LIGHTING SOLUTIONS

LiCS OUTDOOR

Operating Manual iCT

Intelligent Configuration Software

for commissioning and controlling the
PowerLine light management system

Manual Version 2.0
For Software Version 1.6

LiCS OUTDOOR

Introduction

Thank you for purchasing the LiCS system made by Vossloh-Schwabe. Please read this manual to familiarise yourself with the system's functions before you begin to use it. This will also help you to make more effective use of it. Once you have read the manual, please keep it in a safe place for easy future reference. Anyone tasked with setting up, commissioning, operating, maintaining and repairing the system must be

- suitably qualified and
- strictly observe the instructions contained in this manual.

Use of Symbols in the Manual

The following symbols are used in the manual to highlight procedures, limitations, precautionary measures and instructions that must be observed for safety reasons.

IMPORTANT

This symbol alerts you to important information and any limitations that must be observed. Please read these points carefully to ensure fault-free operation of the system or of individual components.

INFORMATION

This symbol alerts you to additional information regarding the operation of the system or of individual components. It is recommended that you read these notes.

Use of Abbreviations in the Manual

- LiCS = Lighting Control Solutions
- DALI = Digital Addressable Lighting Interface
- iDC = intelligent Data Concentrator
- OLC = Outdoor Lighting Control
- URL = Uniform Resource Locator
- CET = Central European Time
- NTP = Network Time Protocol

LEGAL NOTES

Trademarks

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Contents

1.1 GENERAL INFORMATION

This manual is for the "intelligent Configuration Tool" – iCT for short – for commissioning and controlling light management systems featuring Vossloh-Schwabe's powerline-supported system from the LiCS Outdoor series of components. The software is designed to make the installation and commissioning process as easy as possible. To this end, the system also features a databank that supports project management as well as a database of ballasts, drivers and luminaires. The manual details the functions available at the time of writing and has been put together to the best of Vossloh-Schwabe's knowledge. However, as technical development is ongoing, no guarantee can be given for completeness. Customer-specific adaptations are not detailed in this manual. By now, localised software versions can also be made available for various languages. The images contained in this manual refer to the standard English version. Further languages can be implemented at any time.

1.2 MOTIVATION

The development of this software is based on years of experience gained in the field of commissioning powerline systems featuring the open LonWorks© technology made by the company echelon©. Addressing data stored in luminaire or pole controllers depends on the respective controller first being registered with the central iDC (also called segment controller, SmartServer or i.LON3). This process includes converting physical addresses into logical addresses and is also referred to as "commissioning". Although it is fundamentally possible to perform this process directly at the iDC, it would be extremely work-intensive and time-consuming. A system with approx. 80 controllers would take between approx. 4–6 hours to be fully commissioned. First and foremost, therefore, the idea was to create a tool that would be capable of transferring all necessary data to the iDC/SmartServer in a largely automated manner and in the shortest possible time, an aim that was achieved with the iCT software.

In most of the cases known to us problems occurred because connections to superordinate systems and servers had yet to be clarified, a situation that can last for several weeks and is made all the more difficult the larger the premises are. And as several departments often need to be involved in the process, it also often goes hand in hand with endless site meetings. Sometimes, delays in the process are caused by the lack of a suitable SIM card for the modem. For all of these reasons, commissioning a light management system must ensure the respective customer is provided with a fully functioning system that switches lighting on or off or dims it at the right time and from the very first day onwards.

1.3 USING THE SOFTWARE, SYSTEM REQUIREMENTS

The software was developed using one of the common HLLs and is supported by an MS SQL databank. Communication with a SmartServer is effected via SOAP-XML, an international standard for WEB-based data transfer. It was therefore necessary to make the complex structures of SOAP-XML invisible to the user and to reduce necessary input to only key data needed for light management purposes. Using the software therefore requires no knowledge of programming languages, databanks or XML.

All program dialogues found in this manual are provided in English. However, localised versions can be made available on request or already feature as part of the installation files.

The program runs upwards of Windows 7 and on Windows 10, 32bit or 64bit version. Versions for iOS (Apple) and Android (Google) are currently being developed. The software can be installed on any PC/laptop/tablet that supports the above-mentioned Windows operating systems. Following installation, the software needs approx. 1GB of free disk space, about 90% of which are required for the MS SQL server. The software can also run on virtual machines. In addition, an Ethernet or WiFi TCP/IP connection is needed and, optionally, an integrated or external GPS receiver.

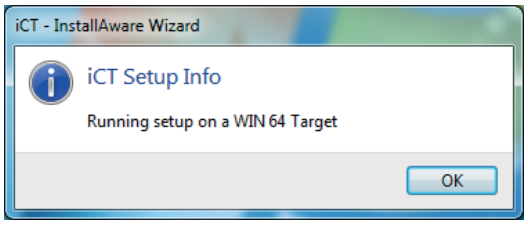
The software should be installed on a system that is not already running an MS SQL database. Experience has shown that a second MS SQL database on the same system can cause the iCT database to function incorrectly.

IMPORTANT

Suitable data-storage measures such as RAID hard disks and backup systems must be provided by the operator. Vossloh-Schwabe Deutschland GmbH accepts no liability for data safety on customer-operated systems. Similarly, no liability will be accepted if the functionality of other software applications is impaired or rendered useless due to the installation of our products. Any claims for compensation will be rejected.

[1] iDC = intelligent Data Concentrator
[2] The term "segment controller" is in fairly common use.
[3] SmartServer or i.LON is a product made by the company echelon and forms the core of the iDC.
[4] As a tablet, Vossloh-Schwabe recommends the FZ-G1 Toughpad by Panasonic (IP66, made to withstand impact from a height of up to 120 cm without sustaining damage).

The software is always delivered with an installer containing all necessary files, including any needed for the MS SQL server and versions for 32bit and 64bit operating systems. The respective version is shown at the start of the installation and needs to be confirmed. Due to the faster processing speeds, it is recommended to use a 64bit system.

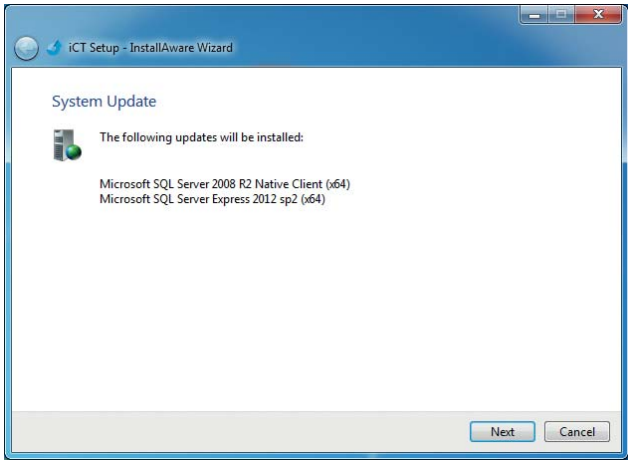


2.1 SOFTWARE INSTALLATION

Just like for other Windows-based applications, the standardised installation process itself is very simple.

2.2 RUN

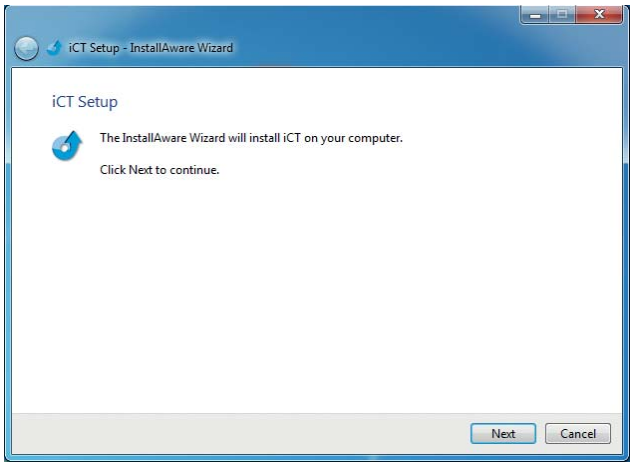
Once the installer has been activated and installation confirmed, the following dialogue window first opens:

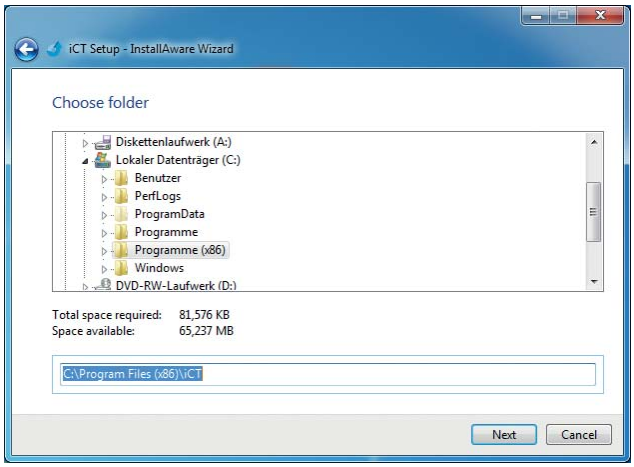


To begin with, the system will want to install the Microsoft SQL server. If this message fails to appear during initial installation, you can assume that an MS SQL server already exists on the computer. In such an event, it is advisable to cancel the installation process to avoid data conflicts. Please then use a different computer or create a virtual environment with a suitable operating system.

Click on "Next>" to start the installation process of the SQL databank. Depending on the computer's processing speed, this can take up to 10 minutes.

The actual software installation process will begin once the MS SQL database has been successfully created. The software itself consists of two parts: the iCT program and an auxiliary program for interactive determination of geographical coordinates:

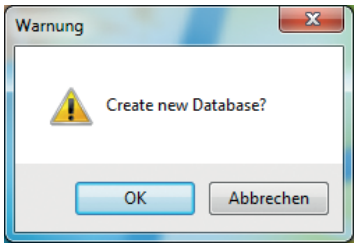




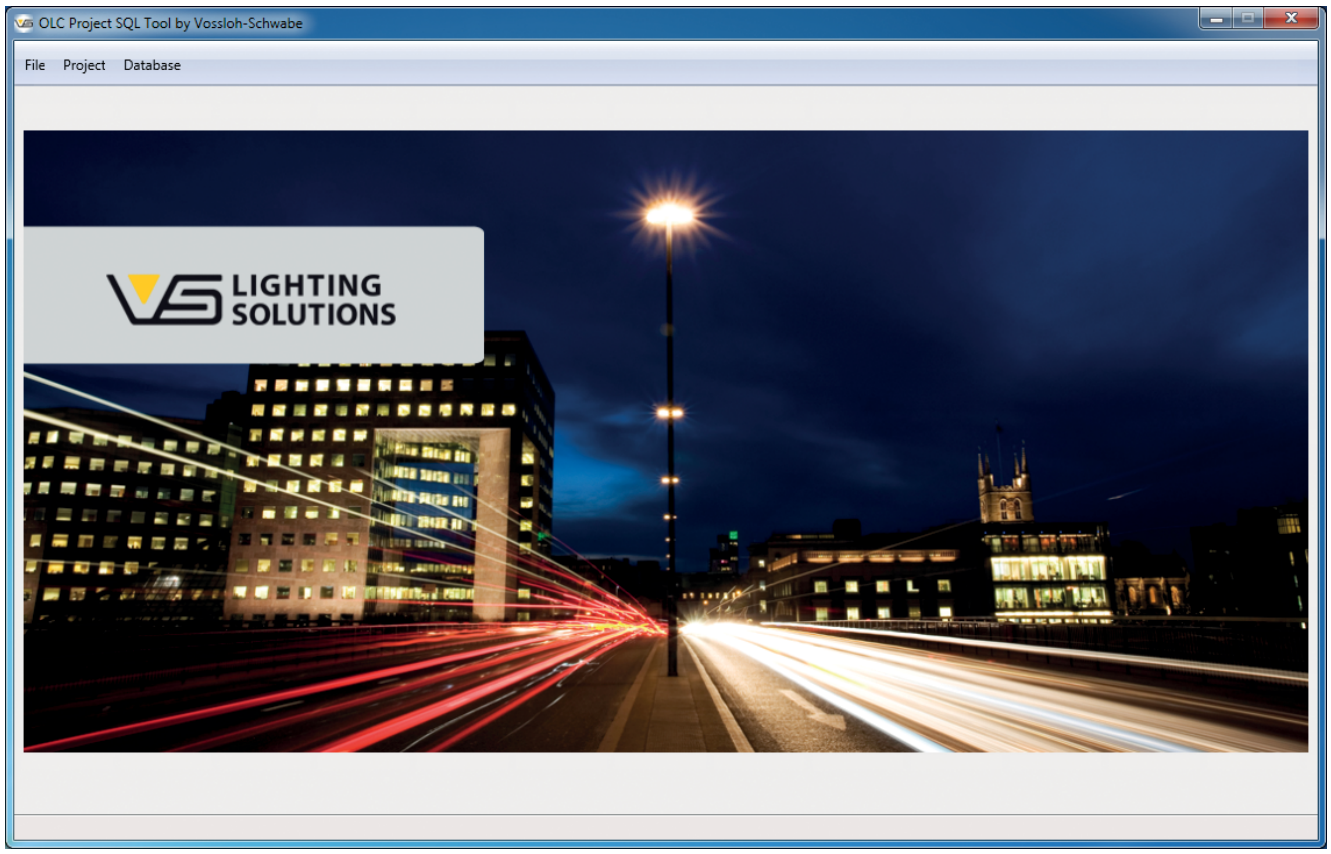
Again, click on "Next>" to continue the installation process.
During installation, the program will ask for the installation path and the program folder.
The process only takes a few seconds and your desktop will display two new icons on completion:

2.3 INITIAL PROGRAM START

The program starts with a double click on the iProjectOLC64(32) using the left mouse key. As a once-only occurrence, the program will first have to create the complete databank structure, a process that has to be actively confirmed by the user:

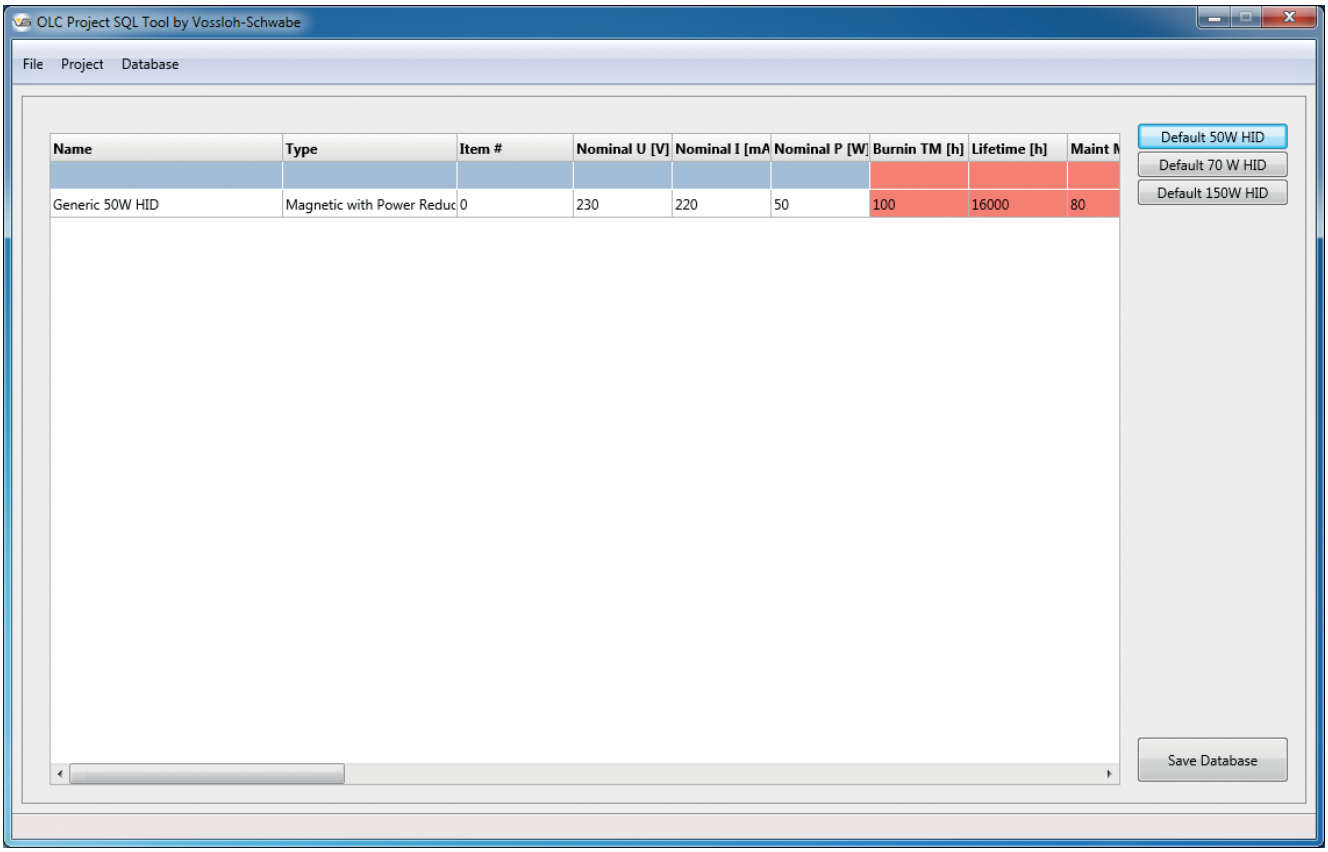


The following start screen will then be displayed:



2.4 INITIAL FUNCTION TEST

A simple test can now be performed to check whether everything was correctly installed, especially the databank.
Go to "Database" in the menu bar and click on one of the buttons on the right:



After clicking on "Save Database", a dataset will be saved to the databank, the page will then be completely deleted and subsequently called up again from the databank. Should the page remain blank after this process has been completed, there is definitely a problem with the databank. Such problems can be caused by various things, but they constitute more of an exception. Mostly though, they are caused by conflicts with a pre-existing MS SQL database. Therefore, please check your computer and install the program again in a "clean" environment. In all other cases, please contact your customer service representative.

The table will be explained in more detail in one of the following chapters.

The software was developed with the aim of avoiding any unnecessary data input.
As a result, commissioning consists of only three basic steps:

- Defining luminaires or ballasts and entering technical data
- Capturing individual luminaires using their neuron IDs
- Running the synchronisation and commissioning process

Beyond that, the program offers further features, e.g. preparing the SmartServer to ensure it operates in the correct mode, and options such as running a quick function test and checking whether the software is ready for use.

3.1 PREPARATION

Before the installation process can begin, it is necessary to check two important details: the technical specifications of the luminaire or ballast as well as the neuron IDs of the controllers:

INFORMATION

Neuron IDs are 12-digit physical addresses that are hardcoded into each controller; each neuron ID exists only once worldwide. This address cannot be modified and serves to identify each individual controller. You will therefore find that the controller casing features two identical labels: one that is intended to remain on the device and a second removable one for documentation and further processing purposes. Experience has shown that it is useful to stick these ID codes on respective templates. In addition to this hexadecimal ID, there is also a barcode (Code128-A) that greatly simplifies later input using a suitable scanner.

3.2 CREATING THE LUMINAIRE AND BALLAST DATABASE

Once the datasheets of the luminaires are at hand, you can begin to enter the data in the database. To this end, start the program as described above and go to the "Database" menu item. The same kind of table you saw during the test will now appear, in which all key data now need to be entered.

The table contains 31 segments, all of which need to be processed for all luminaires. The significance of the data entered in each segment varies, from merely serving as information for the user to being relevant to the correct functioning of the system. The red columns are particularly important for detecting breaches of limit values, which can later trigger respective warnings.

Navigating within the table is simple: apart from the usual cursor movements, the following keys are active:
- Pos 1 -> Goes to the beginning of a line.
- End -> Goes to the end of a line.
- Insert -> Inserts a row directly underneath an existing one.
- Delete -> Deletes a row.
- Enter -> Adds a new row at the end of a table.

You can now begin to enter the required data.
But first, please read the following description of the individual columns to ensure you know the significance of each respective entry.

Description	Significance
Name	Unique name, must be used only once.
Type	Luminaire type or ballast, manufacturer's description.
Item #	Order code, device code.
Nominal U [V]	Nominal voltage as per datasheet (e.g. 230 V).
Nominal I [mA]	Nominal current as per datasheet (e.g. 250 mA).
Nominal P [W]	Nominal output as per datasheet (e.g. 60 W).
Burn-in TM [h]	Burn-in time for HID; lamps cannot be dimmed during this time.
Lifetime [h]	Max. service life of the lamp (e.g. 16,000 hours).
Maint. Min. [%]	Maintenance factor (flux compensation); lower lifetime value = 0 h.

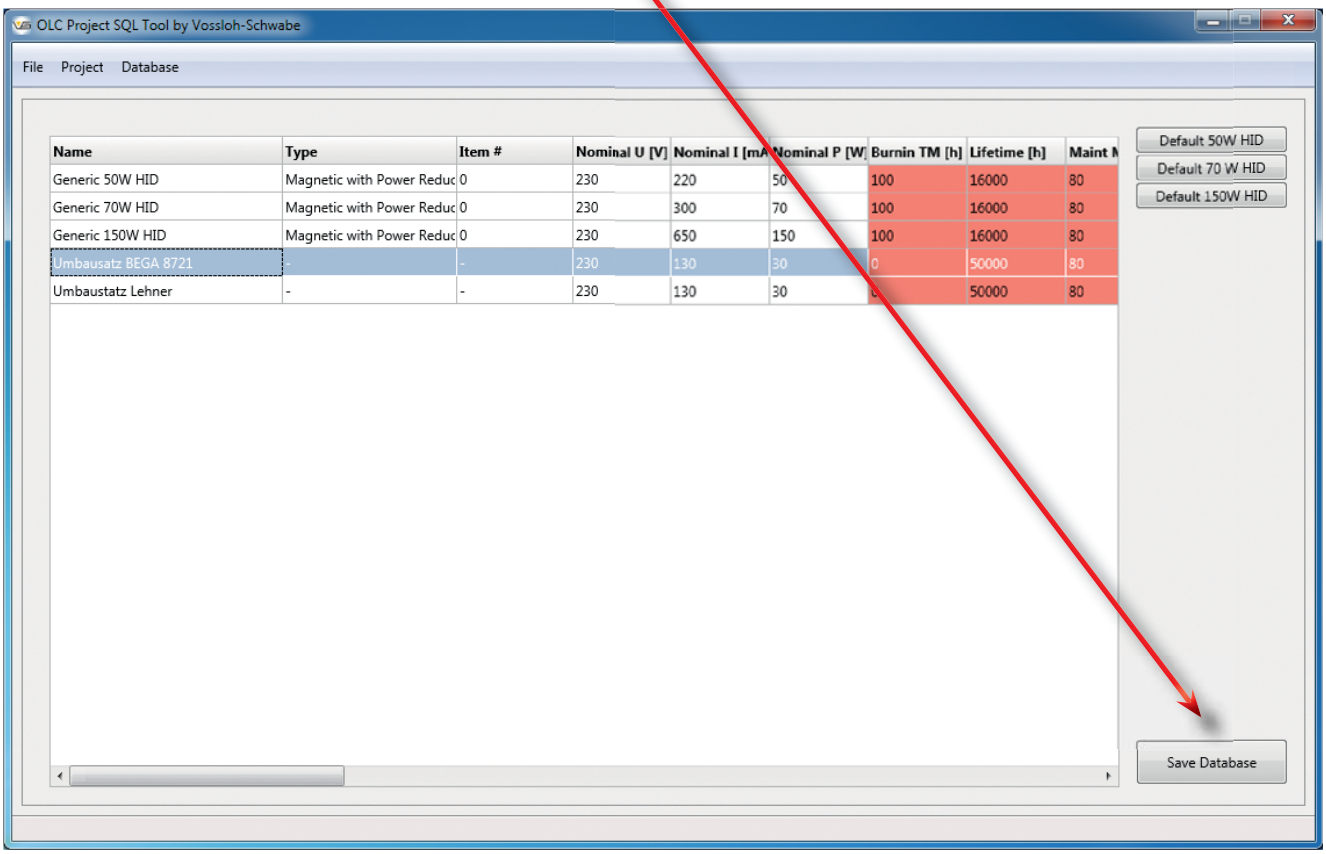
Description	Significance
Maint. Max. [%]	Maintenance factor (flux compensation); upper lifetime value = max..
LST Level [%]	Lighting level upon activation of the LST input.
Main U Max. [V]	Maximum permissible supply voltage.
Main U Min. [V]	Minimum permissible supply voltage.
Lamp U Max. [V]	Maximum permissible lamp voltage.
Lamp U Min. [V]	Minimum permissible lamp voltage.[5]
Main I Max. [mA]	Maximum permissible supply current.
Main I Min. [mA]	Minimum permissible supply current.
Lamp I Max. [mA]	Maximum permissible lamp current.[5]
Lamp I Min. [mA]	Minimum permissible lamp current.[5]
PF Min.	Power factor cos.
P Max. [W]	Maximum permissible output.
P Min. [W]	Minimum permissible output.
Dev. Sel.	Device selection (1-10 V, DALI, PWM, relay).
Low Lev. [%]	Lowest possible dimming value, depends on the lamp (HID = 40%).
Warm-up TM [s]	Warm-up time before lamp can be dimmed; applies only to HID.
Max. Lev. U [V]	Maximum output voltage when addressed via 1-10 V interface.
Power up [%]	Lighting level at power up.
LST enable	Enable LST input.
LST invert	Invert the LST input's direction of operation.
PST invert	Invert the PST output's direction of operation.
DALI linear	Setting DALI output to linear mode (instead of logarithmic).

Please refer to the documentation provided by the LonMark© organisation for further information, especially concerning the OLC profile: http://www.lonmark.org/technical_resources/guidelines/docs/profiles/3512_10.pdf

To make the process a little easier to begin with, clicking on any of the three buttons on the right will create a full dataset, with which three different electromagnetic ballasts can be pre-defined. These can be modified if required and can also help to clarify which numerical values must be entered in the table.

[5] Is not used since there is no uniform DALI standard yet. Set value to 0.
[6] OLC = Outdoor Light Control

Once data entry has been completed, you must click on "Save Database" to save your work.
Failure to do so will result in the loss of all your data!



This process only needs to be completed once per luminaire or ballast, since subsequent projects will also be able to draw on the entered data. The database will therefore grow larger with each new definition and its ultimate size will be limited only by the available space on your hard disk.

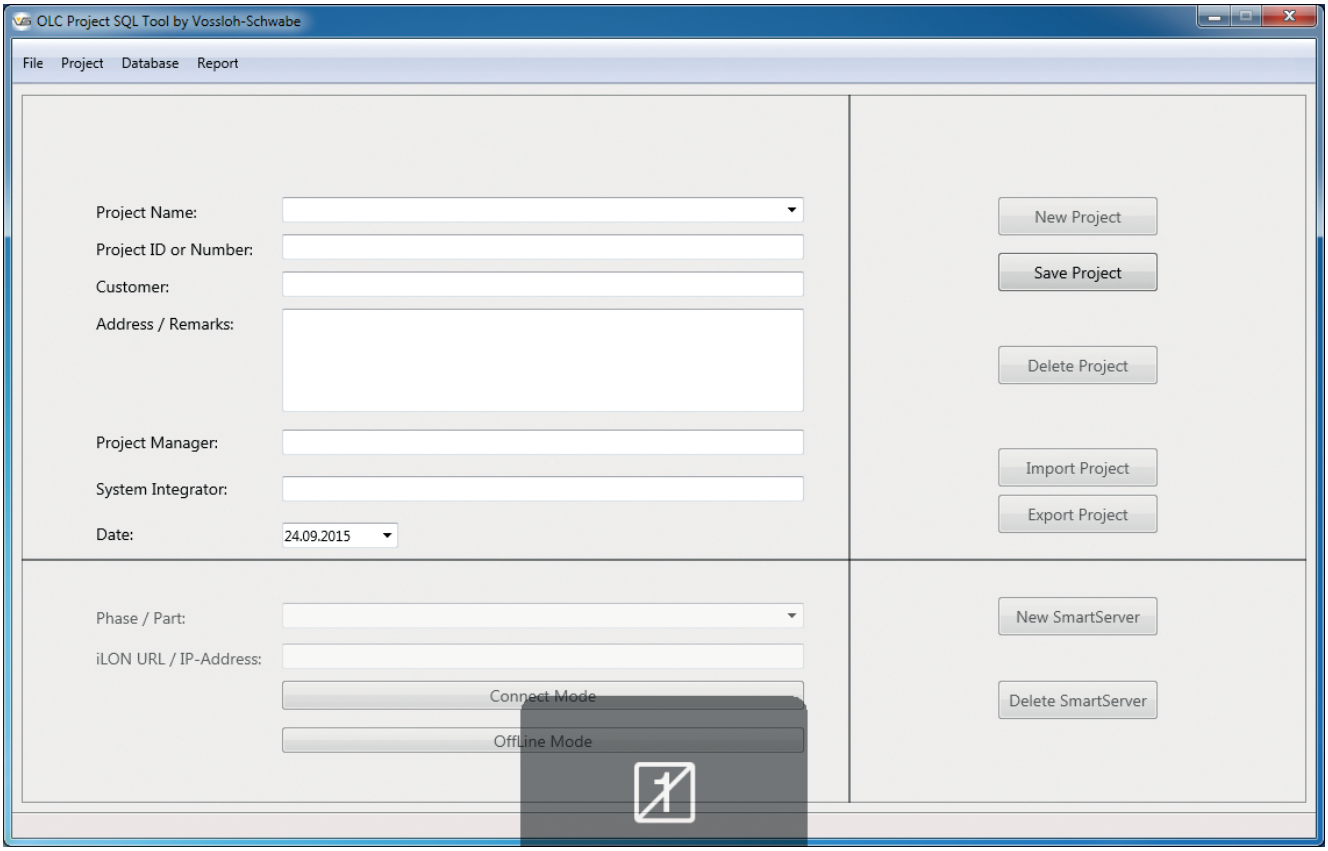
3.3 CREATING A PROJECT

The next step involves creating an individual project, which breaks down into three sections:

- Defining a project with a unique name that the program will let you use only once (project head).
- Defining the SmartServer with its name and IP address.
- Entering all controllers.

The system is capable of managing hundreds if not thousands of projects (as long as the computer provides sufficient free hard disk space). Per project and SmartServer, storage space requirements will be in the region of 200 kB for 100 luminaires. As an example, 1 GB of free hard disk space could be used to manage approx. 5,000 projects, each with its own SmartServer.

To access the project's start page, click on "Project" in the menu bar. The following window will then open:



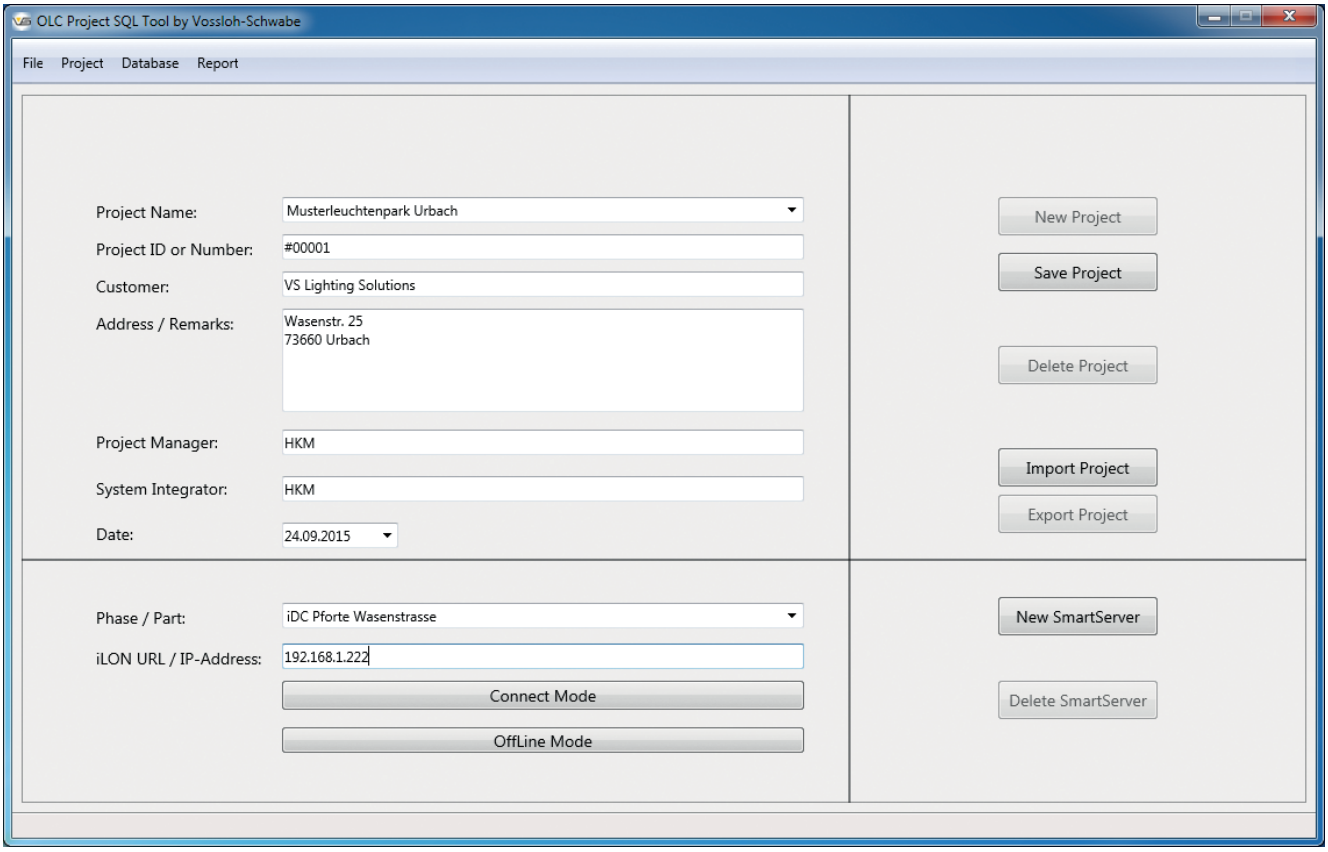
Beginning with the first row, you can now start to create the project:

Description	Significance
Project Name:	Name of the project.
Project ID or Number:	Project code.
Customer:	Customer.
Address/Remarks:	Address/Remarks.
Project Manager:	Name of the project manager.
System Integrator:	Name of the system integrator.
Date:	Date of the first project call up.

The only absolutely indispensable entry is the project name as it will be used to retrieve the project later. All the other entries are optional, but are advisable in the interest of keeping the system orderly.

The "New Project" button clears all fields, after which you can begin entering data. The process is again finalised by clicking on "Save Project". Failure to save your work will result in the loss of all the entered data! All segments can be modified at a later date, including the project name.

As soon as the project head has been confirmed, the SmartServer data can be entered in the lower segment:



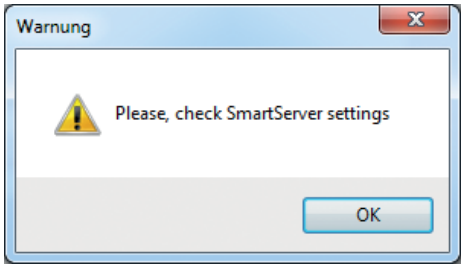
As before, "Save Project" needs to be confirmed to save your work. If several SmartServers need to be defined, these can be created by clicking on the "New SmartServer" button in each case. There is no real upper limit to the number of SmartServers that can be created. Naturally, all entries can be deleted again. However, in such an event, the system will display a warning that all data will be irretrievably lost if deleted. If the project is then deleted, any entries made with regard to the SmartServers and controllers will also be lost. If only the SmartServer is deleted, only the controllers assigned to that particular SmartServer will be deleted.

IMPORTANT

The SmartServer is delivered with a static IP address: 192.168.1.222, via which the SmartServer can be addressed during the commissioning process. The "i.LON SmartServer Quickstart Guide.pdf" contains instructions on how to modify this IP address. You will find this pdf file on the echelon CD that is delivered along with the iDC.

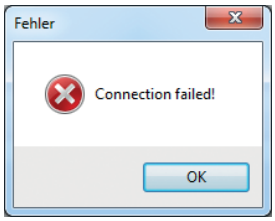
The next step involves entering the controllers, a process that begins with clicking on "Offline Mode". To begin with, data are only entered in the database and a connection to a SmartServer is not required at this point. This is particularly convenient when initially pre-configuring the system in an office setting.

After you have clicked on "Connect Mode", the program will attempt to establish a connection to the SmartServer. If successful, the following message will be displayed during first use:

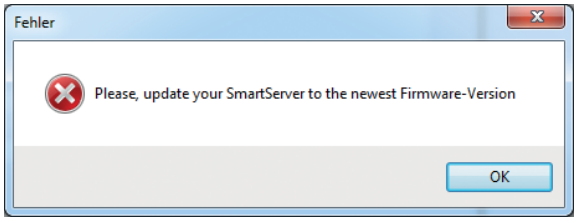


This message refers to the fact that the SmartServer is still in factory condition and cannot yet satisfy street lighting requirements. The next chapter deals with the corresponding configuration of the SmartServer.

Failure to connect to the SmartServer will cause the following message to appear:



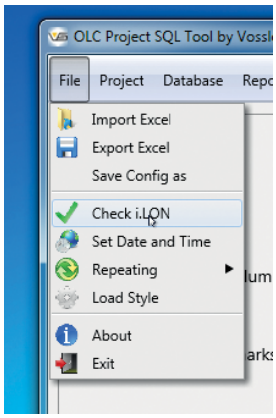
If the SmartServer is not running the latest firmware, the following message will appear:



Information on how to update the firmware to a current version will be provided on request.

3.4 PREPARING A SMARTSERVER FOR INSTALLATION

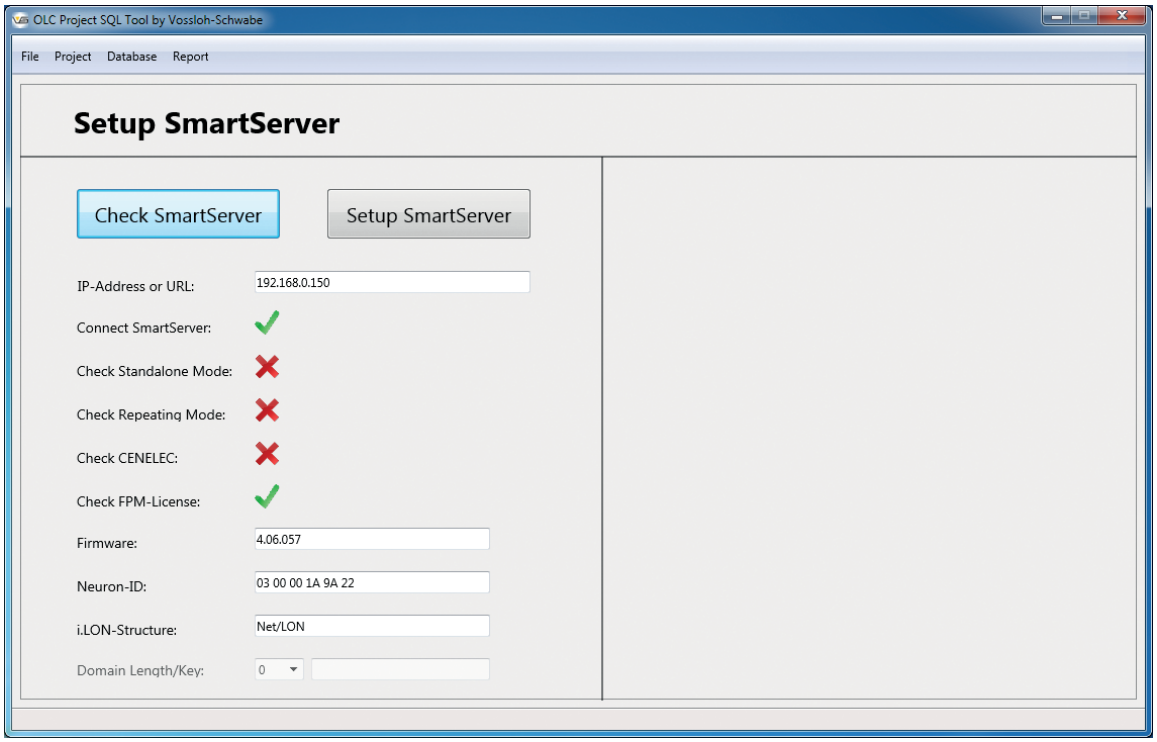
SmartServer configuration now involves the following steps:



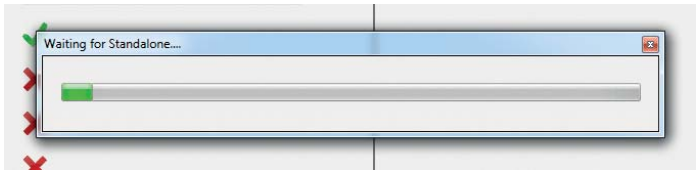
Click on "Check i.LON" in the "File" menu option, after which a window will open with a "Check SmartServer" button and an entry field for the SmartServer's IP address. While it is possible to change this IP address, this usually makes little sense sine it would have been automatically taken over from entries made earlier.

Clicking on "Check SmartServer" will then start a complete function test, after which the results will be displayed.

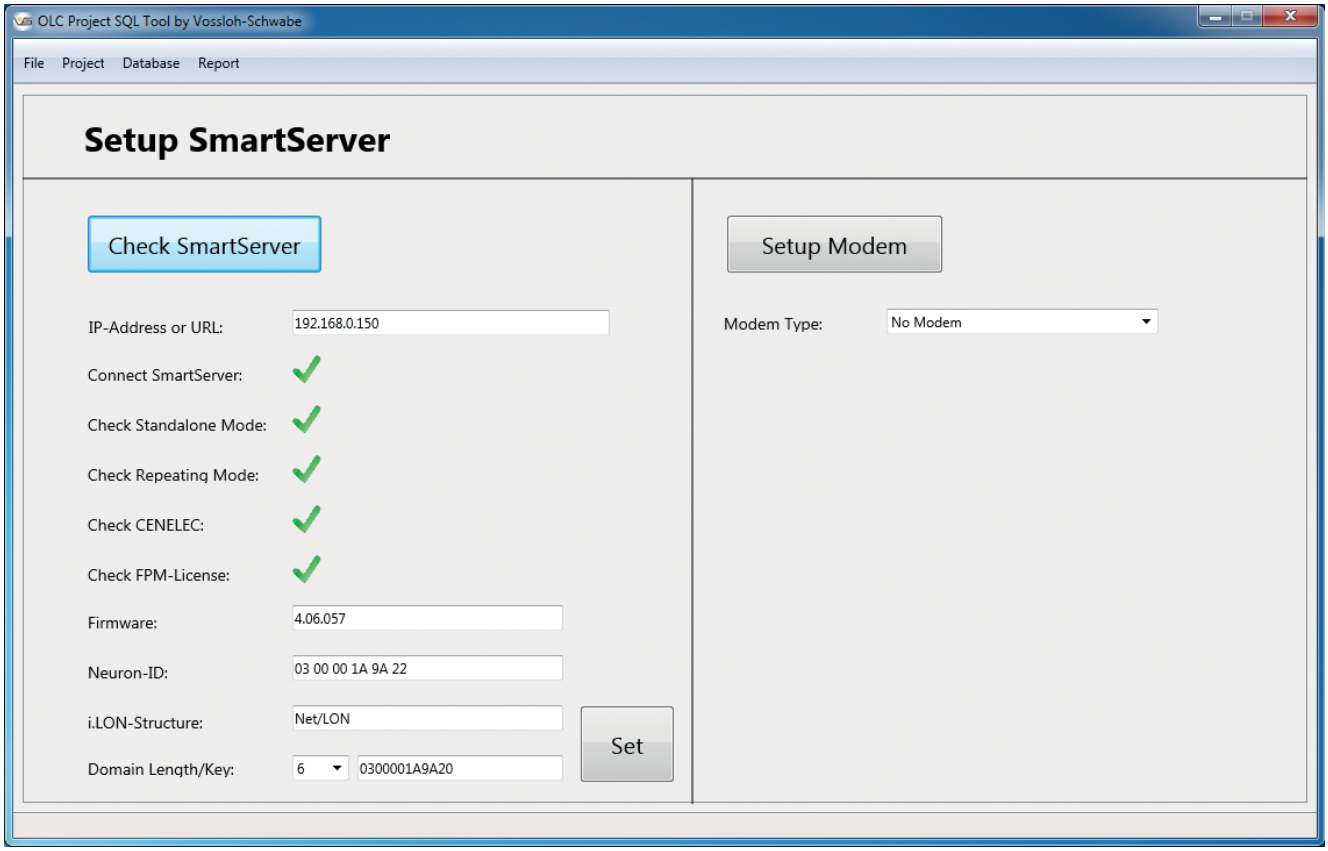
The test only takes a few seconds and delivers the following results:



As you can see, the SmartServer is not in the correct mode, which you can now change by clicking on "Setup SmartServer". In addition to changing the modes, you will also have to import various files that are required for further configuration steps. After changing modes and copying the necessary files, a reboot will be needed, which will take several minutes.
A progress bar will be displayed throughout:



Clicking on "Setup SmartServer" again will then deliver the result:



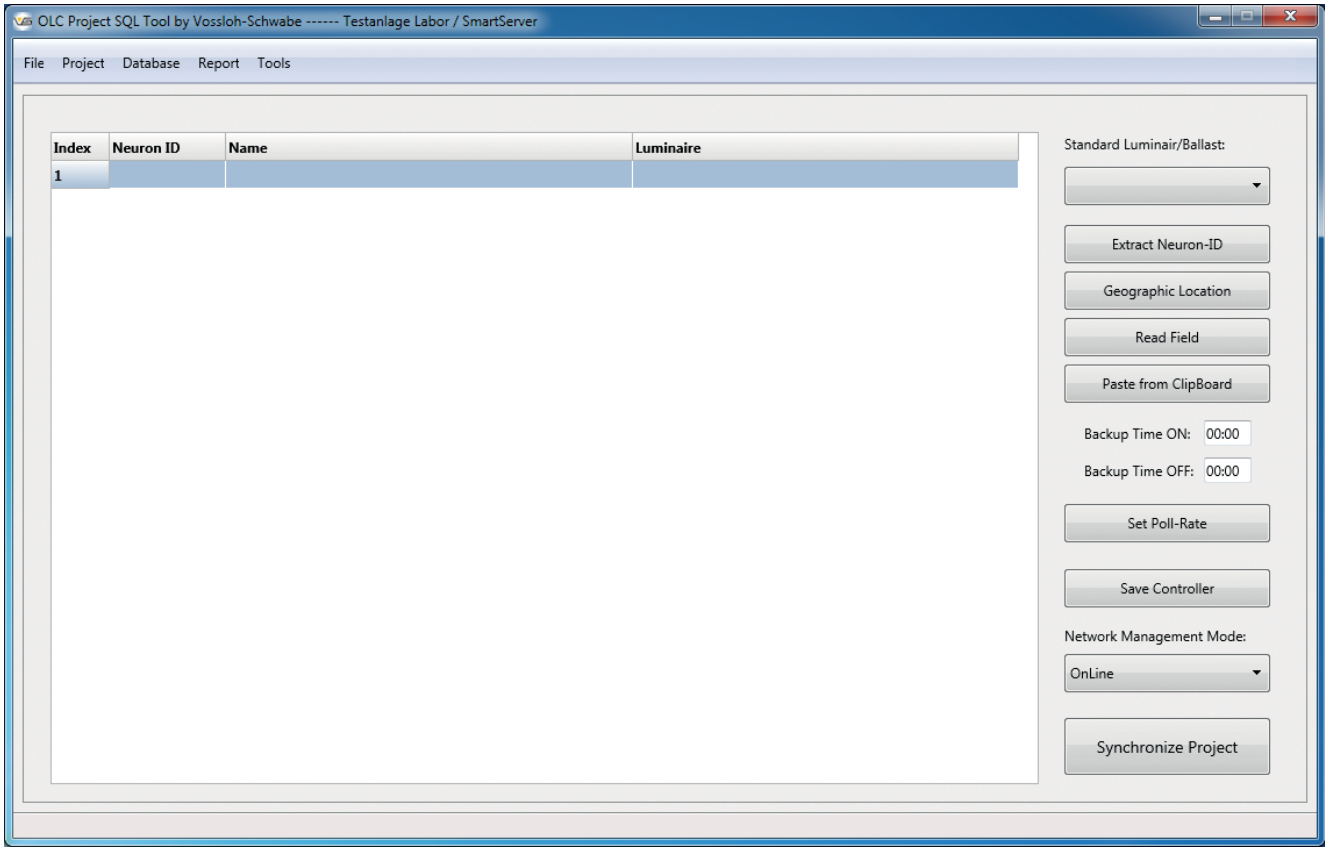
An additional "Setup Modem" button will now appear on the left-hand side.
The "modem" topic will be dealt with in Chapter 4.11 on page 31.

INFORMATION

In addition to the green ticks, you will also find further fields. The firmware number and the neuron IDs (of which each SmartServer has 16) cannot be modified and will have been retrieved from the respective SmartServer. While it is possible to modify the i.LON structure field, this should only happen for a very good reason. The length of the domain key is of greater significance since this code is transmitted along with every protocol sent via the bus connection. As an example, a 6-byte domain key results in a certain overhead that is quite significant in view of the relatively slow data transfer speed (~5,000 bd). It is therefore better to work with a 1-byte domain key at this point. Ideally, the key begins with "01" and counts upwards in steps of 1 for each new SmartServer added to the active project. It is important, though, to ensure that the same key is never used for two SmartServers in close proximity to one another as this would inevitably cause data to be processed incorrectly. Clicking on "Set" will then save the new data and transfer these to the SmartServer.

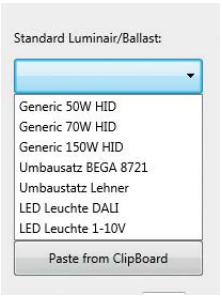
3.5 CONTROLLER INPUT

The controllers and associated data can be entered either in offline or online mode. The entry screens are identical in either case:



The table consists of four columns and any number of rows. You must now enter all controllers that were physically assigned to the previously selected SmartServer. The first column contains an index that is incrementally increased by a factor of 1 for each new row. The second column is for the 12-digit neuron ID and the third is for the user to enter a plain text name that will uniquely identify each respective luminaire. The final column is a combined field in which you can select either the luminaire type or the ballast.

As the type of luminaire found within a single street segment tends to be identical in the vast majority of cases, you can use the "Standard Luminaire/Ballast" drop-down menu to pre-select the respective device type:

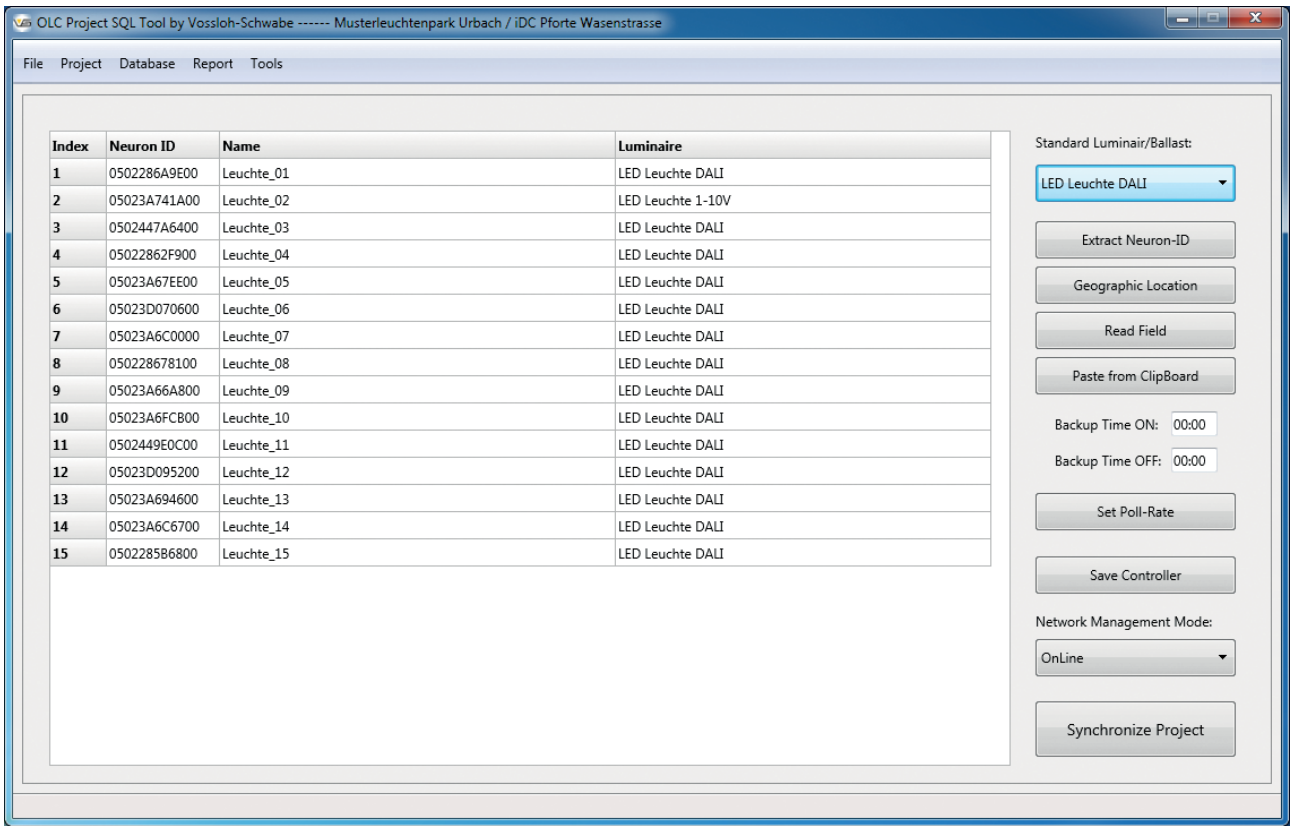


The pre-selected luminaire or ballast type will then automatically be entered in column 4 in each new row.

INFORMATION

In principle, you can now proceed any way you like. However, it is recommended to use a barcode scanner and successively scan in each neuron ID. Setting the barcode scanner to automatic line feed, meaning the cursor will automatically move down into each new row, speeds up the process. The pre-set luminaire or ballast type will again be automatically entered in column 4. Once all neuron IDs have been scanned in, the 3rd column needs to be filled with a plain text name, e.g. Luminaire_01, Luminaire_02, etc., or with IDs commonly used for street luminaires by the operator.

The result could look like this:

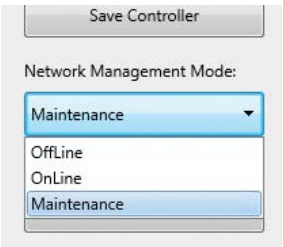


All navigational options such as inserting or deleting individual rows are also possible. Naturally, this also includes such functions as "copy and paste". All entries can be changed at a later point in time, including any data entered in column 4.

Clicking on "Save Controller" will save your data to the databank.

3.6 SYNCHRONISATION

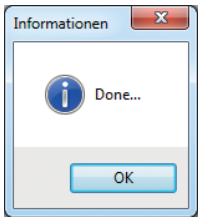
Before you begin with the actual synchronisation process, you are recommended to set "Network Management Mode" to "Maintenance". This drastically reduces the volume of data transfer using the powerline bus since no attempt will be made to retrieve data from the controllers:



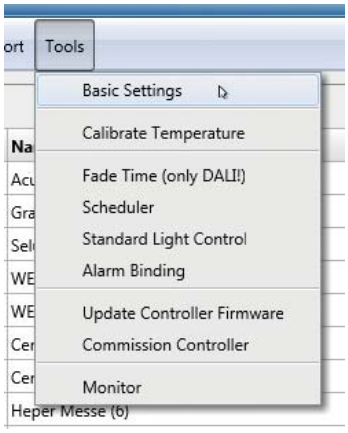
INFORMATION

Using "Offline" mode here would make no sense since it would prevent all and any communication with the controllers.

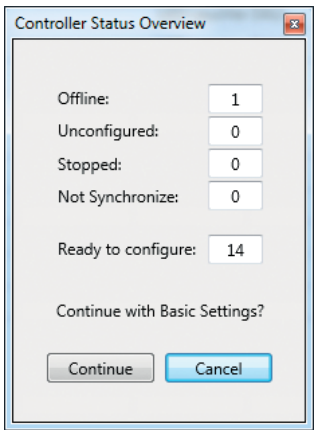
Clicking on "Synchronise Project" will now begin the installation and commissioning process proper. This first involves transferring all controller data to the SmartServer. A progress bar at the lower edge of the screen shows the current data transfer status. Depending on the number of controllers, this process can take several minutes. The following window opens on completion:



To perform the final steps, you now need to click on "Basic Settings" in the "Tools" menu.

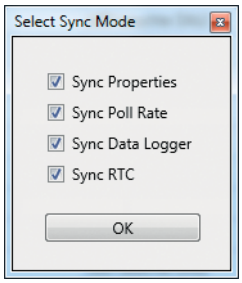


The system will then first check the current status of the controllers:



Ideally, the first four rows should feature a "0" and the final row should display the total number of controllers. Should this not be the case, it may be that the system has yet to finish commissioning all the controllers, which is perfectly possible given larger-scale systems or slow data transfer speeds. If individual controllers fail to be commissioned even after a longer period of time, you will need to troubleshoot the causes. To this end, it will also be helpful to use the web platform of the SmartServer in parallel.

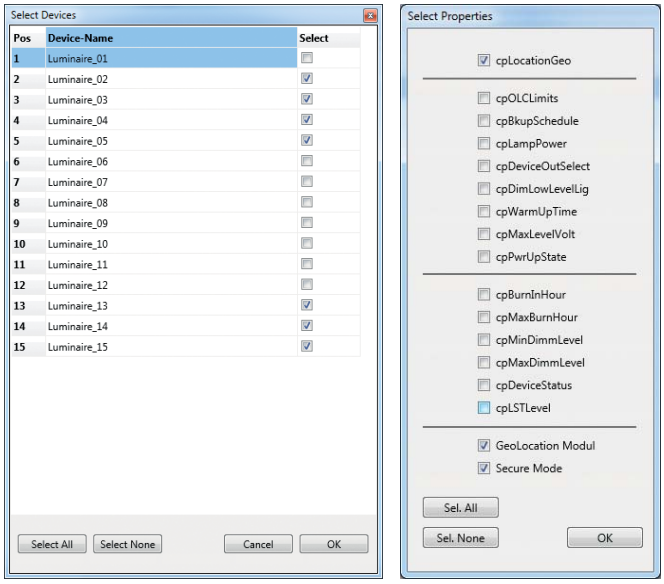
If everything is in order, you can proceed to the next step by clicking on "Continue":



Setting details:

Description	Significance
Sync Properties	Transfer of all data from the previously defined database for the selected ballast.
Sync Poll Rate	Rate at which the SmartServer polls the controllers. The standard setting is 600 s, which means that every single controller will be polled every 10 minutes. This value can be changed and you should calculate a poll time of approx. 5 s per controller. The total value should then be rounded up to the nearest full 30 s or 60 s.
Sync Data Logger	Synchronisation of the data loggers. This must always be carried out upon a new installation or when the number of controllers changes.
Sync RTC	Synchronisation of the real-time clock for the controllers. Like for the data loggers, this must always be carried out upon a new installation or if the number of controllers changes.

To ensure that not all datasets have to be retransferred in the event of only minor changes, you can select the parameters to be transferred ("Properties"), both per controller and per parameter:



Clicking on "OK" will again start the process and the remaining entries will be made. A progress bar will again appear at the lower edge of the screen during this process, which can also take several minutes.

The background processes triggered by the steps described above are highly complex and will involve a constant exchange of data among the SmartServer, the iCT program and the SOAP-XML protocol. The end result is a fully set up and functioning system that communicates on all levels and gives you full control of the switching and dimming status as well as the capture and transfer of all measured data.

Changes to the data in the table can be made at any time in the future, including controller deletions and additions as well as changing neuron IDs, names and luminaire type. However, a synchronisation run must be carried out every time after any such changes are made so that these can be transferred to the SmartServer.

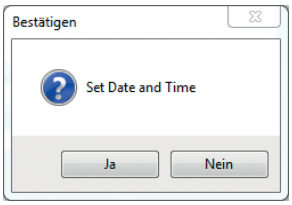
4 FURTHER STEPS

This chapter is all about fine-tuning the system and numerous related additional functions that serve both parameter configuration and function control purposes.

4.1 SETTING THE SMARTSERVER'S SYSTEM TIME

To enable trouble-free operation, it is necessary to set the SmartServer with the correct time and time zone.
A respective menu item ensures the process is both simple and quick:

If this point is selected, a small confirmation window will open:



After clicking on "Yes", the SmartServer's clock will be set to the computer's time and the time zone set to CET[7]. This will also result in the system switching automatically from standard to daylight saving time (and vice versa). In addition, the system will install a connection to an NTP[8] server from the cluster project at pool.ntp.org.

INFORMATION

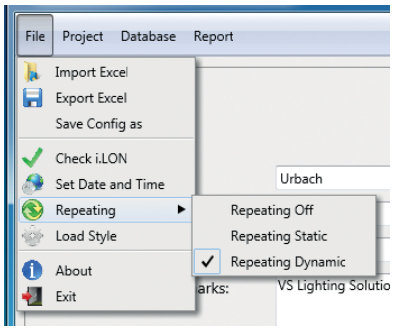
At present, other time zones still have to be set directly at the SmartServer, for which you are requested to refer to the SmartServer's manual.

However, there are plans to include an automatic function to define other time zones in future versions of the iCT software.

[7]CET = Central European Time
[8]NTP = Network Time Protocol

4.2 REPEATING MODE

For the purpose of powerline-assisted data processing and transfer, it is necessary to provide special mechanisms that ensure signals are correctly transferred to all connected devices even in the event of severe disruptions or attenuations. "Dynamic Repeating" is therefore activated by default to ensure this works. However, while the function can still be deactivated, this should only be carried out under very specific circumstances. If, for instance, network quality is good enough not to require any kind of repeating, this function can be deactivated. Users should, however, be aware that the conditions governing the behaviour of and any disruptions to networks are of a dynamic nature, which means disruption levels can differ from day to night.



4.3 MENU ITEM: "TOOLS"

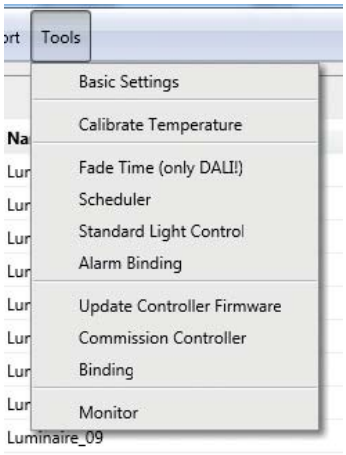
4.3.1 Firmware Update

You should always use the latest version of the controller software, the files for which can be found in the following directory following iCT installation:

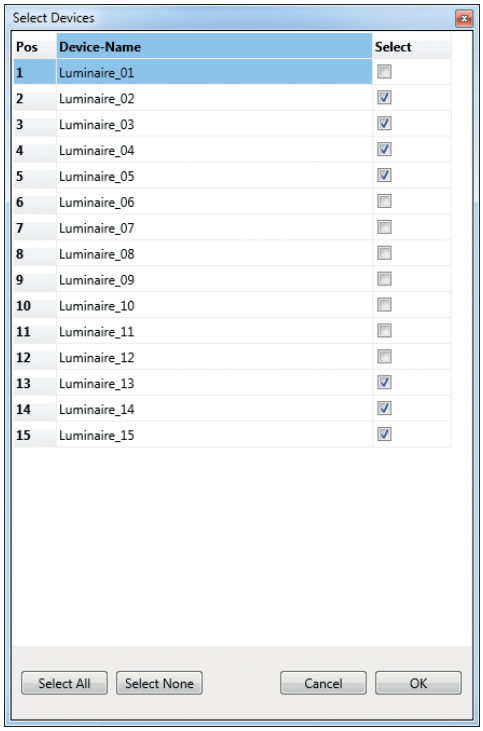
<INSTALLDIR>/iCT_64(iCT_32)/LonWorks/import/Vossloh

The files are called OLC.APB and OLC.XIF, both of which will have been copied into the respective directory of the SmartServer during initial installation and will then be available for use. Should you want to transfer these files to the SmartServer at a later point in time via an FTP connection, please proceed as directed in Chapter 7.1 on page 45.

Starting the actual download process itself now only involves clicking on "Update Controller Firmware" in the "Tools" menu:



In the next step, this update can also be carried out by activating the respective controllers:



Clicking on "Select All" will check all controller boxes, clicking on "Select None" will uncheck all boxes again. Individual controllers can be selected for download with a mouse click in the respective boxes.

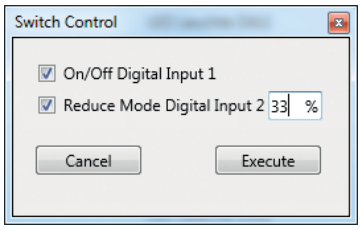
INFORMATION

The process does take quite some time; you can work on a time factor of approx. 2 minutes per controller. Given 100 controllers, this adds up to about 3.5 hours. But since the process is carried out in a fully autonomous manner, it neither needs supervision, nor a connection to the iCT program. Care should be taken, though, to ensure the process is completed well before dusk sets in.

A progress bar at the lower edge of the screen again displays the status of the process. The following information is provided: the total number of controllers, the number of already processed controllers, the number of controllers yet to be processed, the number currently being processed, the anticipated total time to completion and the mean processing time per controller.

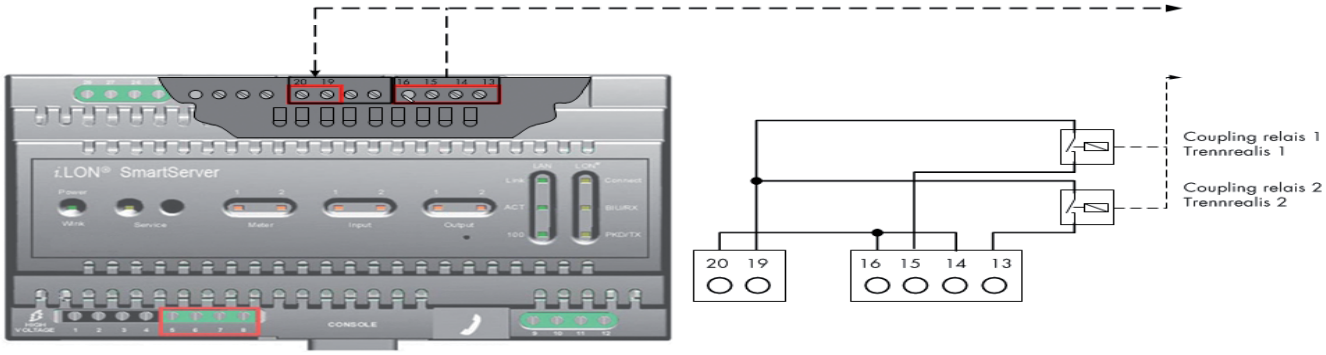
4.3.2 Light Control via Digital Inputs

Each of the iDC's SmartServers features two independent, non-floating digital inputs that can be addressed via respective coupling relays. Systems often feature so-called repeater functions with half-night switches or individual ripple control receivers, which normally switch lighting on and can also dim it down at night, or are fitted with simple light sensors. It is equally possible to transfer these functions to the controllers 1:1. To this end, the controllers must remain connected to the power supply at all times and corresponding control signals exist for addressing the coupling relays. A click of the mouse is all it takes to start the process. The following dialogue opens by clicking on "Standard Light Control" in the "Tools" menu:



If only the first option is checked, a signal applied to digital input 1 will merely switch light on or off. If the second box is also checked, lighting levels can also be dimmed down to a pre-defined level. Clicking on "Execute" activates the process, which takes no more than a few minutes to complete.

The two digital inputs must be wired as follows:



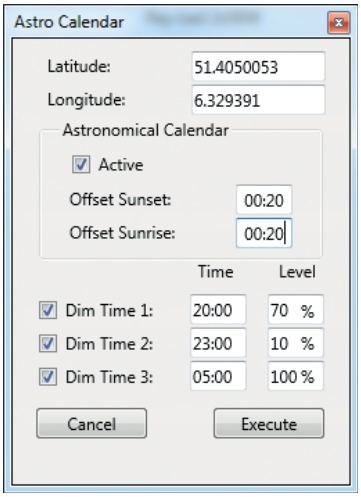
4.3.3 Activating the Scheduler

If there are no external switching signals for light control purposes, a scheduler can be enabled instead.

The SmartServer features an internal scheduler that can be programmed with up to 40 independent timer programs. But for the present scenario, only one of these is needed. In addition, the SmartServer can be switched on and off using its astronomical clock function. However, this means having to enter the geographical coordinates of the system so that times for sunrise and sunset can be correctly calculated. All this is contained in this tool.

The function was included because new systems often lack connections to superordinate systems, such as our iLIC. However, to ensure the benefit of energy savings from the very first day of installation onwards, dimming profiles can be defined for night-time switching in advance of such connections.

The entry screen is reached via "Scheduler" under "Tools":



The coordinates for latitude and longitude are indispensable if the astronomical calendar is activated.

Three possible scenarios are available for activation:

- Only switching lighting on or off using the astronomical calendar.
- Dimming lighting levels only at certain times (up to 3 different times).
- Astronomical switching and additional dimming at certain times.

The timer program will behave in line with the enabled option. To ensure twilight times can be adjusted, a freely definable offset value can be set for sunrise and sunset, in which regard the value has to be added for sunset and subtracted for sunrise.

Clicking on "Execute" will run the process and transfer your settings to the SmartServer, which will then activate the respective timer. The process takes no more than a few minutes.

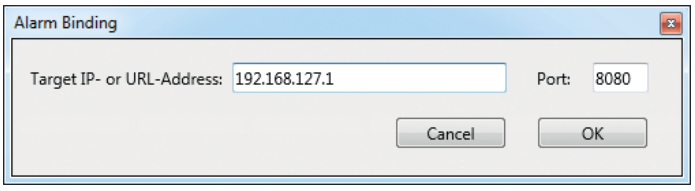
INFORMATION

If the astronomical calendar is enabled, a higher switching priority will be enabled for the OFF phase than for normal switching processes. This prevents other switching processes from prematurely switching lighting on or off. If, for instance, light was set to come on with a dimming value of 70% at 20:00 h, but the sun only goes down at 20:45 h, the system will be prevented from lighting up at 20:00 h with a dimming value of 70% and will only come on at 20:45 h. This ensures lighting cannot easily be switched on during the day.

4.3.4 Alarm Binding

For the purpose of alarm management, it is important to ensure any alerts are directly transferred to the superordinate iLIC system. This can be achieved with the SmartServer via something called WEB binding, which ensures that error messages are evaluated with each poll cycle and immediately transferred to the server, which will then send out a warning message soon after.

You can enable the function via "Alarm Binding" under "Tools". You will merely need to know either the URL or the server's IP address:



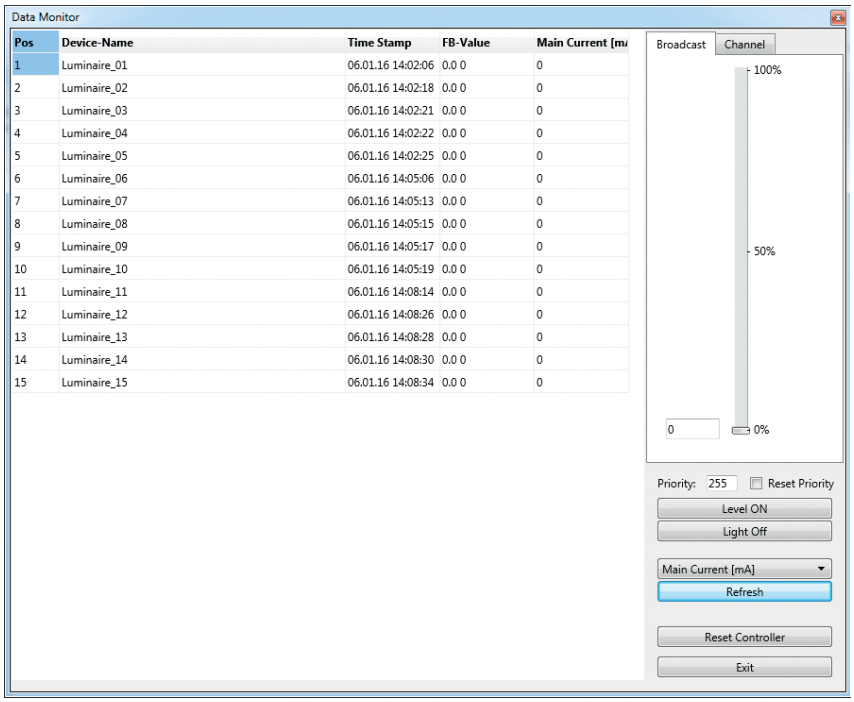
Port 8080 should remain unchanged. At the same time, any firewall TCP protocols must be set to forward port 8080.

Clicking on "OK" will then run the respective processes, which take no more than a few minutes to complete.

4.3.5 Monitor

The data monitor is a highly useful tool for checking an installed lighting system and permits fast identification of error sources. The data monitor not only provides information on the overall status of the system at a glance, but also lets you retrieve measured data. This gives you a good overview of what is currently happening in the system at any given point in time. In addition, all luminaires can be switched on or off or dimmed. In this mode, all luminaires are always addressed together.

Clicking on "Monitor" under "Tools" produces the following screen:



Button details:

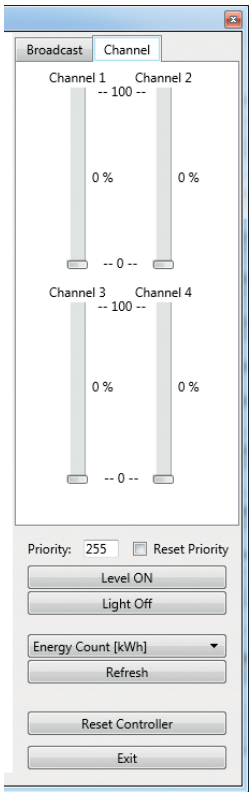
Description	Significance
Level ON	Luminaires are switched on at the pre-defined dimming level, which can be preset either with a numerical value or using the slider.
Level OFF	Lighting is switched off.
Measured Parameter	Selection of the parameters to be measured: current, output, voltage, power factor, energy meter, temperature, hours of operation.
Refresh	Refresh measured values.
Reset Controller(s)	Reset controller(s).
Exit	Exit monitor.

The result will then be shown in the table, of which column 1 contains a serial number, column 2 the luminaire description, column 3 the time stamp and column 4 the return value for the dimming status as well as the ON(1) or OFF(0) status. Column 5 then displays the previously selected measured value.

As already described in Chapter 4.3.3 on page 23, activating the astronomical calendar can render luminaires undimmable and unswitchable during the day. To ensure both functions remain available, there is a field in which you can change the switching priority. A value of 255 is given the lowest and a value of 0 the highest priority. To permit switching with an active astronomical calendar, this value should be set to<= 220. This is necessary to ensure the "Level ON" function can work. The priority value can be reset by clicking on "Reset Priority", but will revert to its original value after a 24-hour cycle. A respective message will appear if the switching priority is insufficient.

Vossloh-Schwabe's OLC controllers are also capable of independently controlling up to 4 DALI ballasts when in DALI mode.
This depends on the DALI devices having been programmed with sequential numerical addresses (0, 1, 2, 3, ...).

There is a respective entry screen for testing such a constellation:

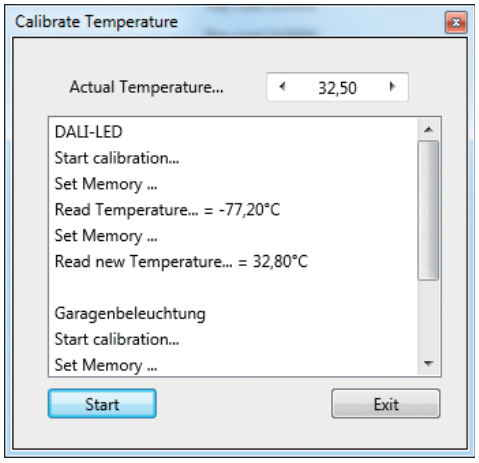


4 different levels can be set in the "Channel" tab, which are then transferred after clicking on "Light ON".

4.3.6 Calibrating the Temperature

A sensor contained within the controller can directly measure the ambient temperature inside the controller. However, the deviation lies in the region of ±5° C, which can be sufficient to evaluate and detect extreme temperature fluctuations.

Clicking on "Calibrating the Temperature" under "Tools" lets you select the controller you wish to calibrate as already described in Chapter 4.3.1 on page 21. A window will then appear in which you can enter the target temperature in steps of 0.5 °C:



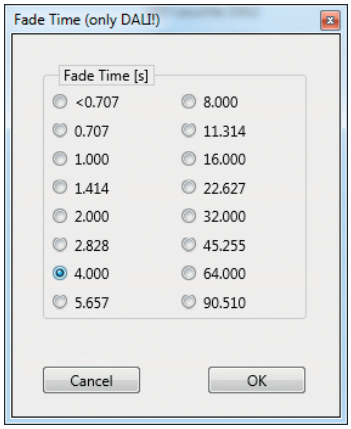
Once the process has been started by clicking on "Start", corresponding information will be displayed. During this process, the internal calibration memory will be set to 0 and the temperature measured (in our example: –77.20 °C). Subsequently, a new correction value will be calculated using the target temperature and entered. To finalise, the temperature is measured again. However, this can slightly deviate from the preset value for reasons inherent in the system.

4.3.7 Fading Settings (Only for DALI Ballasts/Drivers)

Modern DALI ballasts or drivers currently feature various light control options, one of which is to set a "fading". This function allows you to achieve a seamless transition between various brightness levels, but is available only with DALI devices. It is not possible using 1–10 V or PWM devices.

As already described in Chapter 4.3.1 on page 21, clicking on "Fade Time (only DALI!)" under "Tools" lets you select the controllers.

Confirming "OK" will open a new window:



16 different fading times are available for selection.
These values cannot be modified and correspond to the DALI standard.

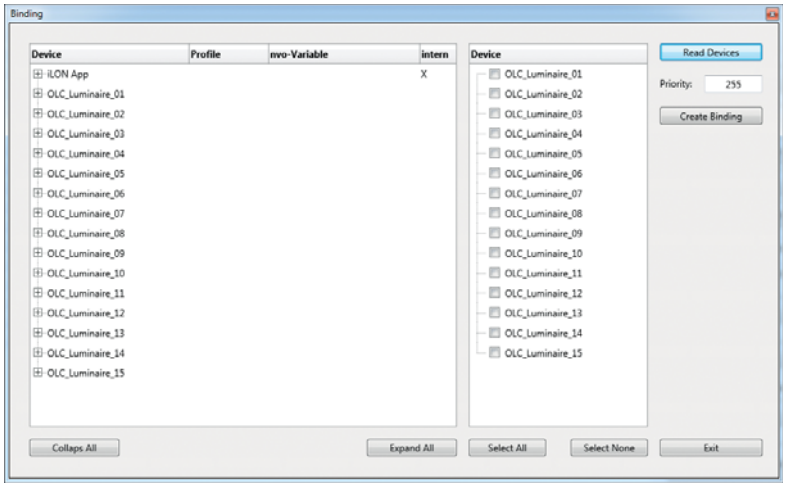
4.3.8 Binding

Binding refers to the possibility of transferring signals from one controller to another. As an example, this could be a sensor whose signal you want to transfer to other controllers to, e.g., switch light on or dim it up. This tool lets you create such a binding from a single source to any number of target devices.

In this context, the following limitations apply:

- Direct binding is only possible using internal variables, such as those delivered by the SmartServer (e.g. the digital inputs).
- Only SNVT_switch variables can be processed; these are also the variables that can be used for light-control purposes.
- Peer-to-peer bindings involve a certain polling-based delay. However, the poll rate can be reduced for individual sensor controllers, but this must be carried out manually directly at the SmartServer. Direct or "real" peer-to-peer is in preparation and will become available with the next generation of controllers.

Opening the function by clicking on "Binding" under "Tools" will result in the following window being displayed:

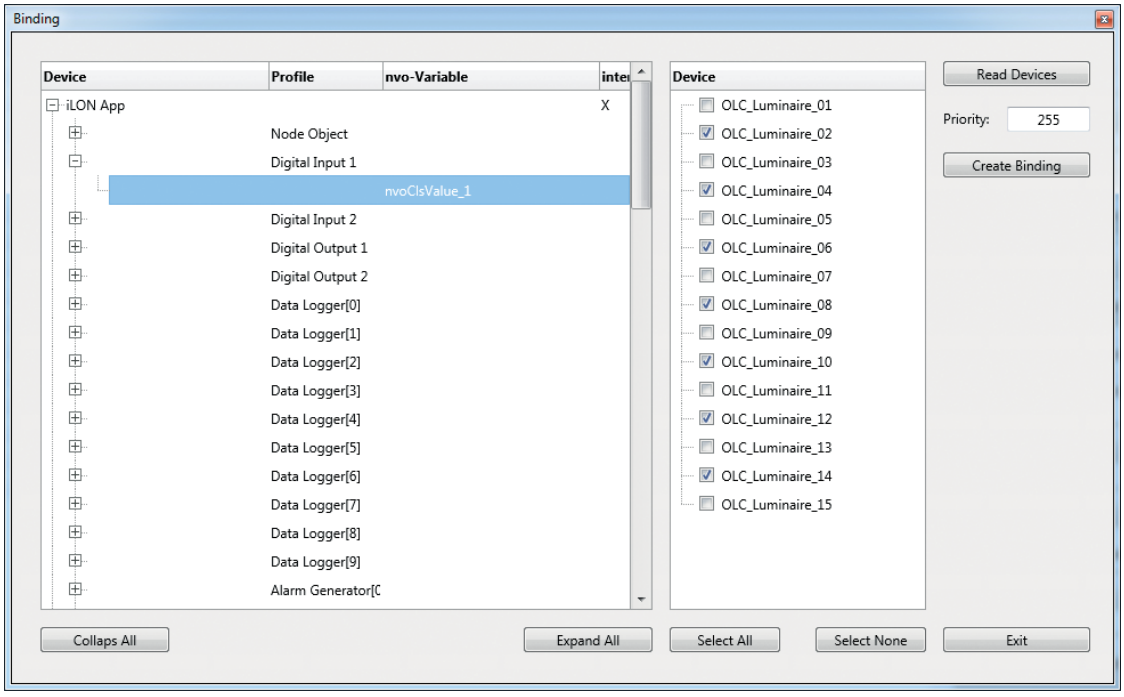


Clicking on "Read Devices" will fill in the table, after which the signal source will be shown on the left- and the possible targets on the right-hand side. In each case, a 1:n connection is therefore established.

Button details:

Description	Significance
Read Devices	Read in all devices/controllers that feature an SNVT_switch network variable.
Priority	Define the binding priority (0...255).
Create Binding	Start the binding process.
Collapse All	Completely collapse the tree structure of the source directory.
Expand All	Completely expand the tree structure of the source directory.
Select All	Select all controllers.
Select None	Deselect all controllers.
Exit	Exit window.

A variable can now be selected on the left-hand side (source directory) that will affect the controller(s) selected on the right-hand side. The following image provides an example of this:



As can be seen, the digital input's output variable (nvo variable) affects the marked controllers. Whether a variable is generated internally by the SmartServer or stems from another external device is shown by an "X" in the "Internal" column.

The priority of the binding can be set in the "Priority" field, in which regard "255" constitutes the lowest and "0" the highest priority. This can be important if the transferred signal is to be given priority over other signals, especially if the astronomical calendar function is activated.

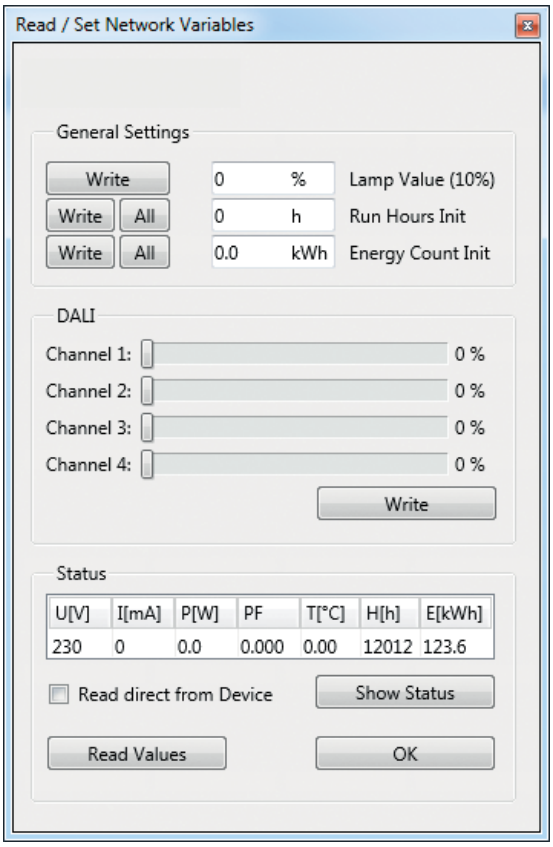
4.3.9 Commissioning at a Later Date

On occasion it can become necessary to re-commission individual or all controllers, especially if individual devices were replaced and the synchronisation process was not properly carried out.

Similar to the way described in Chapter 4.3.1 on page 21, clicking on "Commissioning Controller(s)" under "Tools" opens a selection screen in which you can choose the controllers you want to commission. The process is started by confirming "OK". The process will take about 30 seconds per controller, so that a system with 100 controllers will take less than an hour. As this is another fully autonomous background process, no further supervision is required.

4.4 INDIVIDUAL POLLING

Controllers can be individually polled via "Connect Mode" under "Project". Placing a left mouse click on the respective controller in the "Index" column will perform a quick check of the status of the individual controller. The following window will then open:

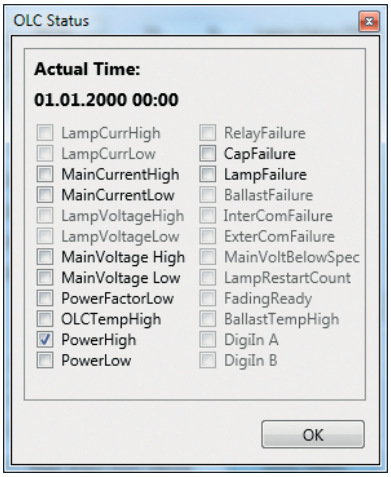


The screen provides an immediate overview of the device status and data can be transferred at the same time, for which the upper three fields are provided. After entering a value, it is then transferred by clicking on "Write". Values entered in the second and third lines can also be transferred simultaneously to all controllers to set initial values.

The window also contains 4 sliders with which, as already described in the "Monitor" chapter, up to 4 different DALI channels can be addressed independently.

The following field shows all polled values of the respective controller. These values can be updated by clicking on "Read Values". The displayed values are not polled directly from the controller, but instead constitute a process snapshot delivered by the SmartServer. However, it is still possible to retrieve these values directly from the controller. This merely involves activating the "Read direct from device" field prior to polling the data. Depending on the size of the system, this can take 10–30 seconds.

Clicking on "Show Status" opens another window, in which the current system status and any errors that may have been identified will be displayed:

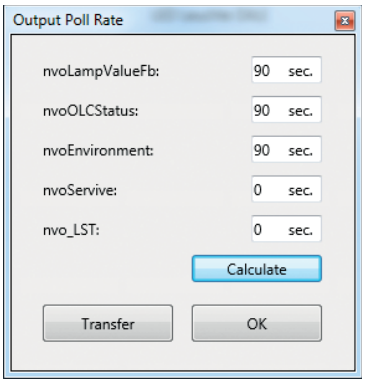


As can be seen in the example, the last transfer took place at 24:00 hours on 01.01.2000 and excessive power consumption was evidently detected. In the following, only those errors displayed in bold type will be explained.

4.5 CHANGING THE POLL RATE

INFORMATION

As mentioned above, the poll rate can be adjusted to suit your requirements. Approx. 5 seconds per controller should be calculated and the total rounded up to the nearest full 30 seconds. A system with 10 luminaires would therefore amount to a poll rate of 1 minute = 60 seconds. Clicking on either "Connect Mode" or "Offline Mode" under "Project" will return you to the entry table, where you can activate "Setting the Poll Rate" to yield the following entry screen:



The language found in the window is LonWorks jargon. It is usually sufficient to enter the same value in all 5 fields. In special cases, the bottom two values can be set to 0, which will result in these two factors not being polled and will speed up the process by reducing the polling time to about 3 seconds per controller.

However, it is also possible to ascertain the optimum polling time by clicking on "Calculate". This is the preferred method.

Clicking on "OK" and "Save Controller" will save your entries to the databank and clicking on "Transfer" will transfer them to the SmartServer. This transfer process will also be carried out during synchronisation provided the respective field was enabled.
(Also see Chapter 3.6, pages 18–20.)

4.6 SETTING BACKUP SWITCHING TIMES

Backup switching times can be set to act as an additional safeguard in the event of communication and/or controller problems. Usual back-up times are 18:00 hours for ON and 06:00 hours for OFF. In line with these instructions, luminaires will be switched either on or off should any break in communication last for longer than 15 minutes within the defined time period. This ensures that luminaires will be switched on at night regardless of any possible problems. However, activating this function makes sense only for non-switched systems, i.e. those that are supplied with power 24 hours a day. The backup function does not need to be activated for switched networks since lighting will automatically be switched back on again at the "Power Up" level following the return of mains power (compare Chapter 3.2, pages 9–10).

4.7 IM- AND EXPORTING PROJECTS AND LUMINAIRE DATA

Both project data and the databank with all luminaire and ballast data are im- and exportable.
As entire teams are often tasked with implementing light management systems, data exchange can be vital.

4.7.1 Im- and Exporting Projects

The process is simple: you will find an "Import Project" and an "Export Project" button on the right-hand side of the project entry screen. To export a project, simply select the one you want and click on the respective button. A window will then open asking you to define the disk drive, path and file name in a Windows-typical manner. A *.dbx file will then be created. All associated data of all SmartServers and controllers will be saved to this file.

Importing projects works in a similar manner. If the program finds a project of the same name during the import process, confirmation will be sought as to whether the import should continue. The controller datasets also contain luminaire and ballast data. These can be subsequently imported into the database if not already available. Simply click on "Connect Mode" or "Offline Mode" and then enable "Save Controller" in the following controller screen. If these data are not already available, the program will ask whether they should be added.

4.7.2 Im- and Exporting Luminaire Data

When exporting the luminaire and ballast database, data are saved to an Excel© spreadsheet. The file can be edited and then imported back to the database using the import function. Both functions can be found under "File":

4.8 EXPORTING NEURON IDS

This function lets you export all entered neuron IDs into a text file, for which you need only click on the "Extract Neuron ID" button. The file name will be "NIDList.txt" and should not be altered. The file can be saved to any directory you want.

This list will be required should you ever wish to carry out a firmware update/upgrade using the "PLCUpdater" tool. This also lets you upgrade the firmware of the second processor within the controller, which is not possible using the iCT software. However, this measure should be carried out only in exceptional cases, for instance in the event of customisations.

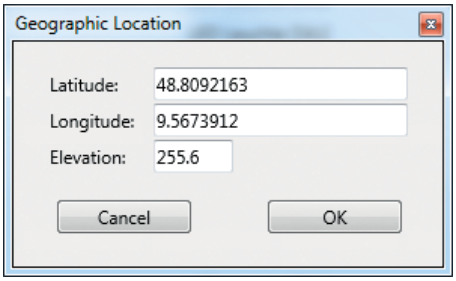
4.9 MANUAL ENTRY OF GEOGRAPHICAL COORDINATES

Two options are available:

- manually for each individual luminaire and
- interactively using "GPSTracker".

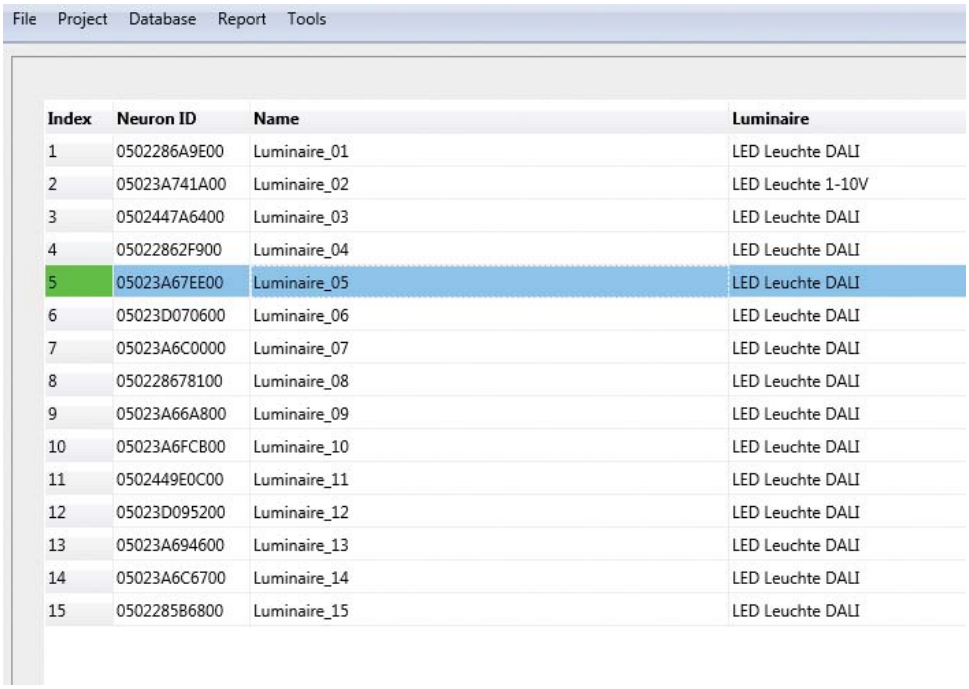
The first option is briefly described below, the second in Chapter 4.12.

While manual entry is an option, it is extremely time-consuming. If you wish to proceed in spite of the time factor, simply open the screen with the controller data by clicking on either "Connect Mode" or "Offline Mode" via "Project". Then select the respective controller and click on "Geographic Location" to open the following entry screen on the right:



Latitude must be entered in the first row and longitude in the second. The elevation of the device is entered in the third row, but this value has no effect on determining the geographical location. The values are saved by confirming "OK".

The background of the respective field in the index column will then turn green to show that geographical coordinates have been entered for the respective luminaire.



Index	Neuron ID	Name	Luminaire
1	0502286A9E00	Luminaire_01	LED Leuchte DALI
2	05023A741A00	Luminaire_02	LED Leuchte 1-10V
3	0502447A6400	Luminaire_03	LED Leuchte DALI
4	05022862F900	Luminaire_04	LED Leuchte DALI
5	05023A67EE00	Luminaire_05	LED Leuchte DALI
6	05023D070600	Luminaire_06	LED Leuchte DALI
7	05023A6C0000	Luminaire_07	LED Leuchte DALI
8	050228678100	Luminaire_08	LED Leuchte DALI
9	05023A66A800	Luminaire_09	LED Leuchte DALI
10	05023A6FCB00	Luminaire_10	LED Leuchte DALI
11	0502449E0C00	Luminaire_11	LED Leuchte DALI
12	05023D095200	Luminaire_12	LED Leuchte DALI
13	05023A694600	Luminaire_13	LED Leuchte DALI
14	05023A6C6700	Luminaire_14	LED Leuchte DALI
15	0502285B6800	Luminaire_15	LED Leuchte DALI

Using this method is only recommended for individual controllers, but not entire systems. These data can later be imported automatically from the iLC server and will then be used to mark the actual luminaire positions on the integrated maps.

4.10 IMPORTING AN EXISTING SYSTEM

As data can sometimes be lost (defective PC, hard disk, etc.), it can be necessary to re-import all associated data of an already functioning system, in which event luminaire- and ballast-specific data will also be rescued.

Start the process as you would to create a new project by defining all basic conditions as described in Chapter 3.3 and by opening the controller screen again with "Connect Mode". Although the screen will initially be blank, clicking on "Read Field" will immediately fill it with data. All data that were saved to the SmartServer during initial commissioning will now be at the program's disposal again. Clicking on "Save Controller" will then immediately save the data to the databank again.

4.11 MODEM OPERATION

You will need a suitable data connection to transfer data from the SmartServer to the iLC or to other management systems.
This data connection can be established directly via the SmartServer's TCP/IP port or you can use a GPRS/HSPA+ modem.

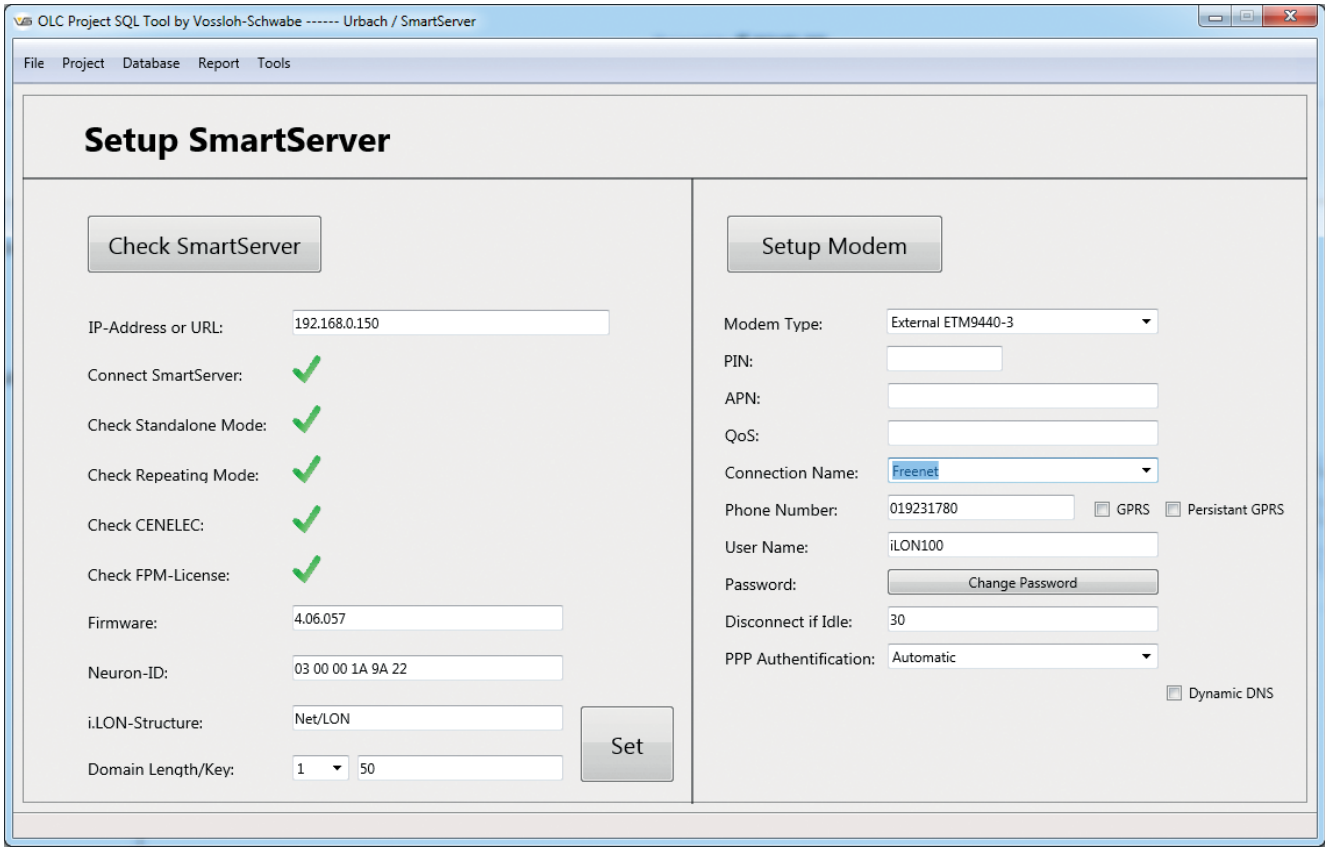
If you plan to use a router, commissioning details can be found in Chapter 6 on page 40. The following instructions do not need to be followed in such an event.

This kind of modem must be connected to the SmartServer via a serial interface, which you will find pre-wired in the iDC.
You will just have to insert the requisite SIM card of your telecom provider in the modem.

Further configuration steps are then carried out using the iCT program. The configuration screen is accessed via "File" and "Check i.LON", upon which a screen will open in which you can check the SmartServer, as already described in Chapter 3.4 on page 14. Clicking on "Check SmartServer" will take you to the next step.

A further button called "Setup Modem" is located on the right-hand side. Select the modem type, which is always the "External ETM 9440-3", as this is the default modem integrated into the iDC's 186230 GPRS version. However, the future may bring changes in this respect since developments in mobile telephony are ongoing.

Once the correct modem has been selected, the following screen opens:

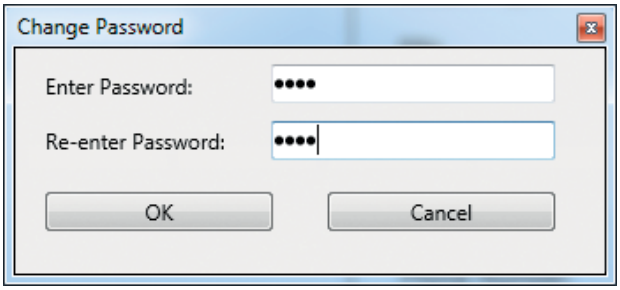


Functions of the individual entry fields:

Description	Significance
Modem Type:	Pre-defined modem types. By default, this is currently the "External ETM 9440-3".
PIN:	Personal Identification Number, will be issued along with the SIM card by your telecom provider.
APN:	Access Point Name, internet address, also provided by your telecom provider (e.g. Telekom: "internet.t-dl.de").
QoS:	Quality of Service, only if your telecom provider specifies such information. Mostly the field is left blank.
Connection Name:	Selection of the profile name. Select either T-Online or Freenet, but this entry has no effect on connection settings.
Phone Number:	Dialling number, mostly "*99***1#". In addition, select the "Persistent GPRS" option to ensure constant network availability.
User Name:	Will be issued by your telecom provider.

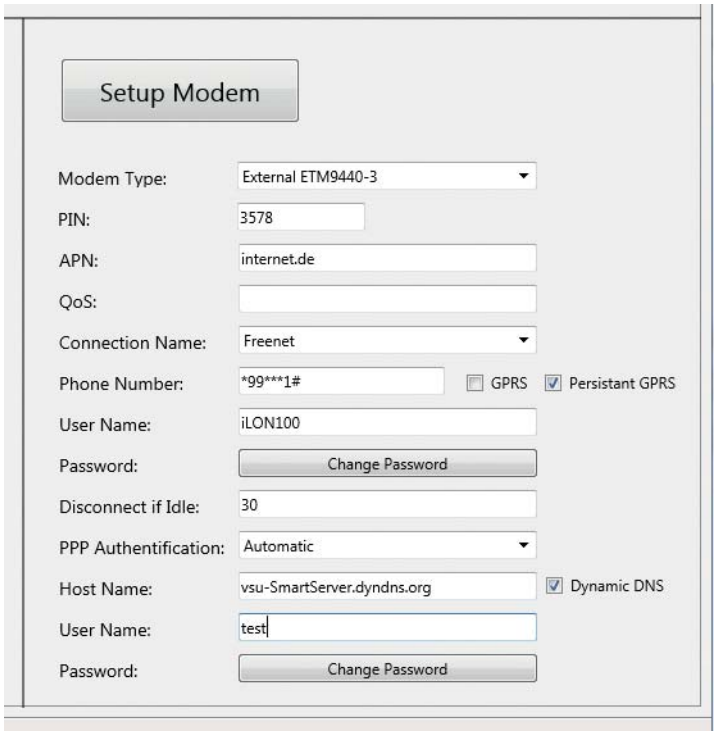
Description	Significance
Password:	Will be issued by your telecom provider.
Disconnect if idle:	Disconnects the link after x seconds of inactivity. Standard value: 30 seconds.
PPP Authentication:	CHAP, PAP or Automatic, is required for establishing an internet connection. Standard setting: Automatic.

A respective entry screen opens when you click "Change Password":



Using the "Dynamic DNS" option, you can now additionally define connection data to the "DynDNS" DNS provider. This is always important if your telecom provider more or less regularly changes the assigned IP address, also referred to as a "dynamic IP address". DynDNS provides an analysis service for this. To this end, the device is assigned a freely definable URL (e.g. http://myOLC-project.dyndns.org), at which it can then always be contacted. You naturally have to register with DynDNS to use the service, after which you will be provided with the requisite connection data. These will then need to be entered under "Host Name" and "Password".
Read more on the topic of DynDNS at "www.dyndns.org".

A completed entry screen could therefore look like this:

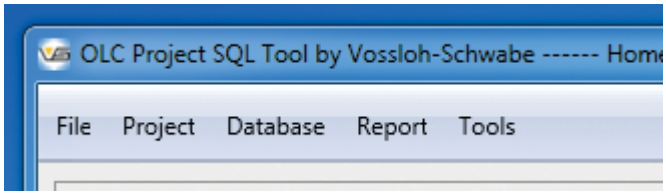


[10] URL = Uniform Resource Locator

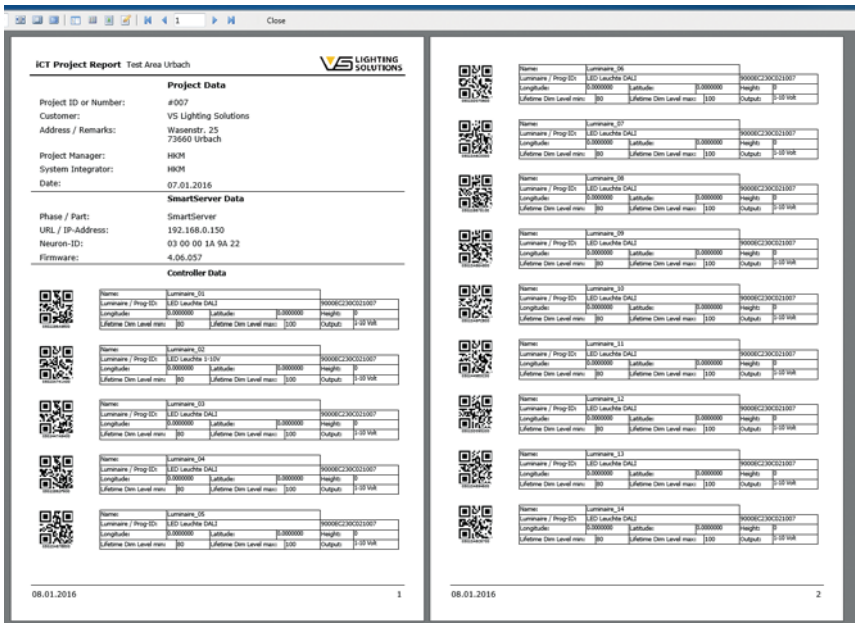
4.12 GENERATING REPORTS

For documentation purposes, simple reports can also be generated. If required, these reports are designed to enable a complete reinstallation using the documented data without having to do any physical work on the controllers themselves.

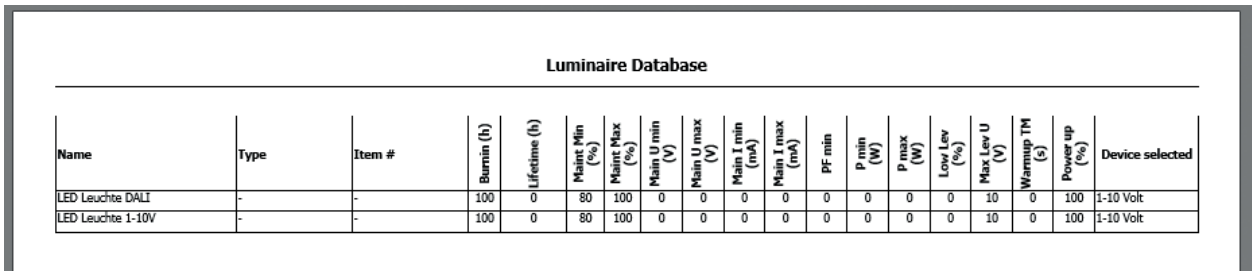
The menu bar contains an item called "Report".



Clicking this item produces the complete report of any one project. Apart from general data, the report also contains all of the project's SmartServers along with their key parameters.



The QR code contains the neuron ID and can be read using commonly available scanners. The last page also contains an overview of all luminaires within the system and/or associated driver data.



Luminaire Database

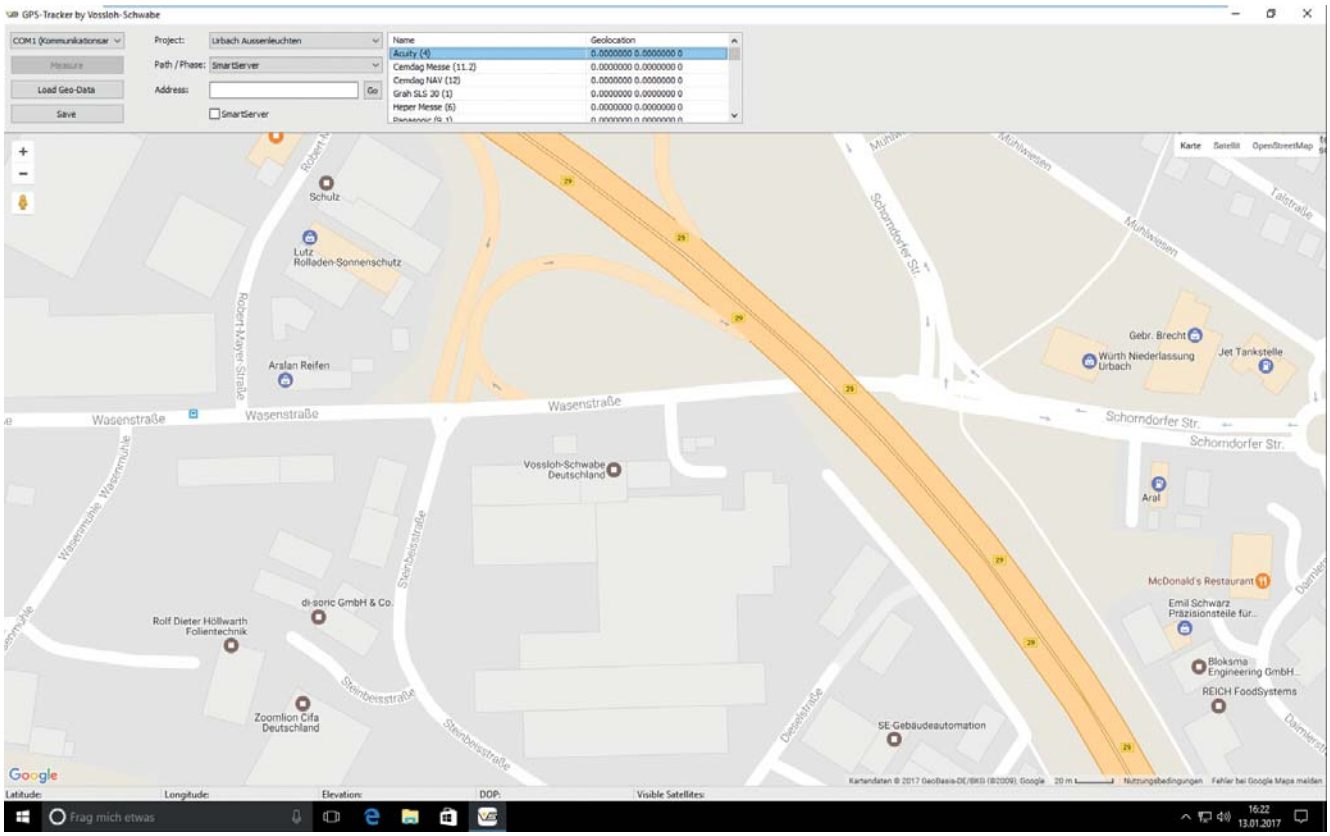
Name	Type	Item #	Burnin (h)	Lifetime (h)	Maint Min (%)	Maint Max (%)	Main U min (V)	Main U max (V)	Main I min (mA)	Main I max (mA)	PF min	P min (W)	P max (W)	Low Lev (%)	Max Lev U (V)	Warmup TM (s)	Power up (%)	Device selected
LED Leuchte DALI	-	-	100	0	80	100	0	0	0	0	0	0	0	0	10	0	100	1-10 Volt
LED Leuchte 1-10V	-	-	100	0	80	100	0	0	0	0	0	0	0	0	10	0	100	1-10 Volt

5 Determining Geographical Coordinates using GPSTracker

As already mentioned in Chapter 4.9 on page 30, one of the key functions of a light management system consists of determining geographical coordinates and marking these on relevant maps stored in the iLC servers. Geographical coordinates are always made up of latitude and longitude; together, they can be used to pinpoint any location in the world. There are two options to enter these data into the project directly:

- GPS-aided and
- interactively.

The following window opens when the program is started:

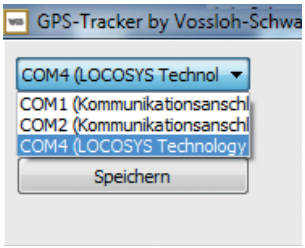


As you can see, the program works with Google Maps©. An internet connection is critical for this step.
Given a mobile device, this can generally be established with a GPRS/HSPA+ connection.

5.1 GPS-AIDED DETERMINATION OF GEOGRAPHICAL COORDINATES

Most currently available laptops or tablets feature a GPS receiver. In addition, numerous external products are on offer that can be used if no such receiver is integrated. The accuracy of determined coordinates lies within a range of 3–50 m.

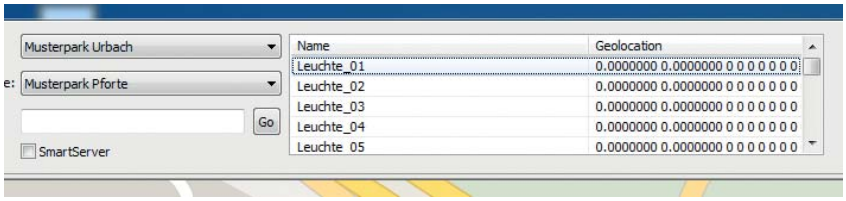
The coordinate determination process begins with defining the interface with the GPS receiver, to which end you must click on the button at the top left. A left mouse click on the button will display a list of possible interfaces:



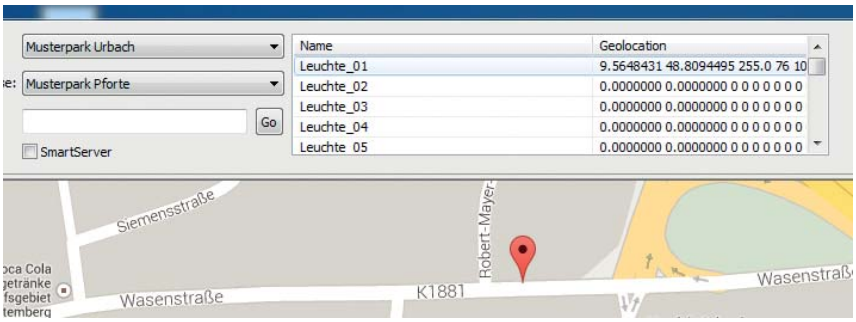
In our example, this would be the COM4 serial interface. Please refer to the device manual for further information on your GPS server.

As soon as the program detects valid signals from the receiver, the "Measure" button can be clicked.

The corresponding project and the associated SmartServer can then be selected, upon which the selection field will be filled with the respective luminaire data. The next step involves selecting the respective luminaire in the selection field and clicking on "Measure".



The coordinates are then determined internally, which can take several seconds. As soon as the determined coordinates have attained the requisite degree of accuracy, the location will be marked on the map and the data updated in the selection field:



The determined coordinates are then transferred directly to the controllers saved in the databank when "Save" is clicked.

5.2 INTERACTIVE DETERMINATION OF GEOGRAPHICAL COORDINATES

Determining the geographical location of a luminaire can also be performed interactively without needing a GPS receiver. An internet connection is needed, however, to ensure that the map can be displayed. Entering the street and city in the "Address" field (e.g. "Heilbronner Str. Stuttgart") will then find the respective luminaire. Clicking on "Go" will display the corresponding map excerpt.

The procedure is similar to the one described for the "measured" method above. Again, the project and the associated SmartServer are first selected, upon which the selection field with the controllers will be displayed.

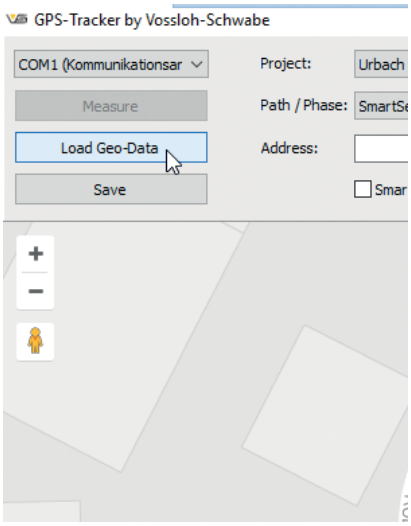
The respective controller now needs to be selected so that the correct geographical coordinates can be assigned to it. In this case, though, the coordinates are not determined as described above, but instead you must move your cursor to the correct position on the map and then mark the luminaire location with a left mouse click. A marker will then "fall" from the upper screen edge to mark the respective spot. After that, the program will automatically determine longitude, latitude and elevation; these values will then be entered in the selection field.

5.3 IMPORTING EXISTING GEOGRAPHICAL COORDINATES FROM AN EXCEL SPREADSHEET

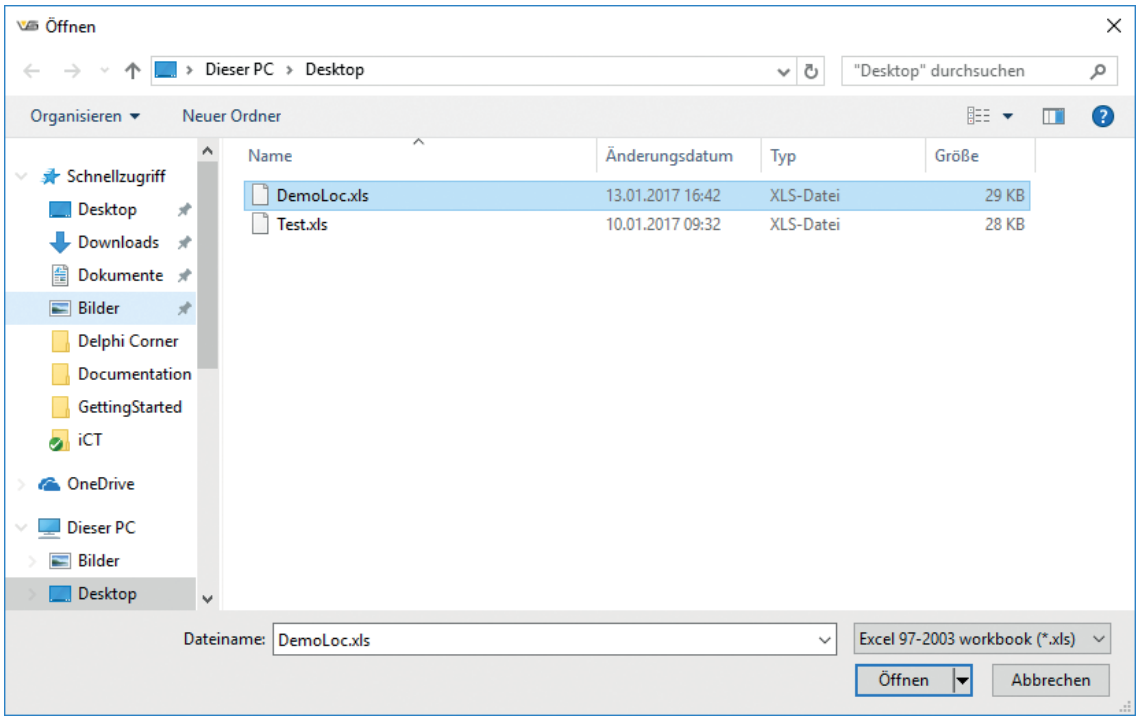
Although this method does in principle provide a way of importing luminaire locations directly from an Excel spreadsheet, it requires diverse preparatory steps to work. The function can only work reliably if the Excel spreadsheet was created in the following format: column No. 1 must always be the name of the luminaire, column No. 2 is longitude and column No. 3 is latitude. The spreadsheet could look like this:

	A	B	C	D
1	Luminaire_01	9,5673912	48,8092163	
2	Luminaire_02	9,5669218	48,8093418	
3	Luminaire_03	9,5670962	48,8093453	
4	Luminaire_04	9,5675763	48,8093921	
5	Luminaire_05	9,5672973	48,8093523	
6	Luminaire_06	9,5684694	48,8090290	
7	Luminaire_07	9,5683810	48,8088154	
8	Luminaire_08	9,5679089	48,8093965	
9	Luminaire_09	9,5682737	48,8094071	
10	Luminaire_10	9,5682549	48,8092234	
11	Luminaire_11	9,5680779	48,8092552	
12	Luminaire_12	9,5678256	48,8092622	
13	Luminaire_13	9,5680779	48,8092163	
14	Luminaire_14	9,5683971	48,8085946	

Headers must not be used in this file. The table begins directly with the first row. The file can be saved in *.xls or *.xlsx format.
In the next step, this file is then imported into the project:



A dialogue window then opens in which you can select the file:



Once the file you want has been opened, the program will begin to compare luminaire names with those listed in the table. As soon as matches are found, the geographical coordinates will be assigned to the respective luminaires, after which all locations will be displayed on the map. The results can then be saved with the "Save" button. To ensure this import is successful, it is key that all luminaire names coincide.

5.4 EDITING LOCATIONS

When using the GPS-aided method, the determined geographical coordinates often lack sufficient accuracy. The program therefore provides an interactive option to edit existing coordinates.

Hold down the left mouse key and "grab" the marker, which can then be moved to the correct location on the map.
Then release the left mouse key to position the marker in its new location.

To delete a marker, position the cursor directly over the marker, then place a right mouse click. A window will then open that will ask you to confirm the deletion. Either of the two methods described above can then be used to properly position the marker.

Even the location of the SmartServer can marked using one of the two described methods so as to determine the geographical coordinates that the astronomical calendar will require.

To ensure that these coordinates are saved to every device, the system must be synchronised, for which you merely have to activate "Sync Properties".

6.1 GENERAL INFORMATION

Practical experience has shown that using modems is no longer state-of-the-art and also comes with a number of disadvantages. It is therefore absolutely indispensable for the SIM card of your telecom provider to feature an open IP address to ensure the SmartServer can then be reached via the internet. However, such connections are not made available by every telecom company and attract additional costs.
The Asian region in particular predominantly works with CDMA, which is not supported by all modems. In addition, security aspects must be considered since an open IP address renders SmartServers vulnerable to attack.

However, using a router allows you to work with internal IP addresses. In addition, all communications are routed through an open VPN tunnel, which makes it practically invulnerable to attack from outside. Furthermore, router technology works worldwide.

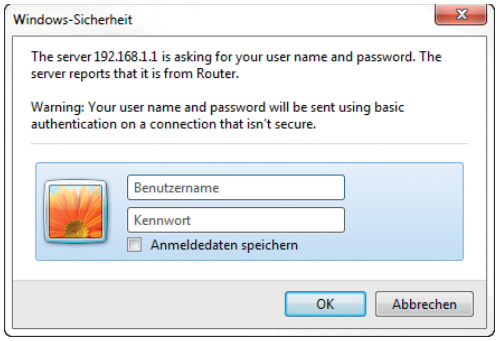
All necessary technology is provided by Vossloh-Schwabe Deutschland GmbH on a dedicated server with a corresponding VPN server and associated portal platform. Smaller systems comprising up to 5 SmartServers are managed directly by us in-house, whereas for larger systems that are likely to be extended in the future, a customer-specific portal access point is provided. On request, the VPN server can also be installed on computers/servers at the customer's premises.

6.2 CONNECTION AND CONFIGURATION

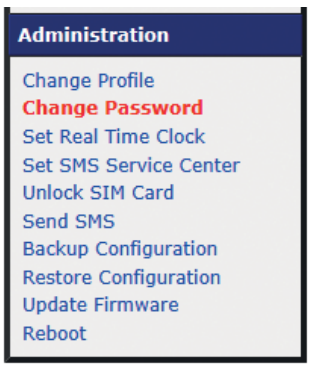
The router must be configured to provide the desired functionality. To this end, you must upload a configuration file to the router.
This configuration file will be made available by us or can be downloaded if you have access to the portal.

To begin with, the router must be connected to a computer/laptop/tablet at port "ETH0" using a patch cable. Then open your internet browser (IE, Firefox, Chrome, Opera...). You can then access the router via http://192.168.1.1. Should no connection be established, please check the network settings of the computer. Do not insert the SIM card yet at this point.

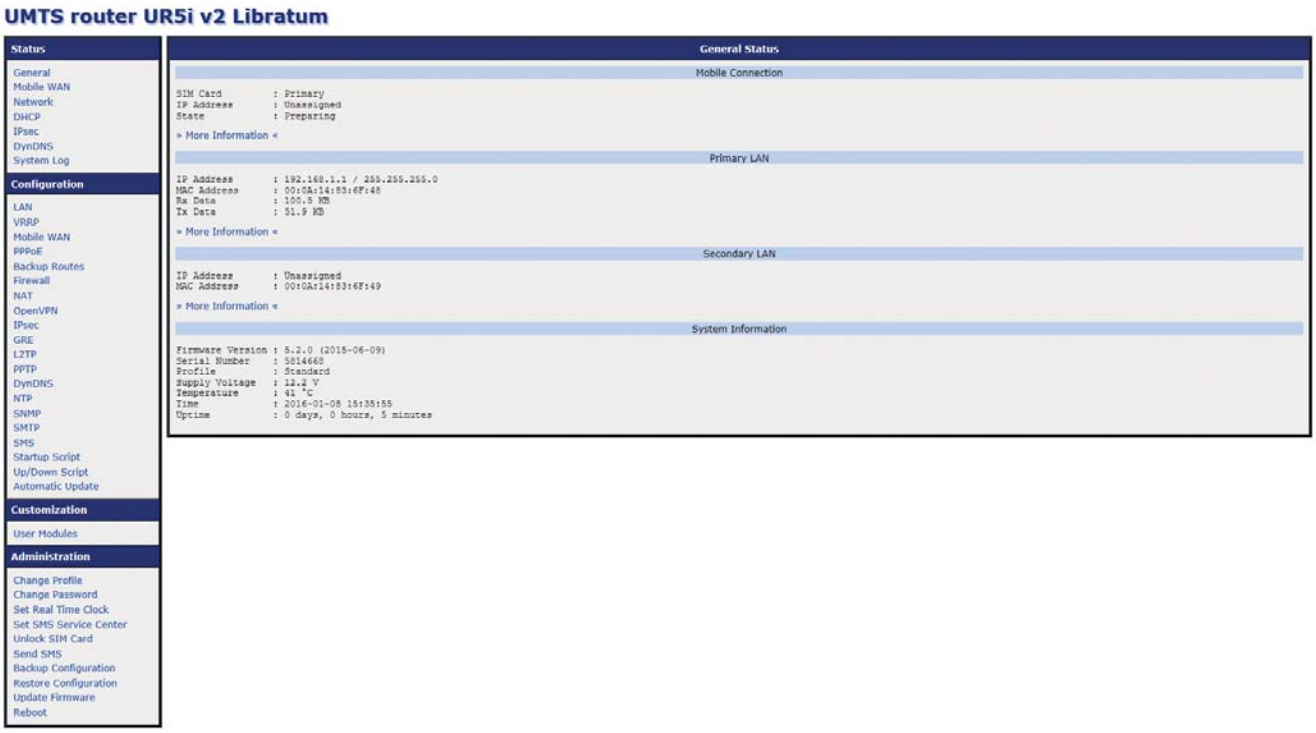
A login window will open in which you will need to enter your user name and password:



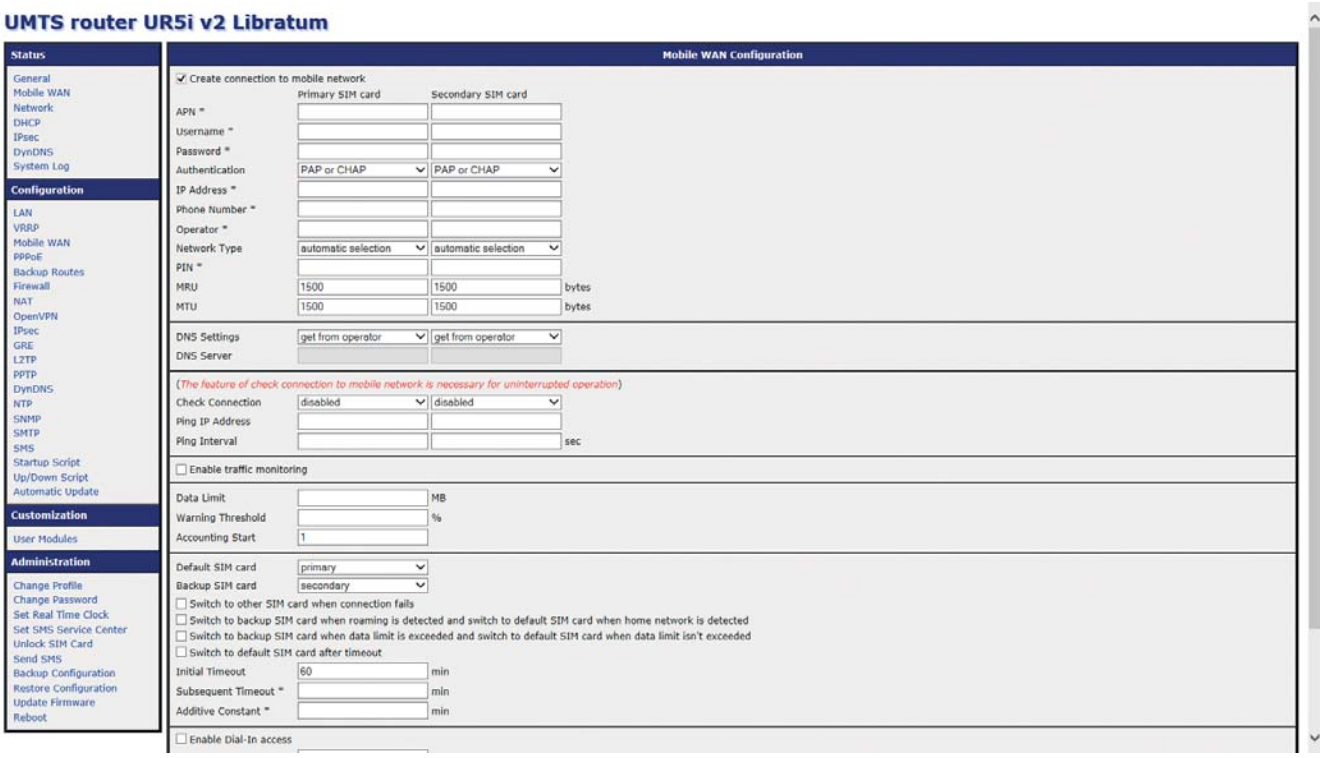
Default settings for user name and password are "root". The router portal then opens with a message that the password needs to be changed:



Once you have logged in again, you can now configure the router.



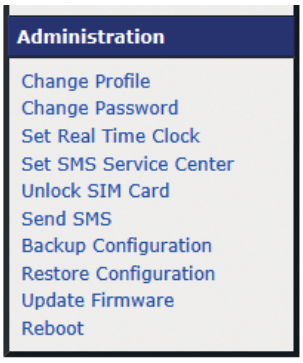
The following steps are fairly simple, beginning with selecting the menu item "Mobile WAN" under "Configuration".



No more than the PIN and if required the provider's APN need to be entered here under "Primary SIM card". Should you want to insert a second SIM card in the system as a safeguard, the same entries will have to be made under "Secondary SIM card".

Afterwards, the router must be switched off and the SIM card(s) inserted.

Then the router must be switched back on and the configuration file uploaded:

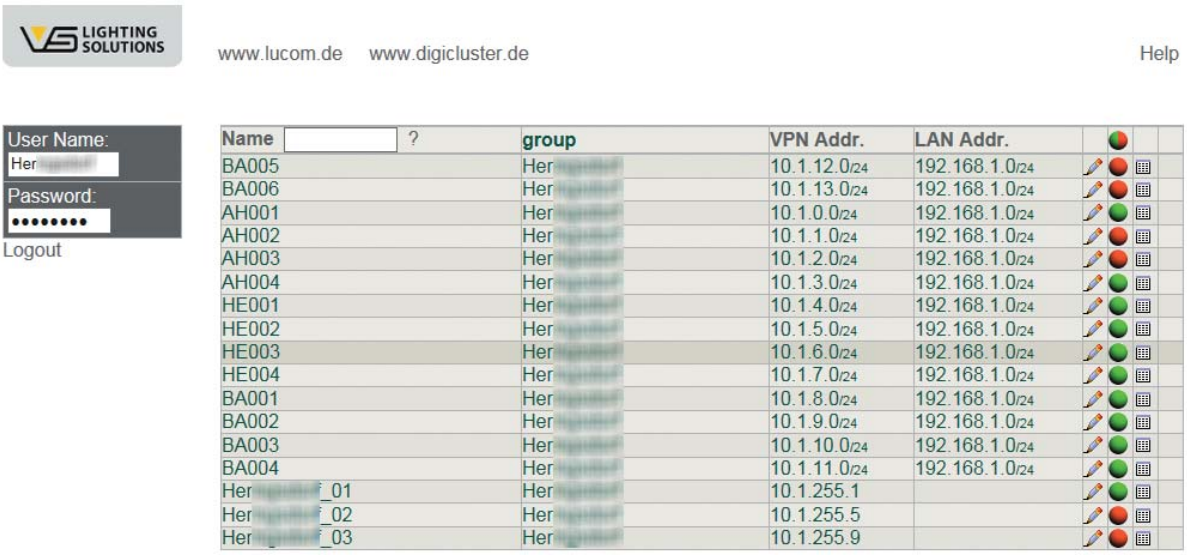


An entry screen opens in which the file must be entered. The data are transferred to the router by clicking on "Apply" and once a reboot has been carried out, the router will be ready for use.

6.3 VPN PORTAL

If access has been provided to the VS VPN portal, you can now test the connection to the router.
The portal is accessed via https://vs-lms.net/vpn. Depending on the browser used, a message will appear that there is a problem with the security certificate. This message can safely be ignored and the website can be allowed to load.

The portal will again first require a user name and a password, both of which we can provide if required.
If your login is successful, the portal will open:



You will now see a full overview of all connected systems.
These include the actual network and the road warriors [12].

The red and green dots indicate which systems are currently online.

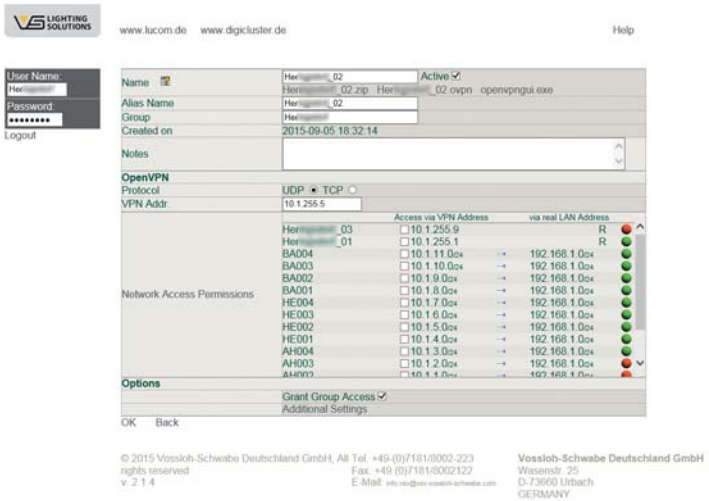
[12] road warriors = term used in the field of IT and refers to a (mobile) internet connection to an existing network, in this case a connection to an open VPN client.

6.4 NETWORKS

Networks can be recognised by the fact that there will be an entry in the "LAN Addr." column. Basically, these are the routers that will be available via the VPN address, in which regard the final octet of the IP address is key. The router is directly accessible at xxx.1 and the SmartServer at xxx.222 via your WLAN. For the third row (AH001) in the figure under 6.3, this means that the router can be reached at 10.1.0.1 and the SmartServer at 10.1.0.222. The entry under "LAN.Addr." refers to the router's local network.

To ensure the system works as described above, the factory settings of the SmartServer's IP address (192.168.1.222) must not be changed.

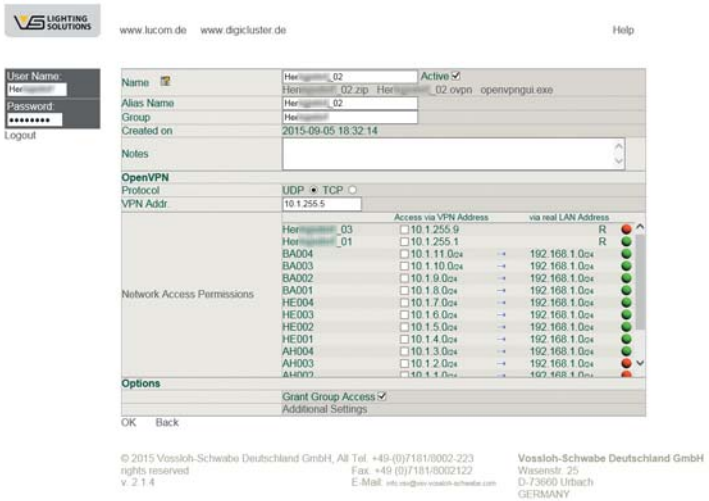
On the right-hand side you will now find a pen icon, with which you can activate the editing mode for each individual router. Only the upper area with the entry "<name>.cfg" is of interest, with which you can now download the configuration file for the corresponding router.
No further settings should be made at this point since this can cause unexpected results. The telephone number of the SIM card is the only exception, but entering it is entirely optional.



6.5 ROAD WARRIORS

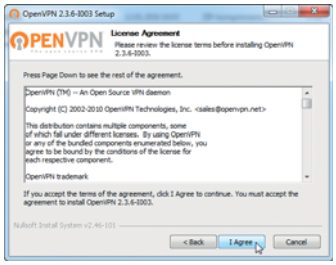
6.5.1 Installation

An open VPN client must be installed to ensure data can be transferred to the SmartServer. The entry required to generate the necessary files can be found in the portal overview. You must select those entries in which the "LAN Addr." field is blank, then you can activate the editing mode again with a click on the pen icon.

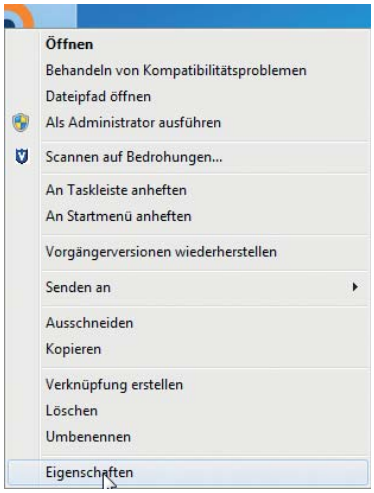


In the "Name" field you will find three files with the following endings: <name>.zip, <name>.ovpn and openvpngui.exe.
During initial installation, it is important to download the *.zip and openvpngui.exe files.

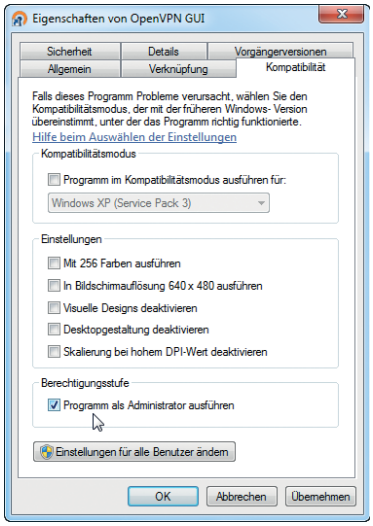
The "openvpngui.exe" file is the actual client software that needs to be installed on the server.
Please follow the instructions when you run the file.



The next step involves unzipping the zip file and copying all the files it contains to the following directory:
c:\<INSTALL_DIR>\OpenVPN\config. Following successful installation, you will find a corresponding icon on your desktop. Now you have to ensure that the program is started in administration mode, to which end a right mouse click on the icon will open the following pop-up:



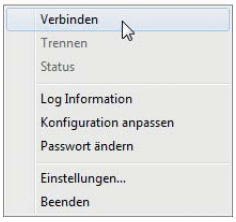
After the properties have been selected, the following window opens:



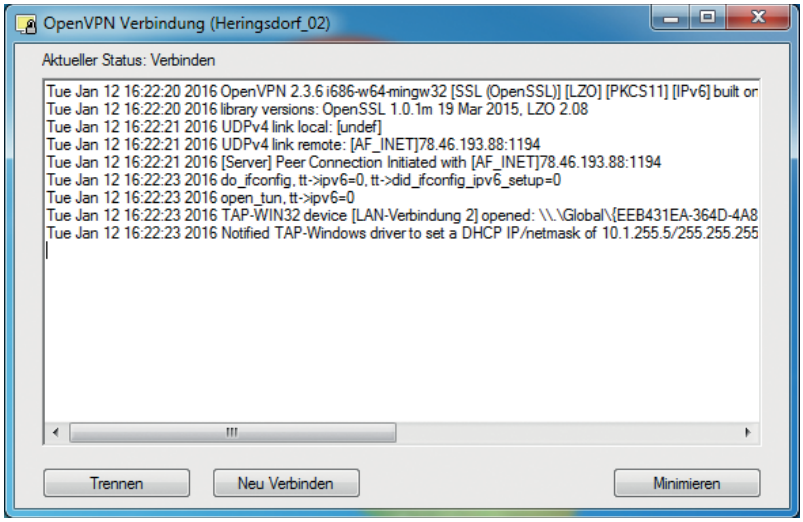
Under the "Compatibility" tab you will find an entry called "Open program as administrator", which you must activate.

6.5.2 Manual Client Start

The program can now be started manually. In your system tray you will find an icon that you must activate with a right mouse click.
First: Then:



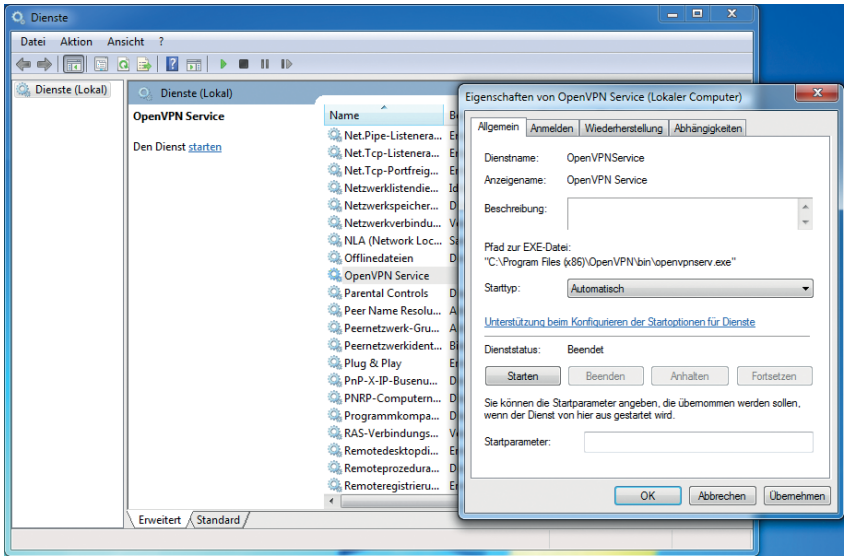
After which a monitor window will open in which you can observe any activity:



Once a connection has been established, the colour of the icon in your system tray will turn green.
If no connection can be established, the icon will turn yellow.

6.5.3 Automatic Client Start

Alternatively, the VPN client can also be started automatically when the server is powered up.
To this end, you only have to set the open VPN service to "automatic".



This not only starts the client, but also establishes the connection automatically.
Please note that the access details must be installed on only one computer/server. Should it be necessary for several systems to access the SmartServers, a separate dataset will have to be generated for each system.

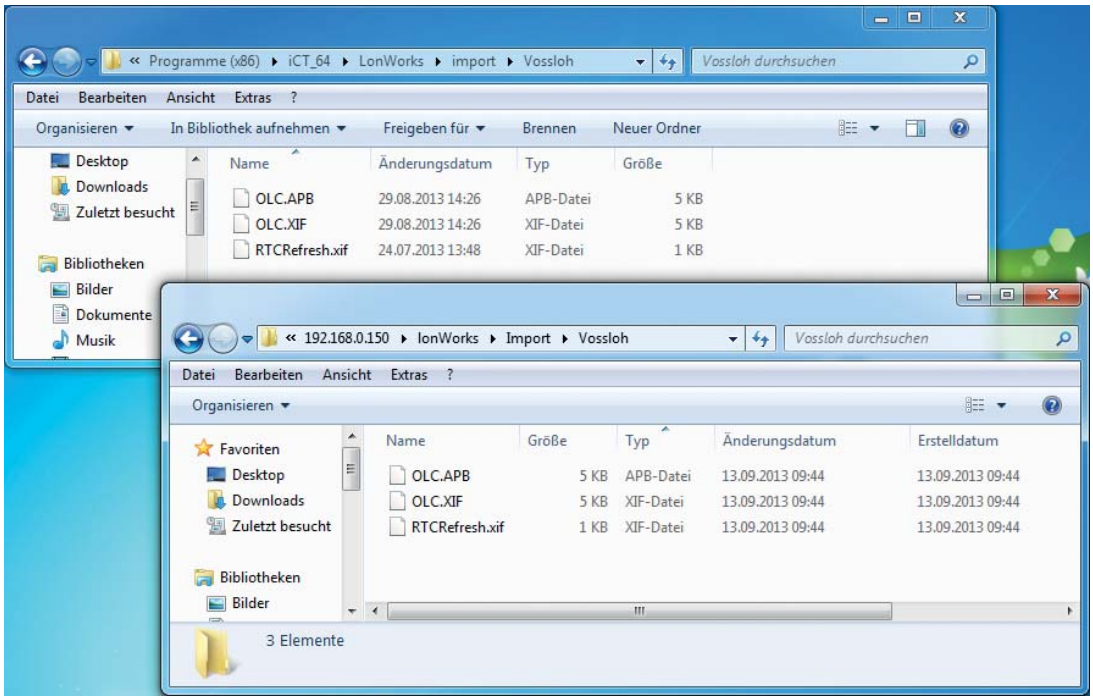
7 MISCELLANEOUS

The chapter deals with a number of final points that should also be given consideration.

7.1 FTP CONNECTION, COPYING DATA

As already described in Chapter 4.3.1 on page 21, it can be necessary to copy the application files of the controller(s) to the SmartServer, for which this provides brief instructions.

Data transfer is effected via FTP and can be realised using existing Windows resources. Simply open your Windows Explorer in two separate windows:



As described in Chapter 4.3.1 on page 29, in the first Explorer window simply navigate to:

<INSTALLDIR>/iCT_64(iCT_32)/LonWorks/import/Vossloh

An FTP connection is then established to the SmartServer in the second Explorer window, to which end you must enter the following in the address line:

ftp://<SmartServer address> (z.B. ftp://192.168.1.222)

The Explorer will then ask you for a user name and a password, which in both cases is "ilon".
A folder directory will then open, in which you must navigate to the following:

<INSTALLDIR>/LonWorks/import/Vossloh

The files can now be transferred simply by using copy and paste.

IMPORTANT

On no account should you try to change, copy or delete anything else in the file structure of the SmartServer! This would automatically critically impair the ability of the device to function or even render it completely useless.

7.2 COPYING AND PASTING CONTROLLER DATA

An additional option for entering neuron IDs is to import these from an Excel spreadsheet. Although such spreadsheets can naturally contain further details apart from the neuron IDs and the luminaire names, they are nonetheless easy to transfer to the iCT program:

	A	B	C	D
1	Neuron-ID	Name	Driver	Lifetime
2	0502286A9E00	Leuchte_01	LED Driver 1050 mA	50000
3	05023A741A00	Leuchte_02	LED Driver 1050 mA	50000
4	0502447A6400	Leuchte_03	LED Driver 1050 mA	50000
5	05022862F900	Leuchte_04	LED Driver 1050 mA	50000
6	05023A67EE00	Leuchte_05	LED Driver 1050 mA	50000
7	05023D070600	Leuchte_06	LED Driver 1050 mA	50000
8	05023A6C0000	Leuchte_07	LED Driver 1050 mA	50000
9	050228678100	Leuchte_08	LED Driver 1050 mA	50000
10	05023A66A800	Leuchte_09	LED Driver 1050 mA	50000
11	05023A6FCB00	Leuchte_10	LED Driver 1050 mA	50000
12	0502449E0C00	Leuchte_11	LED Driver 1050 mA	50000
13	05023D095200	Leuchte_12	LED Driver 1050 mA	50000
14	05023A694600	Leuchte_13	LED Driver 1050 mA	50000
15	05023A52F600	Leuchte_14	LED Driver 1050 mA	50000
16	0502285B6800	Leuchte_15	LED Driver 1050 mA	50000
17				

IMPORTANT

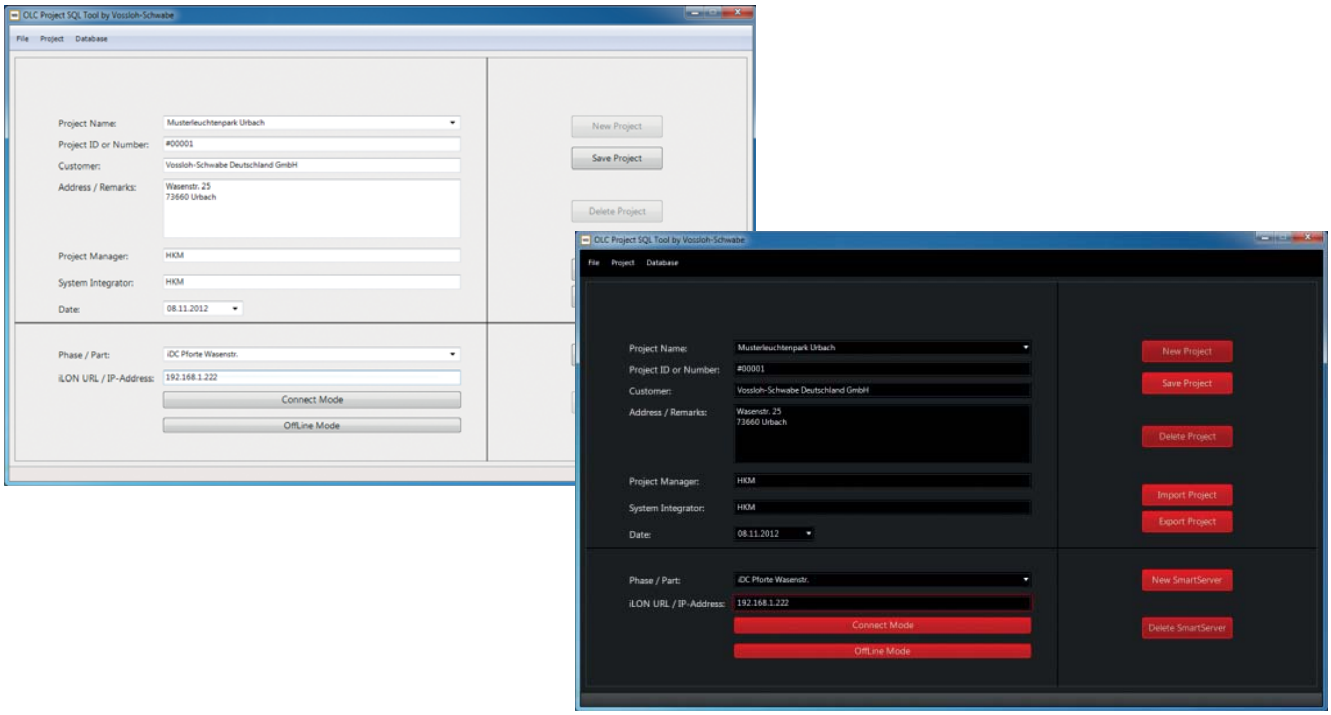
The following must be ensured in this regard: on the one hand, the column with the neuron IDs must contain text and on the other hand, the neuron ID must always be on the left and the name on the right. The selected files can now be copied to the clipboard with Ctrl+C. On the right-hand side of the controller entry screen, the iCT program provides a button called "Paste from Clipboard". Clicking on this button will copy the data to the table. However, it is important to have first selected the luminaire or ballast type, after which you must save all entries to the databank by clicking on "Save Controller".

7.3 CHANGING MICROSOFT STYLE

Should the design of the program's GUI not be to your liking, it can easily be changed under "File" by clicking on "Load Style". Your Windows Explorer will then open and offer various files for selection. The style files can be found in the following directory:

<InstallDir>/iCT_64(iCT_32)/Styles

You can choose any style file you like, which will then change the appearance of the GUI:



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