

Operating Manual

DEHNrecord DRC LC M3+



Created by : DEHN + SÖHNE GmbH + Co.KG.
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Program errors may lead to viruses and data loss, therefore data backup is required.

Terms and definitions

Blitzductor

Surge protection module manufactured by DEHN + SÖHNE

DEHNrecord DRC LC M3+

DEHNrecord DRC LC M3+ is a compact hand-held reader with integrated RFID technology for contactless testing of surge protection modules (Blitzductors).

HW

Hardware

LifeCheck®

Test for correct functioning during operation without removing the surge protection modules.

Microsoft .NET Framework® 2.0

A library that is largely independent of programming languages for developing and executing applications and services based on Microsoft .NET technology (e.g. PC application programs and so-called web services).

RFID

Radio **F**requency **I**dentification – Identification via radio technology which allows contactless reading and saving of data.

SPD

Surge **P**rotective **D**evice – surge protection module

SW

Software

VB 2005

Microsoft Visual Basic® 2005 – Programming language of the Microsoft Windows® operating system using .NET technology

C#2005

Microsoft Visual C# 2005 – Programming language of the Microsoft Windows® operating system using .NET technology.

USB

Universal **S**erial **B**us – Bus system for connecting external devices

References

/1/ Operating manual for **DEHNrecord DRC MCM XT**
Created by: DEHN + SÖHNE

1 Application

DEHNrecord DRC LC M3+ is a compact hand-held reader with integrated RFID technology (**R**adio **F**requency **I**dentification) for contactless testing of surge protection modules. It is marked with the LifeCheck[®] symbol.

LifeCheck[®] symbol:



The following surge protection modules feature LifeCheck[®] technology:

- **Blitzductor CT;** **Type BCT MLC**
- **Blitzductor XT;** **Type BXT ML**

Only surge protection modules (SPDs) with integrated LifeCheck[®] function can be tested with the DEHNrecord DRC LC M3+ reader!

SPDs with LifeCheck[®] symbol can be tested during operation (e.g. in a distribution cabinet) and do not have to be removed.

2 LifeCheck[®]

Protection modules with LifeCheck[®] symbol feature an additional circuit. This circuit consists of a combined RFID-based transmission and monitoring unit. Thermal and electrical overload of an SPD is reliably monitored and detected. The proper operation and the last test date of the protection module is read out by means of the DEHNrecord DRC LC M3+ reader and is shown on the integrated display.

3 Device description

In the following, the basic characteristics of DEHNrecord DRC LC M3+ are described.

3.1 Components

Delivery includes the hand-held DEHNrecord DRC LC M3+ reader and a software package which can be installed on common PCs.

The **DEHNrecord DRC LC M3+** reader consists of

- an **RFID reader unit**,
- a **USB cable** that is connected to a PC for data transfer,
- a **sensor** for reading out or overwriting the information of the surge protection modules

For testing Blitzductor XT or Blitzductor CT plug-in modules, a sensor is available for each version:

Sensor	Part No.	For use with
LCS DRC BCT	910 654	Blitzductor CT ; BCT MLC
LCS DRC BXT	910 652	Blitzductor XT ; BXT ML

As a standard, delivery includes LifeCheck[®] sensor of type LCS DRC BXT.

The software package includes

- **DEHNrecord user interface** (for use as VB 2005 application in MS Windows[®])
- **interface driver** for the USB interface of the reader
- **operating manual** (pdf file)
- Microsoft **.NET Runtime** environment (automatic download from the Microsoft website if not installed on the PC yet)
- software update for updating the device software of the DRC LC M3+

The software package supplied with the DRC LC M3+ is available on CD as a complete package with installation routine for PCs. The latest version of the software package can also be downloaded at www.dehn.de/download/.



Fig. 1: DRC LC M3+ reader

- 1** **USB cable** with type A and mini-B USB plug
- 2** **Display** (two-line display, 16 characters per line) for status indication
- 3** **LifeCheck® sensor** with connecting cable (approx. 1 m long); connection via RJ 12 plug, snaps onto BXT protection modules
- 4** **"SCROLL LEFT / RIGHT"** keys for jumping between the menu items on a **horizontal** level
- 5** **"ESC"** key for jumping back to a higher-level menu item (**vertical** level)
- 6** **"OK"** key for confirming and executing the relevant menu item
- 7** **"OFF"** key for switching off the device immediately; the device can also be switched off automatically after a certain time (10-90 minutes, see 6.3)
- 8** **"ON"** key for switching on the device
- 9** **Power supply plug** for loading via USB cable
- 0** **"RESET"** key for resetting the device manually (hardware reset), switches off the reader (hardware version 1.0.03 and higher)

3.2 Functions

The following functions are available after the software package for the **DEHNrecord user interface** has been installed on a PC:

- Creation of databases describing the arrangement of the DEHN Blitzductors within the installation
- Saving of databases on the PC
- Installation of databases on the reader
- Upload of databases from the reader to the PC with automatic synchronisation of the databases
- Printing of test reports

The following sections will describe the functions of the device in detail.

After installing the "**DEHNrecord DRC software update**" software package on a PC, new software versions can be installed on the DEHNrecord DRC LC M3+ reader via the USB cable and saved in the FLASH storage system.

For a more detailed description of the software update, see chapter 15.

4 Installation

The following requirements have to be fulfilled for installing the software package:

4.1 System requirements

A common PC with a Microsoft operating system that is compatible with .NET-Framework such as

- Windows® 98
- Windows® ME
- Windows® 2000 with SP3
- Windows XP® with SP3
- Windows Vista with SP2
- Windows® 7 with Sp1

is required. Both 32 and 64-bit Windows versions are supported. Please note that the software package cannot be installed on Windows® 95 and Windows® NT.

The processor of the PC should be at least a Pentium III processor (700 MHz).

The graphic board must support at least 1024x768 pixels and 256 colours.

The central memory should be at least 256 MB. Furthermore, a CD drive and a USB interface are required.

A hard disk of approx. 15 MB (or approx. 100 MB if .NET Framework® 2.0 has not been installed yet) is needed for installation.

.NET Framework® 2.0, requires a Microsoft Software Installer (MSI) (3.0 version or higher) and a Microsoft Internet Explorer (5.01 version or higher).

If not installed yet, the DEHN installation program automatically starts the download of the Microsoft Software Installer and .NET Framework® 2.0.

However, access to the internet is required for download from the Microsoft website.

4.2 Installation procedure

Insert the CD into the CD drive of your PC to install the software package. Installation is performed in two steps. First of all, the USB interface driver for the hand-held reader is installed. Secondly, the DEHN user interface is installed.

Note:

The reader may only be connected to the PC for the first time if the software package has been installed successfully.

4.2.1 Installing the USB interface driver

Administrator rights for the PC may be required to install the USB interface driver. The installation procedure is menu-driven and self-explanatory. The system may have to be rebooted after installation (prompt in the installation routine).

4.2.1.1 Windows XP – Vista – 7:

To install the interface driver, change to the directory ...\\CP210x\\Windows_XP_S2K3_Vista_7. Double-click the file **"CP210xVCPInstaller.exe"** to start the installation.

4.2.1.2 Other Windows versions:

To install the interface driver, change to the directory ...\\CP210x\\Windows_other. Double-click the file **"CP210x_Drivers.exe"** to start the installation.

The interface driver must be installed in the path "C:\\SiLabs\\MCU\\CP210x".

4.2.2 Installing the DEHN user interface

To install the user interface, change to the directory ...\\DRC LC M3+\\install_DRC_LC_M3+. Double-click the file **"install.bat"** to start the installation.

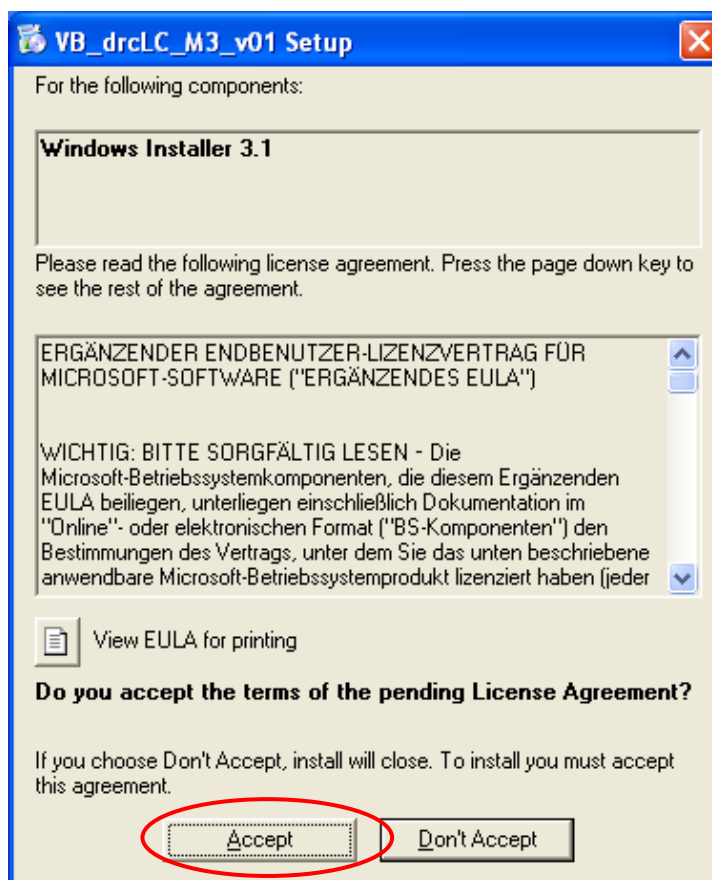
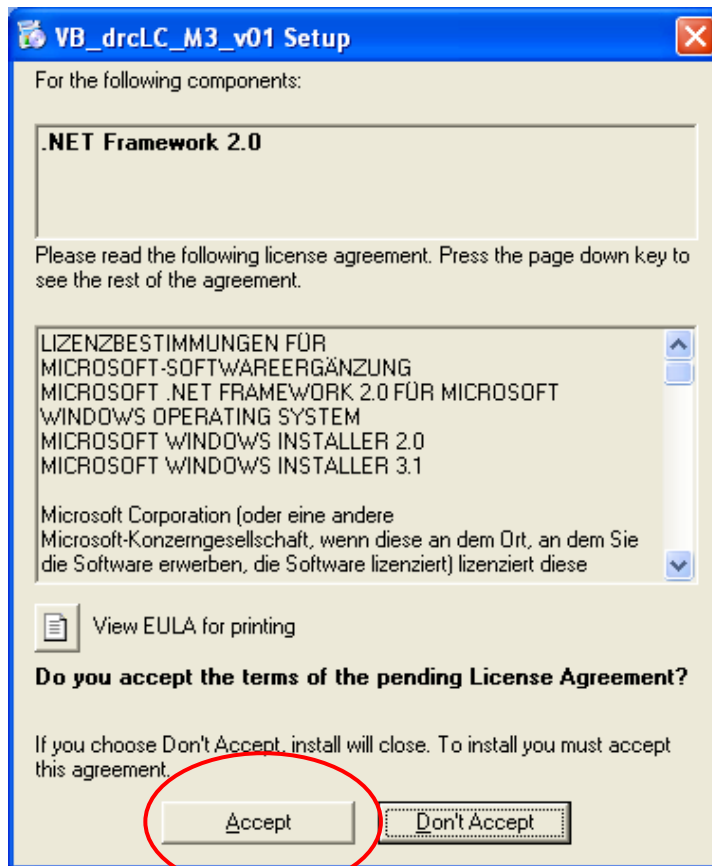
During installation, the system checks whether .NET-Framework® 2.0 is already installed. If this is not the case, it will be downloaded from the Microsoft website. Finally, the DEHN user interface for the DEHNrecord DRC LC M3+ hand-held reader is installed.

4.2.2.1 Installing the .NET Framework® 2.0 environment

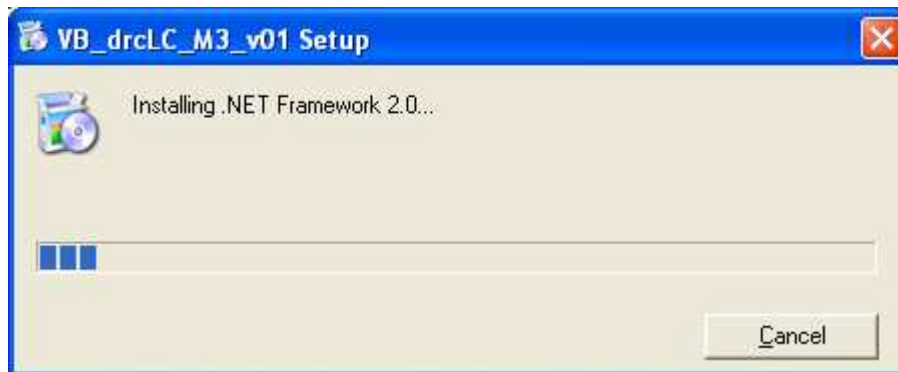
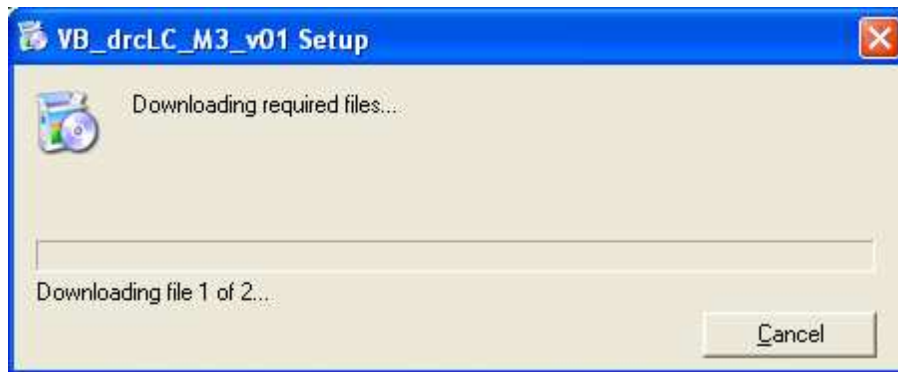
If not installed yet, the Microsoft Software Installer and .NET Framework® 2.0 are now automatically downloaded from the Microsoft website.

The duration of this procedure highly depends on the size of your computer's central memory and the Internet data transfer rate (size of file to be downloaded: approx. 35 MB) and takes at least five minutes.

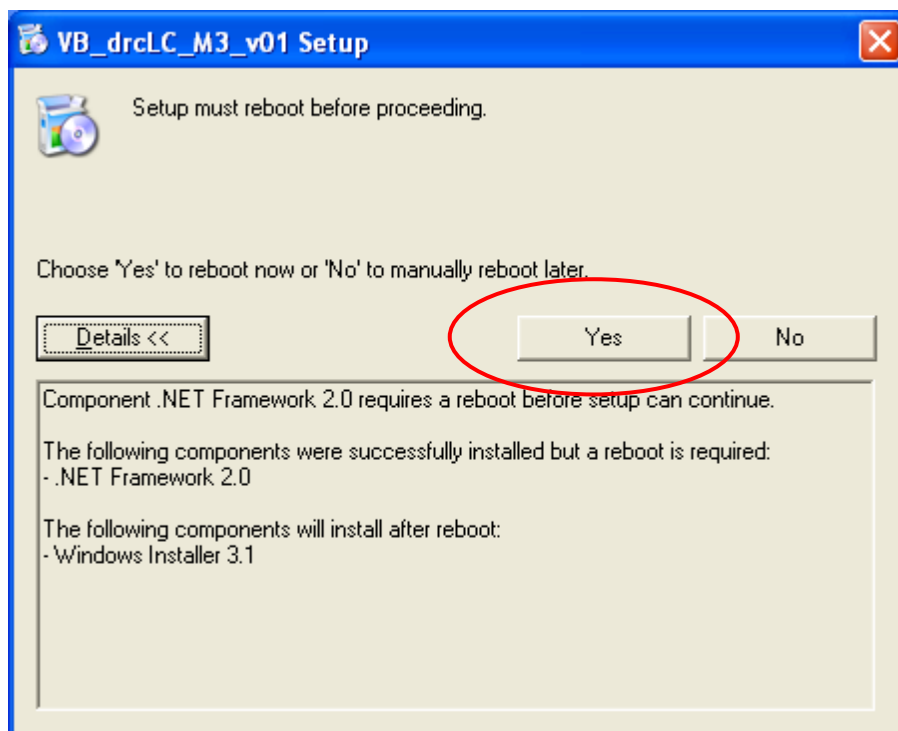
When starting the download, Microsoft prompts you to accept their licence terms.



After accepting the licence terms, download is started and .NET-Framework[®] 2.0 is installed.

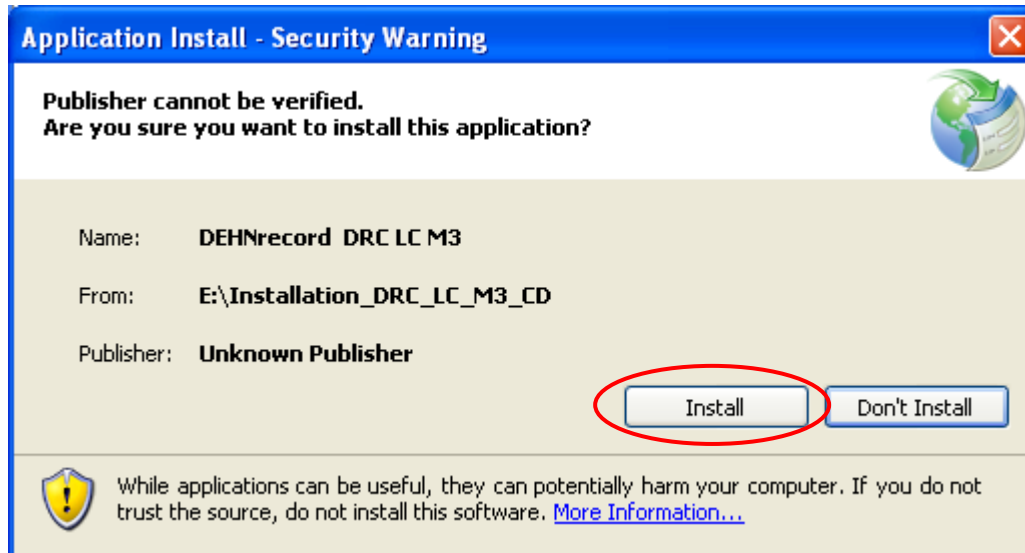


After the installation has been completed, the installation routine prompts you to reboot the operating system. As soon as this prompt has been confirmed, the system is rebooted and installation of the DEHN user interface is continued automatically. Please wait until the installation of the user interface (see 4.2.2.2) is completed.



4.2.2.2 Installing the DEHN user interface

Finally, the DEHN user interface for the DEHNrecord DRC LC M3+ reader is installed.



A “Security Warning” window opens. Click the “Install” button to continue.

The application is installed and automatically started.





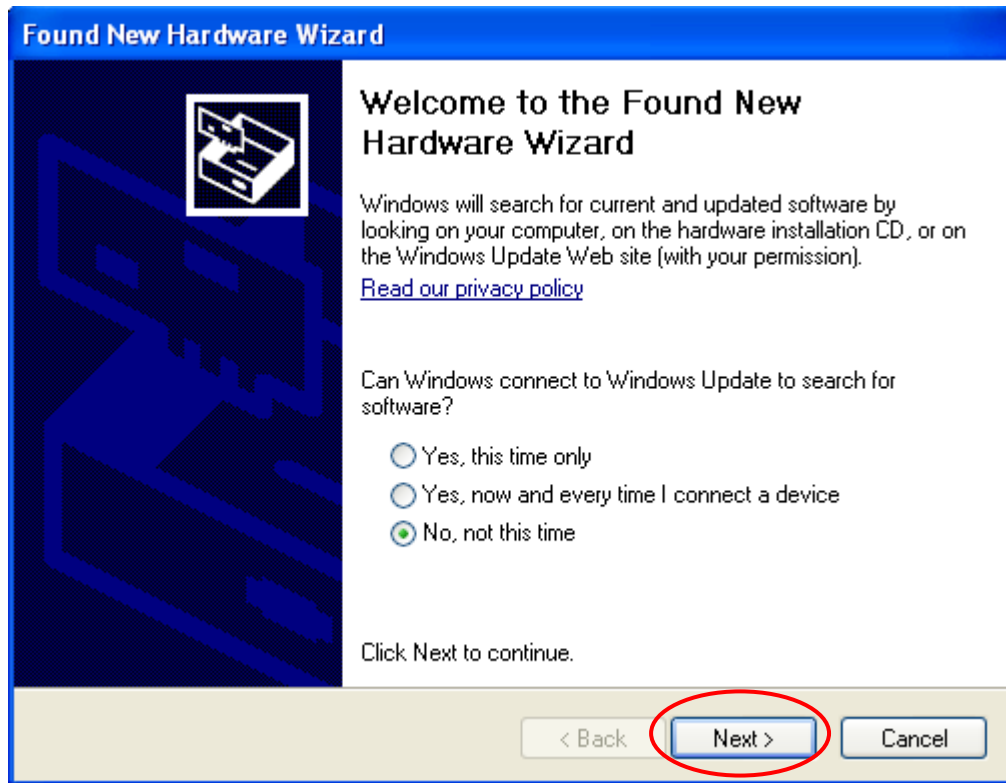
Click the “Exit” menu item to close the application.

4.3 Checking the installation procedure

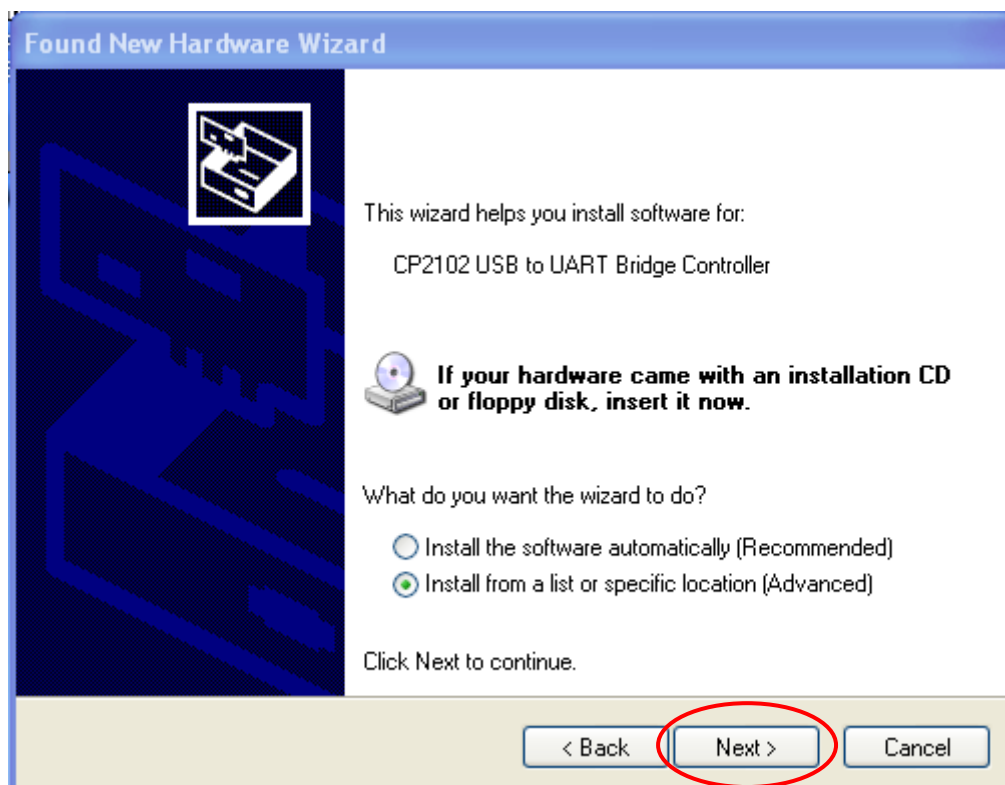
After the installation has been completed, the following tests have to be performed.

4.3.1 USB interface driver

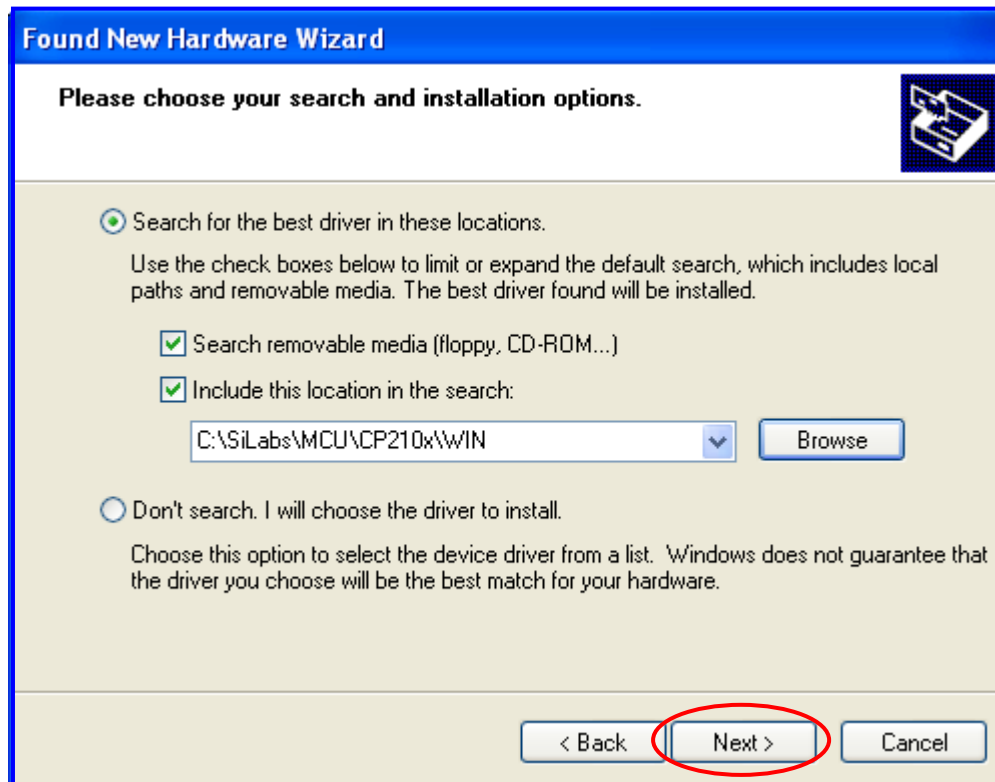
Before testing for correct installation, the reader must be connected to a PC by means of the USB cable (see 5.2.5) and must be switched on. As soon as the reader is switched on, the USB driver is loaded and activated. If the reader is switched on for the first time, the Windows operating system recognises the reader as new hardware and automatically activates the interface driver (if Windows XP – Vista – 7 version is installed). If other Windows versions are used, the “Found New Hardware Wizard” is started. Select “**No, not this time**” from the “Welcome” window and click the “**Next**” button.



Now a window opens. Select "**Install from a list or specific location (Advanced)**" and click the "**Next**" button again.



Select **"Include this location in the search"** from the next window and enter the path **"C:\SiLabs\MCU\CP210x\WIN"**. Click the **"Next"** button again.



Now the system installs the first of the two required drivers (**CP210x USB Composite Device**).

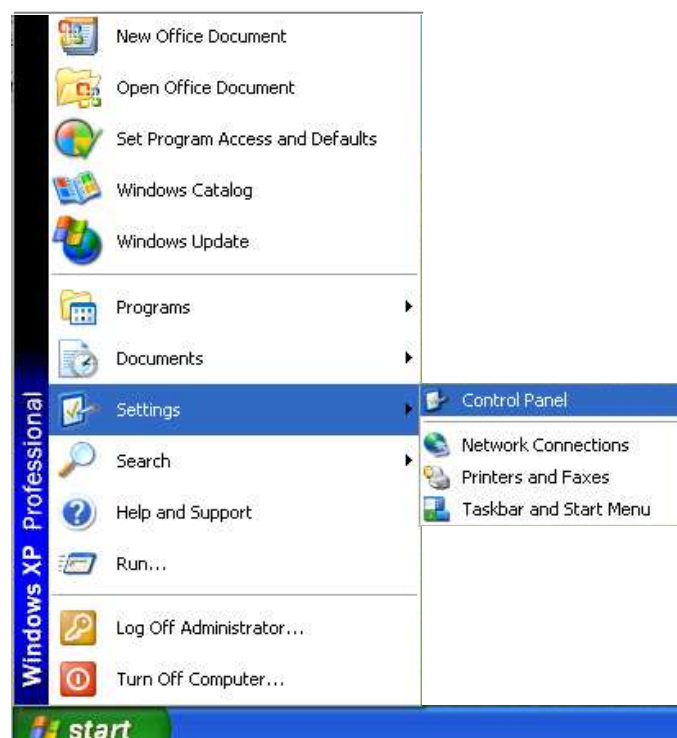


Complete the procedure by clicking the "**Finish**" button.

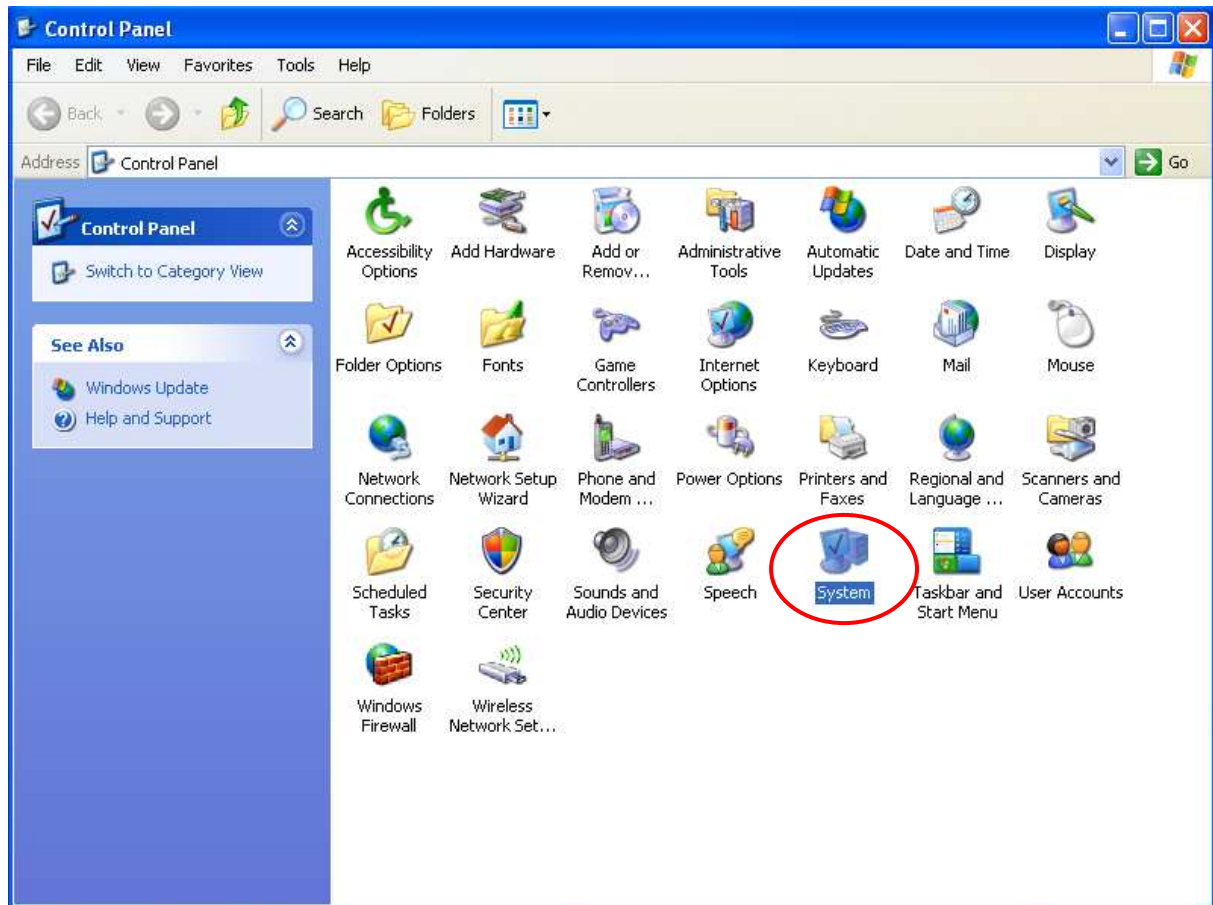


Now, repeat this procedure to install the second driver (**CP210x USB to UART Bridge Controller**).

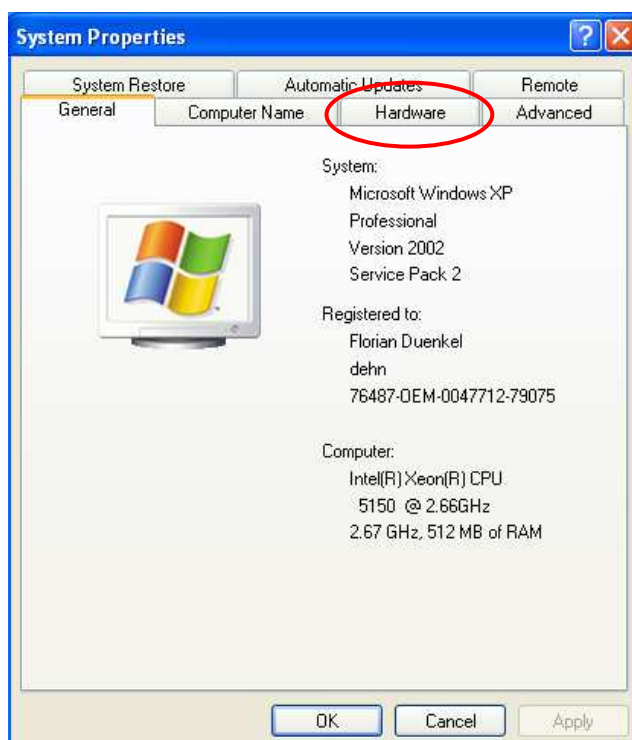
After the drivers have been installed and activated, select "Settings" from the Windows® Start menu and "Control Panel".



Select the "System" icon in the Control Panel" window.

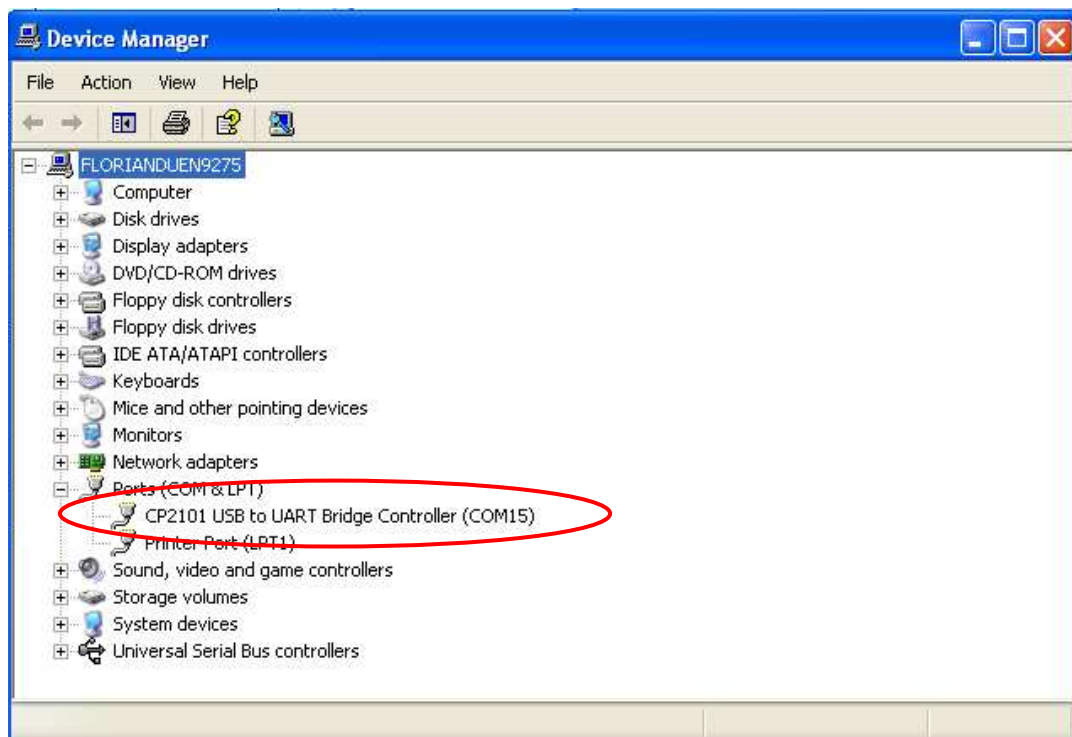


Now the "System Properties" window opens. Select the "Hardware" icon and then click the "Device Manager" button.





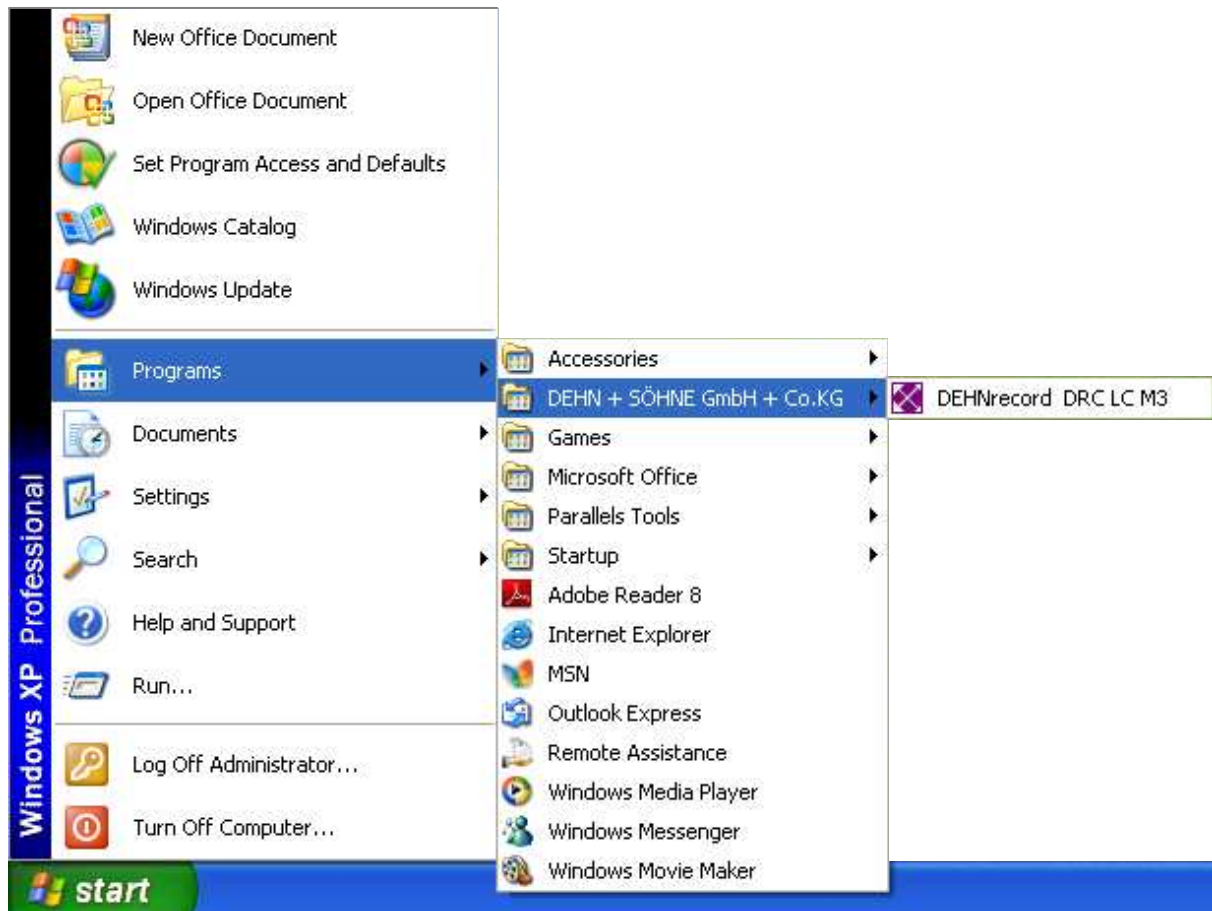
The “Device Manager” window should now also include the USB driver **“CP210x USB to UART Bridge Controller (COM??)”** in the “Ports (COM & LPT)” item.



Keep in mind the COM interface designation in brackets (in this case: **COM15**) as it must be selected as interface from the DEHN user interface.

4.3.2 DEHN User interface

If the DEHN user interface has been installed correctly, a new “DEHN + SÖHNE GmbH + Co.KG.” item is created in the Windows® Start menu. Select “Programs” and “DEHN + SÖHNE GmbH + Co.KG.” to activate the DEHN user surface.



5 Initial operation of the reader

When using the DEHNrecord DRC LC M3+ reader, the following has to be observed.

5.1 Warnings

- Before use, DEHNrecord DRC LC M3+ and the components included in delivery should be inspected for signs of damage. If damage is found, the reader or its accessories must not be used.
- The device may only be used under the conditions shown and referred to in this operating manual.
- Modification of or tampering with the devices and adding or removing components not intended for this purpose is impermissible, will jeopardise safety and will void warranty.
- The device may only be used by skilled persons in line with the relevant safety regulations.
- If it must be assumed that the device can no longer be used without risk, it must be put out of operation and secured against being switched on accidentally.
- Safe operation is no longer possible if
 - the device shows signs of damage
 - electrolyte has leaked
 - the device does not work any more
 - fluids have penetrated the device
 - the device has been inadequately stored and used
 - the device has been stressed during transport
- High-energy electromagnetic fields with frequencies of approx. 125 Hz around the external antenna may interfere with DEHNrecord DRC LC M3+.

5.2 Initial operation

Press the "ON" key to activate the reader. The bootloader of the device is started immediately and the device displays

Bootloader v1.00

The bootloader allows to load new software versions from a connected PC to the reader. The procedure corresponds to that described in 15.5.2 "Software update".

Once started, the bootloader checks whether there is a connection to a PC (via the USB cable). If there is no connection, the bootloader is deactivated immediately and displays the welcome text on the reader:

**DEHN+Söhne
RFID Reader**

If there is a connection to a PC, the bootloader enquires whether a new software version should be loaded.

Update Software ?

Press the “OK” key to update the software.

Downloading !

is displayed.

The software update procedure is described in detail in chapter 15 of this manual.

When pressing any key or no key for approx. 30 seconds, the bootloader is closed and the welcome text is displayed.

**DEHN+SÖHNE
RFID Reader**

The following settings will be displayed for a short time:

**14:05:00
05:12:08**

Time and date

Battery 80%

Battery charge condition

**Sensor:
LCS DRC BXT**

Connected sensor

**Software Version
1.2.00 03.12.08**

Software version and date

**AUTO Switch-off
-> 30 Minutes**

Setting for the automatic switch-off of the device

When using a new DEHNrecord DRC LC M3+ reader or a reader which has not been used for a long time, the following should be observed:

5.2.1 Checking date and time

When booting up the device, date and time are displayed for a short time. If these values are incorrect, set them manually (see 6.1).

If a date before 1st January 2003 is set (may occur if the battery is too low), the device automatically changes to the "**EXTRAS : Settings : Time/Date**" submenu when booting up the device (see 6.1).

5.2.2 Checking the battery (hardware version 1.0.03 or higher)

The device automatically displays the battery status when the device is booted up. The battery status can be selected from the "**EXTRAS : Battery test**" submenu at any time (see 7.1). The following battery statuses are possible:

Text	Remaining test duration
Battery OK	approx. 250 programming operations possible
Batt. 80, 60, 40, 20, 10%	~ percentage of 'Battery OK' time
Battery low	device switches off automatically
No indication	low battery

If "Battery <= 20 %" or "Battery low" is displayed or the device cannot be switched on, the battery must be recharged for further testing. This can be done in two different ways:

- **via the USB power supply unit and USB cable**
- **via the USB interface of a PC with the USB cable**

Charging takes approx. 3 hours.

Maximum charging current: 500 mA, voltage: 4.75 – 5.25 V d.c.

5.2.3 Connecting the LifeCheck[®] sensor

Plug the required sensor of type LCS DRC BCT or LCS DRC BXT into the RJ 12 socket of the reader (see Fig. 1). The type of sensor used is automatically displayed

when switching on the device and must be compared with the designation on the rating plate.

5.2.4 Activation and test for correct operation

Press the "**ON**" key on the keypad to activate the device. If the automatic deactivation function is activated and no test is started within 10 to 90 minutes (depending on the setting; see 6.3) or no key is pressed, the device switches off automatically. Press the "**ON**" key again to switch on the device. After boot up, the device can be switched off at any time by pressing the "**OFF**" key.

Before testing, check DEHNrecord DRC LC M3+ and the sensor for correct operation using the reference module included in delivery (see 10).

5.2.5 Connection to a PC

Plug the mini-B plug into the socket of the reader and the type A plug into any USB port of the PC to connect the device to a PC via the USB cable.

The software package must be installed before plugging in the mini-B and type A plug for the first time (see 4.2).

5.2.6 General information on the operation of the device

All operations are performed according to the flow charts described in chapter 13. To that end, the keys of the keypad are used as follows:

The "**SCROLL**" keys (left/right) allow to select the required submenu item (displayed in the 2nd line of the display) from the respective menu item (displayed in the 1st line of the display).

Press the "**OK**" key to

- execute the selected submenu item,
- start the relevant action, or
- confirm the displayed result of the action

Press the "**ESC**" key to

- exit the relevant menu item and jump to a higher menu level or
- abort the relevant action.

The red "**Arrow**" keys (keys 2, 4, 6 and 8) allow to select the parameters for the relevant actions. The function-specific meaning of the relevant action is described in the following section.

6 Setting the reader

After boot up, the reader is in the "**Mode**" main menu and can be set.

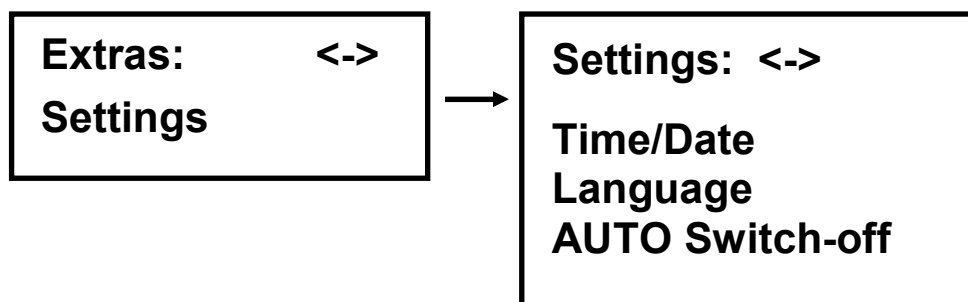
Use the "**SCROLL LEFT**" or "**SCROLL RIGHT**" keys to select one of the "**STANDARD LC**", "**DRC MCM**" or "**EXTRAS**" submenus and press the "**OK**" key.



Note:

The "DRC MCM" submenu is only relevant for the stationary DRC MCM XT /1/ monitoring device. This is described in chapter 12 of this manual.

Before using the reader for the first time, all required settings must be adjusted in the "**Extras**" menu item.



6.1 Date and time

Date and time can be checked in the "**Settings: Time / Date**" menu. If date and time are set correctly, press the "**OK**" key.

If date and/or time have to be adjusted, proceed as follows:

:

- enter the time in the hh:mm:ss format (24 h) with the numerical keys
- press "**OK**"
- enter the date in the DD.MM.YY format
- press "**OK**"

6.2 *Language*

You can choose the desired display language of DEHNrecord DRC LC M3+ (English, German or French).

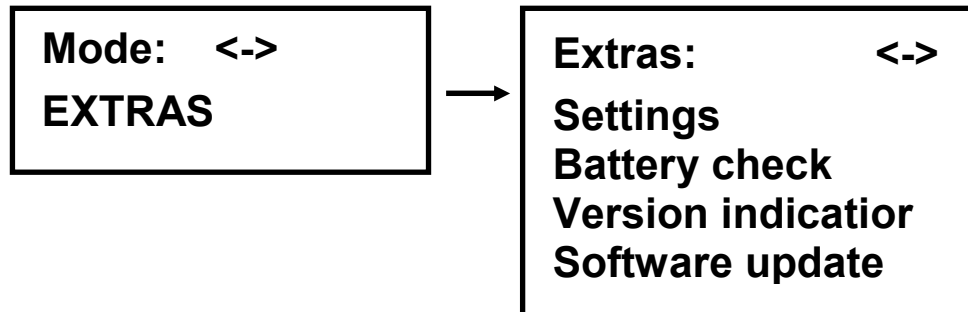
Press the "**OK**" key in the "**Settings: Language**" menu to change the language. Select the desired language by pressing one of the "**SCROLL**" keys. After pressing the "**OK**" key again, the device automatically changes to the selected language. When the device is switched off, the language remains as originally set. When delivered, the language is set to **German**.

6.3 *AUTO switching-off*

This submenu allows to select the period of time after which the device is automatically switched off if no key is pressed. The device can be activated or **deactivated** (OFF) in steps of 10 minutes (ranging from **10** to **90 minutes**). Press the red "**UP**" key (2) or the "**DOWN**" key (8) to select the deactivation time and confirm with "**OK**".

7 Other service functions

In addition to the "Settings" described before, the following service functions can be selected from the "EXTRAS" menu:



7.1 *Battery check* (hardware version 1.0.03 or higher)

Press the "OK" key to determine the battery charge condition (see 5.2.2). This process takes some time.

Please wait!

is displayed, before the battery charge condition is shown.

Battery 80%

Confirm again with "OK" to return to the "EXTRAS" menu.

7.2 *Version indicator*

This submenu shows the hardware version and the software version installed on the device.

Press the "OK" key in the "Extras: Version indicator" menu. The device first shows the current software version. If the "OK" key is pressed again, the hardware version is displayed.

Software Version
1.2.00 04.05.09

Hardware Version
1.0.03

Press the "OK" key to return to the "EXTRAS" menu.

7.3 Software update

This submenu allows to download new software versions from a connected PC to the reader.

This software update is described in chapter 15.

For successfully downloading a new software version from a PC to the reader,

- a USB cable connection between PC and reader is required
- the reader must be switched on
- the "**DEHNrecord DRC software update**" program must be started on the PC (reader must have been connected and switched on before)
- the appropriate COM interface must be selected in the "DEHNrecord DRC software update" program and the file with the new software version must be selected.

Press the "OK" key in the "**Extras: Software Update**" menu to start the download. Confirm that the above requirements are fulfilled.

**Software Update
File/COM?→OK**

Press the "OK" key to start the "Bootloader".

Bootloader v1.00

is displayed.

The bootloader checks whether there is a USB cable connection to a PC. If this is not the case, the bootloader is exited immediately and the reader displays the welcome text.

If there is a connection to a PC, the bootloader enquires whether a new software version should be downloaded.

Update SW?

Press "OK" to start downloading the new software version.

Downloading!

is displayed.

When pressing any key or no key for approx. 30 seconds, the bootloader is exited and the welcome text is displayed. If the new software version has been downloaded successfully,

Download finished

is displayed, the welcome text

appears and the device switches to the operation mode.

**DEHN+SÖHNE
RFID reader**

In case of errors, the download process is interrupted and

Error > Abort

is displayed.

In this case, check whether the above mentioned requirements are fulfilled. Then restart the procedure.

8 First start of the user interface

Start the DEHN user interface as described in section 4.3.2.

8.1 Settings

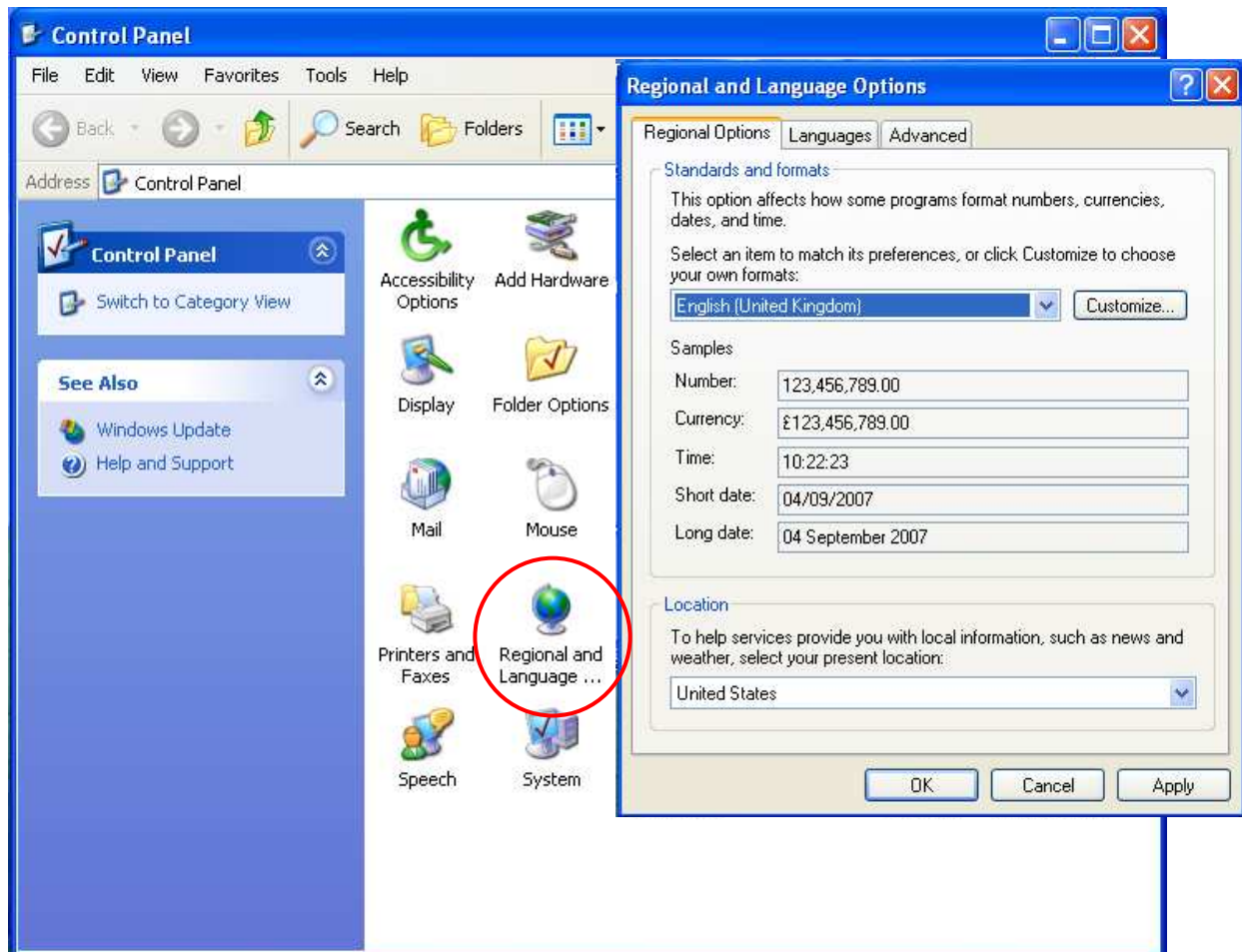
After each start, the language and communication interface for connection with the reader must be set.



Click the “Settings” menu item to select the desired settings.

8.1.1 Setting the language

Every time the device is started, the program automatically checks which Regional and Language Options are set in the Windows® control panel. If a language other than German (Germany) or French (France) is set, the program automatically selects “**English**” as predefined language and is started in this language.



You can change the language anytime by selecting “Select language” from the Settings menu item.



8.1.2 Setting the communication interface

Before establishing a communication connection for data exchange with the reader (downloading or synchronising a database), select “Select COM port” from the “Settings” menu to make sure that the correct communication port has been selected. Otherwise no connection can be established.

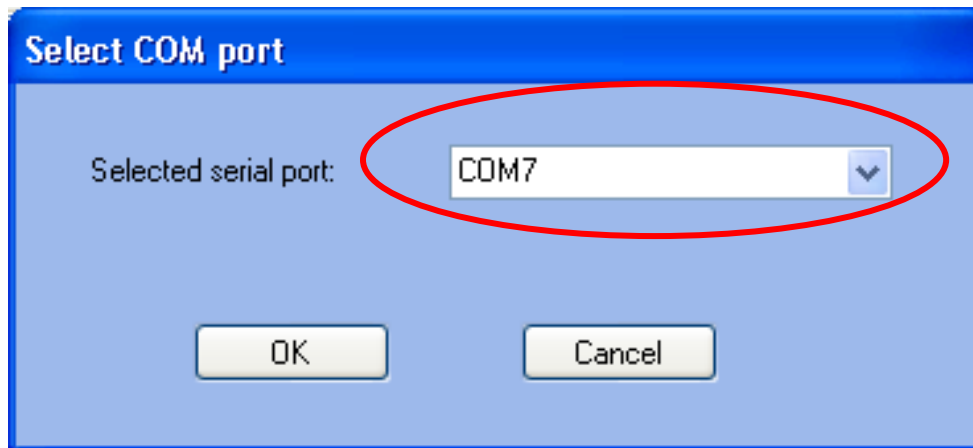


For this purpose, **ensure that**

- the hand-held reader and the PC are connected via the USB cable
- the hand-held reader is switched on and booted up

Windows® automatically loads and activates the USB interface driver as soon as the hand-held reader is switched on. However, the USB interface driver is deactivated and removed from the memory whenever the hand-held reader is switched off or unplugged. The interface can no longer be used even if it is still displayed.

If the interface can no longer be addressed although a connection is established and the reader is switched on, remove and replug the USB cable. After a short time, the COM port can be reset in the “Settings” menu.



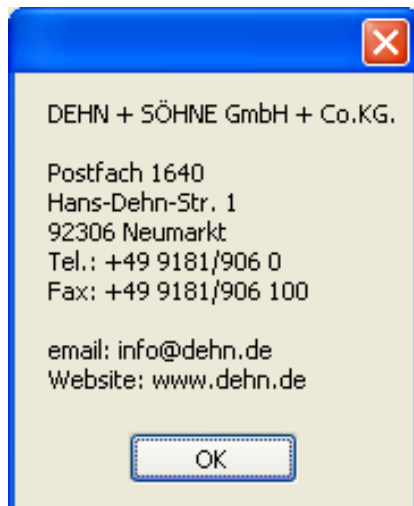
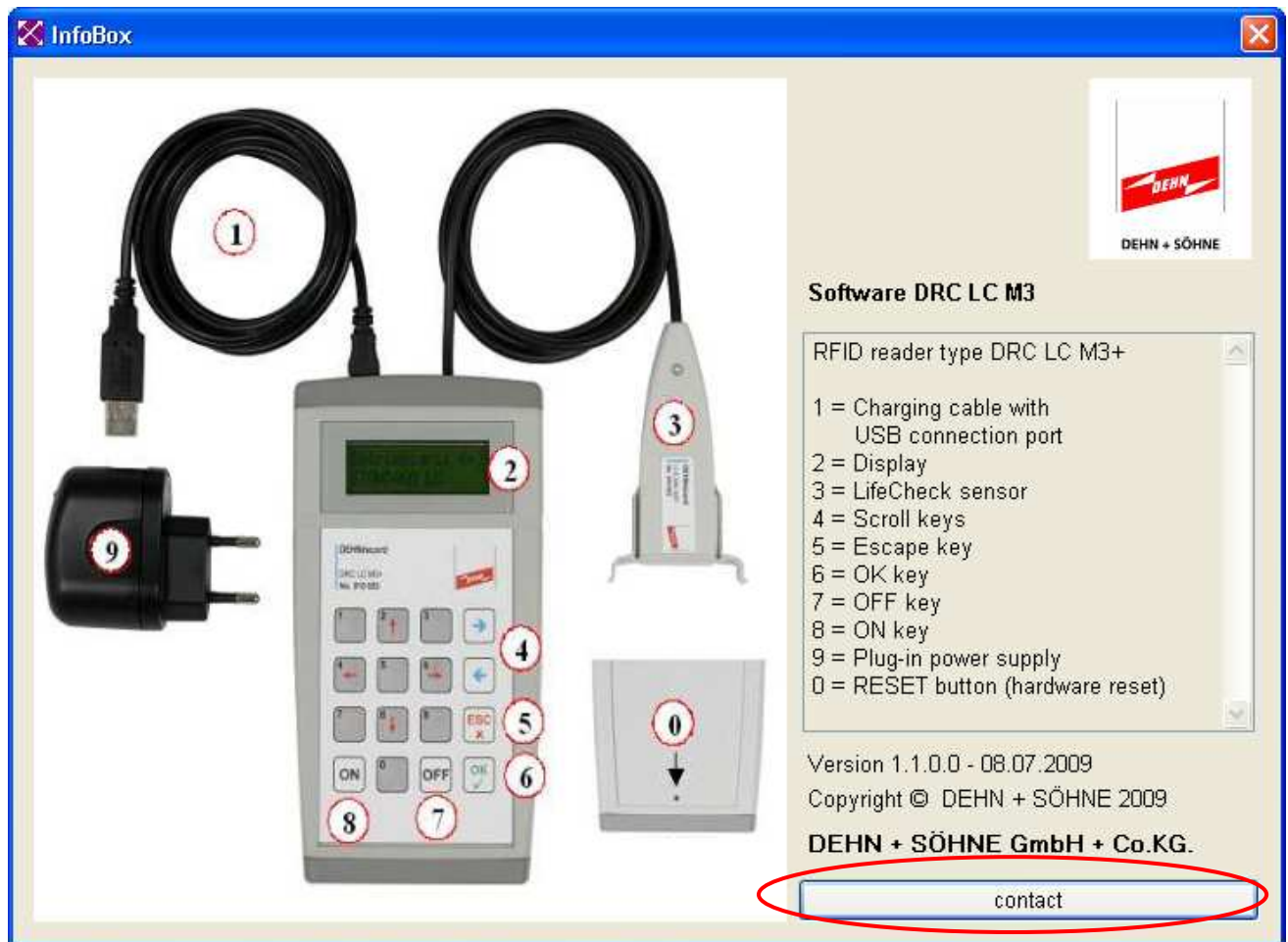
Select the COM port determined in the control panel as described in section 4.3.1.

In most cases, the right COM port is automatically preset. It is important to check whether the right COM port is selected as an incorrect port may be preset due to additionally installed devices with serial COM port or COM port simulations (e.g. Bluetooth devices).

8.2 Help function

The “Help” submenu gives short information on the program version and the contact address of the manufacturer. Furthermore, a pdf of this document can be downloaded as an online operating manual.





During the installation procedure (see 4.2), the operating manual files (DRC_LC_manual_xx.pdf) are saved locally on the PC. The online version of the manual is only available if a program for reading the pdf format (e.g. Adobe Acrobat Reader) that is linked with a ".pdf" file extension is installed on the PC.

9 Working with databases

The most important innovation of the DEHNrecord DRC LC M3+ reader is that all Blitzductors of an installation can be tested and managed by means of a database.

For this purpose, a database including all Blitzductors installed is created for every installation or part of an installation. The databases are created on a PC and loaded on the reader on site for testing. During the tests with the hand-held reader, the current status of the Blitzductors is determined and updated in the database. To evaluate the test results, the updated database of the reader is synchronised with the database on the PC. The test results can be printed in the form of a test report.

A database contains the database name to identify the installation (max. 12 ASCII characters) and a database record per Blitzductor (max. 250 entries) including the

- terminal designation (7 ASCII characters)
- Part No. / serial No. (six-digit)
- status (ok / replace / unchecked)
- last test (date + time)
- last successful test (date)

These data are saved both in the database of the reader and in the database of the PC.

Each record of the PC database also provides a comment field (max. 50 ASCII characters) which can be edited by the user.

Since texts and, if necessary, special characters for the terminal, plain texts / comments are entered, all databases are only generated on the PC.

Note:

Do not use commas and semicolons when entering data as these characters are used as delimiters in the database.

9.1 Creating the first database

The following section describes how to create a database on the PC by means of the DEHN user interface.

Click the “Process database” menu item to start editing or evaluating a database.



If no database has been loaded yet ("Load database" menu item, see 9.5), the program starts with an empty database window. If databases have been loaded before, the last database loaded is displayed and can be edited. In order to avoid accidental modification, databases are principally loaded in a “locked” mode.

Edit database :

Back

db name (12 characters) :

Terminal (7 characters)	Part No. (6 characters)	Status	Time of last check	Date of last check	Last successful check	Comments

Edit database

Save changes

Database locked

Print report

Send to reader

Save database to PC

Click the "Edit database" button to edit the database. The database is then unlocked and an empty record is displayed for entering the data (marked with "*" on the left side of the record).

The screenshot shows the 'Edit database' interface. At the top, there is a 'Back' button and a text input field for 'db name (12 characters)'. Below this is a table with the following columns: Terminal (7 characters), Part No. (6 characters), Status, Time of last check, Date of last check, Last successful check, and Comments. The first row of the table is highlighted in light green and contains an asterisk (*) in the first column, indicating it is the selected record. Below the table, there are several buttons: 'Edit database' (circled in red), 'Database unlocked' (circled in green), 'Send to reader' (red), 'Save changes' (red), 'Print report' (grey), and 'Save database to PC' (green).

When clicking the record, default values are loaded for all records.

The screenshot shows the 'Edit database' interface after a record has been selected. The table now displays a record with the following values: Terminal (P00.000), Part No. (000000), Status (??????), Time of last check (00:00:00), Date of last check (01.01.01), Last successful check (01.01.01), and Comments. The record is highlighted in light green. The buttons at the bottom remain the same as in the previous screenshot.

After double-clicking the relevant column, the relevant value can be edited. Generally only the "Terminal", "Part No." and "Comments" columns can be filled or edited. The format of every entry is checked (after pressing the ENTER key).

In case of an error, the relevant cell is marked red and an error message appears.

Please observe the following when entering data:

Only the terminal designation allows to clearly identify Blitzductors for testing (during the test by means of the database). When entering a terminal, its designation is therefore checked for accuracy. Possible errors are displayed (see example below).

In general, data is only transferred if there are no errors.

db name (12 characters) : NM_DB1_BXT

Terminal (7 characters)	Part No. (6 characters)	Status	Time of last check	Date of last check	Last successful check	Comments
P01.001	920324	*??????	00:00:00	01.01.01	01.01.01	First
P01.002	920324	*??????	00:00:00	01.01.01	01.01.01	database
P01.002	920347	*??????	00:00:00	01.01.01	01.01.01	
P01.004	920347	*??????	00:00:00	01.01.01	01.01.01	

Terminal in multiple use

OK

Edit database Database unlocked Send to reader

Save changes Print report Save database to PC

Tip! : Click the “Save changes” button from time to time to ensure that the data have been transferred correctly. In order to continue entering data, click “Edit database”.

When creating a database, the Part No. should be entered for all transponders as this is indicated on the reader when testing on site.

As the status of the Blitzductors can only be determined during testing, the “Status” column is predefined as “Unknown (??????)”.

Date and time are also updated during every test and are therefore predefined as 01.01.01 00:00:00 when creating a database. The user can enter any information (max. 50 characters) in the comment column.

Edit database : NM_DB1_BXT.txt

Back

db name (12 characters) : NM_DB1_BXT

Terminal (7 characters)	Part No. (6 characters)	Status	Time of last check	Date of last check	Last successful check	Comments
P01.001	920324	*??????	00:00:00	01.01.01	01.01.01	First
P01.002	920324	*??????	00:00:00	01.01.01	01.01.01	database
P01.003	920347	*??????	00:00:00	01.01.01	01.01.01	
P01.004	920347	*??????	00:00:00	01.01.01	01.01.01	

Edit database
Database locked
Send to reader

Save changes
Print report
Save database to PC

Click the “Save changes” button to finally save the data in the database. A distinctive name should be chosen for the database before (max. 12 characters) and entered in the caption.

- Tip! :**
- Click the title of a column to sort data in ascending or descending order.
 - Complete records (one line) can be deleted by highlighting them and pressing the “Delete” key.

Edit database : NM_DB1_BXT.txt

Back

db name (12 characters) : NM_DB1_BXT

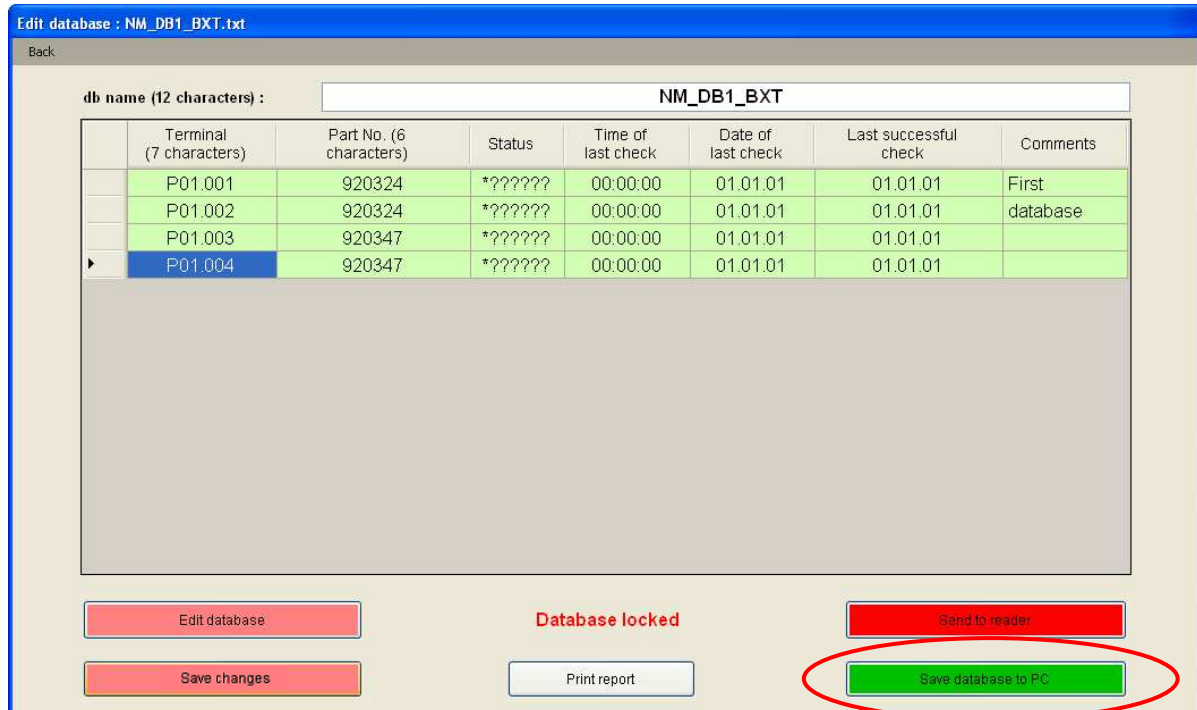
Terminal (7 characters)	Part No. (6 characters)	Status	Time of last check	Date of last check	Last successful check	Comments
P01.004	920347	*??????	00:00:00	01.01.01	01.01.01	
P01.003	920347	*??????	00:00:00	01.01.01	01.01.01	
P01.002	920324	*??????	00:00:00	01.01.01	01.01.01	database
P01.001	920324	*??????	00:00:00	01.01.01	01.01.01	First

Edit database
Database locked
Send to reader

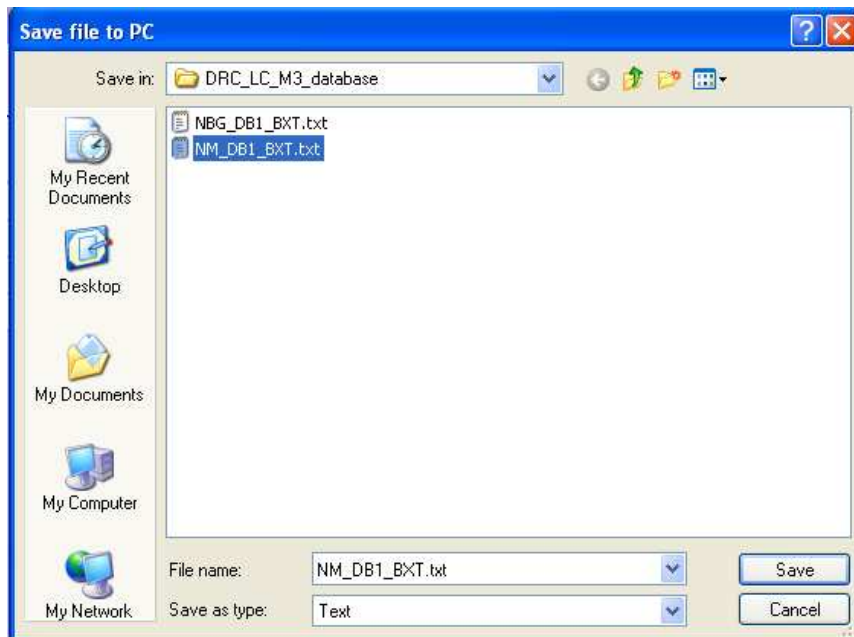
Save changes
Print report
Save database to PC

9.2 Saving the database on the PC

After the database has been created, it should be saved on a PC. The PC database must not get lost as the information in the comment field is only saved in the PC database and is needed for synchronising the database of the reader. Any number of copies can be created on any data carrier.



Click the "Save database to PC" button. The Windows® standard dialog for saving a file appears.



To avoid confusion, the name of the database should be identical with the file name.

Tip! : The database must be saved as a TXT file and can be read and edited with **MS Excel®**.

9.2.1 Tips for editing a database with MS Excel®

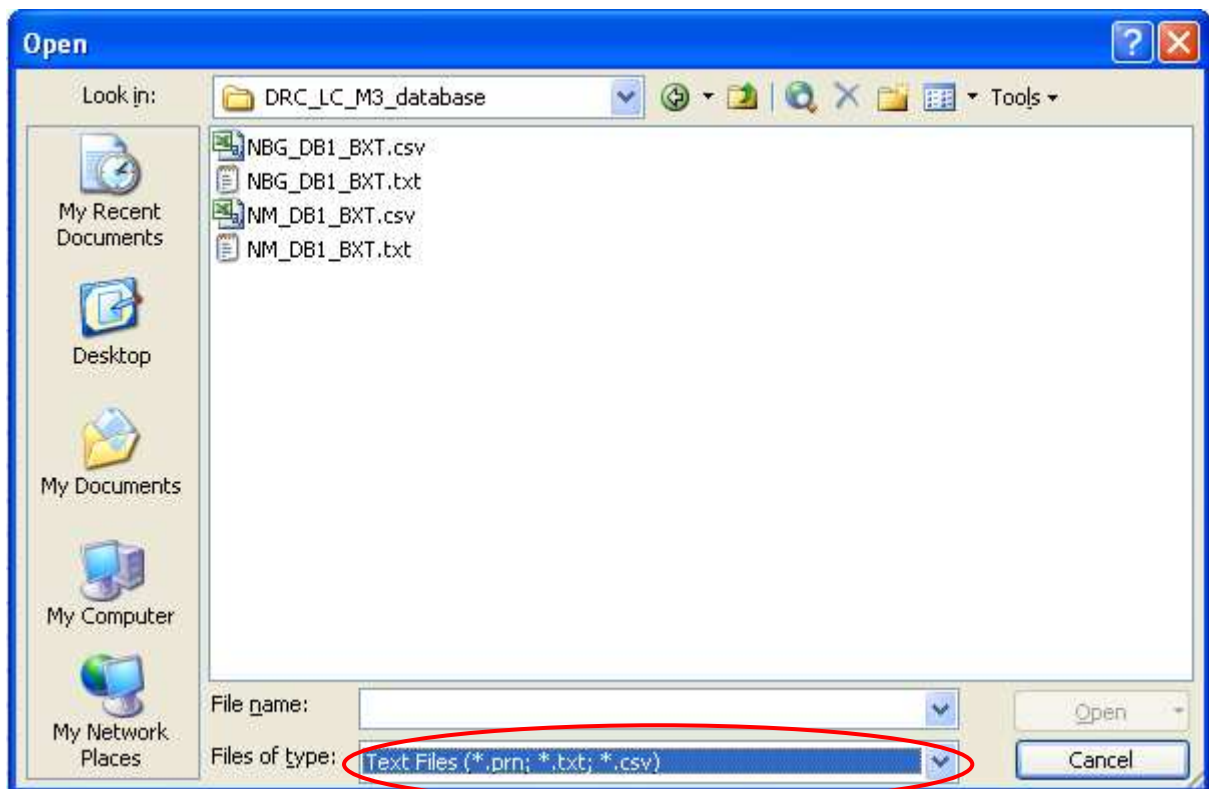
Databases can be read and edited with MS Excel® and then saved on the reader again for further use, if the following is observed:

- Saving the database via the DEHN user interface (see 9.2)

The database must be saved with **".txt"** extension (preset).

- Opening the database in MS Excel®

When opening the file in MS Excel®, select "Text Files" as file type to activate the Text Import Wizard.



When loading the data by means of the Text Import Wizard, make the following settings (see also the following screenshots):

- Settings for the Text Import Wizard:

Step 1: Select "Delimited" to separate the fields by delimiters

Step 2: Select "Semicolon" as delimiter

Step 3: Define the data format for all (previously highlighted) columns as "Text"

Text Import Wizard - Step 1 of 3

The Text Wizard has determined that your data is Delimited.
If this is correct, choose Next, or choose the data type that best describes your data.

Original data type
Choose the file type that best describes your data:

☒ **Delimited** - Characters such as commas or tabs separate each field.
☐ **Fixed width** - Fields are aligned in columns with spaces between each field.

Start import at row: File origin:

Preview of file E:\DRC_LC_M3_Datenbanken\NM_DB1_BXT_en.txt.

1	NM_DB1_BXT	;;;;;
2	P01.001;920324;10:40:16;16.07.07;16.07.07;Replace;lightning str;	
3	P01.002;920324;10:40:24;16.07.07;16.07.07;Replace;ditto.	
4	P01.003;920347;10:40:35;16.07.07;16.07.07;ok;	
5	P01.004;920347;10:40:48;16.07.07;16.07.07;ok;	

Text Import Wizard - Step 2 of 3

This screen lets you set the delimiters your data contains. You can see how your text is affected in the preview below.

Delimiters

☐ Tab ☒ **Semicolon** ☐ Comma
☐ Space ☐ Other:

☐ Treat consecutive delimiters as one

Text qualifier:

Data preview

NM_DB1_BXT						
P01.001	920324	10:40:16	16.07.07	16.07.07	Replace	lightning
P01.002	920324	10:40:24	16.07.07	16.07.07	Replace	ditto.
P01.003	920347	10:40:35	16.07.07	16.07.07	ok	
P01.004	920347	10:40:48	16.07.07	16.07.07	ok	

Text Import Wizard - Step 3 of 3

This screen lets you select each column and set the Data Format.

'General' converts numeric values to numbers, date values to dates, and all remaining values to text.

Column data format

☐ General ☒ **Text** ☐ Date: ☐ Do not import column (skip)

Data preview

Text	Text	Text	Text	Text	Text	Text
NM_DB1_BXT						
P01.001	920324	10:40:16	16.07.07	16.07.07	Replace	lightning
P01.002	920324	10:40:24	16.07.07	16.07.07	Replace	ditto.
P01.003	920347	10:40:35	16.07.07	16.07.07	ok	
P01.004	920347	10:40:48	16.07.07	16.07.07	ok	

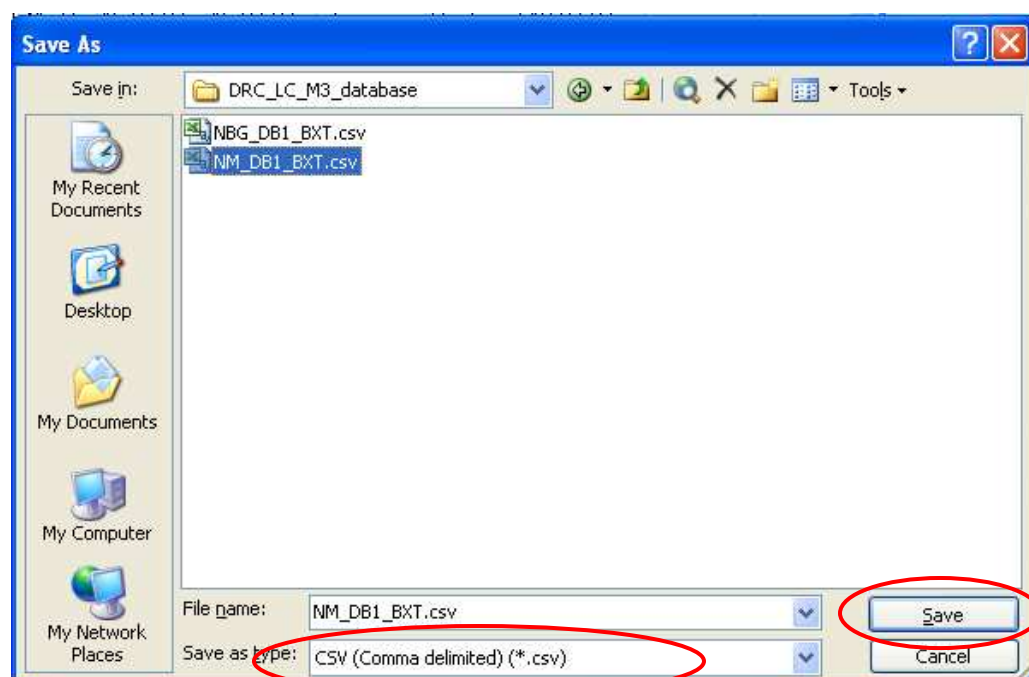
	A	B	C	D	E	F	G	H	I	J
1	NM_DB1_BXT									
2	P01.001	920324	10:40:16	16.07.07	16.07.07	Replace	lightning strike - 11.07.07			
3	P01.002	920324	10:40:24	16.07.07	16.07.07	Replace	ditto.			
4	P01.003	920347	10:40:35	16.07.07	16.07.07	ok				
5	P01.004	920347	10:40:48	16.07.07	16.07.07	ok				
6	P01.005	920344	10:41:01	16.07.07	16.07.07	ok				
7	P01.006	920342	10:41:14	16.07.07	16.07.07	ok				
8	P01.007	920324	10:41:27	16.07.07	16.07.07	ok	Replaced 10.07.07			
9	P01.008	920342	10:42:06	16.07.07	16.07.07	ok				
10	P01.009	920354	10:07:11	16.07.07	16.07.07	ok				
11	P01.010	920354	10:07:20	17.07.07	17.07.07	ok				
12	P01.011	920364	10:07:33	17.07.07	17.07.07	ok				
13	P01.012	920310	10:43:08	16.07.07	16.07.07	ok				
14	P01.013	920310	10:43:25	16.07.07	16.07.07	ok				
15	P01.014	920325	10:43:43	16.07.07	16.07.07	ok				
16										
17										

- Saving the database in MS Excel®

After the database has been edited in MS Excel®, save it as follows:

- 1) The "end of database" symbol (SUB = CTRL Z = 0x1a) in the last line of the database must not get lost when editing the database.
- 2) Save the database as ".csv" file.

Now the database can be saved on the DEHN user interface for further use.



9.3 Downloading the database on the reader

After the database has been saved, it is downloaded on the reader. Up to 4 databases db1 to db4 can be saved on the reader at the same time. The database designation db1 to db4 corresponds to the memory area where the database is saved. A database can be selected for data transfer by entering the database number (1, 2, 3 or 4). To avoid confusion, the name of the database is displayed after entering the database number (e.g. NM_DB1_BXT).

The following provides a brief description on how to use the reader. Detailed information on the reader is given in 11.1.

Click the “Send to reader” button to download the database currently loaded on the PC.

db name (12 characters) : NM_DB1_BXT

Terminal (7 characters)	Part No. (6 characters)	Status	Time of last check	Date of last check	Last successful check	Comments
P01.001	920324	*??????	00:00:00	01.01.01	01.01.01	First
P01.002	920324	*??????	00:00:00	01.01.01	01.01.01	database
P01.003	920347	*??????	00:00:00	01.01.01	01.01.01	
P01.004	920347	*??????	00:00:00	01.01.01	01.01.01	

Buttons: Edit database, Save changes, Database locked, Print report, Send to reader (circled in red), Save database to PC.

The “Send file to DRC LC ” window opens.

Send database

Back

Please connect the reader DRC LC to the USB port of your PC
 --> then click 'Send database to DRC LC'
 --> Finally select the reader modus 'Load database'

Send file to DRC LC (circled in red)

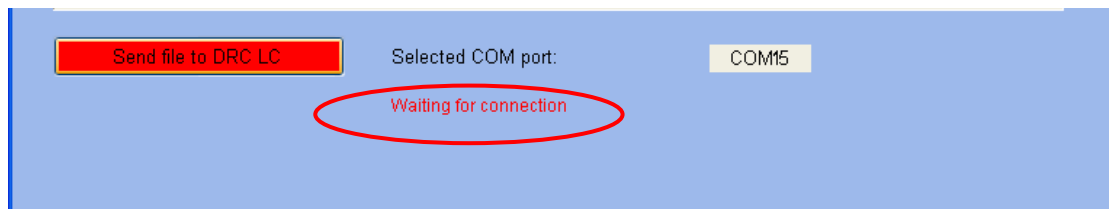
Selected COM port: COM15 (circled in red)

Line status

Now check whether the reader is connected properly and the correct COM port has been selected (see 8.1.2).

Select the "**PC->M3**" submenu item from the "**STANDARD LC: Database (DB) : DB : TRANSFER**" menu item of the reader (see also 11.1) and the requested database number 1 to 4 by entering the relevant number.

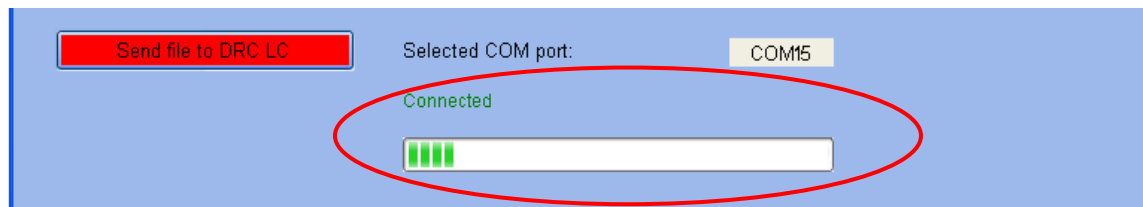
Click the "Send file to DRC LC" button on the PC. Now the connection status changes to "**Waiting for connection**" (red).



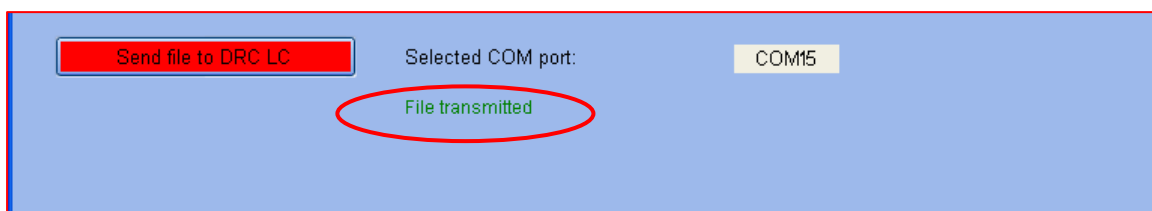
Press the "**OK**" key on the reader. Now the reader tries to establish a connection to the PC and displays

**Start connection
Please wait!**

As soon as the connection is established, the connection status is changed to "**Connected**" (green) and a progress bar indicates the progress of the data transfer.



If the transfer was successfully completed, the connection status changes to "**File transmitted**" (green) after the transfer.



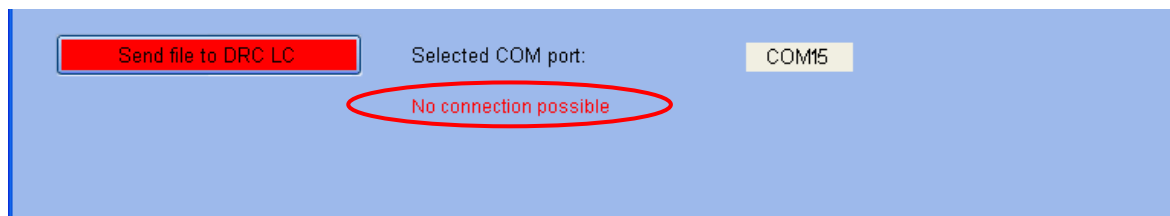
The database sent from the PC is now saved on the reader in the selected memory area.

Note:

When downloading a database, the status of all Blitzductors is "unchecked".

Press the "Back" key to jump back to the "Process database" window.

If no connection can be established, the procedure is cancelled after approx. 1 minute.

**9.4 Testing the surge protection modules by means of a database**

The surge protection modules can only be tested by means of the reader. This procedure is described in detail in 10.5.

9.5 Upload for synchronising a database with the PC

After testing the surge protection modules by means of the reader, the local database in the reader must be synchronised with the PC for evaluating and preparing a test report. For this purpose, the database of the reader is uploaded back to the PC which compares each record by means of the distinctive terminal.

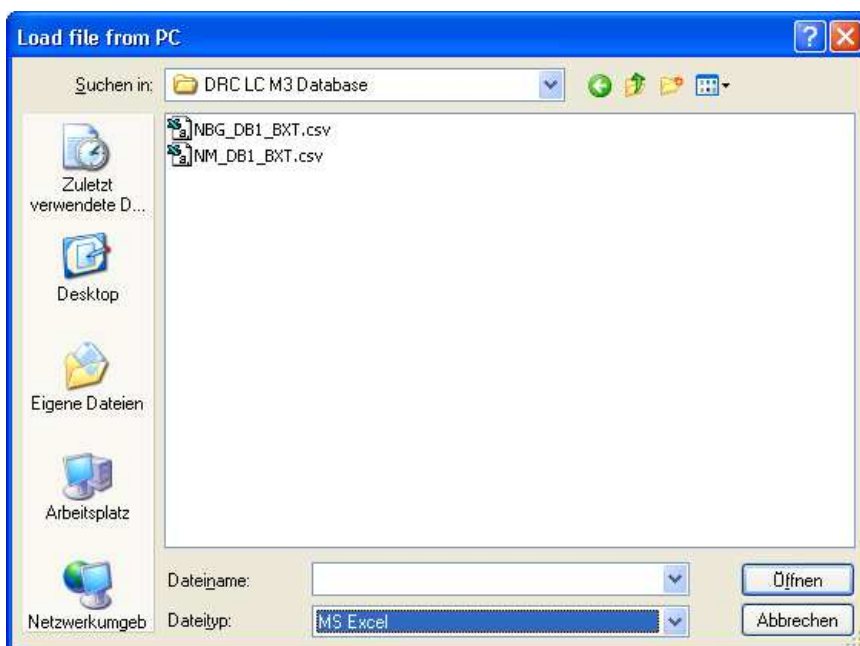
The following information is only uploaded from the database of the reader, if the date/time of the last test is more up-to-date than the data saved in the database of the PC:

- Part No./serial No.
- Status
- Date/time of last test
- Date of last successful test.

Before synchronising the reader, the relevant database must be loaded on the PC. Click the "Load database from PC" menu item to start loading a database.

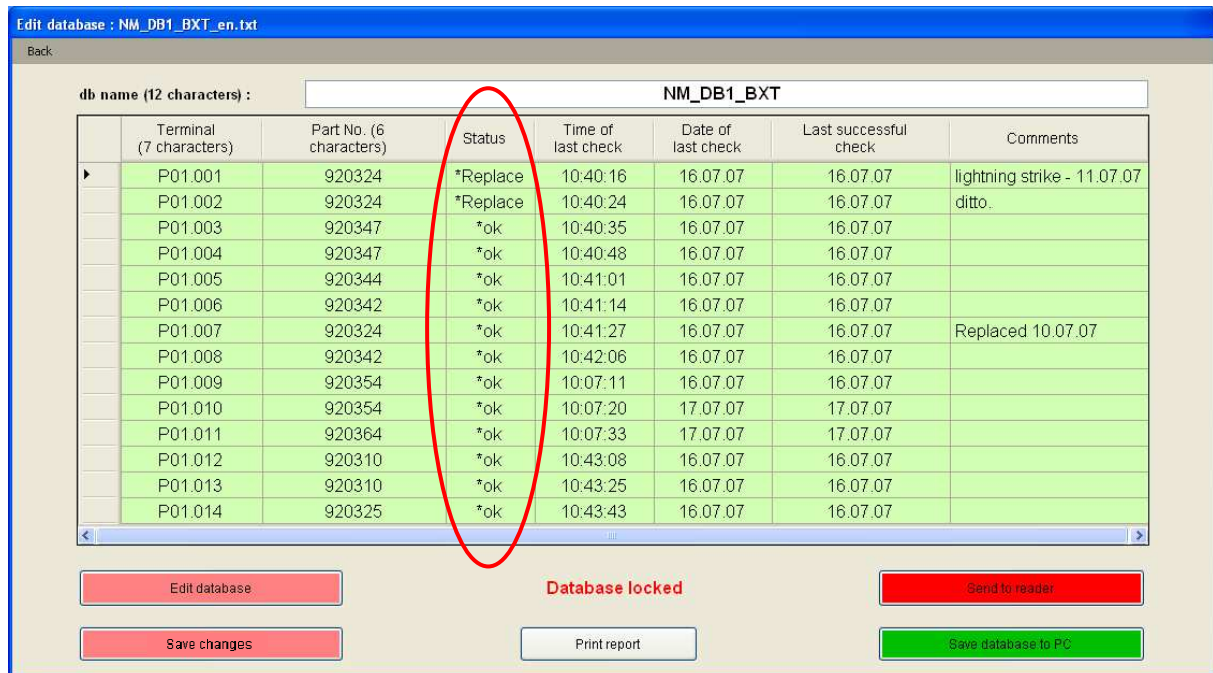


The Windows® standard dialog for loading a file opens.



Select the relevant database file (*.txt or .csv) to load it. While the database is loaded, all records are marked “not synchronised with the hand-held reader”.

“*” is displayed in the “Status” column.



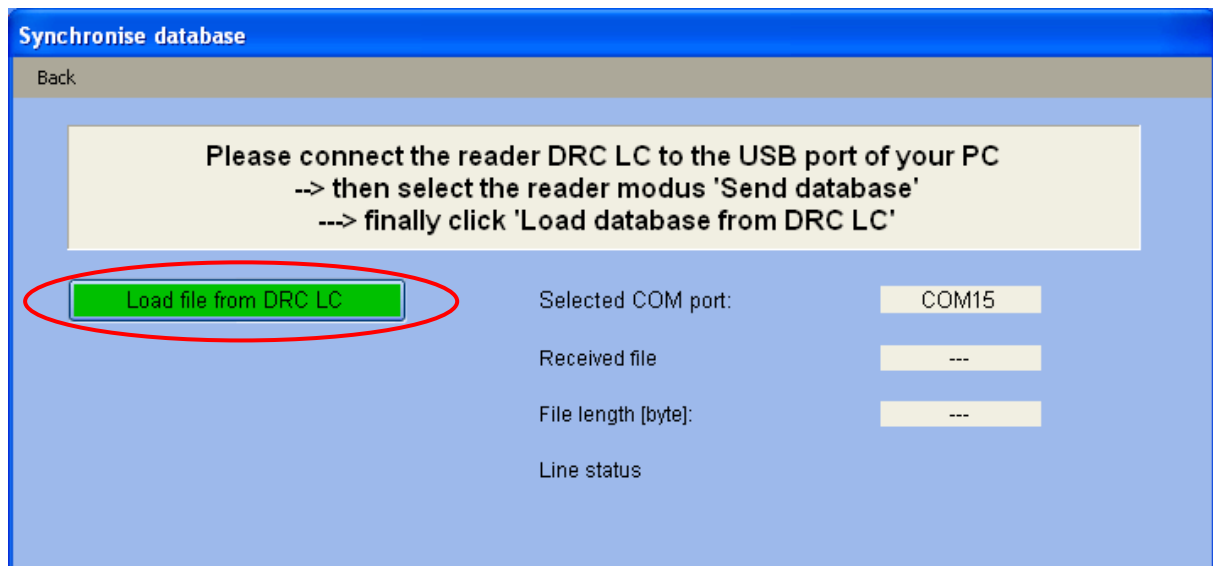
Click the “Synchronise database with DRC LC” item to start the upload.



The further procedure corresponds to that when downloading a database to the reader. The following provides a brief description on how to use the reader. Detailed information on the reader is given in 11.2.

When the "Synchronise database" window opens, check again whether the reader is connected properly and the correct COM port has been selected (see 8.1.2).

Select the "**M3->PC**" submenu item from the "**STANDARD LC: Database (DB) : DB : TRANSFER**" main menu item (see also 11.2). Then select the requested database number 1 to 4 by entering the relevant number and confirm with the "**OK**" key.



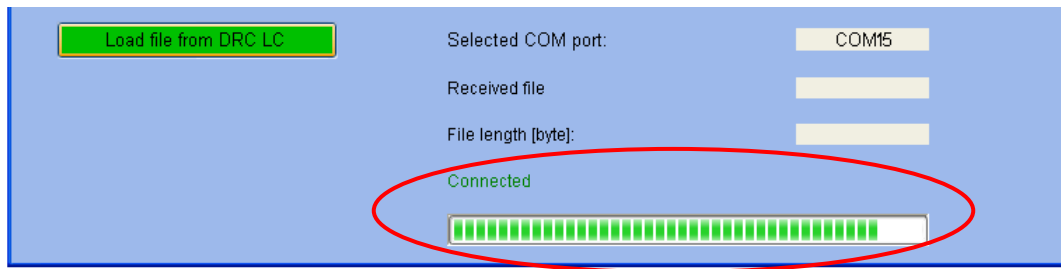
Now the reader waits for the connection to the PC and displays

**Wait for conn.
Please wait!**

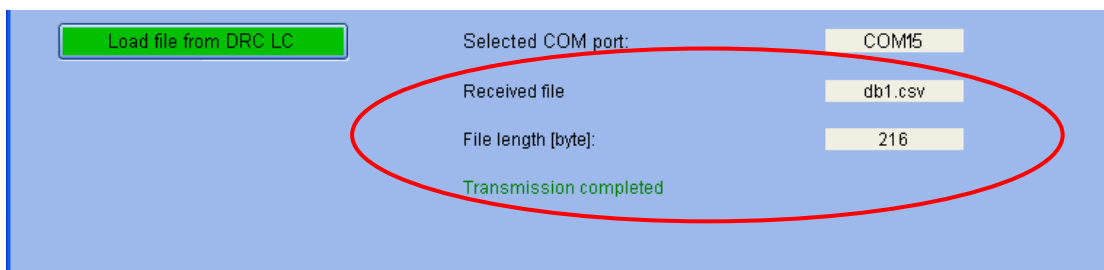
Click the "Load file from DRC LC" button on the PC. As soon as the connection is established, the connection status changes to "**Connected**" (green) and the reader displays

**Transfer data
Please wait!**

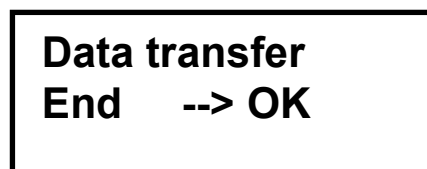
A progress bar indicates the progress of the data transfer.



If the data transfer was successful, the connection status changes to **“Transmission completed”** (green) after transfer. The database designation (db1 to db4) and the size of the transferred database are also displayed.



After successful transfer, the reader displays



Press the **"OK"** key to confirm.

Press the "Back" key to jump back to the main menu and select "Process database". The database is now synchronised with the reader and contains all current records with the results of the last test. "*" is still displayed in the "Status" column for records which have not been synchronised by the hand-held reader. For safety reasons, the database should now be immediately saved on the PC (see 9.2). Normally a test report is also prepared (see 9.6).

Edit database : NM_DB1_BXT_neu_en.txt

Back

db name (12 characters) : NM_DB1_BXT

	Terminal (7 characters)	Part No. (6 characters)	Status	Time of last check	Date of last check	Last successful check	Comments
▶	P01.001	920324	Replace	12:25:42	18.07.07	16.07.07	lightning strike - 11.07.07
	P01.002	920324	Replace	12:26:08	18.07.07	16.07.07	ditto.
	P01.003	920347	ok	12:27:13	18.07.07	18.07.07	
	P01.004	920347	ok	12:27:26	18.07.07	18.07.07	
	P01.005	920344	ok	12:27:38	18.07.07	18.07.07	
	P01.006	920342	ok	12:27:55	18.07.07	18.07.07	
	P01.007	920324	ok	12:28:23	18.07.07	18.07.07	Replaced 10.07.07
	P01.008	920342	ok	12:29:17	18.07.07	18.07.07	
	P01.009	920354	Unchecked	10:07:11	16.07.07	16.07.07	
	P01.010	920354	*ok	10:07:20	17.07.07	17.07.07	
	P01.011	920364	*ok	10:07:33	17.07.07	17.07.07	
	P01.012	920310	ok	12:29:44	18.07.07	18.07.07	
	P01.013	920310	ok	12:29:58	18.07.07	18.07.07	
	P01.014	920325	ok	12:30:11	18.07.07	18.07.07	

Edit database Database locked Send to reader

Save changes Print report Save database to PC

If no connection is established within approx. 1 minute, the following window opens to show the communication problem. You can either restart connection ("Yes" button) or cancel communication.

Communication problem

No connection possible

Connection error! Try again?

Yes Cancel

Load file from DRC LC

Selected COM port: COM15

Received file

File length [byte]:

No connection possible

In case of an error the reader displays

**Transfer error
Communication?**

Press the "OK" key to confirm.

9.6 Preparing a test report

To prepare a test report, click the “Print report” button in the “Edit database” window.

Edit database : NM_DB1_BXT_neu_en.txt

Back

db name (12 characters) : NM_DB1_BXT

	Terminal (7 characters)	Part No. (6 characters)	Status	Time of last check	Date of last check	Last successful check	Comments
▶	P01.001	920324	Replace	12:25:42	18.07.07	16.07.07	lightning strike - 11.07.07
	P01.002	920324	Replace	12:26:08	18.07.07	16.07.07	ditto.
	P01.003	920347	ok	12:27:13	18.07.07	18.07.07	
	P01.004	920347	ok	12:27:26	18.07.07	18.07.07	
	P01.005	920344	ok	12:27:38	18.07.07	18.07.07	
	P01.006	920342	ok	12:27:55	18.07.07	18.07.07	
	P01.007	920324	ok	12:28:23	18.07.07	18.07.07	Replaced 10.07.07
	P01.008	920342	ok	12:29:17	18.07.07	18.07.07	
	P01.009	920354	Unchecked	10:07:11	16.07.07	16.07.07	
	P01.010	920354	*ok	10:07:20	17.07.07	17.07.07	
	P01.011	920364	*ok	10:07:33	17.07.07	17.07.07	
	P01.012	920310	ok	12:29:44	18.07.07	18.07.07	
	P01.013	920310	ok	12:29:58	18.07.07	18.07.07	
	P01.014	920325	ok	12:30:11	18.07.07	18.07.07	

Edit database Database locked Send to reader

Save changes Print report Save database to PC

A title can be defined in the window that opens and the author of the test report can be entered. The file name is automatically entered in the title line. This title, however, can be overwritten or deleted.

Click the “Print report” button to start printing.

Print report

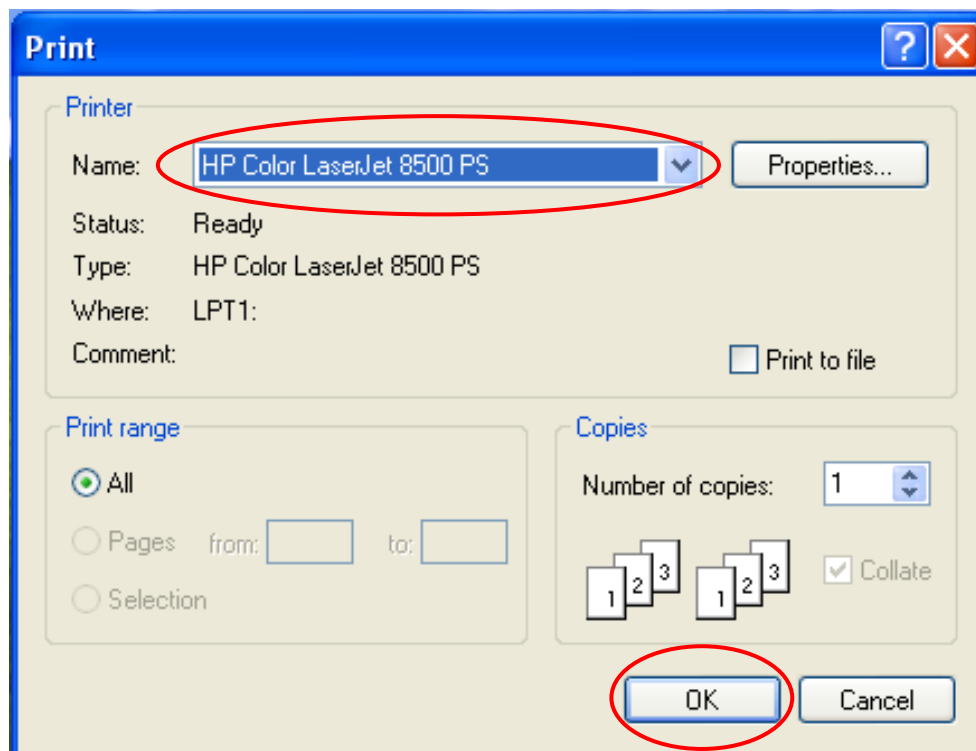
Back

Title: Station Neumarkt 1 - NM_DB1_BXT

Author: Master Blitzductor

Print report

The Windows® standard dialog for printing a file opens. Select an installed printer and click the “OK” button to print the test report.



The test report is printed in horizontal format. Apart from the records of the current database, it contains the following data:

- title line
- line showing author and current PC date
- page in "Page X / of Y" format

RFID test report

Station Neumarkt 1 - NM_DB1_BXT

Written by : Master Blitzduktor

Date : 16.08.2007 12:45:29

Terminal	Part No.	Status	Last check Time	Date	Last Successful Check	Comments
P01.001	920324	Replace	12:25:42	18.07.07	16.07.07	lightning strike - 11.07.07
P01.002	920324	Replace	12:26:08	18.07.07	16.07.07	ditto.
P01.003	920347	ok	12:27:13	18.07.07	18.07.07	
P01.004	920347	ok	12:27:26	18.07.07	18.07.07	
P01.005	920344	ok	12:27:38	18.07.07	18.07.07	
P01.006	920342	ok	12:27:55	18.07.07	18.07.07	
P01.007	920324	ok	12:28:23	18.07.07	18.07.07	Replaced 10.07.07
P01.008	920342	ok	12:29:17	18.07.07	18.07.07	
P01.009	920354	Unchecked	10.07.11	10.07.07	16.07.07	
P01.010	920354	-	-	-	-	
P01.011	920354	-	-	-	-	
P01.012	920310	ok	12:28:44	18.07.07	18.07.07	
P01.013	920310	ok	12:29:58	18.07.07	18.07.07	
P01.014	920325	ok	12:30:11	18.07.07	18.07.07	

Not synchronised

Note:

Only those records of the database which have been imported via the “Load database” menu item are printed. If the database has been extended or changed in the meantime, it must be saved and then loaded again to ensure that all records are displayed.

The test report only shows information on the “State”, “Time / Date of last test” and “Most recently successfully tested” columns if the records have been synchronised via the reader.

10 Testing by means of the reader

DRC LC M3+ features four different options to test surge protection modules with LifeCheck®. The procedure corresponds to that of the “**STANDARD LC**” menu item as described in 13.2.

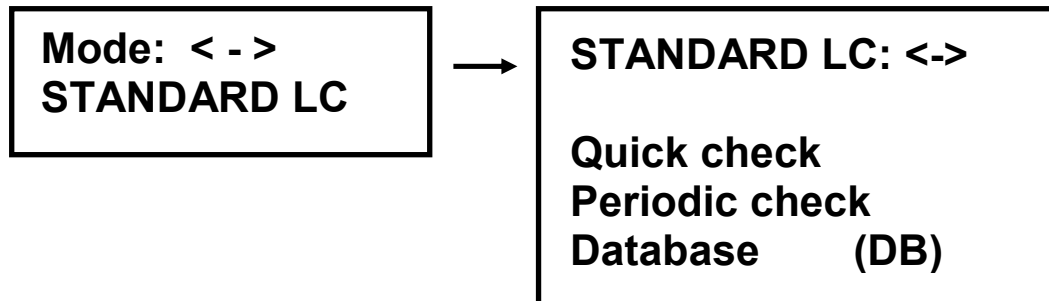


Fig. 2: Positioning the hand-held antenna

10.1 Quick testing

During this test, the data on the RFID transponder in the surge protection module are not changed. Only the last updated test date is displayed.

Attention: Blitzductors CT manufactured before 1st January 2007 must be pre-configured once by a periodic test (refer to section 10.4). Otherwise, the LifeCheck® module cannot be identified!

Quick testing should be performed as follows:

- switch on the device
- change to the "**STANDARD LC: Quick check**" menu (see 13.2)
- the reader prompts you to position the hand-held antenna

**Position
LC Sensor -> OK**

- Position the hand-held antenna above the module to be tested and make sure that the LifeCheck® symbol of the antenna and the protection module are in line with each other (see Fig. 2)
- Confirm with the "**OK**" key
- While testing

**--- Checking ---
Please wait!**

is displayed.

- On the following, the indication of test result is described.

10.2 Visual and acoustic indication of the test result

After **successful testing**, the following is displayed:

**19. 04. 07
.. LifeCheck OK ..**

Date of last update (periodic test)

Status of the surge protection module

In addition, **a beep** sounds.

In case of a **pre-damaged protection module** the display shows:

**---.---.---
.. Replace SPD ..**

In addition, **three beeps** sound.

The pre-damaged surge protection module must be replaced to ensure safe operation of the installation.

10.3 General test instructions

- Pre-damaged modules should always be removed and tested again to ensure that they are not influenced by the installation environment.
- High-energy electromagnetic fields with a frequency of about 125 kHz around the external antenna may impair DEHNrecord DRC LC M3+.
- If surge protection modules of type Blitzductor CT and Blitzductor XT with LifeCheck[®] are plugged in directly next to each other, reliable status indication cannot be ensured. **A minimum lateral distance of 18 mm between the different BXT and BCT modules must be maintained to ensure reliable detection.**

10.4 Periodic tests

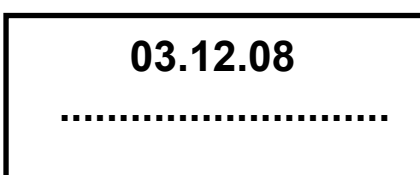
The date of the last update, which is saved on the RFID transponder in the surge protection module, is **displayed and** automatically **replaced by the current date**.

If there is no date saved on the surge protection module yet, the device is reconfigured once and the current date is saved on the RFID transponder integrated in the LifeCheck[®] module.

Benefits of periodic tests:

- reliable identification of already tested modules
- reliable determination of the last test cycle
- storage of the last test date on the protection module

For periodic testing, change to the “**STANDARD LC: Periodic checking**” menu (see 13.2.). The procedure corresponds to that of the quick testing procedure, however, the date of the last update is already displayed at the beginning of the test.



After that, it is replaced by the current date.

In case of an error between the reading (date of last update) and writing (current date) process (for example by removing or displacing the LifeCheck[®] sensor from the device to be tested)



is displayed.

Repeat the test. If errors occur again, remove the device and test it again.

10.5 Testing by means of a database

The most important innovation of the DEHNrecord DRC LC M3+ reader is that all Blitzductors of an installation can be tested and managed by means of a database.

Testing by means of a database differs from quick or periodic testing in the following points:

- the Blitzductor to be tested is already defined by the reader (guided)
- the Blitzductors are selected upon provision of the relevant terminal

The Blitzductors can be tested step by step from the beginning to the end of the complete database. Alternatively, only unchecked Blitzductors can be selected for testing. This is advisable if an aborted step-by-step test is to be continued.

Apart from that, the procedure for testing by means of a database corresponds to that of periodic testing (see 10.4). The last date of the update saved on the RFID transponder in the surge protection module is also automatically **replaced by the current date**.

The procedure corresponds to that of the “**Check SPD**” and “**Unchecked SPD**” items in the “**STANDARD LC: Database (DB)**” menu as described in 13.2

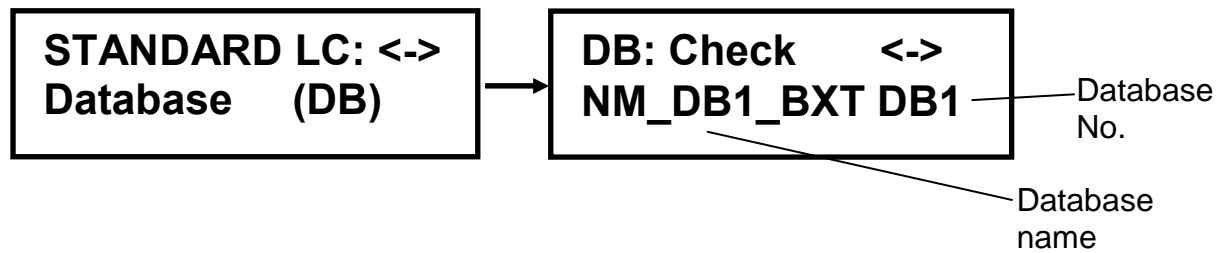
Every time the databases are used, they are checked for plausibility by means of an internal index. If a database error is detected, the test is aborted and the device displays

Database error !

In this case, delete the database on the reader and load it again from the PC. Before that, try to synchronise the device with the PC to transmit current test results.

10.5.1 Working through a database step by step

Select the “**DB: Check**” item from the “**STANDARD LC: Database (DB)Check**” main menu item on the reader and the requested database number 1 to 4 by entering the relevant number. After selecting the database number, the name of the database is displayed.



If no name is displayed, this database number contains no database and no test can be performed. If the "OK" key is pressed to start testing, the display shows:

**No SPD
in DBx**

After pressing the "OK" key, the first database entry is tested. The reader displays the terminal, Part No./serial No. and status of the last test of the Blitzductor to be tested.

P01.001 920360 — Part No. / serial No.
LifeCheck OK — Terminal
— Status of last test (ok – replace – unchecked)

Note:

After downloading a database, all Blitzductors are preset as "unchecked".

As with quick and periodic testing, position the hand-held antenna above the module to be tested. Make sure that the LifeCheck® symbol of the antenna and protection module are in line with each other (see Fig. 2).

Then press the "OK" key. At the beginning of the test,

**--- Checking ---
Please wait!** is displayed.

The date of the last update saved on the RFID transponder in the surge protection module is read out and compared to the current date. If both dates are identical (i.e. the module has already been tested successfully that day),

**19.04.2007
... Already tested ...** is displayed and the enquiry whether the test should be really carried out appears.

Overwrite?

This prevents that the same module is accidentally tested several times as a result of incorrect positioning of the hand-held antenna.

Press the "**OK**" key to carry out the test and the "**ESC**" key to skip the test of this database entry. In this case, the status of the Blitzductors and the date/time of the last test remain unchanged.

If the date of the module deviates from the current date, a function test is immediately started. This procedure corresponds to that of periodic testing. The date of the last update saved on the RFID transponder in the surge protection module is automatically **replaced by the current date**.

If no date is saved in the surge protection module yet, the device is reconfigured once and the current date is saved on the RFID transponder integrated in the LifeCheck® module.

Tip! : Page back to restart the test of the relevant module (see 10.5.2).

The test result is displayed as described in 10.2. Based on the result, the status, date/time of the last test as well as the date of the last successful test are also updated in the database.

After confirming the test result with the "**OK**" key, either

- the next database entry is shown for testing, if LifeCheck OK is displayed
- or the same database entry is automatically shown again, if replace SPD is displayed.

This procedure is repeated until the end of the database is reached.

When reaching the end of the database,

DB completed

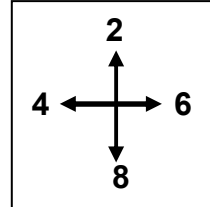
is displayed for a short time

and the display jumps back to the start of the "**DB: Check**" menu item.

10.5.2 Paging through a database

"Testing by means of a database" does not have to be performed step by step (entry after entry). If the terminal and Part No./serial No. are displayed at the beginning of a test, you can page forward and back by pressing one of the following "jump" keys:

- "4" key -> single step back
- "6" key -> single step forward
- "8" key -> 10 steps back
- "2" key -> 10 steps forward



Tip! : Press the "Single step back" key to test a module again.

You cannot quit the database by pressing the "jump" keys. When paging forward, the database always displays the last entry, when paging back, the database displays the first entry.

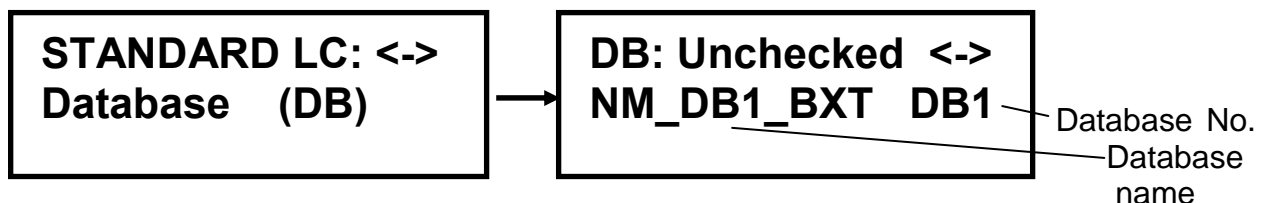
Press the "**ESC**" key to immediately abort testing and quit the database.

DB quit!

is displayed.

10.5.3 Testing all "unchecked" modules in a database

When selecting the "**DB:Unchecked**" submenu item from the "**STANDARD LC: Database (DB)**" main menu item



and selecting a database, only Blitzductors which have not been tested yet are displayed. Apart from that, the test procedure corresponds to that of testing by means of a database (see 10.5.1). However, this type of testing does not allow to page back and forward.

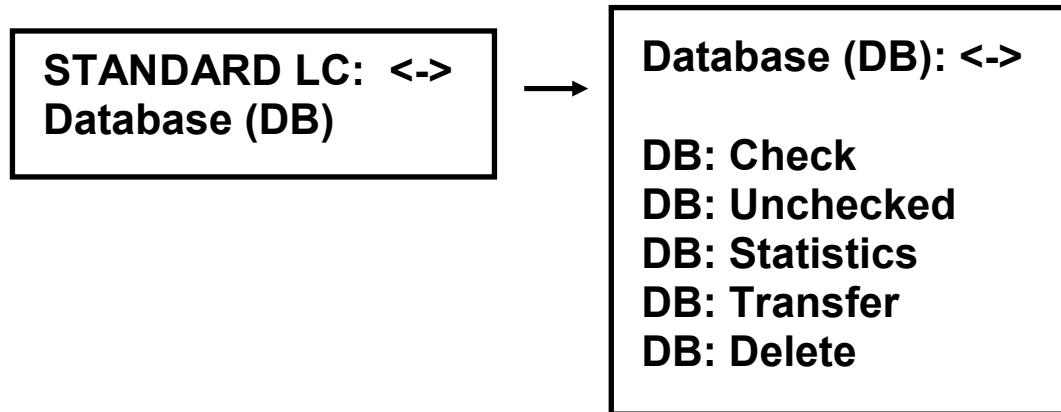
If all surge protection modules have already been tested,

**-> No unchecked
SPDs in DBx**

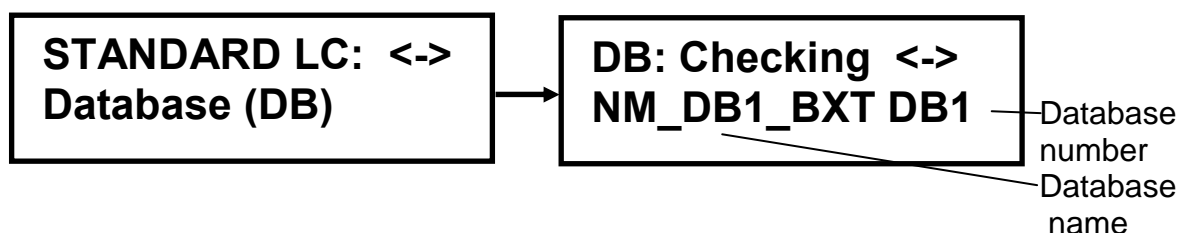
is displayed and the database is quitted.

11 Working with databases on the reader

The following describes how to work with databases on the reader. The procedure corresponds to that of the "STANDARD LC: Database (DB)" submenu described in 13.2.



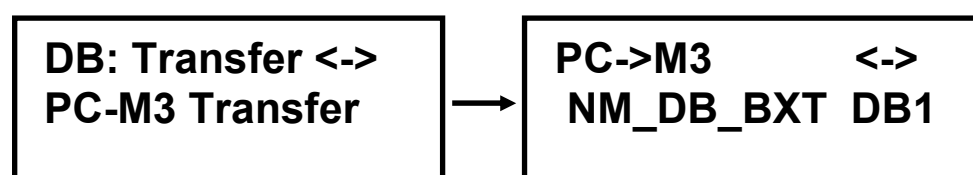
Up to 4 databases db1 to db4 can be saved on the reader at the same time. The database designation db1 to db4 correspond to the memory area where the database is saved. A databases saved in the reader is selected by entering the database number (1, 2, 3 or 4). To avoid confusion, the database name is displayed after entering the number (e. g. NM_DB1_BXT).



Every time before synchronising the databases with the PC (download and upload), check whether the reader is connected properly and the right COM port has been selected on the PC (see 8.1.2).

11.1 Loading a database from the PC (download)

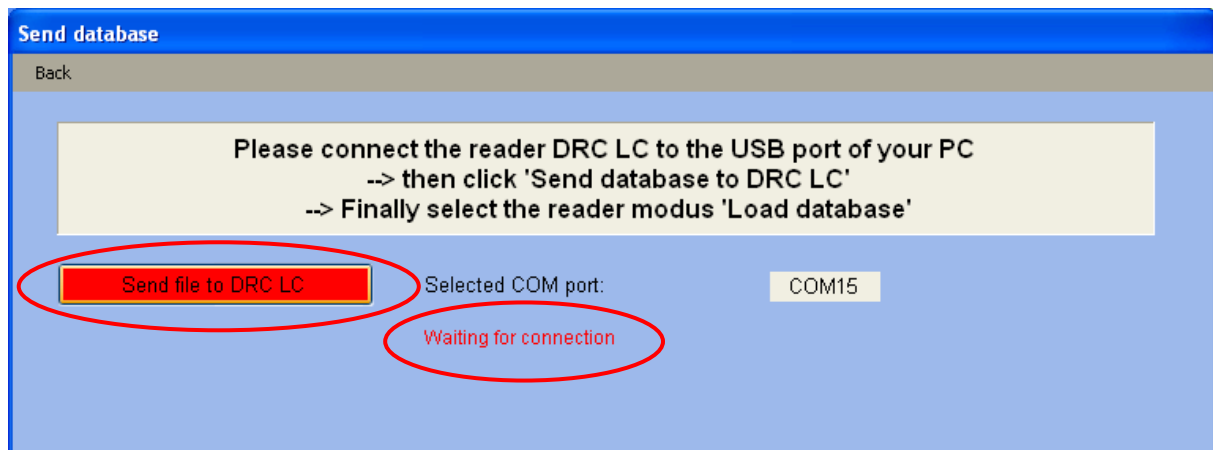
Select the "PC->M3" submenu item from the "STANDARD LC: Database (DB): DB: Transfer" main menu item of the reader and confirm with the "OK" key.



Select the requested database number 1 to 4 by entering the relevant character.

To be able to load a database, the relevant memory area must be unoccupied. If a database name is displayed after the database number has been selected, the memory is occupied. If the **"OK"** key is pressed, the database can be overwritten (see 11.1.1).

If the database number is not occupied, select the "Send file to DRC LC" button in the "Send database" window of your PC (see also 9.23). As soon as the connection status has changed to **"Waiting for connection"** (red), press the **"OK"** key on the reader to start the connection.



Now, the reader tries to establish a connection to the PC and displays

**Start connection
Please wait!**

If the connection is established, the PC displays the connection status **"Connected"** (green) and a progress bar indicates the progress of the data transfer. When data has been transferred successfully, the connection status changes to **"File transmitted"** (green) after transfer. The reader displays

**Data transfer
completed -> OK**

Confirm with the **"OK"** key.

The reader jumps back to the **"PC->M3"** menu item of the **"DB: Transfer"** submenu.

The database sent from the PC is now saved on the reader in the selected memory area.

If no connection can be established, the procedure is cancelled after approx. 1 minute.
The reader displays

**Transfer error
Communication?**

Confirm with the **"OK"** key.

11.1.1 Overwriting a database

If a new database is downloaded from the PC to an occupied database number by pressing the **"OK"** key, the display shows

**Database
allocated !**

**Really
overwrite DBx?**

If you do not want to overwrite the existing database, press the **"ESC"** key. Press the **"OK"** key to delete the database. The display shows

**Deleting
database**

**Database
deleted**

The download of a new database from your PC must be confirmed.

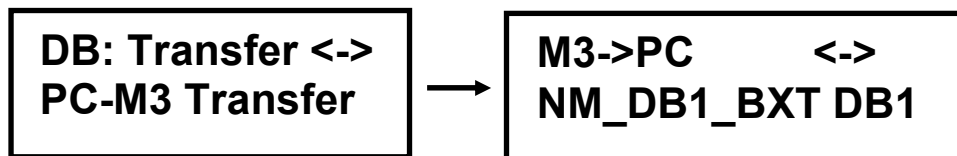
**Transfer PC->M3
Start → OK**

Confirm with the **"OK"** key to start download (see 11.1).

11.2 Synchronising a database with the PC (upload)

When synchronising a database with the PC, the complete database is transferred from the reader to the PC. After that, the PC database is synchronised. The reader is not involved in this process.

Select the “**M3->PC**” submenu item from the “**STANDARD LC: Database (DB): DB: Transfer**” menu item and then the requested database 1 to 4 by entering the relevant number. Confirm with the “**OK**” key.



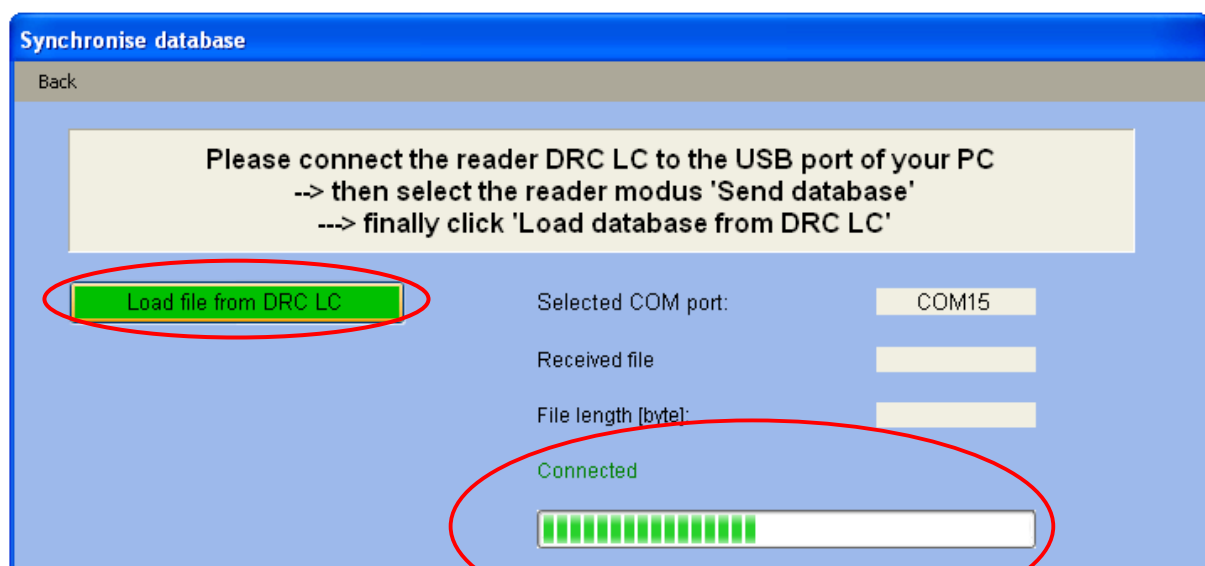
Now the reader waits for a connection with the PC and displays

**Wait for conn.
Please wait !**

Click the “Load file from DRC LC” button in the “Synchronise database” window on the PC (see also 9.5). As soon as the connection is established, the connection status changes to “**Connected**” (green) and the reader displays

**Transfer data
Please wait !**

A progress bar indicates the progress of the data transfer.



When the data has been transferred successfully, the connection status changes to **“Transmission completed”** (green) after transfer. The name (db1 -> db4) and the size of the database transferred are also displayed.

**Data transfer
completed -> OK**

Confirm with the **"OK"** key.

The reader jumps back to the **“PC->M3”** menu item of the **“DB: Transfer”** submenu.

The procedure is cancelled, if no connection is established within approx. 1 minute.
The reader displays

**Transfer error
Communication ?**

Confirm with the **"OK"** key.

11.3 Deleting a database

Select the **“STANDARD LC: Database (DB): DB: Delete”** menu item to delete a database. First select the database to be deleted by entering the relevant number (1, 2, 3 or 4). After entering the number, the database name is displayed.

**STANDARD LC: <->
Database (DB)**



**DB: Delete <->
NM_DB1_BXT DB1**

This procedure can be repeated for all databases at any time. The actual deleting procedure is only started by pressing the **“OK”** key. To prevent accidental deletion of a database, press the **“OK”** key again after

**Really delete
DB1 ?**

has been displayed.

If you do not want to overwrite the existing database, press the "**ESC**" key. Pressing the "**OK**" key deletes the database and the display shows

**Deleting
database**

**Database
deleted**

Then the device jumps back to the "**DB: Delete**" menu item of the "**STANDARD LC: Database (DB)**" submenu.

11.4 Statistical functions for a database

Select the "**STANDARD LC: Database (DB): DB: Statistics**" menu item for the statistics of a database. First, select the database (as described before) by entering the relevant number (1, 2, 3 or 4).

**STANDARD LC: <->
Database (DB)**



**DB:Statistics <->
NM_DB1_BXT DB1**

Press the "**OK**" key again. The LCD display shows

**tot-chd-fty-ok
009 007 001 006**

The abbreviations in the first line stand for:

tot = Total number of database entries (number of surge protection modules)

chd = Already tested surge protection modules

fty = Faulty surge protection modules which have to be replaced

ok = Faultless surge protection modules

The second line shows the associated number.

After confirming with "**OK**", the reader jumps back to the "**DB: Statistics**" menu item of the "**STANDARD LC: Database (DB)**" submenu.

12 DRC MCM

12.1 Stationary DRC MCM XT monitoring device

DEHNrecord DRC MCM XT /1/ is a compact monitoring device with integrated RFID technology (LifeCheck®), supplied in an XT enclosure for stationary testing of surge protection modules (Blitzductors).

Up to 10 surge protection modules can be assigned to a DRC MCM XT monitoring device. The DEHNrecord DRC MCM XT monitoring device permanently checks the proper function of this “group” of protection modules without contact. The test result is indicated by an integrated LED and by remote signalling via a changeover contact. Both the LED indicator and remote signalling contact only indicate a total information on the status of all protection modules assigned to the monitoring device (“All protection modules ok” / “Protection modules must be replaced”).

DEHNrecord DRC LC M3+ is used to identify which protection modules must be replaced.

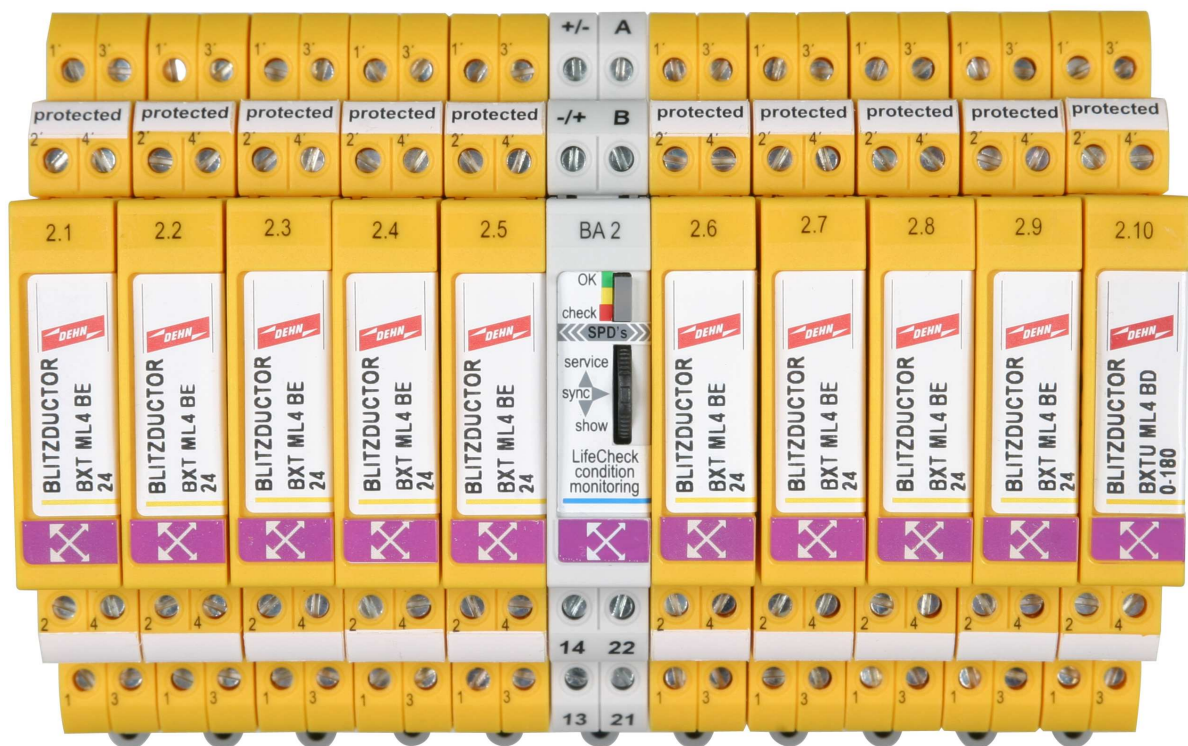


Fig. 3: Stationary DRC MCM XT monitoring device

When delivered, Blitzductors XT and CT cannot be used in conjunction with the DRC MCM XT monitoring device. The Blitzductors must be assigned to the relevant monitoring device by programming the RFID transponders integrated in the Blitzductor. When programming the transponders, a distinctive password containing the bus address of the assigned DRC MCM monitoring device and the consecutive number of the relevant Blitzductor is generated for each transponder which is saved in

the transponder. During operation, the transponder only responds to enquiries containing this password.

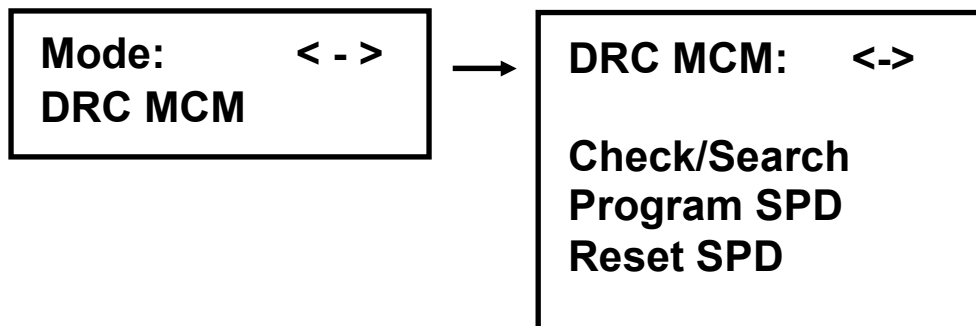
The functions of the DEHNrecord DRC LC M3+ reader were extended so that also Blitzductors XT and CT, which are used in conjunction with the stationary DRC MCM XT monitoring device (see /1/), can be

- **programmed** and
- **tested**.

The following chapters give detailed information on the functions of all submenu items of the new "DRC MCM" main menu item.

12.2 Working with the reader in the DRC MCM mode

The "**DRC MCM**" menu item was added to the "**Mode:**" main menu of the reader (see 13.1). This menu item contains all functions required for programming and testing the Blitzductors CT and XT used in conjunction with the stationary DRC MCM XT monitoring device. The procedure corresponds to that of the "**DRC MCM**" submenu as specified in 13.3.



12.2.1 Configuration

The stationary DRC MCM XT monitoring device (see /1/) must be configured for a specific application. For this purpose, the bus address (also referred to as group No.) as well as the number of Blitzductors to be monitored must be set on the device by means of a DIP switch. The Blitzductors are assigned to the relevant monitoring device by programming the RFID transponders integrated in the Blitzductors. When programming the transponders, a distinctive password containing the bus address of the assigned DRC MCM monitoring device and the consecutive number of the relevant Blitzductor is generated for each transponder which is saved in the transponder. During operation, the transponder only responds to enquiries containing this password.

For testing Blitzductors in the "**Mode:DRC MCM: Check/Search**" menu item, these data must be saved on the reader.

DRC MCM: <->
Check/Search

Select the "**Check/Search**" submenu and press the "**OK**" key. The following is displayed:

Configuration
Addr=xx SPDs=xx

Now enter the bus address (**Addr=**) of the assigned monitoring device and the number of assigned Blitzductors (**SPDs=**). Only bus addresses between 01 and 15 and numbers between 01 and 10 are permissible. Make sure that the SPDs are numbered consecutively.

When entered, the values are already checked. Impermissible values will not be accepted ("x" presetting remains). With the "**SCROLL LEFT/RIGHT**" keys you can jump between the bus address entry and the number of SPDs. Press the "**OK**" key to save the entered values which are checked again. Impermissible values will be detected and

Invalid value

is displayed.

Note:

When selecting the "**Configuration**" menu item, the currently entered values are displayed. If you do not want to change these values, confirm with the "**OK**" key (corresponds to reading out the values). Moreover, the status of all Blitzductors assigned to the relevant monitoring device is reset to "Unchecked SPD" (-) at each request (see 12.2.4).

When the configuration has been entered successfully, select one of the "**Check SPD**", "**Search SPD**" or "**MCM Status**" submenu items (???????) and press the "**OK**" key.

???????? <->
ADDR=xx xx*SPD

12.2.2 Testing an SPD

Enter the assigned SPD number ("as programmed") to test Blitzductors for correct operation.

Check SPD <->
ADR=xx xx*SPD

After selecting the "**Check SPD**" submenu item and pressing the "**OK**" key, select the consecutive number of the Blitzductor. For this purpose, the display shows the entered bus address (see Configuration 12.2.1) and the consecutive SPD number.

ADR = xx SPD = 01
Check SPD -->OK

The consecutive SPD number is preset with 01 when selecting the above function. It can be changed with the help of the "BACK" ← (4) and "Forward" → (6) keys. Press the "**OK**" key to start the test (for positioning the sensor, please refer to 10.1).

- - - Checking - - -
Please wait !

Depending on the test result,

LifeCheck OK
ADR= xx SPD =xx

or

Replace SPD
ADR = xx SPD = xx

is displayed.

Press the "OK" key. Depending on the test result, testing can be continued with the next consecutive SPD number (LifeCheck OK) or repeated with the same consecutive SPD number (Replace SPD). Press the "ESC" key to abort testing. After having successfully tested the last consecutive SPD number, the test is automatically finished and

**All SPDs
checked**

is displayed.

12.2.3 Searching an SPD

If neither the consecutive SPD number nor the current status of a Blitzductor is known, both data can be determined by means of the "Search SPD" submenu item.

Search SPD
ADR=xx SPD=01-yy

Press the "OK" key to start searching.

ADR=xx SPD=01-yy
Please wait !

is displayed.

The search starts with the consecutive SPD No. 01 and ends as soon as a Blitzductor was found, at the latest, however, as soon as all configured Blitzductors (yy) (see 12.2.1) were tested (SPD=01-yy).

Depending on the test result, the display shows either the consecutive number of the Blitzductor (??) found,

**ADR = xx SPD = ??
LifeCheck OK**

or, if no Blitzductor was found,

**ADR=xx SPD=01-yy
Replace SPD**

is displayed.

Press the "OK" key to confirm the test result.

Note:

Every new search begins with the consecutive SPD number 01 again. When searching a protection module, no other protection module may be located in close proximity to the LifeCheck® sensor to ensure clear identification of the protection modules.

12.2.4 MCM status

This submenu shows the current status of all Blitzductors within the configured group.

**MCM Status <->
ADR=xx xx*SPD**

Press the "OK" key.

**MCM ADR = xx
1 0 1 1 1 1 1 - - -**

is displayed.

According to the number of the assigned SPDs (see 12.2.1), a sign (- or 0 or 1) for the current status is shown for each Blitzductor. The Blitzductors are numbered consecutively from left to right, i.e. the first sign on the left stands for the consecutive SPD number 01 and the last sign on the right stands for the maximum SPD number assigned (max. 10). The current status of the relevant SPD is displayed as follows:

1	=	SPD OK
0	=	Replace SPD
-	=	Unchecked SPD

Press the "**OK**" key to quit this submenu item.

Note:

Select the "**Configuration**" menu item (see 12.2.1) to reset the status of all assigned Blitzductors to "Unchecked SPD" (-).

12.2.5 Programming an SPD

When delivered, Blitzductors XT and CT cannot be used in conjunction with the DRC MCM XT monitoring device. The Blitzductors must be assigned to the relevant monitoring device by programming the RFID transponders integrated in the Blitzductor. When programming the transponders, a distinctive password containing the bus address of the assigned DRC MCM monitoring device and the consecutive number of the relevant Blitzductor is generated for each transponder which is saved in the transponder. During operation, the transponder only responds to enquiries containing this password.

The Blitzductors can be programmed in the "**DRC MCM: Program SPD**" submenu item.

DRC MCM: <->

Program SPD

Select this submenu item and press the "**OK**" key. Enter the bus address of the DRC MCM monitoring device and the consecutive number of the Blitzductor. For this purpose, the display shows the bus address and the consecutive SPD number.

ADR=xx SPD=xx

Program SPD-->OK

Now enter the bus address (**ADR=**) of the assigned monitoring device and the consecutive number of the Blitzductor to be programmed (**SPD=**). Only bus addresses between 01 and 15 and numbers between 01 and 10 are permissible.

When entered, the values are already checked. Impermissible values are not accepted ("x" presetting remains). With the "**SCROLL LEFT/RIGHT**" keys you can jump between the bus address entry and the number of SPDs. Press the "**OK**" key to save the entered values which are checked again. Impermissible values will be detected and



Invalid value

is displayed.

Press the "**OK**" key to start programming and testing (for positioning the sensor, please refer to 10.1).



**-Programming-
Please wait !**

Depending on the test result, the display shows either



**LifeCheck OK
ADR=xx SPD=yy**

or



**Replace SPD
ADR=xx SPD=yy**

Press the "**OK**" key. Depending on the test result, programming can be continued with the next consecutive SPD number (LifeCheck OK) or repeated with the same consecutive SPD number (Replace SPD). If required, another Blitzductor can be programmed by reentering the bus address and SPD number. Press the "**ESC**" key to quit the menu item.

Attention:

When programming a protection module, no other unprogrammed protection module may be located in close proximity to the LifeCheck® sensor to prevent that it is also programmed.

12.2.6 Resetting an SPD

In the "**DRC MCM: Reset SPD**" submenu item Blitzductors that are already assigned to a DRC MCM XT monitoring device can be reset to their delivery status (reprogramming).

**DRC MCM: <->
Reset SPD**

Select the "**Reset SPD**" submenu item and press the "**OK**" key. Then select the set bus address and the consecutive number of the Blitzductor (see 12.2.5. Programming an SPD).

**ADR=xx SPD=xx
SPD reset -->OK**

Press the "**OK**" key to start reprogramming Blitzductors to their delivery status and testing (for positioning the sensor, see 10.1).

**-- Reset --
Please wait !**

Depending on the result of the test following the reprogramming procedure, the display either shows

**LifeCheck OK
ADR=xx SPD=yy**

or

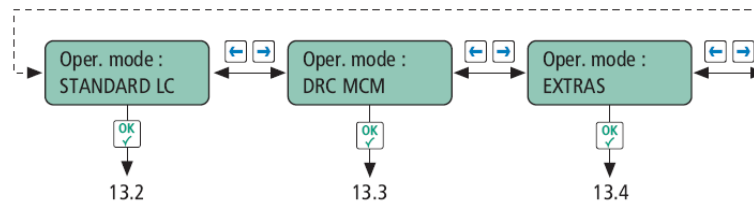
**Replace SPD
ADR=xx SPD=yy**

Press the "**OK**" key. Depending on the test result, reprogramming can be continued with the next consecutive SPD number (LifeCheck OK) or repeated with the same consecutive SPD number (Replace SPD). If required, another Blitzductor can be reprogrammed by reentering the bus address and SPD number. Press the "**ESC**" key to quit the menu item.

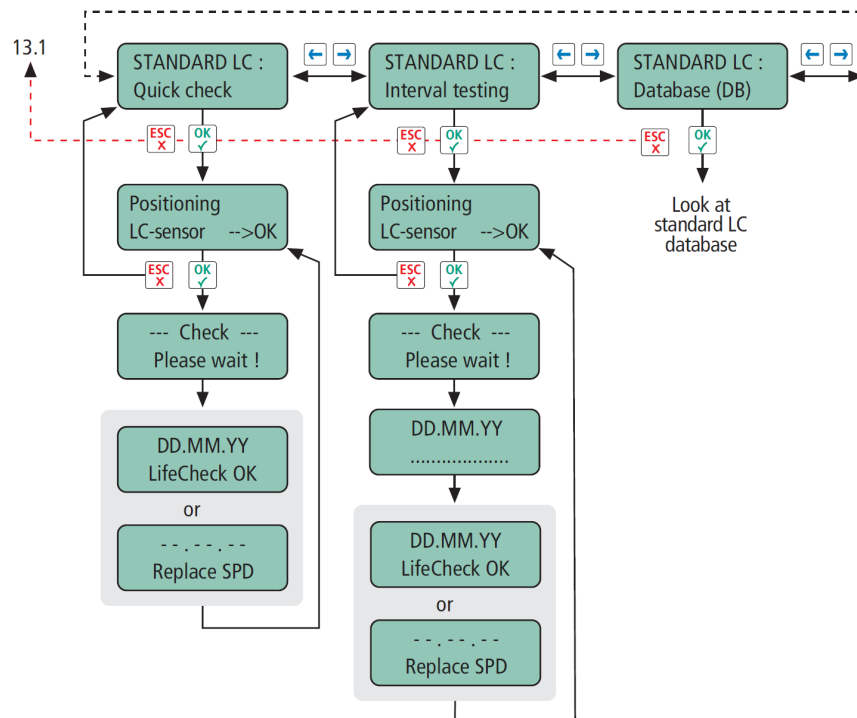
13 Menu structure of the reader

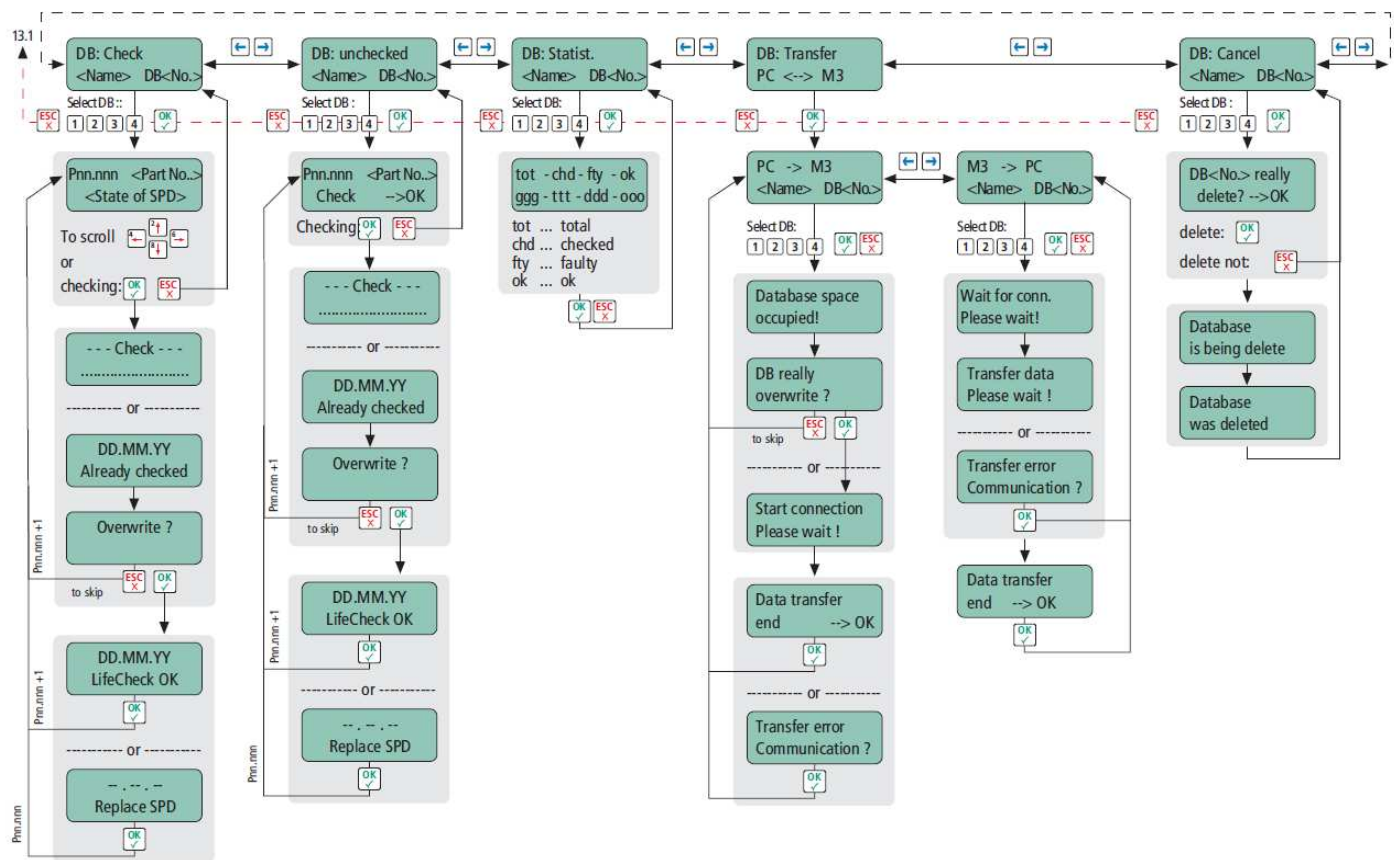
DEHNrecord DRC LC M3+ features the following menu structures:

13.1 Operating modes in the main menu

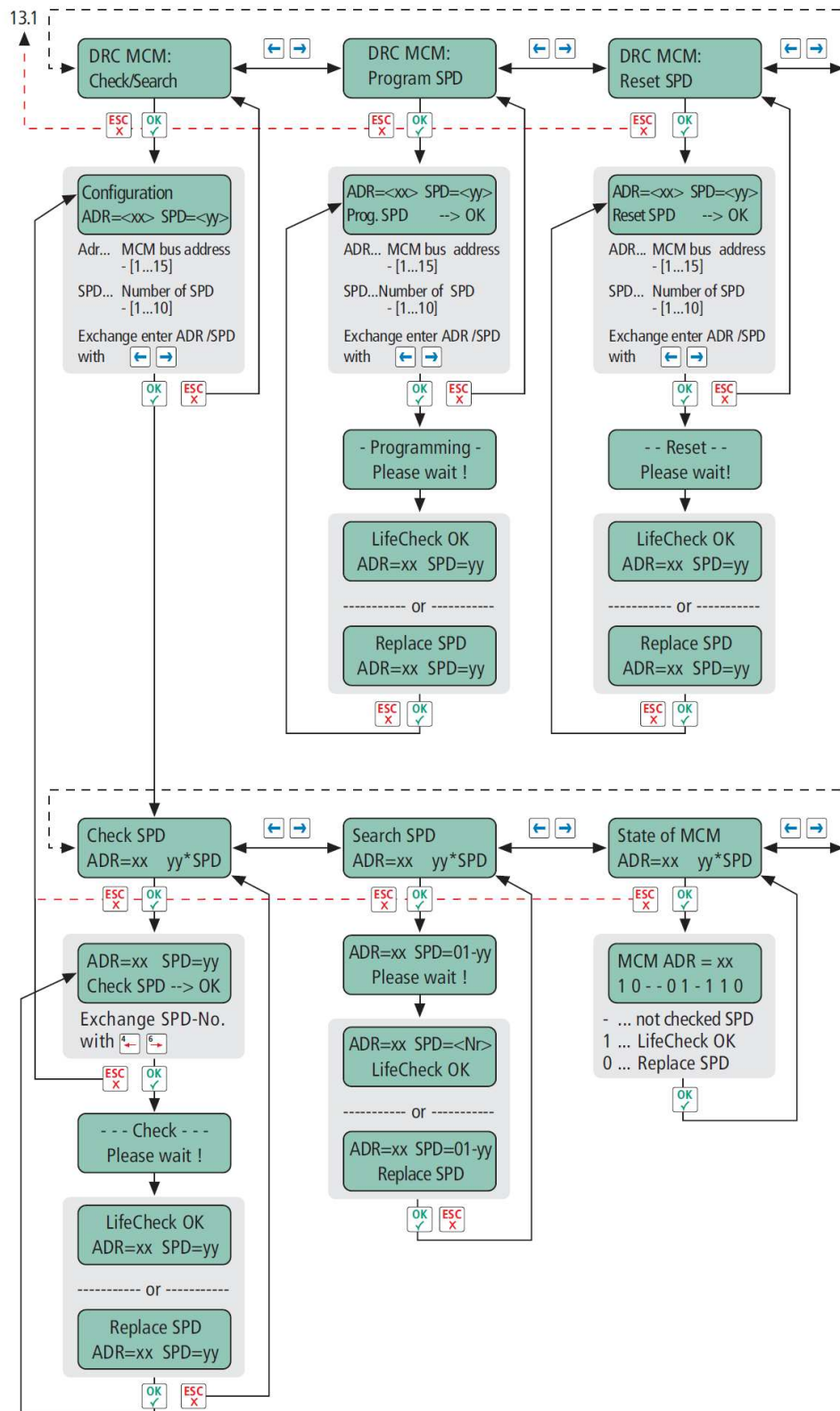


13.2 Standard LC submenu

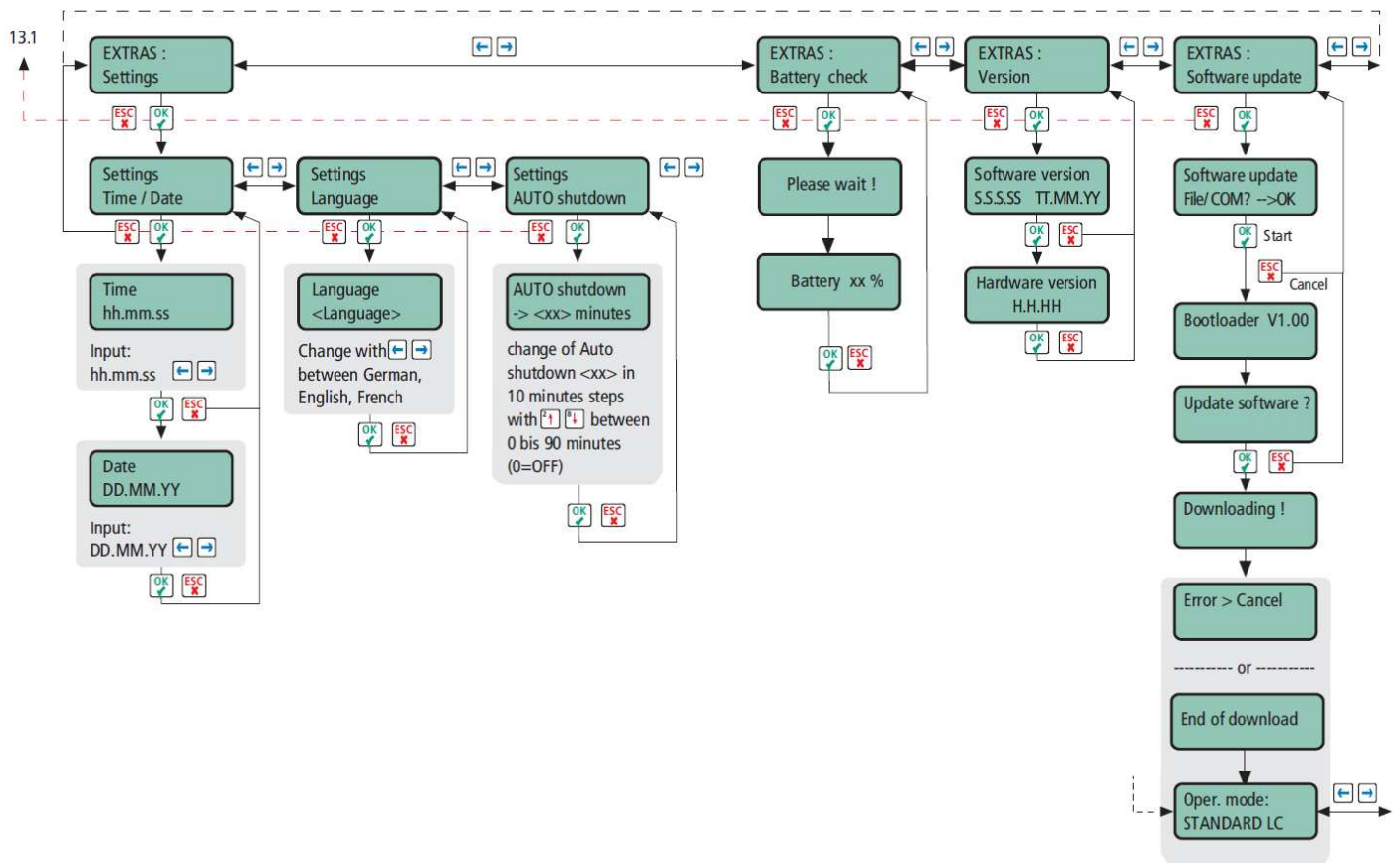




13.3 DRC MCM submenu



13.4 EXTRAS submenu



14 Technical data of DEHNrecord DRC LC M3+

Technical data	DRC LC M3+
Type	DRC LC M3+ Part No.: 910 653
Field of application	Monitoring of surge protection modules of type <ul style="list-style-type: none"> - BCT MLC - BXT ML
Testing	by means of LifeCheck® technology
RFID transmission frequency	125 kHz
Testing period: Quick testing: Periodic testing:	~ 5 s ~ 15 s
Measured value indication	<ul style="list-style-type: none"> - Display, 2x16 characters - Beep
Operation	Keypad
Indication of battery status	Display
Charge battery Charging cable	<ul style="list-style-type: none"> - via 230 V USB power supply unit (included in delivery) or - via female USB connector (type A) on the PC USB cable with type A plug on Mini-B; 1.8 m long
Charging current Charging voltage Charging duration (average)	max. 500 mA 4.75 – 5.25 V d.c. 3 h
Dimensions of the reader	92 x 166 x 30 mm
Weight of the reader	0.24 kg
Operating temperature range	-20 ... + 65 °C
Standards: - Safety (electrical equipment) - EMC - Immunity (industrial environments) - Emissions (industrial environments)	EN 61010–1 EN 61000–6–2 EN 61000–6–4

Technical data	LifeCheck® Sensor
Sensor	LCS DRC BXT (included in delivery) Part No.: 910 652
Field of application	For Blitzductor XT; BXT ML
Sensor	LCS DRC BCT (not included in delivery) Part No.: 910 654
Field of application	For Blitzductor CT; BCT MLC
Cable length	approx. 1 m
RFID nominal frequency	125 kHz
Connection of the sensor with DRC LC M2	via RJ 12 plug on the upper side of the reader
Dimensions	90 x 51 x 12 mm
Weight of the sensor	0.05 kg
Operating temperature	-20 ... + 65 °C

15 DEHNrecord DRC software update

15.1 Application

The **DEHNrecord DRC software update** is a PC application program for downloading new software versions on the

- DEHNrecord DRC LC M3/M3+ hand-held reader and the
- stationary DEHNrecord DRC MCM XT monitoring device.

It is saved in the non-volatile FLASH storage system.

15.2 Software

The software update is supplied with the DRC LC M3+ as PC application software. The latest version of the software update can be also be downloaded from www.dehn.de/download/.

15.3 Installation

The installation of the DEHNrecord DRC software update is described below.

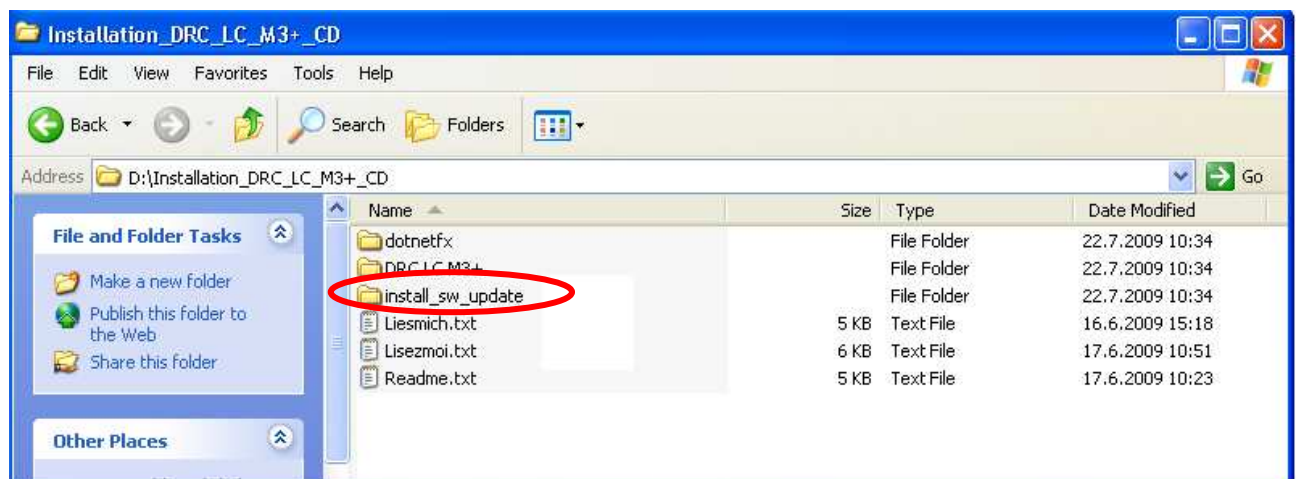
15.3.1 System requirements

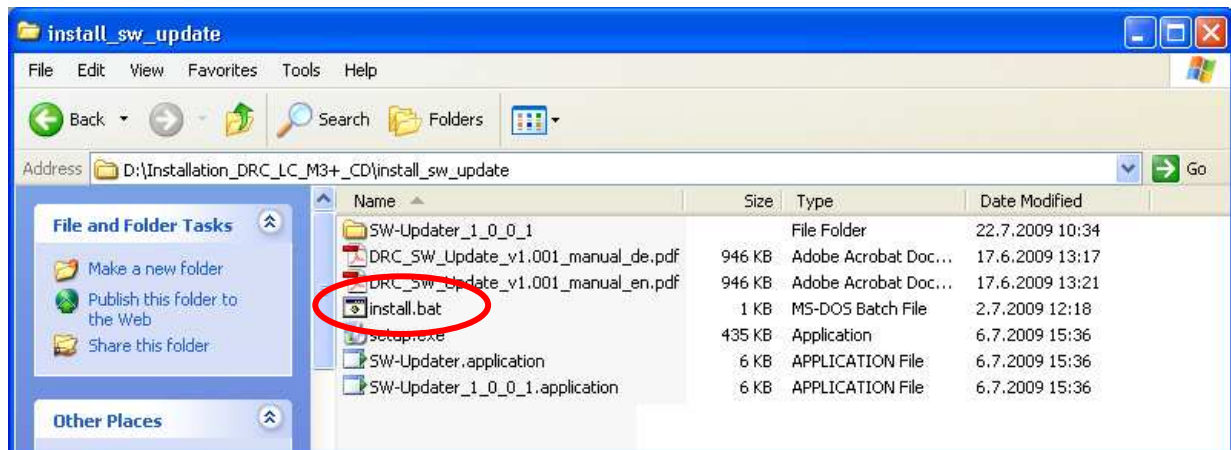
To install the **"DEHNrecord DRC software update"** software package, the **"DEHNrecord user interface"** software package must have been installed successfully (see chapter 4.2.3).

Install the software package only when required (new software version is available and required).

15.3.2 Installation procedure

Insert the CD included in delivery into the CD drive of your PC to install the software package. After opening the CD drive in the Windows® Explorer, double-click the **install_sw_update** directory to open it. If you double-click the **"install.bat"** file, installation is started.



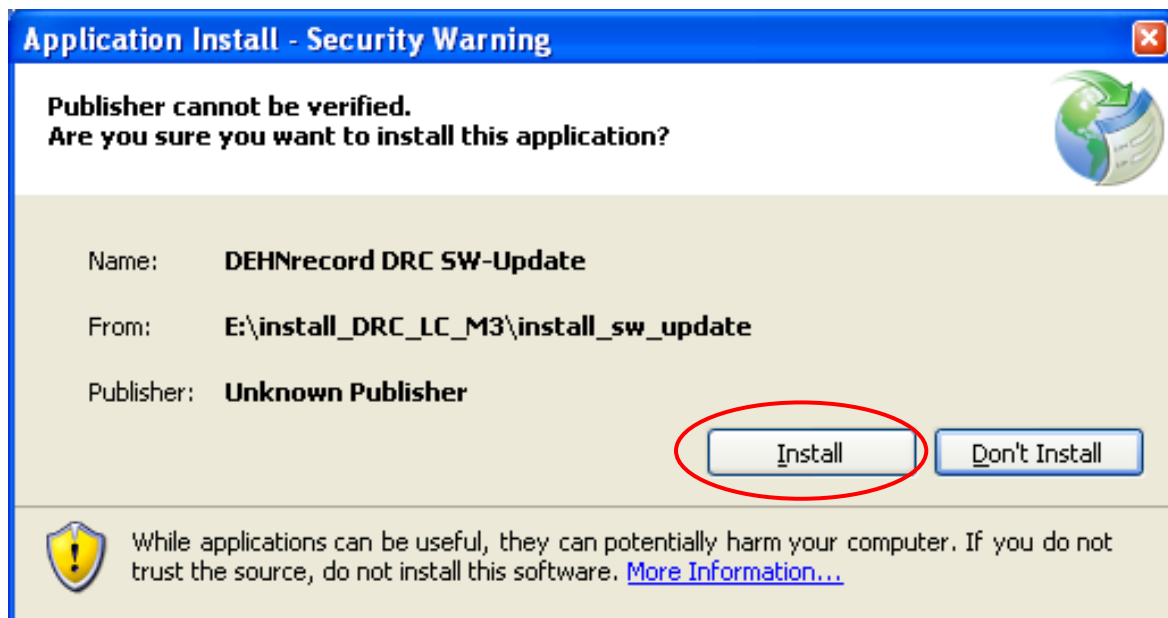


During the installation process, the **DEHNrecord DRC software update** operating manual (this document) is copied in the home directory of the respective user before the **DEHNrecord DRC software update** program package is installed.

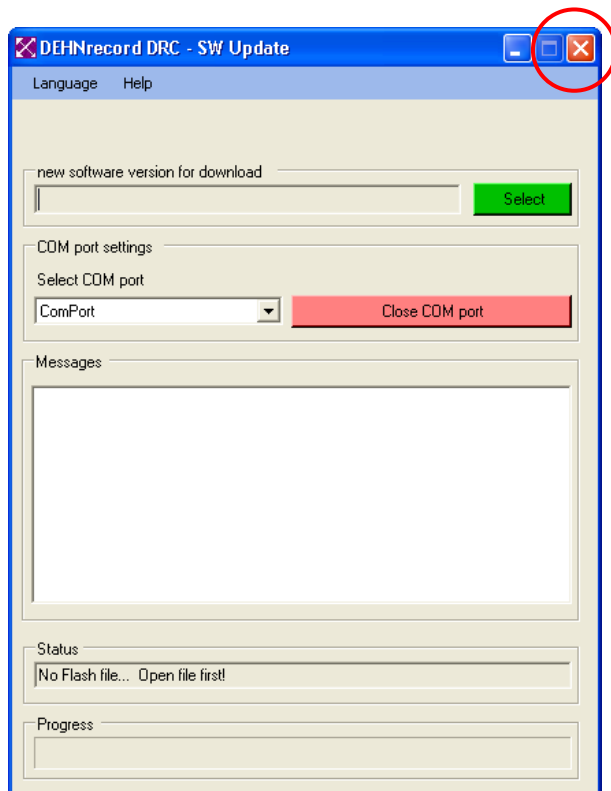
Before installing the software update, the **.NET-RunTime** environment is checked for correct installation. If necessary, incomplete or faulty installations are corrected.

Note: For this purpose, Internet access is required.

If the **.NET-RunTime** environment is installed correctly, the **DEHNrecord DRC software update** program is installed. When the Security warning window appears, click the "Install" button to continue installation.



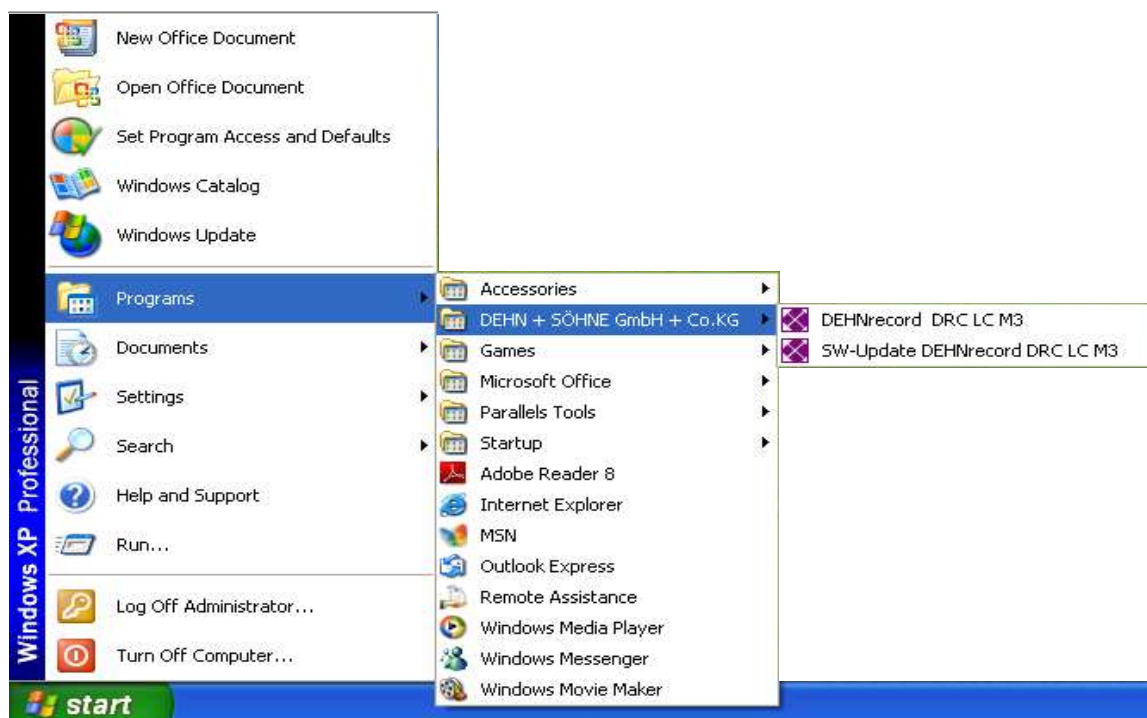
The application is installed and automatically started.



Click the "Close" symbol to close the application.

15.3.3 Checking the installation procedure

If the **DEHNrecord DRC software update** has been installed correctly, a new item for the software update has been created in the Windows® Start menu under Programs "DEHN + SÖHNE GmbH + Co.KG."



15.4 Software update of the reader

When using the hand-held DEHNrecord DRC LC M3+ reader, observe the warnings described in 5.1.

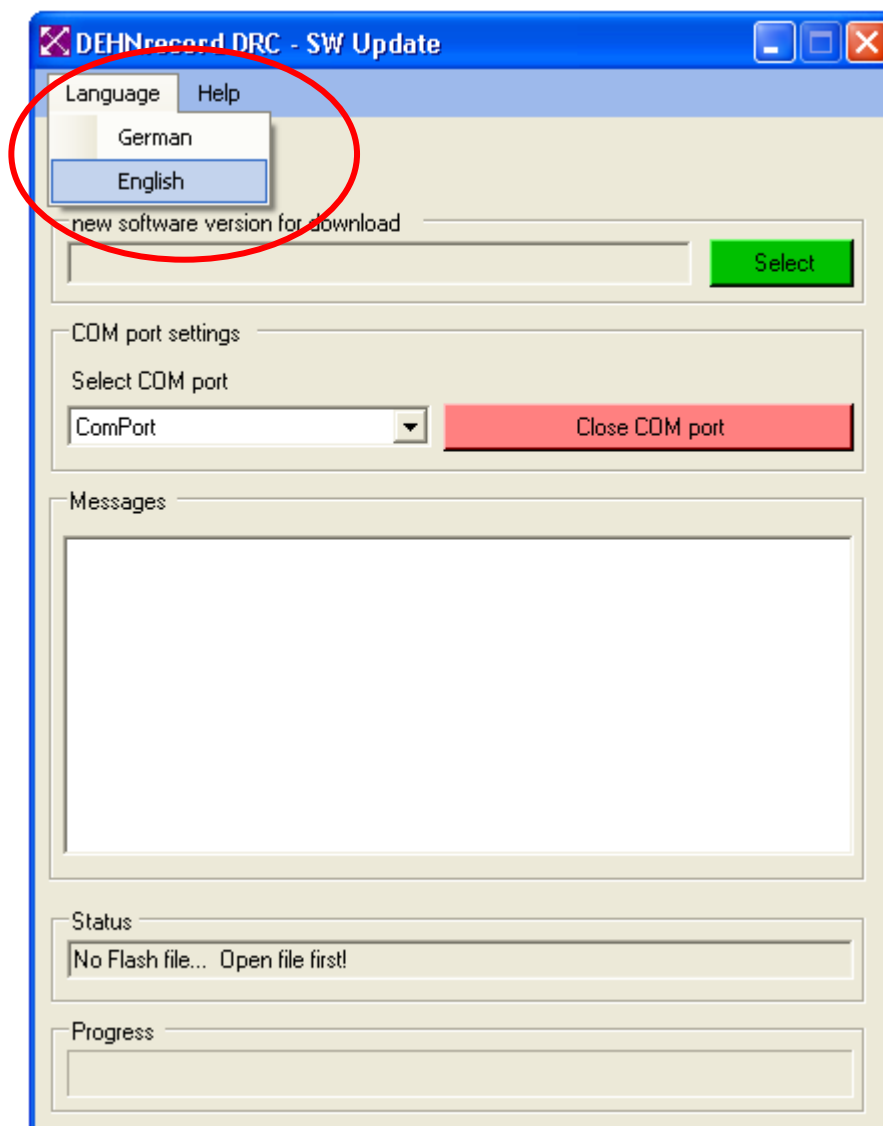
15.4.1 Starting the software update

The DEHNrecord DRC software update is started via the Windows® Start menu as described in 15.3.3.

15.4.1.1 Language

The program automatically checks which Regional and Language Options are set in the Windows® control panel whenever it is started. If a language other than German (Germany) is set, the program automatically selects **“English”** as predefined language and is started in this language.

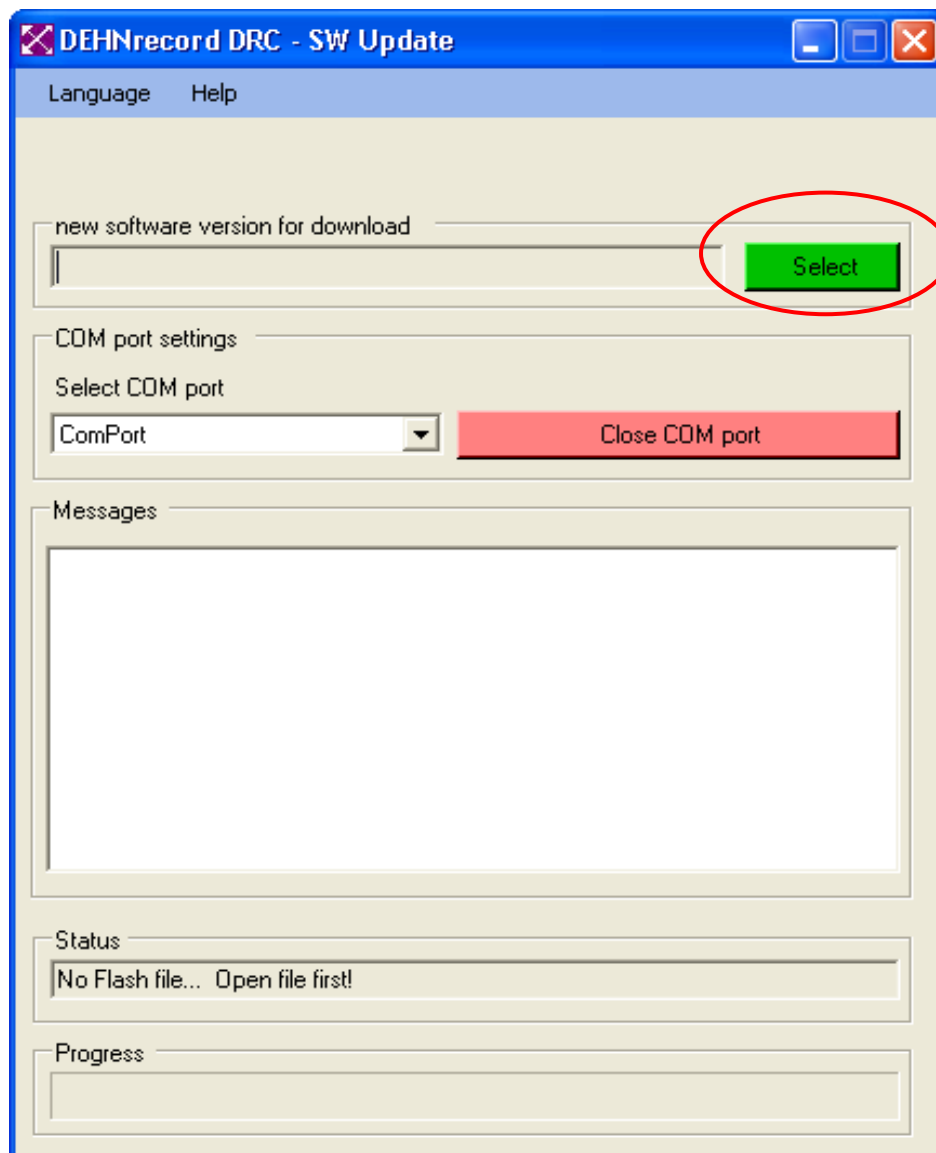
You can change the language anytime by clicking the relevant option.



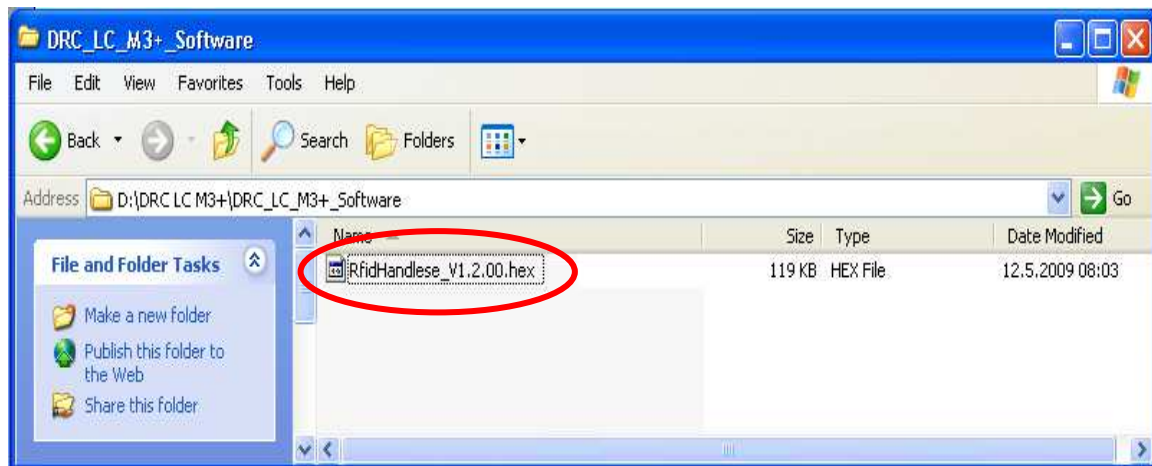
After the program has been started for the first time, select the software update file and set the communication interface for connection with the hand-held reader or the stationary monitoring device. These values are saved in the program and displayed each time the program is started. They only have to be set again if changes are required.

15.4 1.2 Selection of the update file

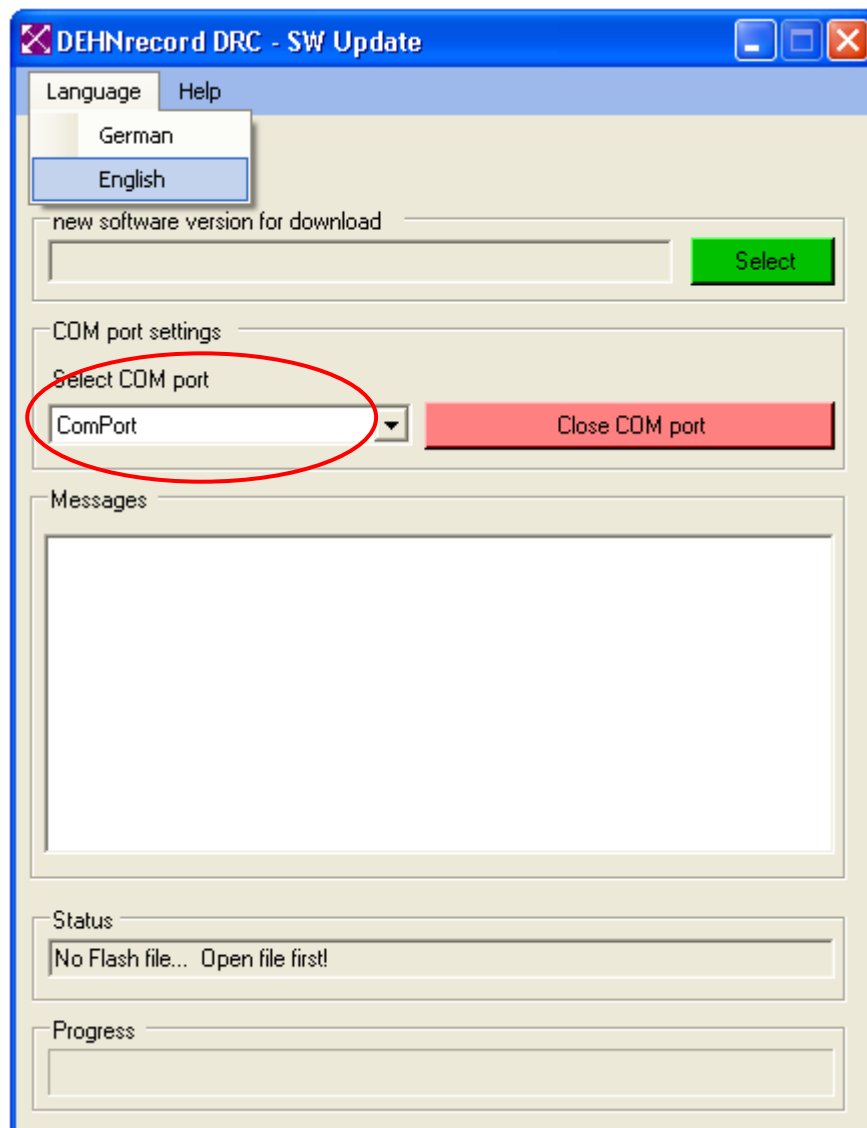
Click the "Select" button in the standard Windows® dialog that opens. The software update file can now be selected to load a file.



Software update files always have a **".hex"** extension.

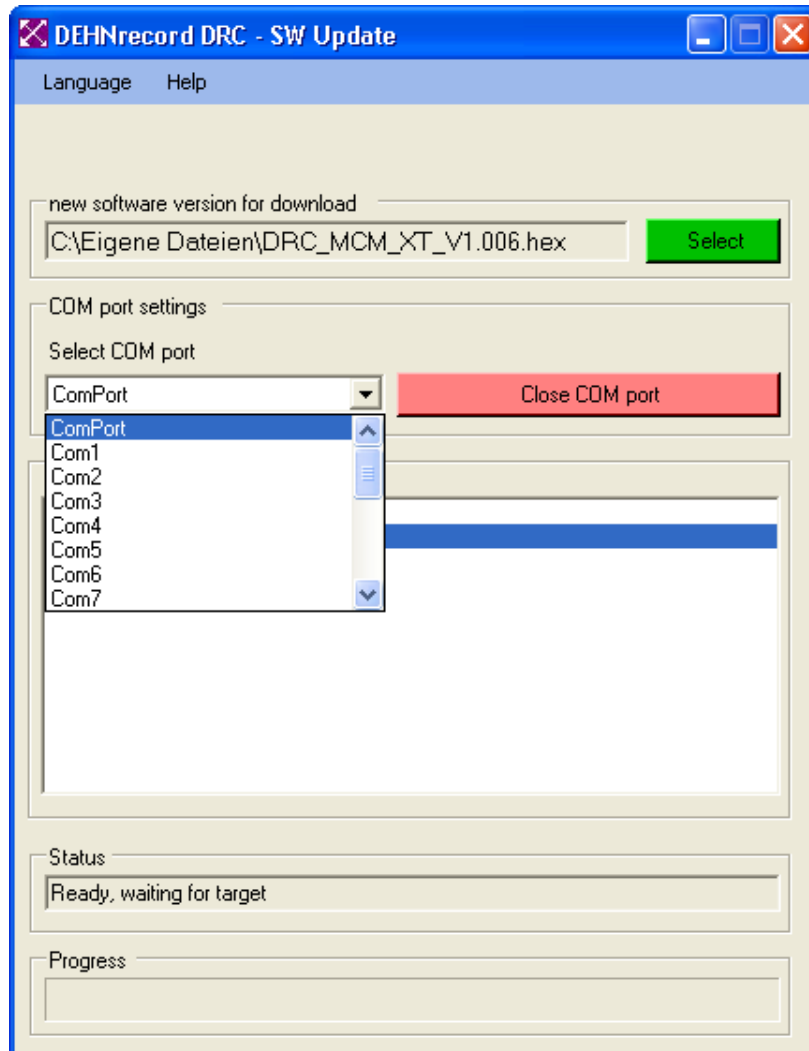


Select the COM port to connect the PC with the hand-held reader or monitoring device.



15.4.1.3 Selection of the COM port

The correct communication port must be selected to connect the PC with the hand-held reader.



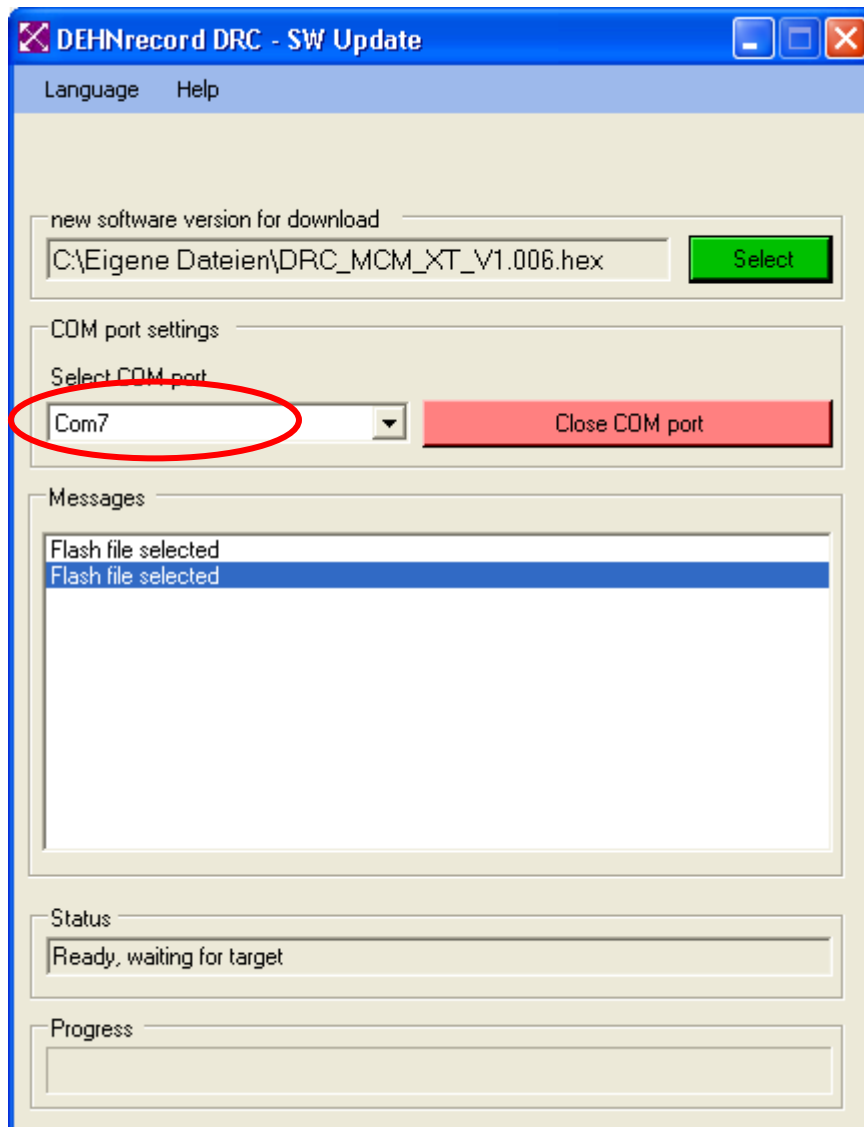
When performing a software update by means of the DRC LC M3+ reader, **ensure that**

- the reader and the PC are connected via the USB cable
- the reader is switched on and booted up

Windows® automatically loads and activates the USB interface driver as soon as the reader is switched on/plugged in. However, the USB interface driver is deactivated and removed from the memory whenever the hand-held reader is switched off or unplugged. The interface can no longer be used even if it is still displayed.

If the interface can no longer be addressed despite of a connected and activated reader, remove the USB cable and plug it in again. After a short time, the COM port can be reset.

Select the COM port determined in the control panel (see 4.3).



The software update is now ready and is waiting for the reader to start the update.

Note:

The COM port can be opened or closed via the "Close / Open COM port" button and is released (Close COM port) or locked (Open COM port) for other applications.

15.4.2 Software update after switching on the reader

Press the "ON" key to switch on the reader. The bootloader is started immediately after the reader has been switched on and



Bootloader v1.00

is displayed.

The bootloader allows to load new software versions from a connected PC to the reader. The procedure corresponds to that described in 15.5.2 "Submenu software update".

Whenever the bootloader is started, it checks if there is a connection to a PC (via USB cable). If there is no connection, the bootloader is deactivated immediately and displays the welcome text on the reader:



**DEHN+Söhne
RFID Reader**

If there is a connection to a PC, the bootloader enquires whether a new software version should be loaded.



Update software ?

Press the "ENTER" key to start the update.

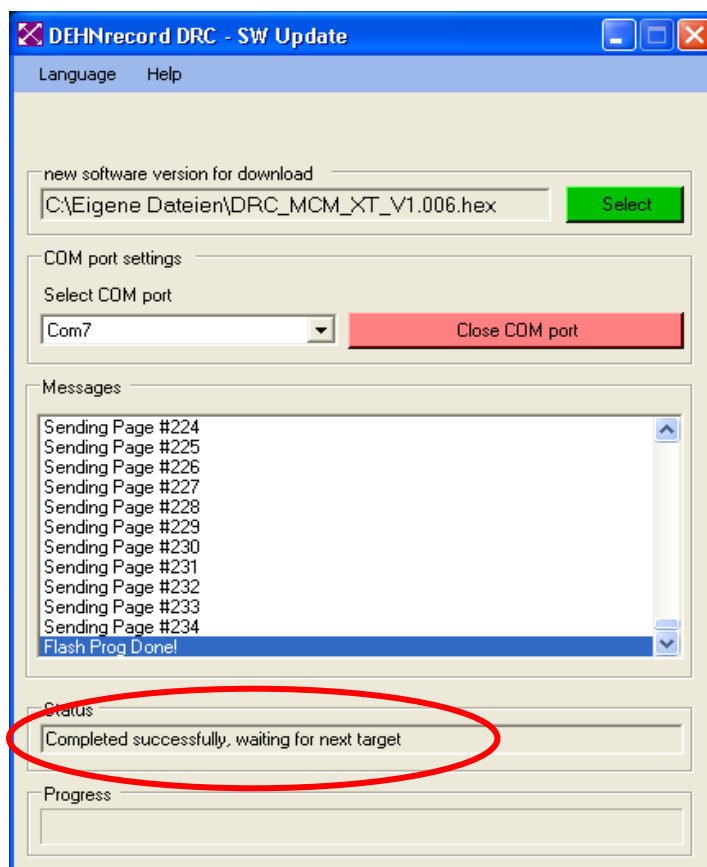
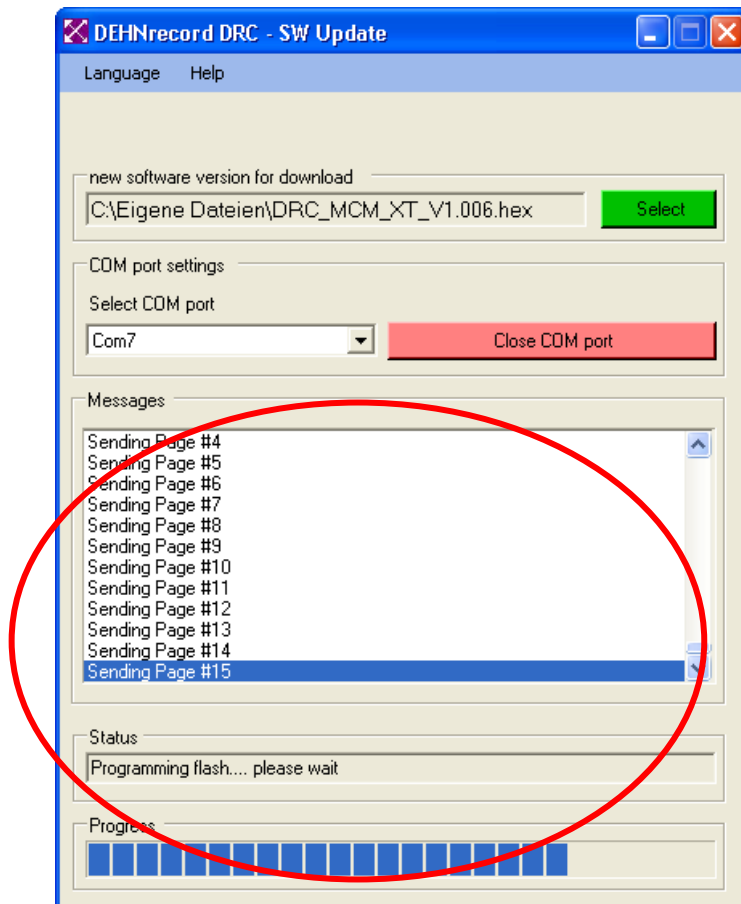


Downloading !

is displayed.

When pressing any key or no key for approx. 30 seconds, the bootloader is closed and the welcome text is displayed.

The "**Messages**" and "**Status**" windows as well as the progress bar show the progress of the update.



The "**Successfully completed** → **wait...**" message in the status window of the DEHNrecord DRC software update shows that the update has been completed.

As soon as the update is completed, the reader is reset and the following welcome text is displayed:

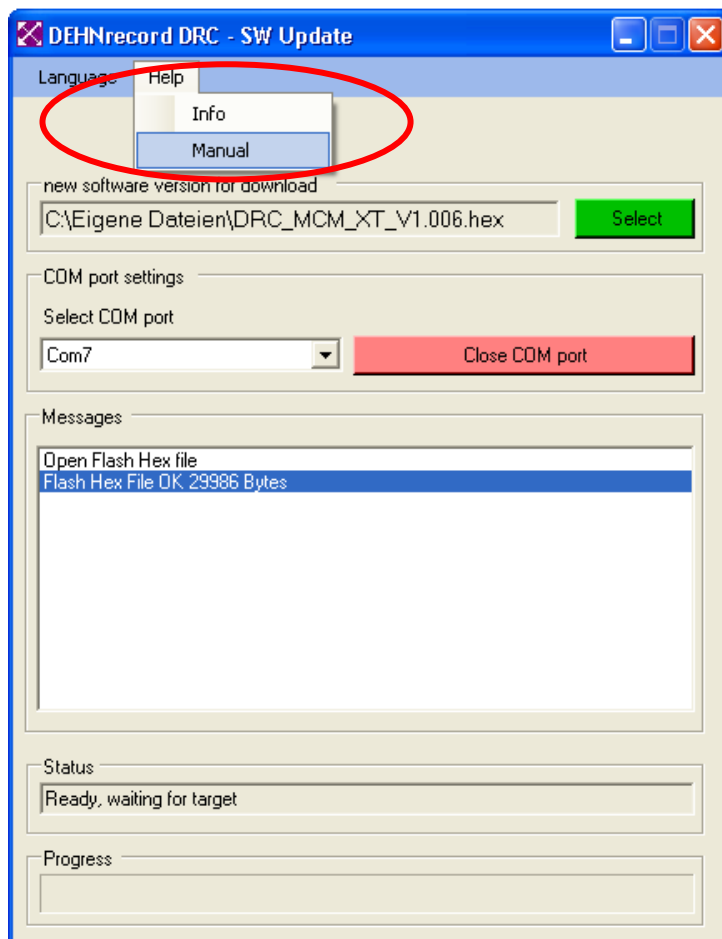
**DEHN+Söhne
RFID Reader**

15.4.3 Software update after selection from the main menu

The update can be started at any time from the main menu of the reader (see 15.5.1). The procedure corresponds to that of reader (see 15.4.2).

15.4.4 Help function

An overview of the program version or an online version of this operating manual (pdf) can be selected via the "Help" menu item.

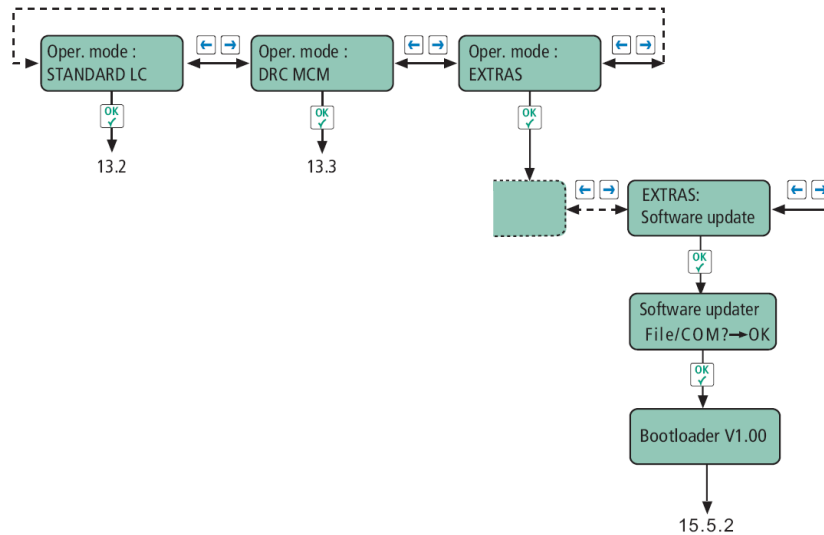


The online version of the manual is only available if a program for reading the pdf format (e.g. Adobe Acrobat Reader) that is linked with a ".pdf" file extension is installed on the PC.

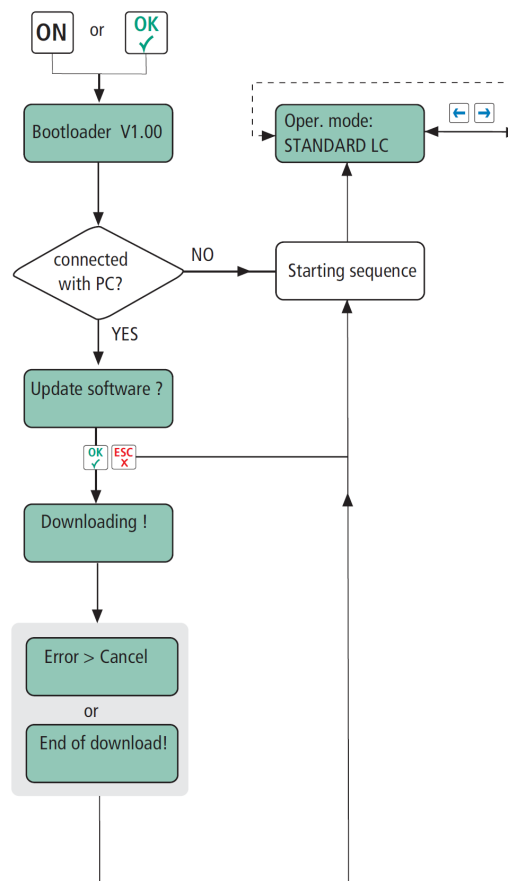
15.5 Menu structure of the reader

DEHNrecord DRC LC M3+ features the following menu structures for a software update:

15.5.1 Starting the software update from the main menu



15.5.2 Software update submenu



**Lightning Protection
Surge Protection
Safety Equipment**

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