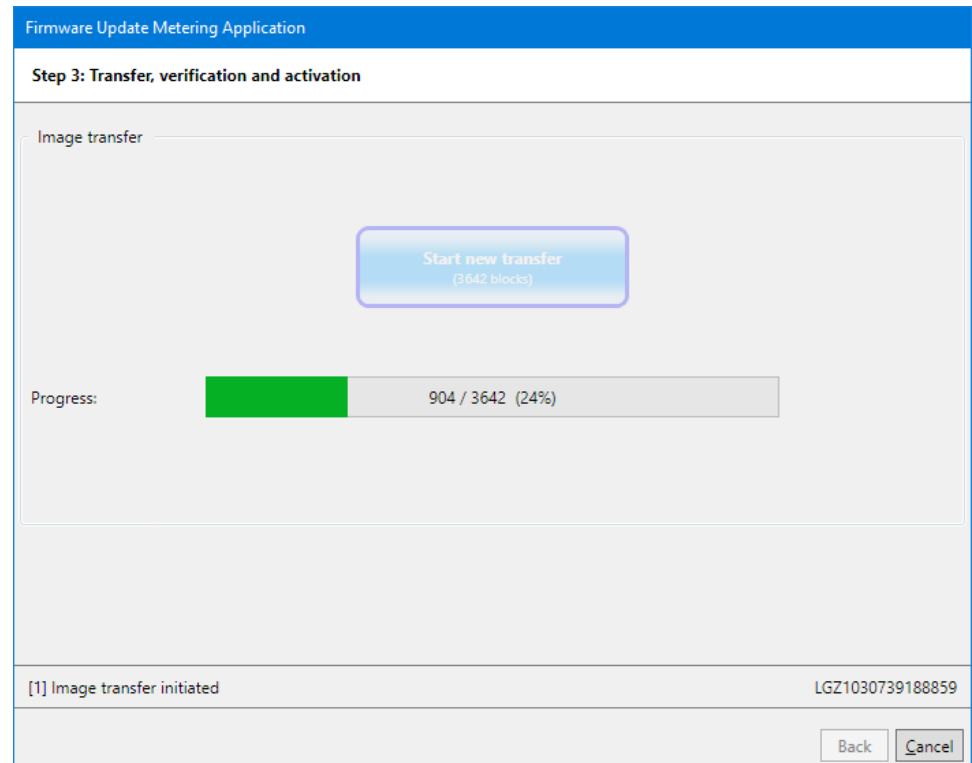
When all blocks are transferred, the verification process is initiated.
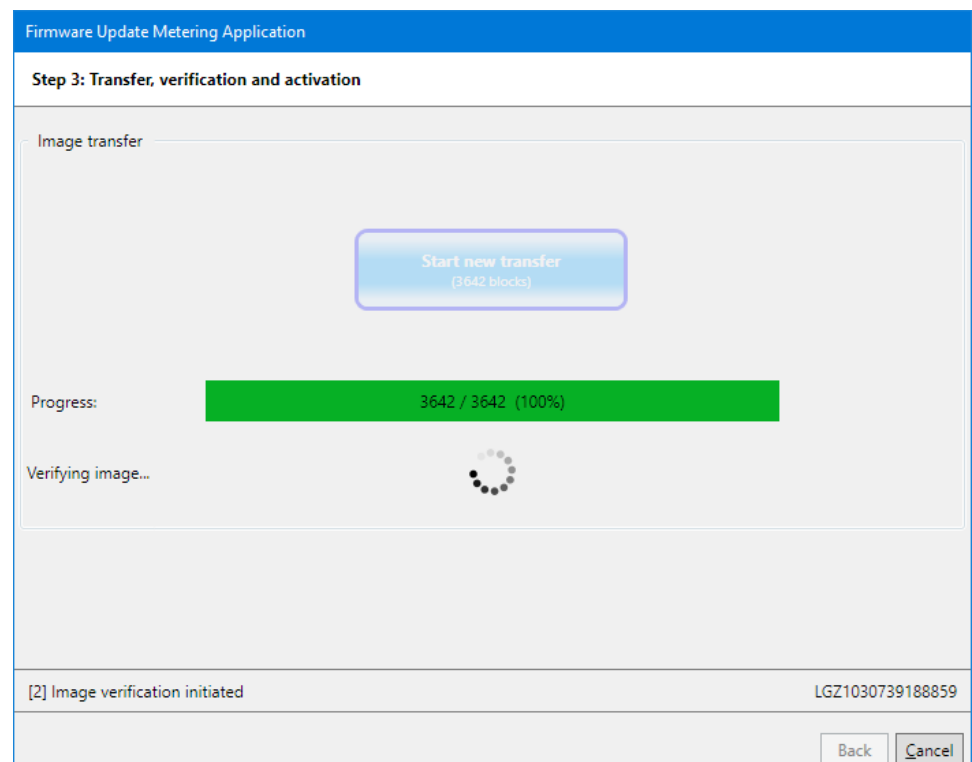
Wait until all blocks are verified and the subsequent firmware activation is started. Then the following display appears:
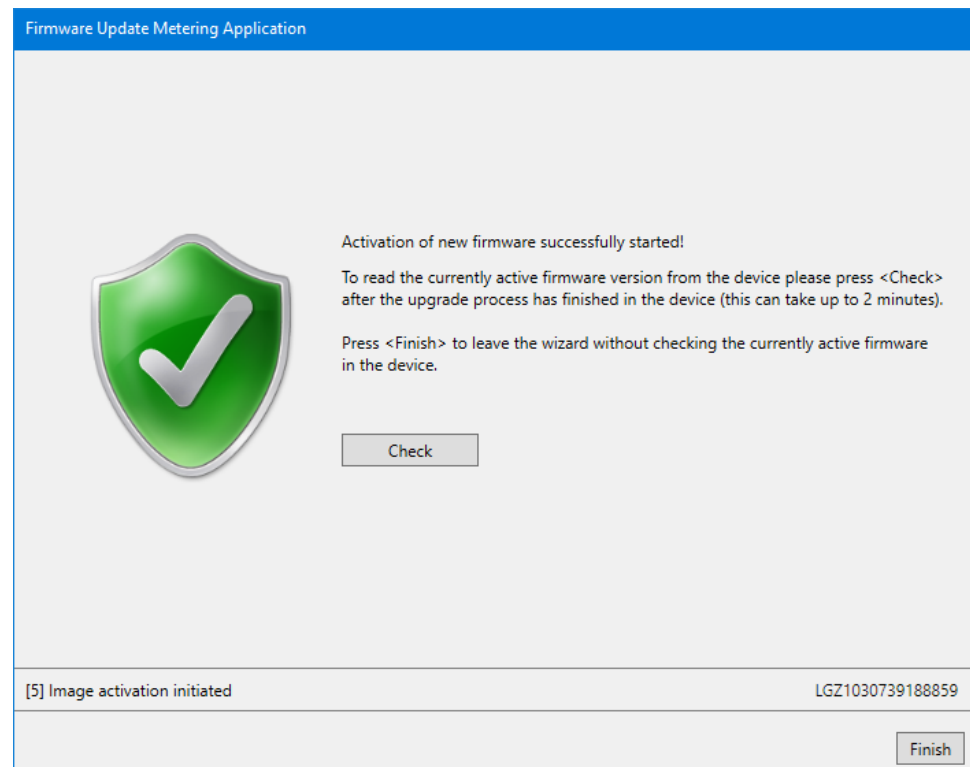
7. Click on **Check**.
   The wizard starts polling the device every 5 seconds and as soon the communication is possible the currently active firmware release is read from the device. The designation of button **Check** changes to **Stop**. With this button the check can be aborted. Please note that the activation of a new firmware can take several minutes. During this time no communication with the device is possible. After the check the following display appears:
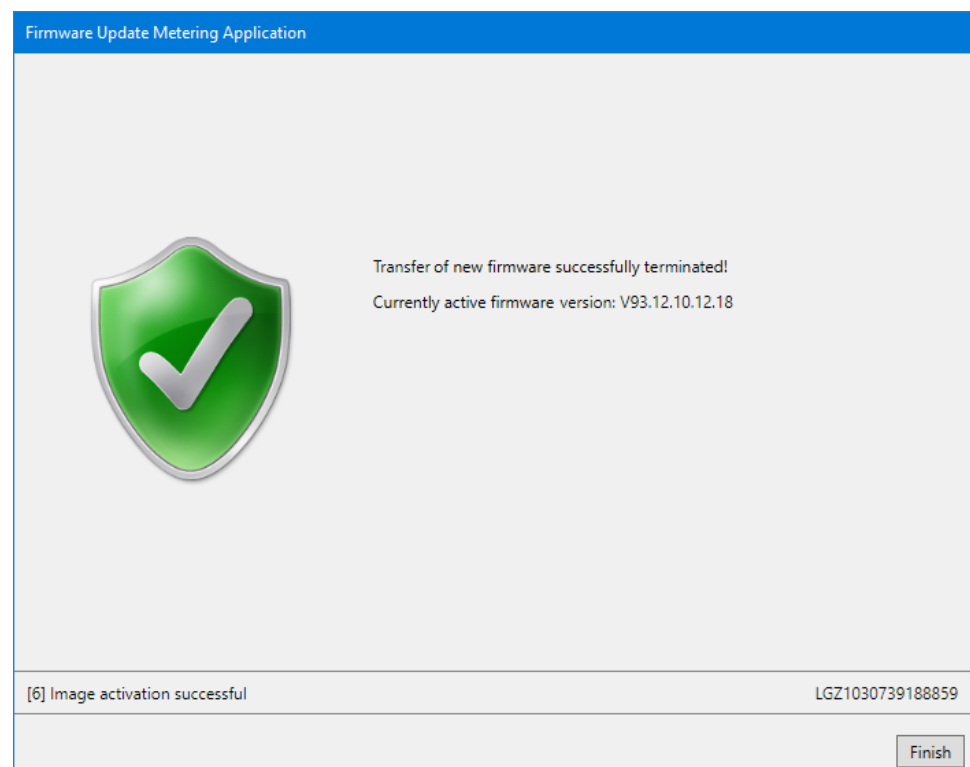
8. Click on **Finish**.
   This concludes the firmware update.

7.4 Diagnostic commands

7.4.1 Vector diagram

A vector diagram of the currents and voltages of the device connected can be displayed with this diagnostic command.

For execution, select the "Vector Diagram" diagnostic command in the command tree.
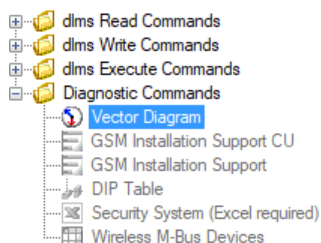
A vector diagram is shown in the "Vector Diagram" window, which is calculated from the continuously read instantaneous values of voltages, currents and phase angles. The individual instantaneous values measured by the meter are displayed next to the diagram.
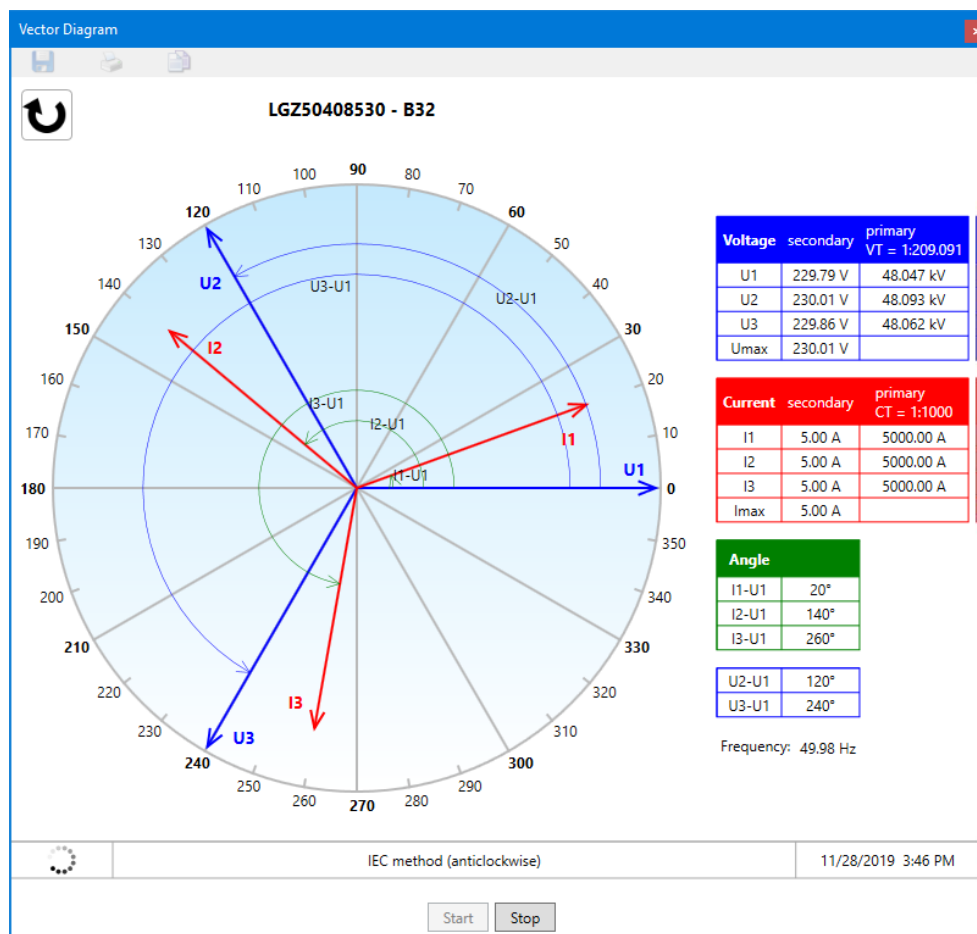
Clicking **Stop** interrupts a current readout of the instantaneous values.

Clicking or respectively, switches between the anticlockwise view to the clockwise view.

Clicking opens the "Save as" dialogue window to save the data displayed in a freely selected directory as XML file.

Clicking displays a print preview, from which the vector diagram can be printed on the standard printer.

Clicking copies the vector diagram to the Windows clipboard, from where it can be inserted in another application (e.g. in a word processing program).

The diagnostic command is ended with **Close**.

7.4.2   GSM installation support

This diagnostic command can only be used if the device connected has a communication unit with GSM modem or if an AD-FG/CG communication module is to be addressed.

For execution, select the "CU GSM Installation Support" or "GSM Installation Support" diagnostic command in the command tree.
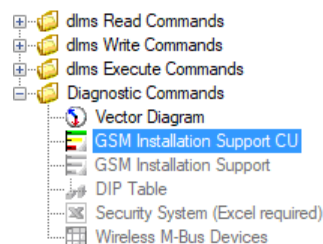
The field strengths of the cell logged in and all neighbouring cells are displayed in the "GSM Installation Support" window. When used on the spot this allows the optimum antenna position to be determined or a check of the received field strength.
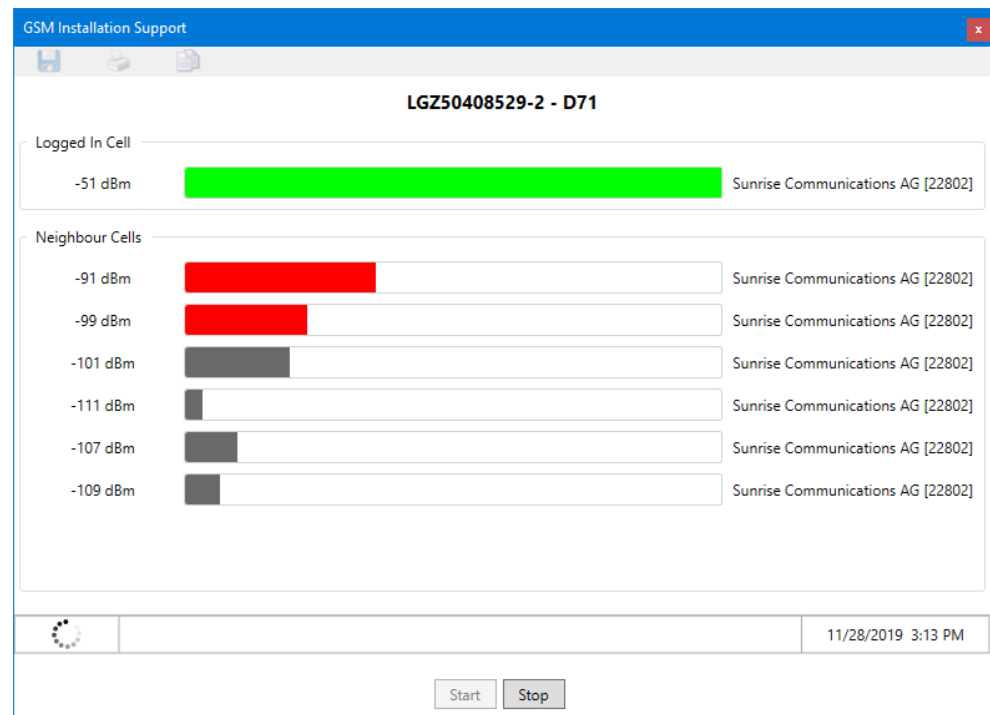
Measurement of field strength is

- continuously updated if the values are read out via device and optical head and no communication takes place simultaneously via the GSM channel, or

- not continuously updated if the values are read out via the GSM channel (in this case the values measured immediately after making the connection are displayed).

Clicking **Stop** interrupts a current measurement of field strength.

Clicking **Restart** repeats the interrupted measurement of field strength.

The diagnostic command is ended with **Cancel**.

7.4.3 DIP table

A graphic evaluation of all voltage failures occurring since the last deletion of the DIP table can be performed with this diagnostic command.

For execution, select the "DIP Table" diagnostic command in the command tree.
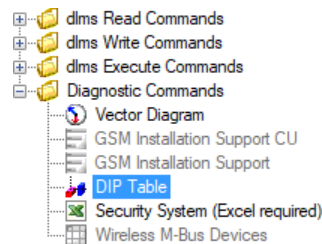
A diagram and a table with number, duration and category of voltage failures are shown in the result window.

	20 ms < 100 ms	100 ms < 500	0.5 s < 1 s	1 s < 3 s	3 s < 20 s	20 s < 60 s
85%Un < 90%Un	4	1	0	0	0	0
70%Un < 85%Un	13	2	13	0	1	0
40%Un < 70%Un	3	1	3	0	0	0
1%Un < 40%Un	0	2	3	5	3	0
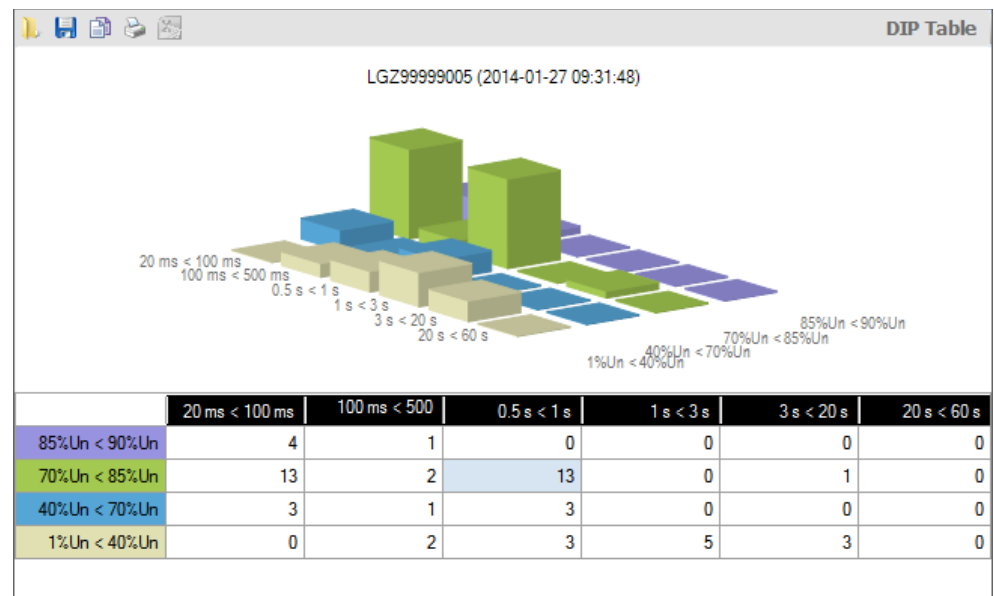
The categories, i.e. the severity of the voltage failures, are shown in colour, e.g. voltage failures of 1 to 40 % of rated voltage in violet. The table contains a line for each category, the diagram a series of bars in the x-direction.

The number of voltage failures occurring is shown in the table as numeral and in the diagram as bar height.

The duration of the voltage failures is divided into four ranges: 20 to 100 ms, 100 to 500 ms, 0.5 to 1 s, 1 to 3 s, 3 to 20 s and 20 to 60 s. The table contains a column for each range, the diagram a series of bars in the y-axis with bars of different colour.

If a change has occurred since the last readout, the relevant bar is shown in red.

When a column or line heading or cell in the table is clicked, the corresponding bar series in the x or y axis or the relevant individual bar is shown highlighted.

	20 ms < 100 ms	100 ms < 500	0.5 s < 1 s	1 s < 3 s	3 s < 20 s	20 s < 60 s
85%Un < 90%Un	4	1	0	0	0	0
70%Un < 85%Un	13	2	13	0	1	0
40%Un < 70%Un	3	1	3	0	0	0
1%Un < 40%Un	0	2	3	5	3	0
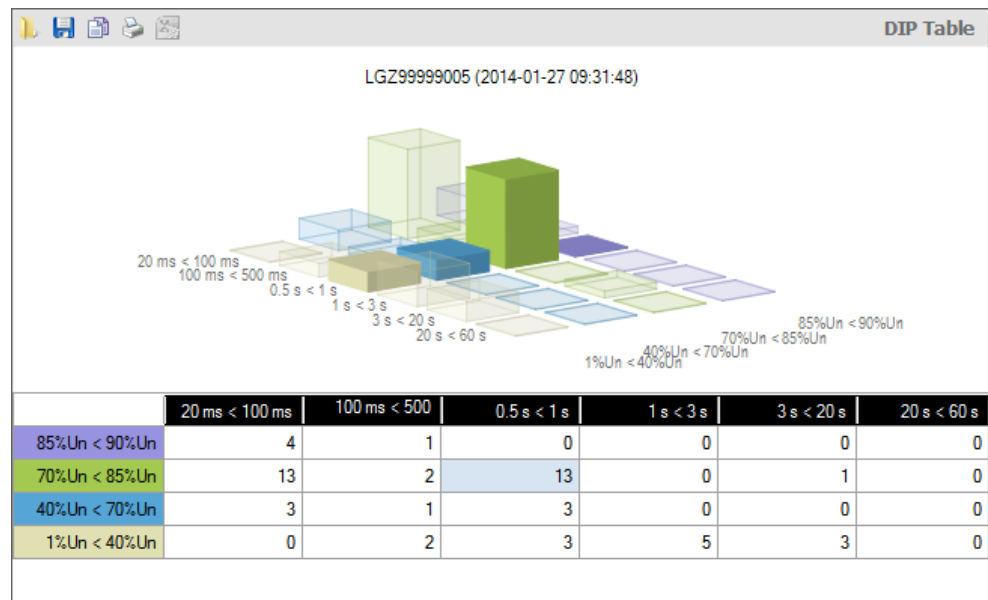
When the cursor is placed on a bar in the diagram, the corresponding value is indicated in the diagram.
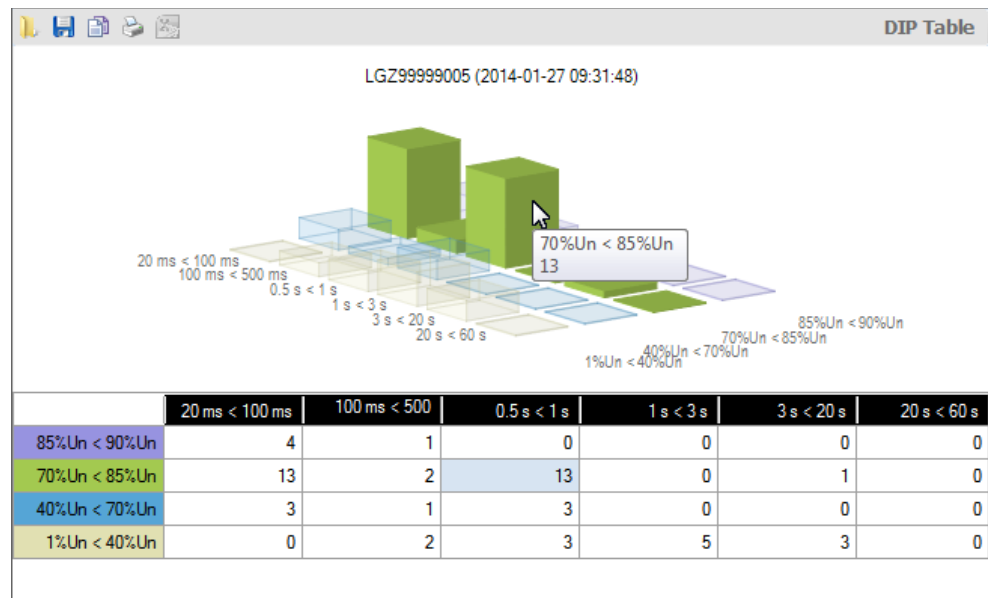
	20 ms < 100 ms	100 ms < 500	0.5 s < 1 s	1 s < 3 s	3 s < 20 s	20 s < 60 s
85%Un < 90%Un	4	1	0	0	0	0
70%Un < 85%Un	13	2	13	0	1	0
40%Un < 70%Un	3	1	3	0	0	0
1%Un < 40%Un	0	2	3	5	3	0

Clicking on [icon] in the result window toolbar opens the "Open Result File" dialogue window to display result files previously saved again in the result window.

Clicking on [icon] in the result window toolbar opens the "Save as" dialogue window to save the data displayed in a freely selected directory as XML file.

Clicking on [icon] in the result window toolbar displays a printing preview, from which the contents of the result window can be printed with the standard printer specified.

Clicking on [icon] in the result window toolbar copies the content of the result window to the Windows clipboard, from where it can be inserted in another application (e.g. in a word processing program).

Deletion of the DIP table can be performed with the "Reset DIP Table" diagnostic command.

7.4.4   Security system

With this diagnostic command the device security system data can be displayed with the Excel table calculation program.

For execution, select the "Security System" diagnostic command in the command tree.
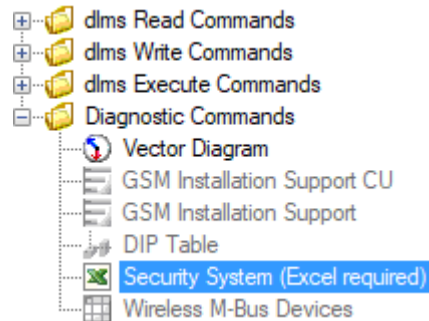
The security system data is read from the device connected and displayed as follows in the Excel table calculation program:
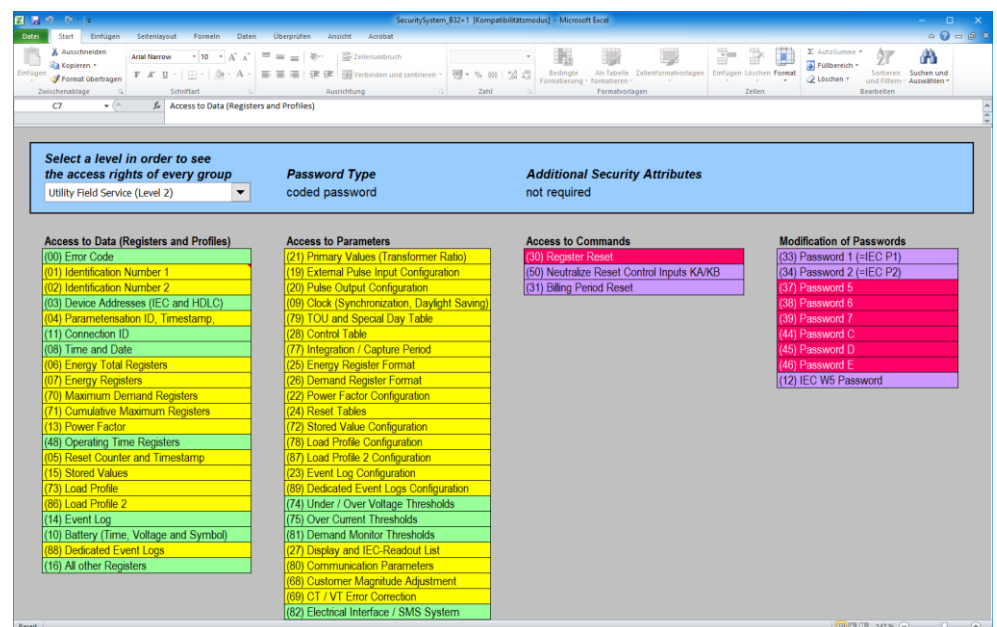
The desired security level can be selected in the drop down list at top left. The access rights for the level selected for individual data, parameters, commands and passwords are then displayed by means of colours according to the colour code.

8   Auxiliary functions

This section describes auxiliary functions of the Landis+Gyr .MAP110 Service Tool:

- Changing the language of the user interface

- Setting colour for disabled commands

- Selecting the calendar base for IEC commands

- Defining storage location of communication settings

- Defining storage policy for keys and passwords

- Setting delay times

- Activating command confirmation

- Enabling .MAP100 file export

- Displaying help topics

- Displaying release notes

- Displaying the current program release and checking for updates

8.1   Changing the language of the user interface

This function allows changing the language of the .MAP110 Service Tool user interface.

Procedure:

1.   Select **Startup language** from the **Tools** menu.
      The "Startup Language" window appears.
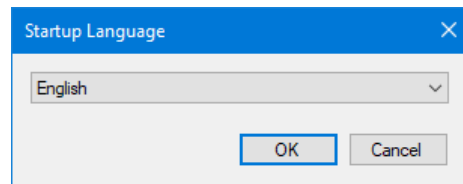
2.   Select the desired language.

3.   Click on **OK**.
      The "Startup Language" window disappears.
      The selected language will be used upon the next startup of the .MAP110 Service Tool.

8.2 Setting colour for disabled commands

The colour for emphasising disabled commands can be set individually with this setting (see also 5.4 "Command tree").

Procedure:

1. Select **Options** from the **Tools** menu.
    The "Options" window appears.

2. Select the "General" tab.
    The colour currently selected for disabled commands is shown.
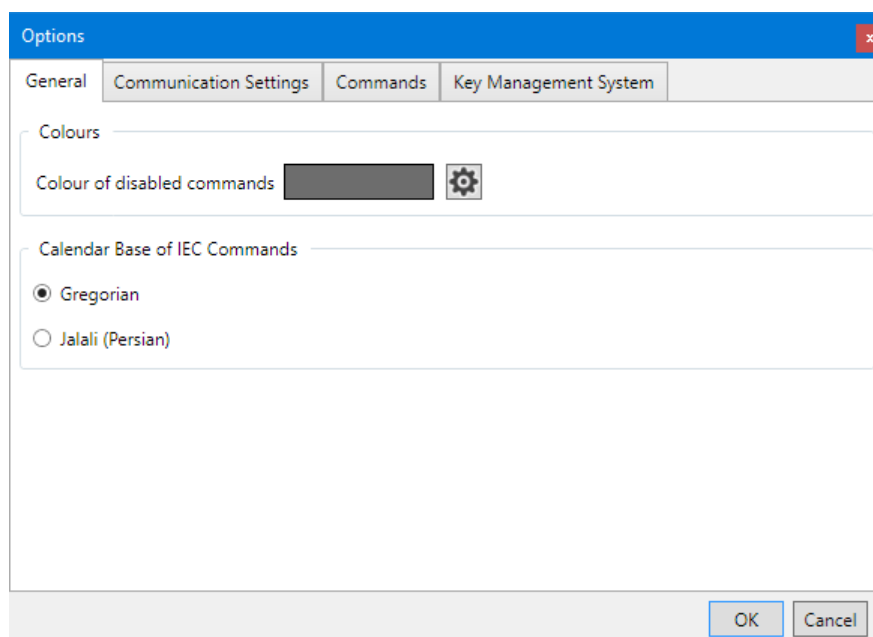
3. In the "Colours" area click on the button [gear icon].
    The "Colour" window appears with a colour palette.

4. Select the desired colour and click on **OK**.
    The "Colour" window disappears and the selected colour is shown in the field "Colour of disabled Commands".

5. Click on **OK**.
    The "Options" window disappears and the disabled commands are emphasised in the new colour in the command tree.

8.3   Selecting the calendar base for IEC commands

Procedure:

1.   Select **Options** from the **Tools** menu.
      The "Options" window appears.

2.   Select the "General" tab.

3.   Select the required calendar base in the "Calendar Base for IEC Commands"
      area.
      The entry of date values occurs in the selected format for IEC commands.
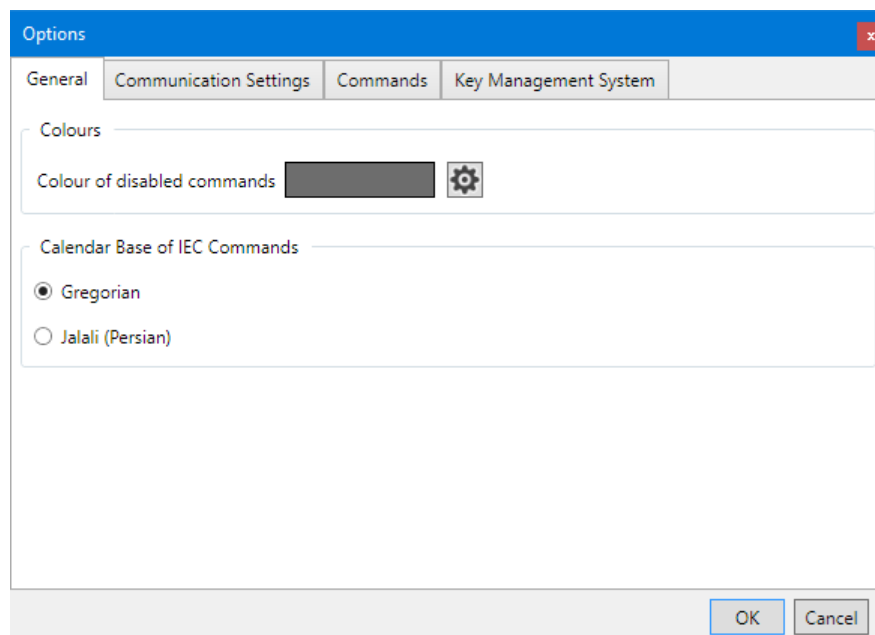
4.   Click on **OK**.
      The "Options" window disappears and the new settings are saved.

8.4   Defining storage location of communication settings

The path where communication settings are stored can be set with this setting.

The communication settings can be shared for all .MAP tools.

Since the keys, passwords and the storage policy are stored encrypted per Windows user, the communication settings cannot be used by other Windows users on the same PC.

Procedure:

1.   Select **Options** from the **Tools** menu.
      The "Options" window appears.

2.   Select the "Communication Settings" tab.

3.   In the "File Location" area click on [...] and select a directory in the tree appearing or enter the path to the desired directory.
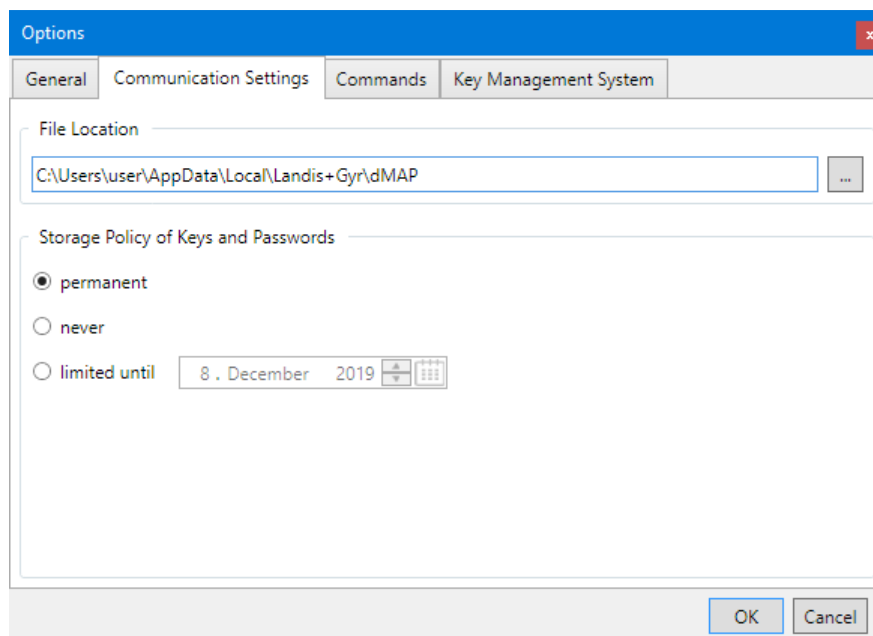
4.   Click on **OK**.
      The "Options" window disappears and the new settings are saved.

All communication settings are stored in the files "DeviceConnectionSettings Vxx.xml", "AddressBookVxx.xml" and "SecuritySettingsVxx.xml" (xx = data version, e.g. 12). Please note that these files will not be automatically transferred into the new directory. If required, the files have to be copied or moved manually.

The default directory for an initial installation is "C:\Users\Current User\AppData\Local\Landis+Gyr\dMAP".

8.5   Defining storage policy for keys and passwords

With this setting, you can set the storage policy for passwords and keys.

> ⓘ **Data deletion with each modification**
> Any modification in the storage policy causes a deletion of all passwords and keys.

Procedure:

1.   Select **Options** from the **Tools** menu.
      The "Options" window appears.

2.   Select the "Communication Settings" tab.
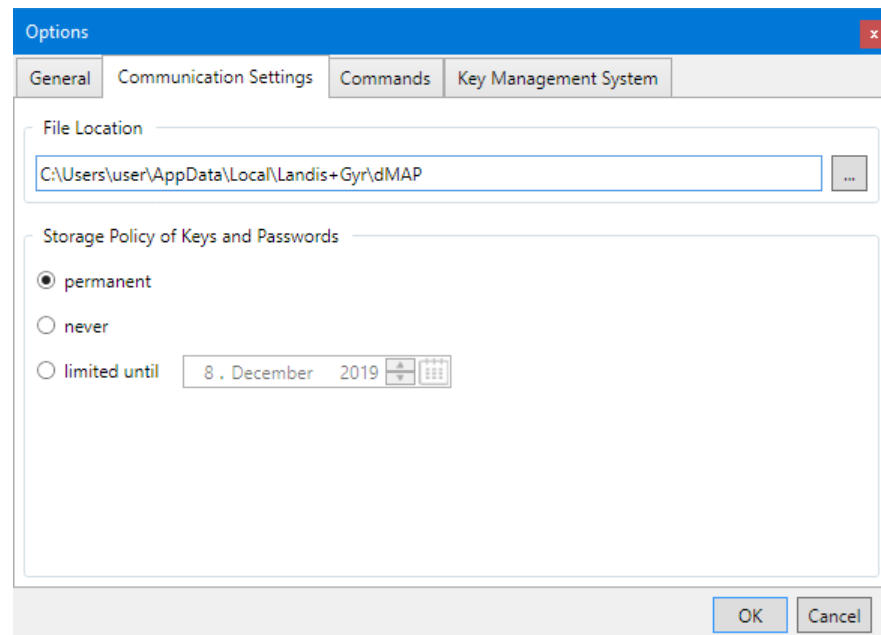
3.   Select the desired storage policy.

      permanent: The passwords and keys are permanently stored on the PC.

      never: The passwords and keys are not stored, i.e. they will be lost when you exit the .MAP tool.

      limited until: The passwords and keys are stored on the PC until the specified expiration date is reached on the PC, and then deleted.

4.   Click on **OK**.
      The "Options" window disappears and the new settings are saved.

8.6 Setting delay times

The repetition delay for diagnostic commands and the repetition delay before reading the status of sent test SMS messages can be set individually with this setting.

Procedure:

1. Select **Options** from the **Tools** menu.
    The "Options" window appears.

2. Select the "Commands" tab.

3. Enter the desired delay times in the corresponding entry fields in the "Command Control" area.
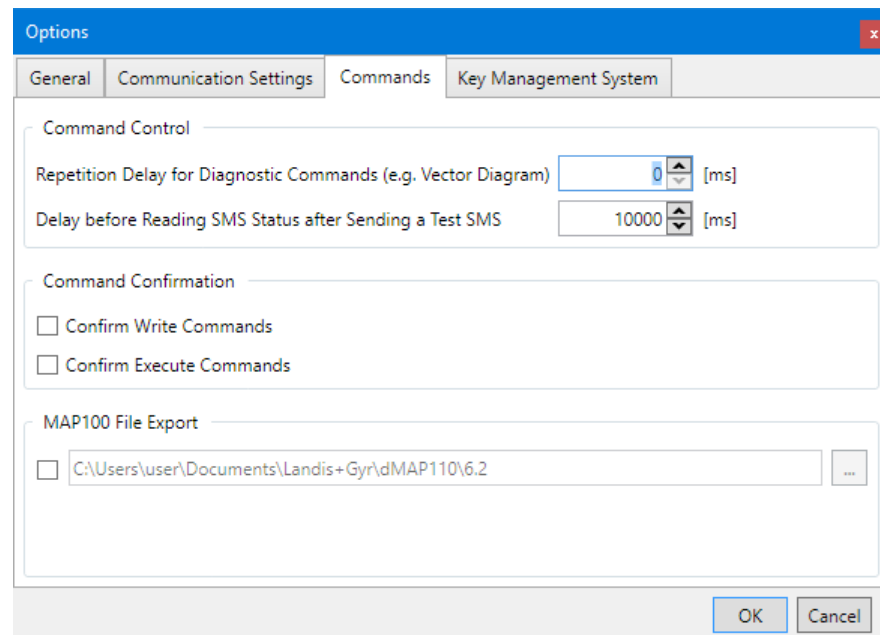
4. Click on **OK**.
    The "Options" window disappears and the new settings are saved.

8.7　Activating command confirmation

Procedure:

1. Select **Options** from the **Tools** menu.
   The "Options" window appears.

2. Select the "Commands" tab.

3. Set a tick in the checkboxes of the "Command Confirmation" area for the command(s) which shall be confirmed prior to execution.
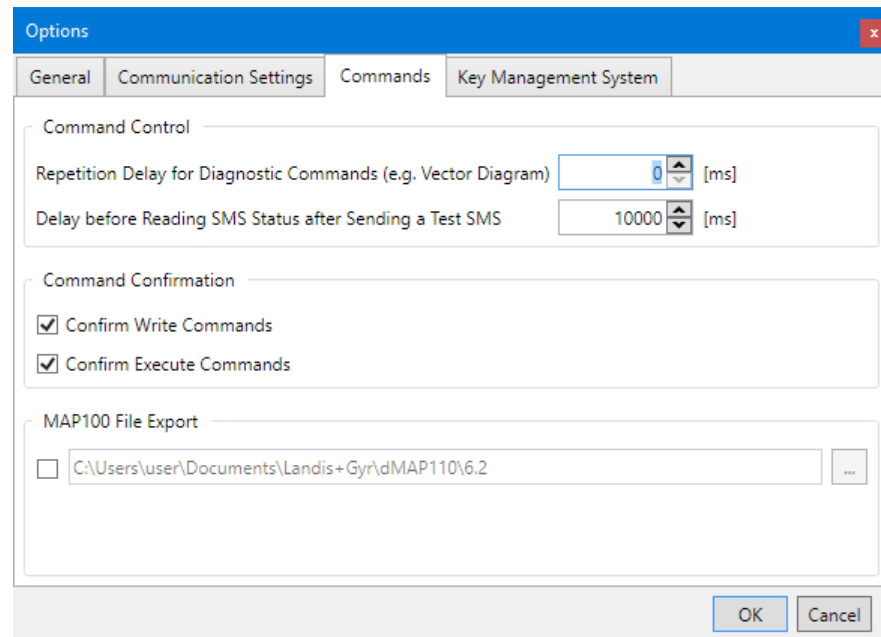
4. Click on **OK**.
   The "Options" window disappears and the new settings are saved.

8.8   Enabling .MAP100 file export

.MAP100 export files (scripts) for mass parameterisation of devices with the .MAP100 Download Tool can be generated and stored in a designated directory during execution of the following write commands (marked with in the command tree):

- Parameterisation ID

- Passwords level 1, 2 and E

- Time of use (TOU)

- Billing period reset

 Only version 3.0 supported
Note that only version 3.0 is supported, i.e. the data is exported in the V3.0 format.

The export file names have the following format: vvv_name_date_time.rep

where
vvv = Firmware release of the device
name = Designation of the write command
date = Generation date in the format YYYYMMDD (year, month, day)
time = Generation time in the format hhmmss (hour, minute, second)
rep = File extension for all .MAP100 files (repair)

Example of the file name for a TOU exported into a ZMD405CT with firmware release B30 on 26th February 2010 at 16:45 hours:
B30_TimeOfUseDS_20100226_164500.rep

The generation of .MAP100 files can be activated and the definition, where these files are saved, can be set with the following procedure.

To avoid unintentional creation of files, please make sure to disable the feature again after successful creation of the needed data files.

Procedure:

1.   Select **Options** from the **Tools** menu.
     The "Options" window appears.

2.   Select the "Commands" tab.

3.   Tick the checkbox "MAP100 file export" to activate or remove the tick to
     deactivate the function.

4.   In the "MAP100 File Export" area click on [...] and select a directory in the
     tree appearing or enter the path to the desired directory.
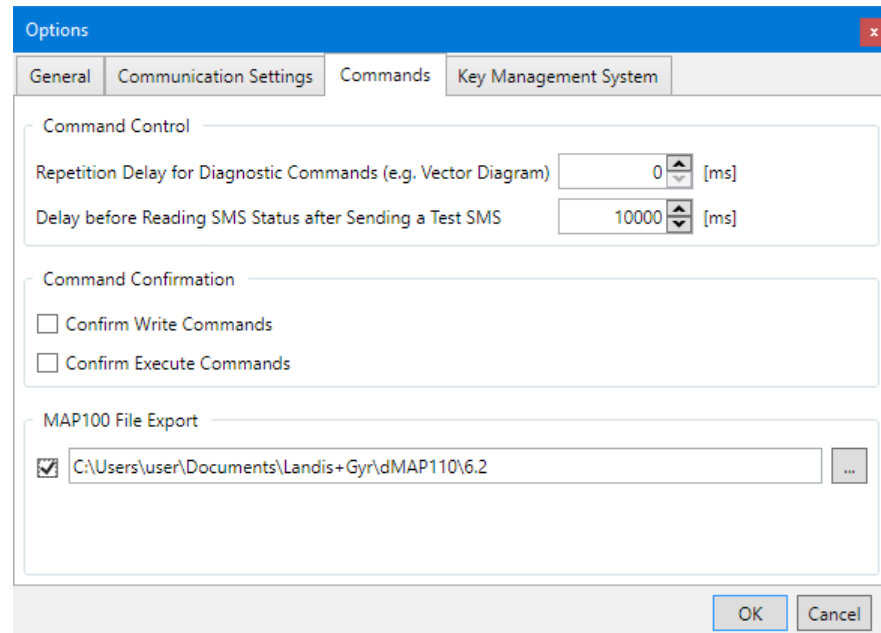
5.   Click on **OK**.
     The "Options" window disappears and the new settings are saved.

8.9 Defining the key management system

With this setting, you can set the credentials for accessing the productive and test key management system.
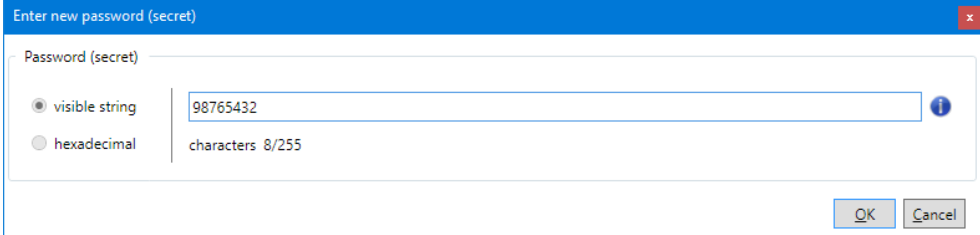
ⓘ **Required credentials**
All required credentials will be supplied to you by your Landis+Gyr representative.

Procedure:
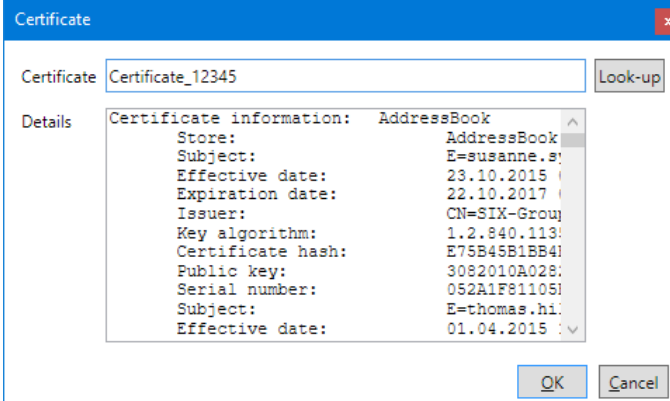
1. Select **Options** from the **Tools** menu.
   The "Options" window appears.

2. Select the "Key Management System" tab.

3. In the selection box "Referenced Key Management System" select "Productive System".

4. Click on behind the "Url" entry box.
   The "Url" window appears.

5. Enter the server name in the "Server" entry box and the port number in the "Port" entry box.
   The resulting Url is displayed in the corresponding box underneath.

6. Click on **OK**.
    The "Url" window disappears and the Url is displayed in the corresponding entry box in the "Options" window.

7. Enter the user name in the "User" entry box.

8. Click on [pencil icon] behind the "Password" entry box.
    The "Enter new password (secret)" window appears.

9. Enter the password as visible string in the "Password (secret)" entry box.
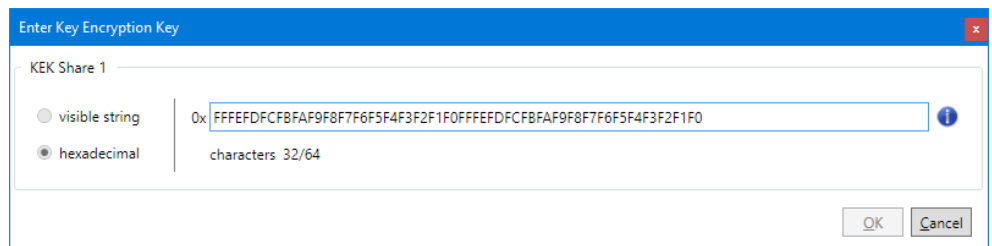
10. Click on **OK**.
    The "Enter new password (secret)" window disappears and the password is displayed with asterisks in the corresponding entry box in the "Options" window.

11. Click on [pencil icon] behind the "Certificate" entry box.
    The "Certificate" window appears.

12. Enter the certificate name in the "Certificate" entry box.
    Klick on **Look-up** to decrypt the certificate and display the details of the certificate.

13. Click on **OK**.
    The "Certificate" window disappears and the certificate name is displayed in the corresponding entry box in the "Options" window.

14. Enter an unambiguous key label in the "Key Label" entry box.
    Default value is "WK_LG".

15. Click on [pencil icon] behind the "KEK Share 1" entry box.
    The "Enter Key Encryption Key" window appears.

16. Enter the key encryption key share 1 (part 1) as hexadecimal string in the "KEK Share 1" entry box.
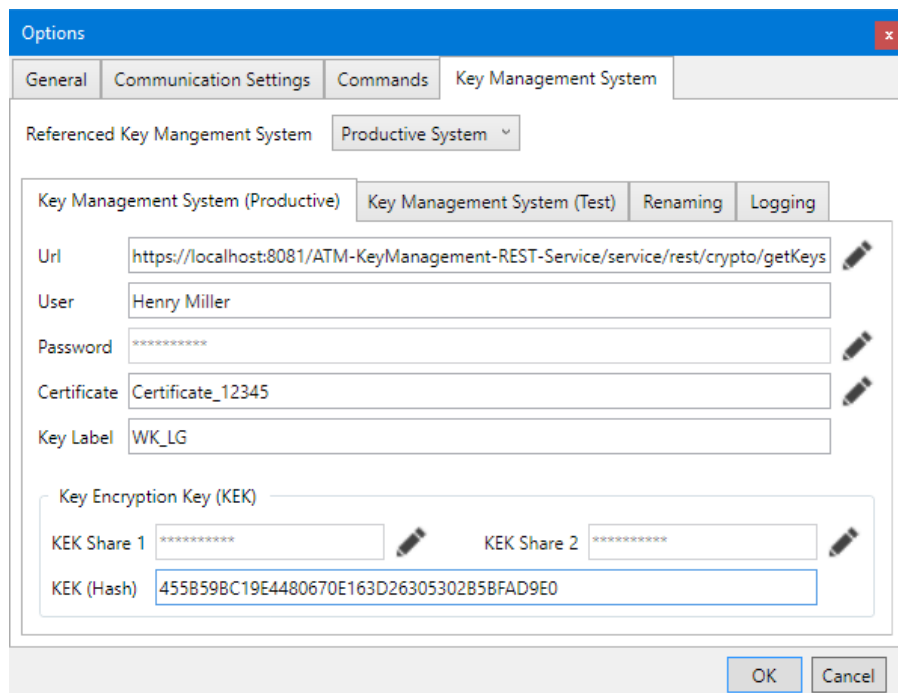
17. Click on **OK**.
    The "Enter Key Encryption Key" window disappears and the key encryption key is displayed with asterisks in the corresponding entry box in the "Options" window.

18. Enter the key encryption key share 2 (part 2) in the same way.
    The key encryption key hash value is calculated out of the two parts entered and displayed in the "KEK (Hash)" box.

19. In the selection box "Referenced Key Management System" select "Test System" and repeat points 4 to 18.

20. Select the "Renaming" tab if the key management system used has to be identified with a client name instead of a COSEM client ID.
    The relation between the COSEM client ID and the client name is defined in the file "KMSClientIDMapping.xml". This file has to be adapted according to the key management system used.

21. Tick the checkbox on the "Renaming" tab and click on [...] to select the folder with the file "KMSClientIDMapping.xml" in the "Open" window which then appears or enter the path to the file in the entry box.
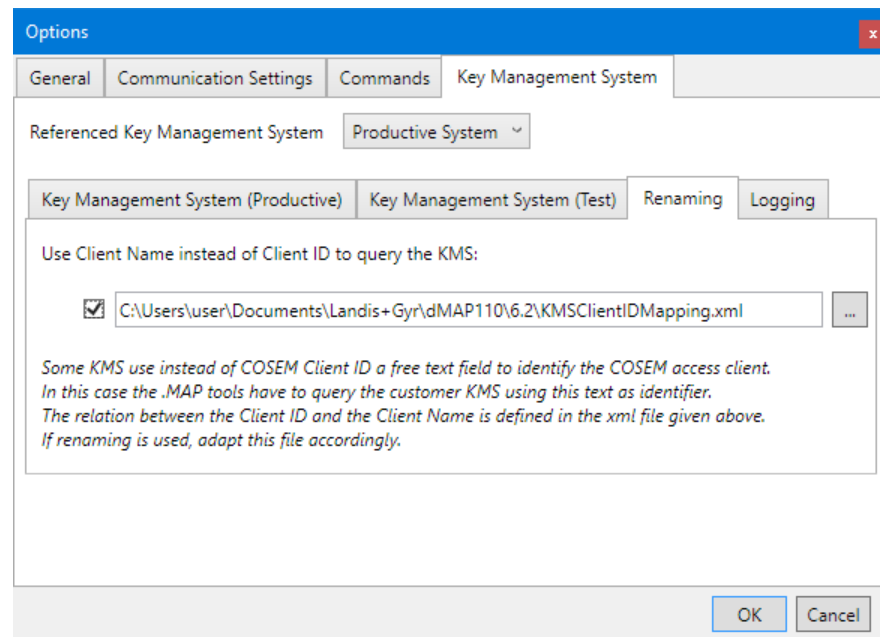
22. Select the "Logging" tab if the queries to the key management system shall be logged.

23. Tick the checkbox on the "Logging" tab and enter the path and the desired name of the log file in the entry box.
    The log file will then be created automatically in the corresponding folder.
    As default value the file name "KMSLog.txt" and the default folder of the used .MAP110 version is used.

    If you have already created a log file, click on […] to select the folder and the file in the "Open" window which then appears.
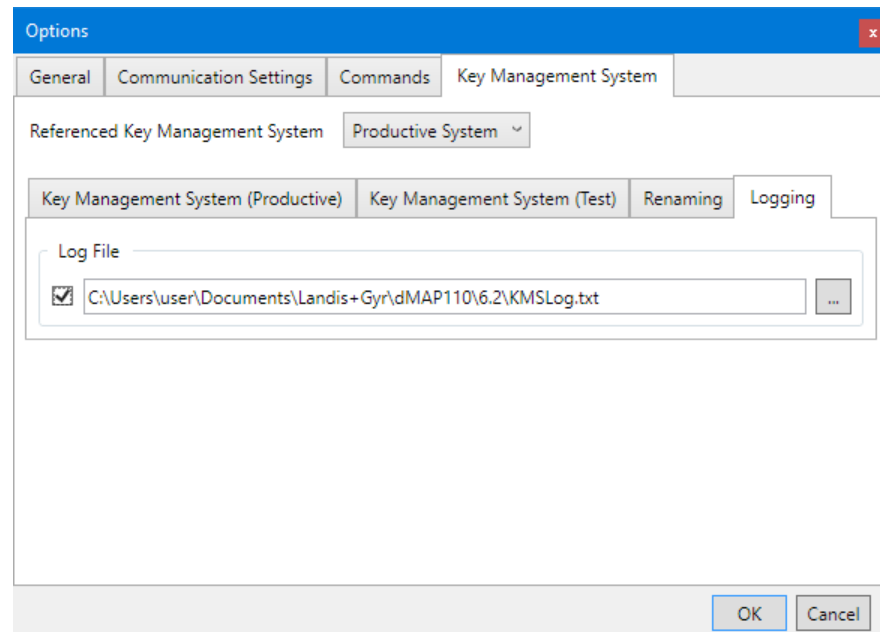
24. Click on **OK**.
    The "Options" window disappears and the new settings are saved.

8.10   Displaying help topics

This function permits access to the help texts for the Landis+Gyr .MAP110 Service Tool. These help texts correspond to the contents of this user manual.

Procedure:

1.   Press function key [F1] or select **Help** from the **Help** menu.
      The online help for the Landis+Gyr .MAP110 Service Tool appears.
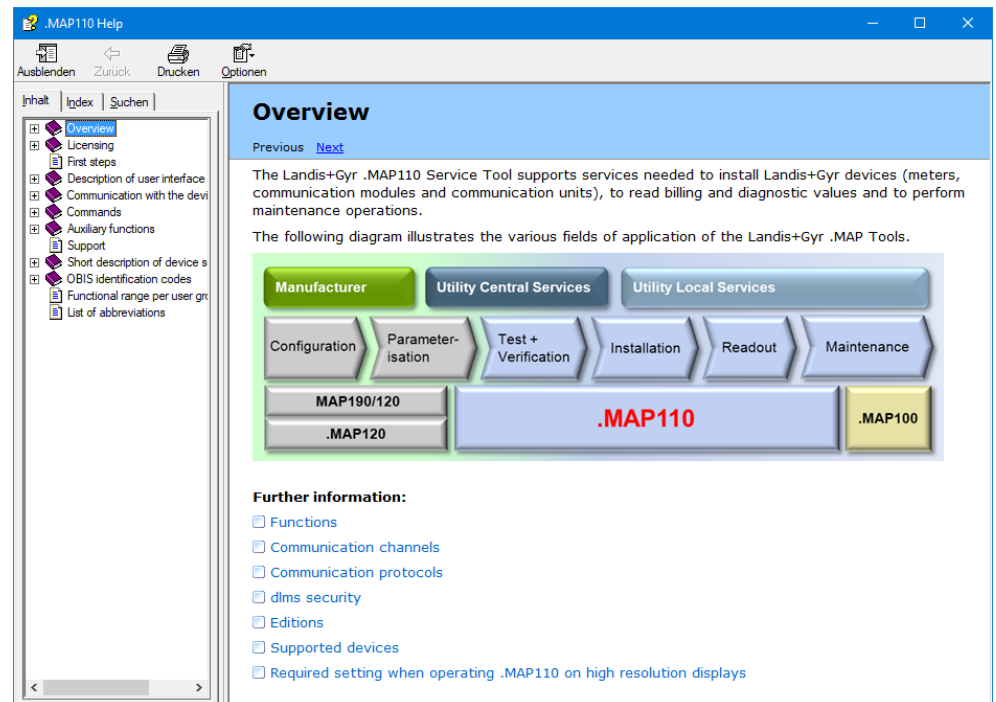
2.   Find the desired information.
      Since the help function is a standard Windows function, it will not be explained at this point. More details are found in the Windows manual belonging to your PC.

3.   Click on ☒ to close the online help.

8.11   Displaying release notes

This function displays the latest read-me file.

Procedure:

1.   Select **Release Notes** from the **Help** menu.
     The latest read-me file appears.
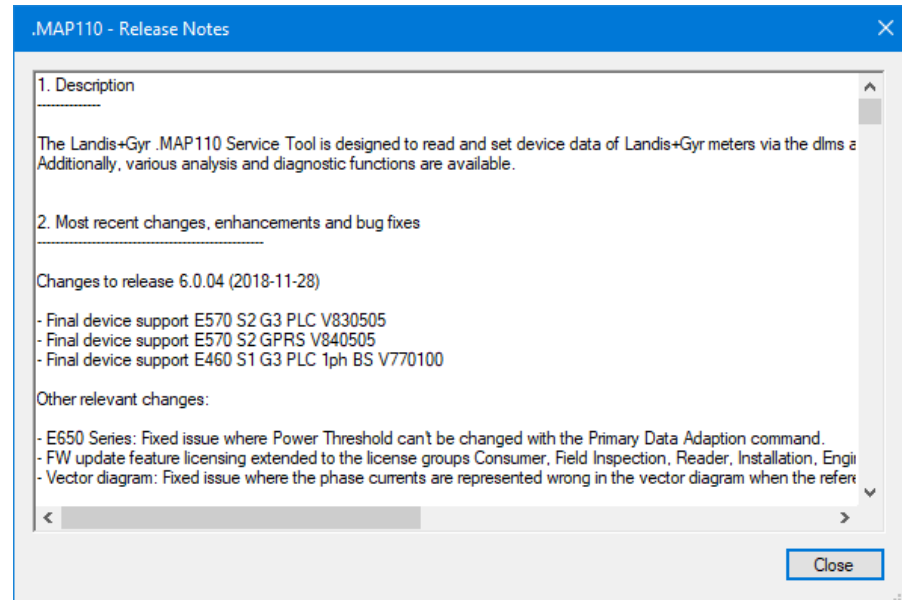
2.   Obtain the information you are interested in.

3.   Click on **Close** to close the read-me file again.

8.12   Displaying the current program release and checking for updates

This function permits the display of information on the current program release and checking whether the installed .MAP110 release is up to date.

ⓘ   **Internet access required**
To perform a check for updates the PC must have access to the Internet, since the .MAP Home Page must be contacted for this.

Procedure:

1. Select **About .MAP110** from the **Help** menu.
    The "About" window appears. It contains information about the current version, the license and the operating system and .NET Framework installed on this computer.
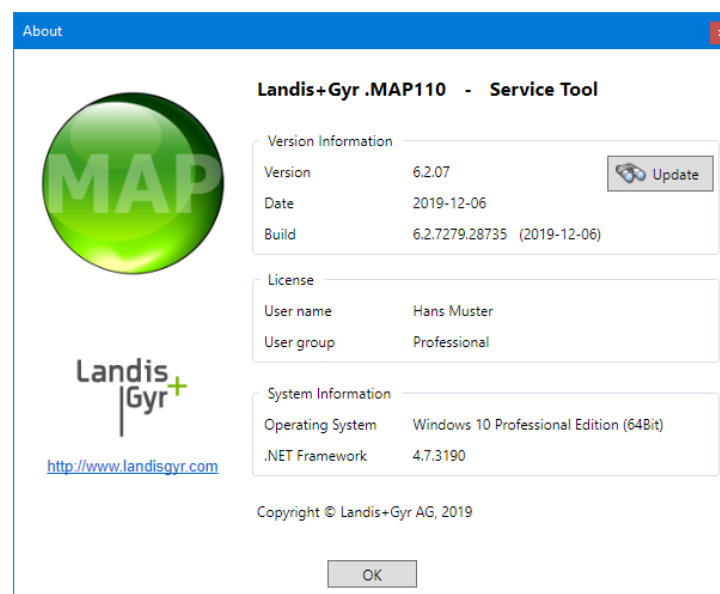
2. Click on **Check for Update** if you want to check whether the installed .MAP110 release is up to date.
    An automatic query is performed on the .MAP Home Page to determine the latest released release available.
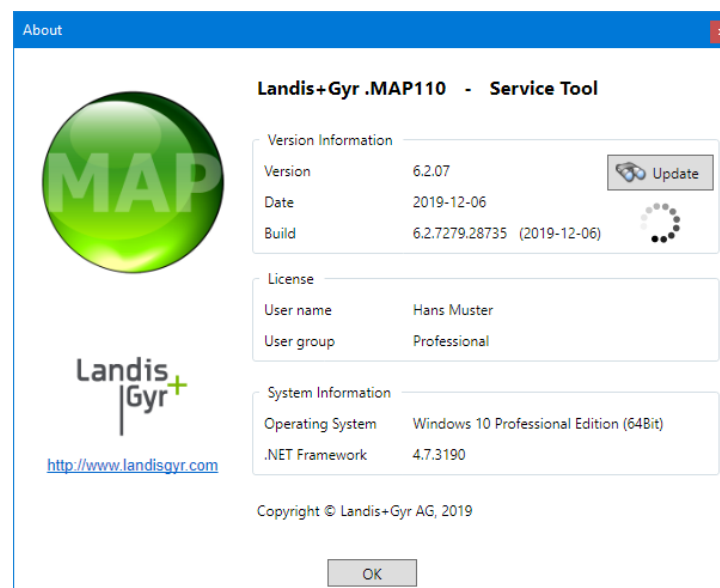
The ⟳ icon is displayed while the query is performed.
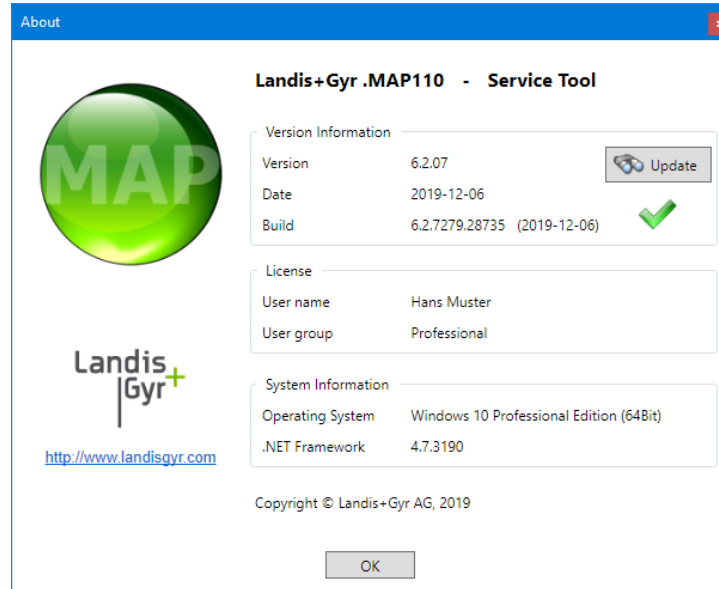
The ✓ icon is displayed, if the installed release is up to date.

If a later release is available, the ⚠ icon appears. To download and install the latest release of the .MAP110 software click on this icon or on the MAP icon to access the MAP Software Download area.

If the ❓ icon is displayed, no information is available or the internet access failed.

3. Click on **OK**.
    The "About" window disappears.

9   Support

The following is designed to help you take the right measure to tackle any problems you may experience when using the Landis+Gyr .MAP110 Service Tools.

If a problem arises try to solve it yourself first by applying the following measures:

- Consult the appropriate section of this manual.

- Invoke the help function as described in section 8.10 "Displaying help topics".

- Read the content of the Readme.txt file, supplied with the software.

If these measures do not help, contact your local Landis+Gyr representative.

10   Short description of device security system

10.1   Introduction

The data and parameters of the Landis+Gyr devices are protected against un-intended or improper access by a flexible, multi-stage security system. It is very similar to the one used in computer systems and consists of several access levels (users) with different access rights.

Detailed information on the security system for the relevant devices is provided in the corresponding functional descriptions.

10.2   Security attributes

For each access level, various security attributes can be defined that must be fulfilled to gain access.

Switches protected by the verification seal

Protected by the verification seal, there is for many devices (e.g. under the main face plate) a block of security switches or jumpers. Their position must be defined in order to gain access to a particular level.

Entering the service menu

It may be defined that access to a certain level will only be granted from the service menu. To enter the service menu, the utility seal must be removed.

Access authentication

For each access level it is defined how the authentication has to be performed. The following authentication types are defined:

- no authentication (access possible without password)

- low level authentication using a static password

- high level authentication using a coded password

- high level authentication using TEA (Tiny Encryption Algorithm)

- high level authentication using MD5 (Message-Digest Algorithm 5)

- high level authentication using SHA-1 (Secure Hash Algorithm)

- high level authentication using SHA-256 (Secure Hash Algorithm)

- high level authentication using GMAC (Galois Message Authentication Code)

In some cases multiple authentication types are selectable per access level.

If a static password is used, the user only needs to know the password. It is checked by the device and access is granted if the passwords match.

For all other passwords and keys the user not only needs to know the password but also an encryption algorithm. Due to the encryption, a Landis+Gyr tool is required to access such a level.

Passwords/Keys

A password or a key must be defined for some authentication types. Static and coded passwords as well as SHA keys comprise 16 characters, TEA and MD5 keys 32 characters.

Communication channels

The access to a certain level may be restricted so that it is only granted via selected communication channels. Access is for instance possible via the optical interface, the integrated interface and both communication channels of the communication unit.

Message security	To ensure the message safety, the messages can be authenticated and/or encrypted, provided a high level authentication using MD5, SHA or GMAC is used for access authentication. The necessary keys are stored in one or several security setup objects.

10.3   Access levels

The Landis+Gyr devices feature up to 15 different access levels (level 0 to 9 and A to E) with different access rights each. For groups of registers and parameters, it can be defined which level is required to read and which level is required to write.

Each access level is protected by security attributes which must be fulfilled to gain access. In order to simplify the handling and to ensure compatibility to other device series, most of the security attributes have been partially or completely fixed.

All access levels are technically strictly independent i.e. a higher access level does not automatically bear all rights of the lower access levels.

10.4   Access levels and their application

The table below describes all access levels with their security attributes and their typical application. The access rights are defined by the utility when ordering the device. They depend on the needs of the utility and on the national regulations.

For levels 0 to 4 access is possible via the dlms and the IEC protocol, for levels 5 to G via the dlms protocol only. The UID (user identification) is used in dlms communication to select the access level.

Please note that not all access levels are available in all devices, the table below therefore just gives an overview. Please always refer to the functional description of the currently used device.

Level	Security attributes	Access rights and typical application examples
0 Public Access UID = 16	without password without breaking a seal all interfaces	This access level is always available. All dlms devices can be accessed on this level. Some data can be read but there is no write access.
1 Data Collection UID = 32	with static password or high level authentication without breaking a seal interfaces selectable	Readout of billing data by means of a handheld terminal or possibly by a central system. All billing data is readable. Limited write access possible, e.g. time/date.
2 Utility Field Service UID = 48	with coded password, encryption key or high level authentication without breaking a seal interfaces selectable Landis+Gyr Tool required if coded password or encryption algorithm is used	Maintenance tasks. All parameters and all billing data are readable. Limited write access to uncritical data is possible, e.g. device addresses, identification numbers, phone numbers etc.
3 Utility Service UID = 64	without password breaking the utility seal necessary local interfaces only	Installation or maintenance work in the utility and in the field. All parameters and all billing data are readable. Limited write access to settable data is possible, e.g. battery operating time, switching tables etc.

Level	Security attributes	Access rights and typical application examples
4 Extended Utility Service UID = 80	without password breaking the verification seal necessary local interfaces only	Installation or maintenance work in the utility. Verification is usually required afterwards. All parameters and all billing data are readable. Write access to all data is possible, e.g. parameterisation, register clearing, password setting etc.
5 Extended Consumer UID = 17	with static password without breaking a seal interfaces selectable	Write access for the end user. All parameters and most billing data are readable. Limited write access to the end user data is possible, e.g. monitor thresholds.
6 Remote Data Collection UID = 18	with static password without breaking a seal remote interfaces only	Remote readout of billing data by a central system. All billing data is readable. Limited write access is possible, e.g. time/date.
7 Remote Service UID = 19	with static or coded password without breaking a seal remote interfaces only	Installation or maintenance work in connection with a central system. All parameters and all billing data are readable. Limited write access to settable data is possible, e.g. switching tables, device addresses, identification numbers, phone numbers etc.
G Management UID = 1	with static password or high level authentication without breaking a seal all interfaces	Installation or maintenance work after verification (locally or via a central system). All parameters and all billing data are readable. Limited write access to settable data is possible, e.g. switching tables, device addresses, identification numbers, phone numbers etc.
L Access Administrator UID = 2	with static password or high level authentication without breaking a seal all interfaces	The same purpose as Level G, additionally the access rights of the other levels can be modified.
8		Reserved for future expansion.
9 Broadcast UID = 102	without breaking a seal remote interfaces only	Pre-established, to send unconfirmed messages to multiple devices (broadcast) not available in .MAP tools.
A Utility Defined UID = 22	attributes selectable at ordering time	No typical application defined. Access rights defined at ordering time according to the needs of the utility.
B		Reserved for future expansion.
C Read Administrator UID = 96	with static password without breaking a seal	Allocation of read access rights All parameter and all billing data are readable. Read access rights for all lower levels (0 to B) can be allocated.
D Utility Administrator UID = 97	with coded password breaking the verification seal necessary local interfaces only Landis+Gyr Tool required because of coded password	Same as level 4. In addition, changes in the utility security system are possible: Read and write access rights can be adapted and all passwords can be changed.

Level	Security attributes	Access rights and typical application examples
E Distributor Service UID = 100	with coded password breaking the verification seal necessary local interfaces only Landis+Gyr Tool required because of coded password	Service access of the distributor. Identical to level D. In addition, changing the access rights and the password of the utility administrator is possible.

11   OBIS identification codes

11.1   General description

For OBIS (Object Identification System) the structure **A-B:C.D.E.F** applies, whereby the individual groups have the following significance:

A   Defines the characteristic of the data item to be identified, e.g. abstract data, electricity-, gas-, heat- or water-related data.

B   Defines the channel number, i.e. the number of the input of a metering equipment having several inputs for the measurement of energy of the same or different types (e.g. in data concentrators, registration units). This enables data from different sources to be identified.

C   Defines the abstract or physical data items related to the information source concerned, e.g. active power, reactive power, apparent power, power factor, current or voltage.

D   Defines types, or the result of the processing of physical quantities according to various specific algorithms. The algorithms can deliver energy and demand quantities as well as other physical quantities.

E   Defines the further processing of measurement results to tariff registers, according to the tariffs in use. For abstract data or for measurement results for which tariffs are not relevant, this value group can be used for further classification.

F   Defines the storage of data according to different billing periods. Where this is not relevant, this value group can be used for further classification.

To simplify the reading in the index field, individual groups of the OBIS code can be omitted. The abstract or physical data C and type of data D must be shown. **A full specification of the OBIS identification number system can be found in standard IEC 62056-61.**

Only the values of interest to metering devices are explained below with a collection of examples.

Group A   Group A of the OBIS identification can theoretically have values in the range between 0 and 9. Only the values
0 (abstract objects) and
1 (electricity related objects)
appear in the Landis+Gyr .MAP110 Service Tool.

Group B   Group B of the OBIS identification can theoretically have values in the range between 0 and 64. Only the values
0 (no channel specified)
1 (channel 1) and
2 (channel 2)
appear in the Landis+Gyr .MAP110 Service Tool.

Group C   Group C of the OBIS identification can have values in the range between 0 and 255. The individual values are differently assigned depending on the value of group A. The values for abstract items (group A = 0) are of no interest at this point, since they are largely specific to either context, country or manufacturer.

The following table shows the values of group C of the OBIS identification for electricity related objects. It has the form of a matrix and is read as follows: the value **46** for instance stands for reactive power in the second quadrant for phase L2.

General purpose objects			**0**					
Active power	import (+A)	∑ Li	**1**	L1	**21**	L2	**41**	L3	**61**
	export (-A)	∑ Li	**2**	L1	**22**	L2	**42**	L3	**62**
Reactive power	import (+R)	∑ Li	**3**	L1	**23**	L2	**43**	L3	**63**
	export (-R)	∑ Li	**4**	L1	**24**	L2	**44**	L3	**64**
	Quadrant I (+Ri)	∑ Li	**5**	L1	**25**	L2	**45**	L3	**65**
	Quadrant II (-Rc)	∑ Li	**6**	L1	**26**	L2	**46**	L3	**66**
	Quadrant III (-Ri)	∑ Li	**7**	L1	**27**	L2	**47**	L3	**67**
	Quadrant IV (+Rc)	∑ Li	**8**	L1	**28**	L2	**48**	L3	**68**
Apparent power	import (+VA)	∑ Li	**9**	L1	**29**	L2	**49**	L3	**69**
	export (-VA)	∑ Li	**10**	L1	**30**	L2	**50**	L3	**70**
Current		∑ Li	**11**	L1	**31**	L2	**51**	L3	**71**
Voltage		∑ Li	**12**	L1	**32**	L2	**52**	L3	**72**
Power factor		∑ Li	**13**	L1	**33**	L2	**53**	L3	**73**
Frequency			**14**	L1	**34**	L2	**54**	L3	**74**
Active power quadrant I+IV+II+III				L1	**35**	L2	**55**	L3	**75**
Active power quadrant I+IV-II-III				L1	**36**	L2	**56**	L3	**76**
Quadrant I				L1	**37**	L2	**57**	L3	**77**
Quadrant II				L1	**38**	L2	**58**	L3	**78**
Quadrant III				L1	**39**	L2	**59**	L3	**79**
Quadrant IV				L1	**40**	L2	**60**	L3	**80**
Phase angles			**81**					
Neutral current			**91**					
Neutral voltage			**92**					
Service information*			**96**					
Error message*			**97**					
Log data*			**98**					
Profile data*			**99**					

*   In all data readouts the OBIS code is shown in .MAP110 in numeric format only (as defined in the standard) instead of partly using characters. Affected values: "C"=96, "F"=97, "L"=98 and "P"=99. This now allows a correct referencing to the standard.

The values 128 to 255 have Manufacturer-specific definitions.
Some examples of Landis+Gyr definitions are:

Value	Application
130	Sum of all phases: reactive power quadrant I+IV+II+III

Value	Application
131	Sum of all phases: reactive power quadrant I+II-III-IV
132	Sum of all phases: reactive power quadrant I+IV
133	Sum of all phases: reactive power quadrant II+III
150	Phase 1: reactive power quadrant I+IV+II+III
151	Phase 1: reactive power quadrant I+II-III-IV
152	Phase 1: reactive power quadrant I+IV
153	Phase 1: reactive power quadrant II+III
170	Phase 2: reactive power quadrant I+IV+II+III
171	Phase 2: reactive power quadrant I+II-III-IV
172	Phase 2: reactive power quadrant I+IV
173	Phase 2: reactive power quadrant II+III
190	Phase 3: reactive power quadrant I+IV+II+III
191	Phase 3: reactive power quadrant I+II-III-IV
192	Phase 3: reactive power quadrant I+IV
193	Phase 3: reactive power quadrant II+III

Group D

Group D of the OBIS identification can have values in the range between 0 and 255. The individual values are differently assigned depending on the value of group A and C, but are not described here.

Group E

Group E of the OBIS identification can have values in the range between 0 and 255. In the Landis+Gyr .MAP110 Service Tool for group E for electricity-related items (group A = 1) the values corresponding to the number of tariffs specified mainly appear (0 = total of all tariffs, 1 = tariff 1, 2 = tariff 2, etc.). Other values apply for specific values of group C, but these are not described here.

Group F

Group F of the OBIS identification can have values in the range between 0 and 255. In the Landis+Gyr .MAP110 Service Tool group F is not used and is therefore always set to 255.

11.2   Examples

The following table shows a selection of OBIS identification numbers and explains their significance.

OBIS code (decimal)	OBIS code (hex)						Description
	A	B	C	D	E	F	
0-0:1.0.0	00	00	01	00	00	FF	Clock
0-0:42.0.0	00	00	2A	00	00	FF	dlms device identification
0-0:96.1.0	00	00	60	01	00	FF	Identification number 2.1
0-0:96.1.1	00	00	60	01	01	FF	Identification number 2.2
0-0:96.2.0	00	00	60	02	00	FF	Number of parameterisations
0-0:96.2.1	00	00	60	02	01	FF	Date and time of last parameterisation
0-0:96.2.2	00	00	60	02	02	FF	Activation date TOU

OBIS code (decimal)	OBIS code (hex) A B C D E F	Description
0-0:96.2.3	00 00 60 02 03 FF	Date of last RCR program change
0-0:96.240.0	00 00 60 F0 00 FF	EEPROM identification
0-0:96.240.13	00 00 60 F0 0D FF	Hardware ID
0-0:96.3.1	00 00 60 03 01 FF	Input terminal states base meter
0-0:96.3.2	00 00 60 03 02 FF	Output terminal states base meter
0-0:96.4.0	00 00 60 04 00 FF	Internal control signal states
0-0:96.5.0	00 00 60 05 00 FF	Internal operating state
0-0:96.6.0	00 00 60 06 00 FF	Operating time of battery
0-0:96.6.3	00 00 60 06 03 FF	Battery voltage
0-0:96.7.0	00 00 60 07 00 FF	Number of phase fails L1..L3
0-0:96.7.1	00 00 60 07 01 FF	Number of phase fails L1
0-0:96.7.2	00 00 60 07 02 FF	Number of phase fails L2
0-0:96.7.3	00 00 60 07 03 FF	Number of phase fails L3
0-0:96.8.0	00 00 60 08 00 FF	Total operating time
0-0:96.8.t	00 00 60 08 t FF	Operating time (t = tariff number)
0-0:96.90	00 00 60 5A FF FF	Configuration ID
0-0:96.90.1	00 00 60 5A 01 FF	Physical IEC device address
0-0:96.90.2	00 00 60 5A 02 FF	Physical HDLC device address
1-0:96.2.7	00 00 60 02 07 FF	Activation date passive TOU
0-0:97.97.0	00 00 61 61 00 FF	Error code register
0-0:98.1.0*126	00 00 62 01 00 7E	Stored values
0-0:240.1.0	00 00 F0 01 00 FF	Device functions
0-1:96.2.5	00 01 60 02 05 FF	Date and time of last calibration
0-1:96.240.8	00 01 60 F0 08 FF	Hardware ID of base meter
0-1:96.3.1	00 01 60 03 01 FF	Input terminal states extension board
0-1:96.3.2	00 01 60 03 02 FF	Output terminal states extension board
0-2:96.240.8	00 02 60 F0 08 FF	Hardware ID of extension board
0-2:96.240.9	00 02 60 F0 09 FF	Reference hardware ID of extension board
1-0:0.0.1	01 00 00 00 00 FF	Identification number 1.1
1-0:0.0.2	01 00 00 00 01 FF	Identification number 1.2
1-0:0.0.3	01 00 00 00 02 FF	Identification number 1.3
1-0:0.0.4	01 00 00 00 03 FF	Identification number 1.4
1-0:0.1.0	01 00 00 01 00 FF	Reset counter
1-0:0.1.2	01 00 00 01 02 FF	Time and date of last billing period reset
1-0:0.2.0	01 00 00 02 00 FF	Software ID
1-0:0.2.1	01 00 00 02 01 FF	Parameterisation ID

OBIS code (decimal)	OBIS code (hex) A B C D E F	Description
1-0:0.2.3	01 00 00 02 03 FF	Ripple control receiver ID
1-0:0.2.4	01 00 00 02 04 FF	Connection ID
1-0:0.2.7	01 00 00 02 07 FF	Passive TOU ID
1-0:0.9.5	01 00 00 09 05 FF	Weekday
1-0:96.99.8	01 00 60 69 08 FF	Display and IEC readout ID
1-0:99.1.0	01 00 63 01 00 FF	Load profile
1-0:99.98.0	01 00 63 62 00 FF	Event log
1-1:0.3.0	01 01 00 03 00 FF	Meter constant active energy
1-1:0.3.1	01 01 00 03 01 FF	Meter constant reactive energy
1-1:0.4.0	01 01 00 04 00 FF	Scale factor for demand display
1-1:0.4.1	01 01 00 04 01 FF	Scale factor for energy display
1-1:0.4.2	01 01 00 04 02 FF	Current transformer ratio
1-1:0.4.3	01 01 00 04 03 FF	Voltage transformer ratio
1-1:13.0.0	01 01 0D 00 00 FF	Average billing period power factor
1-1:13.3.n	01 01 0D 03 n FF	Power factor minimum (n = number)
1-1:13.31.n	01 01 0D 23 n FF	Power factor threshold (n = number)
1-1:13.35.n	01 01 0D 23 n FF	Power factor monitor threshold (n = number)
1-1:13.5.0	01 01 0D 00 00 FF	Last average power factor
1-1:13.7.0	01 01 0D 07 00 FF	Total power factor
1-1:14.7.0	01 01 0E 07 00 FF	Mains frequency
1-1:31.7.0	01 01 1F 07 00 FF	Current L1
1-1:31.35.0	01 01 1F 23 00 FF	Overcurrent threshold L1
1-1:32.7.0	01 01 20 07 00 FF	Voltage L1
1-1:32.31.0	01 01 20 1F 00 FF	Undervoltage threshold L1
1-1:32.35.0	01 01 20 23 00 FF	Overvoltage threshold L1
1-1:33.7.0	01 01 21 07 00 FF	Power factor L1
1-1:51.7.0	01 01 33 07 00 FF	Current L2
1-1:51.35.0	01 01 33 23 00 FF	Overcurrent threshold L2
1-1:52.7.0	01 01 34 07 00 FF	Voltage L2
1-1:52.31.0	01 01 34 1F 00 FF	Undervoltage threshold L2
1-1:52.35.0	01 01 34 23 00 FF	Overvoltage threshold L2
1-1:53.7.0	01 01 35 07 00 FF	Power Factor L2
1-1:71.7.0	01 01 47 07 00 FF	Current L3
1-1:71.35.0	01 01 47 23 00 FF	Overcurrent threshold L3
1-1:72.7.0	01 01 48 07 00 FF	Voltage L3
1-1:72.31.0	01 01 48 1F 00 FF	Undervoltage threshold L3

OBIS code (decimal)	OBIS code (hex)						Description
	A	B	C	D	E	F	
1-1:72.35.0	01	01	48	23	00	FF	Overvoltage threshold L3
1-1:73.7.0	01	01	49	07	00	FF	Power Factor L3
1-1:81.7.0	01	01	51	07	00	FF	Angle U(L1) to U(L1)
1-1:81.7.1	01	01	51	07	01	FF	Angle U(L2) to U(L1)
1-1:81.7.2	01	01	51	07	02	FF	Angle U(L3) to U(L1)
1-1:81.7.3	01	01	51	07	04	FF	Angle I(L1) to U(L1)
1-1:81.7.4	01	01	51	07	05	FF	Angle I(L2) to U(L1)
1-1:81.7.5	01	01	51	07	06	FF	Angle I(L3) to U(L1)
1-1:91.7.0	01	01	5B	07	00	FF	Neutral current
1-1:91.35.0	01	01	5B	23	00	FF	Overcurrent threshold N
1-1:m.2.0	01	01	m	02	00	FF	Cumulative maximum demand (m = measured quantity)
1-1:m.4.0	01	01	m	04	00	FF	Current average demand (m = measured quantity)
1-1:m.6.t	01	01	m	06	t	FF	Maximum demand register (m = measured quantity, t = tariff number)
1-1:m.8.0	01	01	m	08	00	FF	Total energy register (m = measured quantity)
1-1:m.8.t	01	01	m	08	t	FF	Energy register (cumulative) (m = measured quantity, t = tariff number)
1-1:m.9.t	01	01	m	09	t	FF	Energy register (billing period delta value) (m = measured quantity, t = tariff number)
1-1:m.29.t	01	01	m	1D	t	FF	Energy register (registration period delta value) (m = measured quantity, t = tariff number)
1-1:m.35.n	01	01	m	23	n	FF	Demand register monitor threshold (m = measured quantity, n = number)
1-2:82.8.0	01	02	52	08	00	FF	Counter S0 pulses input 1
1-3:82.8.0	01	03	52	08	00	FF	Counter S0 pulses input 2
a-2:m.8.0	a	02	m	08	00	FF	External pulse input 1 (a = medium, m = measured quantity)
a-3:m.8.0	a	03	m	08	00	FF	External pulse input 2 (a = medium, m = measured quantity)

12   List of abbreviations

This section explains some abbreviations used in this user manual or on dialogue windows of the Landis+Gyr .MAP110 application in alphabetical order.

Abbreviation	Definition
	Description
dlms	**Distribution Line Message Specification**
	Messaging system defined originally as part of the application layer of the protocol stack for distribution line carrier systems (IEC 61334-4-41, 1996). Its universality and its independence of the actual communication channel allowed dlms to become the choice of the metering industry for any metering application (Device Language Message Specification).
EDIS	**Energy Data Identification System**
	Identification number system for clear identification of energy data according to DIN 43863-3:1997.
GSM	**Global System for Mobile communications**
	Wireless communication network for data and voice transmission.
HDLC	**High Level Data Link Control**
	Communication protocol used by COSEM (IEC 62056-46), specifying the data link layer. The HDLC standard is ISO/IEC 13239, 2000 (second edition). Some older COSEM implementations rely on the first, 1996 edition of the standard.
IEC	**International Electrotechnical Commission**
	IEC 62056-21 is the standard "Electricity metering - Data exchange for meter reading, tariff and load control - Part 21: Direct local data exchange". This is the third edition of the formerly well-known standard IEC 61107 (IEC 1107).
.MAP	**Meter Application Product**
	The .MAP software tools have been developed and distributed by Landis+Gyr to support electricity meters. This group of tools comprises the .MAP 110 Service Tool and the .MAP120 Parameter Editor.
OBIS	**Object Identification System**
	Identification number system for clear identification of dlms items.
PSTN	**Public Switched Telephone Network**
	The public switched telephone network can be used for data transmission. To this purpose a modem (modulator/demodulator) must be inserted between computer and telephone network and also between the telephone network and the remote device.
VDEW	**Vereinigung Deutscher Elektrizitätswerke**
	VDEW is the central organisation of the German electrical industry. It combines and represents the interests of its members and is consultant and forward-looking body for energy questions (refer also to www.strom.de).

13 Index

Landis+Gyr⁺

manage energy better