

## Quick Guide – Software update

### Cascaded system LB 480

This manual is intended for service technicians who already have experience with software updates using the *FLASH Loader* software and operating *LB 480-PC UserInterface*. The relevant safety regulations must be observed. For SIL devices see operation manual (safety manual “Functional Safety”).

#### Requirements for the software update

Hardware	Software
<ul style="list-style-type: none"> <li>Windows PC</li> <li>Berthold USB/RS485 Service modem</li> <li>USB cable</li> <li>HART® communicator, Field Device Tool / Device Type Manager such as PACTware</li> <li>Connection cable to the RS485 interface of the detector</li> </ul>	<ul style="list-style-type: none"> <li>.bta embedded software update file e.g. <b>Level</b> for the master detector</li> <li>.bta embedded software update file e.g. 01.01.00 <b>Level Switch</b> for slave detectors</li> <li>Berthold USB/RS485 interface driver (BertholdRS485.exe)</li> <li>FLASH Loader (Flashloader_setup.exe)</li> <li>LB 480-PC UserInterface 2.1.1 (LB_480_PC_Control_Setup_2.1.1.exe)</li> </ul>

#### 1. Preparation via HART®

- Disable write protection or safety mode.
- Read and note down the Device ID numbers of all coupled slave detectors.
- Log off slave detectors from the master detector.

#### IMPORTANT



Each detector is updated individually. For this purpose, the RS485 connections in the wiring compartment must be disconnected before updating the respective detector. After the update, the RS485 connections must be reconnected to the respective detector.

#### 2. Perform parameter backup and software update of the master detector

- Connect the PC to the master detector via USB/RS485 service modem.
- Perform parameter backup using *LB 480-PC UserInterface Level*. Alternatively: Write down the parameters to be able to enter them again manually later.
- Perform the software update using *FLASH Loader*. Select .bta embedded software update file e.g. 01.01.00 Level.
- Perform Factory Reset and then Software Reset (SW-Reset) using *LB 480-PC UserInterface Level*.
- Restore the backup to the master using *LB 480 PC UserInterface Level*. Alternatively: Transfer the written down parameters manually to the LB 480.

#### 3. Perform software update of each slave detector

- Connect the PC to the slave detector via USB/RS485 service modem.
- Perform the software update using *FLASH Loader*. Select .bta embedded software update file e.g. 01.01.00 Level Switch.
- Perform Factory Reset and then Software Reset on each slave detector using *LB 480-PC UserInterface LevelSwitch*.

#### 4. Putting the system into operation via HART®

- Log in slave detectors to the master.
- Check or simulate measuring range limits using the CPS test program. Deactivate the simulation afterwards!
- Check that there are no error messages on the master and that the actual measured value is plausible.
- If necessary, activate write protection or safety mode (for SIL devices see safety manual “Functional Safety”).

If you have any questions or need support, please contact our service department at [service@Berthold.com](mailto:service@Berthold.com).

# Detailed instructions – Software update

## Cascaded system LB 480

### NOTICE



#### Qualification of personnel!

Only personnel authorized by Berthold should update the embedded software.

- ▶ If the functional safety requirements (e.g. SIL) apply to the detector or the installation, the update **must** be carried out by authorized service technicians so that functional safety is guaranteed after the software update.

### WARNING



#### Explosion hazard!

Laptops or PCs without appropriate Ex-approvals may not be operated in a potentially explosive atmosphere.

### Non-intrinsically safe detectors and installations

For non-intrinsically safe detectors and installations, the software update of the embedded software can be performed onsite at the permanently installed detector.

### Intrinsically safe detectors and installations

### WARNING



#### Explosion hazard!

Risk of losing intrinsic safety, by grounding the RS485.

Do not use laptops or PCs that are connected to the mains.

Only battery-powered laptops or PCs may be connected to the RS485.

Do not power the service modem with a power supply unit.

For intrinsically safe detectors and installations (Class I Zone 1 / Zone 21 for Class I, II, III Division 1 ATEX / IECEx / NEC / CEC), updating the embedded software onsite is only permitted under the following conditions:

- no explosive atmosphere
- software update via battery-operated laptop (no mains operation, in order to avoid grounding the RS485)
- no power supply for the service modem (in order to avoid grounding the RS485)

### Requirements for the software update

Hardware	Software
<ul style="list-style-type: none"> <li>• Windows PC</li> <li>• Berthold USB/RS485 Service modem</li> <li>• USB cable</li> <li>• HART® communicator, Field Device Tool / Device Type Manager such as PACTware</li> <li>• Connection cable to the RS485 interface of the detector</li> </ul>	<ul style="list-style-type: none"> <li>• .bta embedded software update file e.g. 01.01.00 <b>Level</b> for the master detector</li> <li>• .bta embedded software update file e.g. 01.01.00 <b>Level Switch</b> for slave detectors</li> <li>• Berthold USB/RS485 interface driver (BertholdRS485.exe)</li> <li>• FLASH Loader (Flashloader_setup.exe)</li> <li>• LB 480-PC UserInterface 2.1.1 (LB_480_PC_Control_Setup_2.1.1.exe)</li> </ul>

## 1 Install interface driver, FLASH Loader and LB 480-PC software

To operate the service modem, the interface driver “BertholdRS485.exe” must be installed. Likewise, the installation of the *FLASH Loader* is necessary to upload and install the new software version on the LB 480 detector. To be able to make a reliable data backup before the software update, we also recommend the installation of *LB 480-PC UserInterface*, a Berthold specific software for the RS485 interface.

1. Install the Berthold USB/RS485 interface driver by running the file “BertholdRS485.exe”. Install the driver before connecting the detector service modem to the PC.
2. Connect the service modem to the PC with a USB cable.
- ▶ The service modem is installed.
3. Install the software “Flashloader\_setup.exe”. If this software is already installed, make sure that you use version 2.1.0.0 or 2.1.1.0.
4. Install the software *LB 480-PC 2.1.1 UserInterface* “LB\_480\_PC\_Control\_Setup\_2.1.1.exe”.

### IMPORTANT



The wiring compartment of the master detectors differs from that of the slave detectors.

- ▶ Slave detectors have two terminals for the incoming RS485 signal and two terminals for the outgoing RS485 signal to the next detector.
- ▶ Each detector must be individually connected to the service modem via the RS485 interface to update the embedded software.

### NOTICE



#### Perform data backup!

Calibration parameters and settings are deleted during the software update.

- ▶ Therefore, perform a data backup before updating the software (see page 5).

## 2 Preparation via HART®

5. Use one of the following hosts to operate the LB 480:
  - HART® Communicator Model 375/475
  - Siemens Simatic PDM
  - AMS DeltaV, Emerson Process
  - PACTware
6. If necessary, open the menu path **Device Config ▶ Access** to unlock Write Protect and deactivate Safety Mode: **Write Protect = NO / Safety Mode = OFF**.

#### Condition 1: Write Protect NO / Safety Mode OFF

O.K., the software update can be performed.

#### Condition 2: Write Protect YES / Safety Mode OFF

Enter the password to unlock Write Protect. Write Protect is automatically set from **YES** to **NO**.

#### Condition 3: Write Protect YES / Safety Mode ON

Select Safety Mode **OFF**. Enter the password. Then Safety Mode is automatically set to **OFF** and Write Protect is automatically set to **NO**.

### IMPORTANT



Please contact Berthold if access is blocked and the password is no longer known or available.

- ▶ The detector is unlocked.
7. Write down the Device ID numbers of all coupled slave detectors. The slave detectors are removed via HART® in the following steps and added again using the Device ID numbers after the software update. The Device ID numbers are displayed under the following menu path:  
**Device Config ▶ Setup ▶ Sensor Configuration ▶ Config Slave Detectors ▶ Detector Table**
  8. Remove the slave detectors under the following menu path:  
**Device Config ▶ Setup ▶ Sensor Configuration ▶ Config Slave Detectors ▶ Remove Slave**

- ▶ The HART® communicator or host for operation is only required again in the last step (chapter 6 Putting the system into operation via HART®).

### 3 Data backup and software update of the master detector

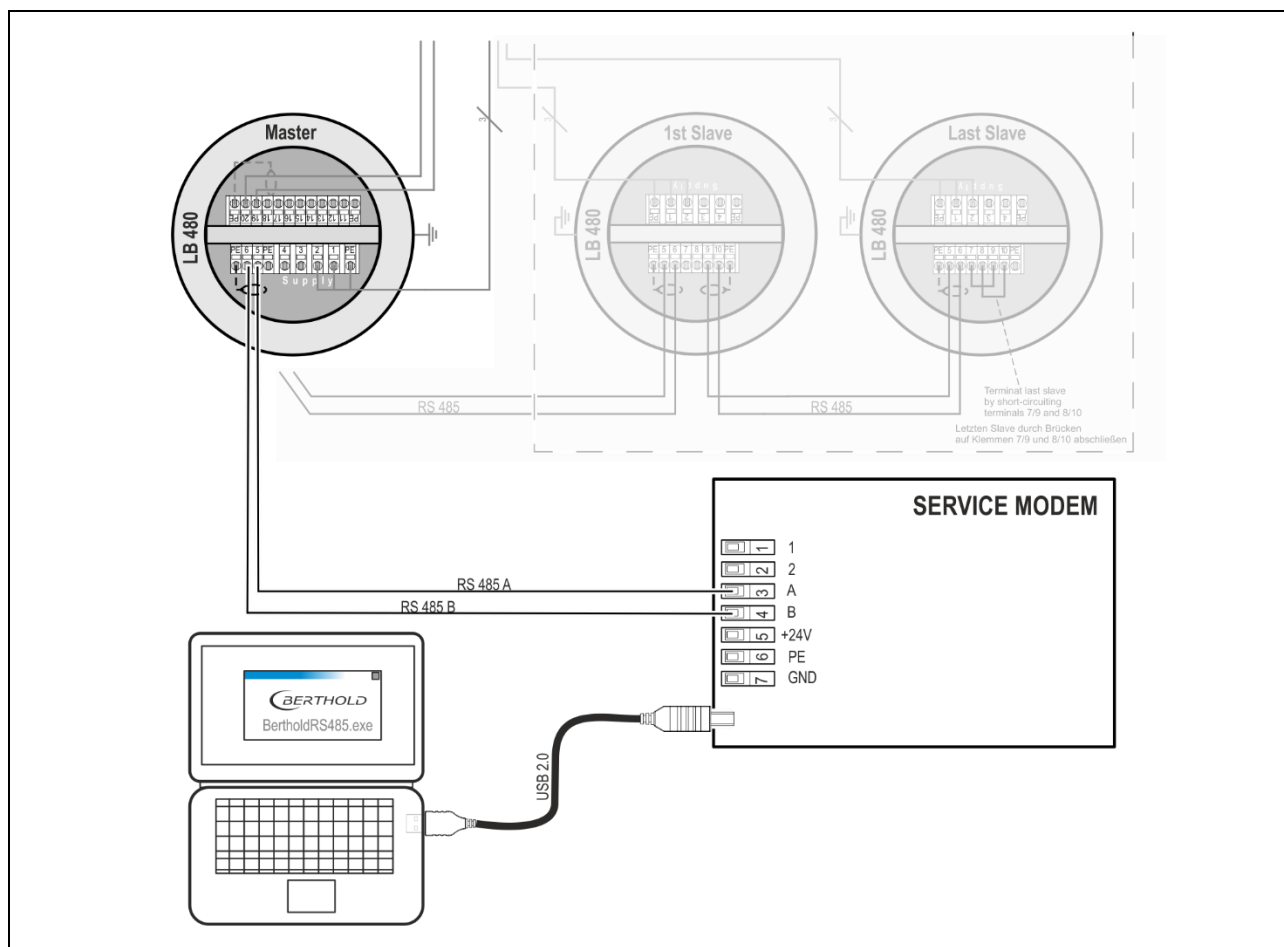


Fig. 1 Connection diagram Master detector – Service modem – PC

#### NOTICE



#### Install the RS485 connection cable professionally!

To store the calibration data and update the embedded software, a connection to the RS485 interface of the detector is required. For this purpose, the wiring compartment of the detector must be opened, and the appropriate cable must be laid.

- ▶ Observe the regulations in the safety manual / explosion protection manual and the operating instructions of the detector.
- ▶ The software update must be performed with the power supply switched on.

9. Disconnect the RS485 connection to the slave detector (terminals 5 and 6). Then connect the master detector to the service modem via this RS485 interface, see connection diagram Fig. 1 and the table below. The power supply of the detector must not be interrupted during the software update.

Terminal detector		Terminal service modem
5	RS485 A	3
6	RS485 B	4

- ▶ The master detector is correctly connected to the PC via the service modem. Data backup can be performed, and the embedded software of the detector can be updated.

## Perform data backup

A data backup of the calibration data and settings must be performed. For this purpose, the Berthold software *LB 480-PC UserInterface Level* is required. Alternatively, you can write down all the calibration data and settings and then enter them again manually after updating. The slave detectors must be removed before data backup via HART® so that *LB 480-PC UserInterface*, and later *FLASH Loader*, can access the RS485 interface (see chapter 2 Preparation via HART®).

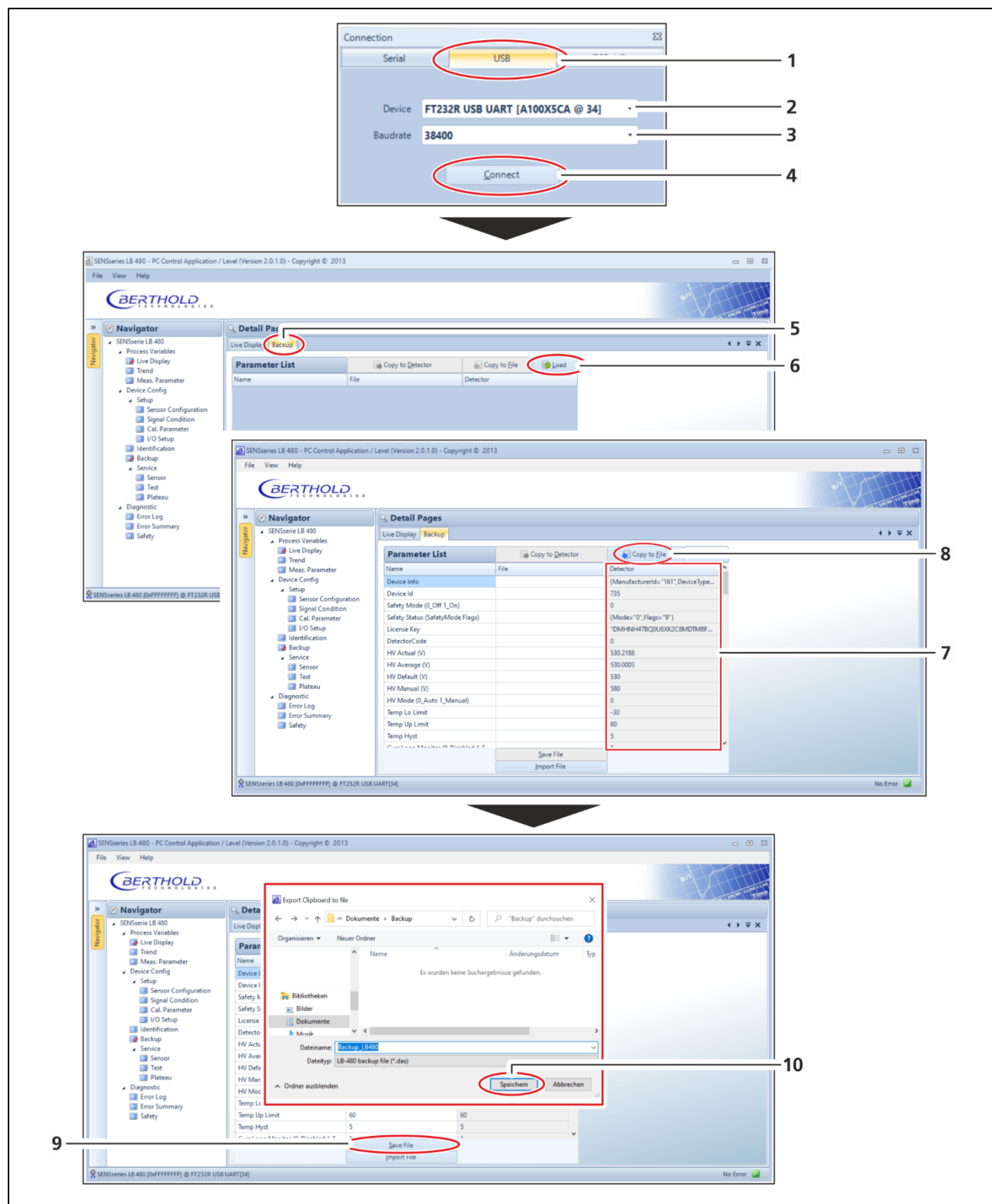


Fig. 2 Data backup using *LB 480-PC UserInterface Level*

10. Start the software *LB 480-PC UserInterface Level* and click on the tab "USB" (Fig. 2, Pos.1).
11. Select the service modem under "Device" (Fig. 2, Pos.2).
12. Select 38400 Baud under "Baudrate" (Fig. 2, Pos.3).

13. Click on <Connect> (Fig. 2, Pos.4).
  - ▶ Connection to the service modem is established and *LB 480-PC UserInterface Level* starts.
14. In the menu tree **Device Config ▶ Backup** (Fig. 2, Pos.5) click on <Load> (Fig. 2, Pos.6).
  - ▶ All parameters are displayed in the column “Detector” (Fig. 2, Pos.7).
15. Click on the button <Copy to File> (Fig. 2, Pos.8).
  - ▶ All parameters are copied to the column “File”.
16. Click on the button <Save File> (Fig. 2, Pos.9).
17. Select a location for the backup file and click on the button <Save> (Fig. 2, Pos.10).
  - ▶ The calibration data and settings are saved and can be restored after the software update.
18. Now close the software *LB 480-PC UserInterface Level* to access the interface with *FLASH Loader* in the following steps.

### Update the master detector

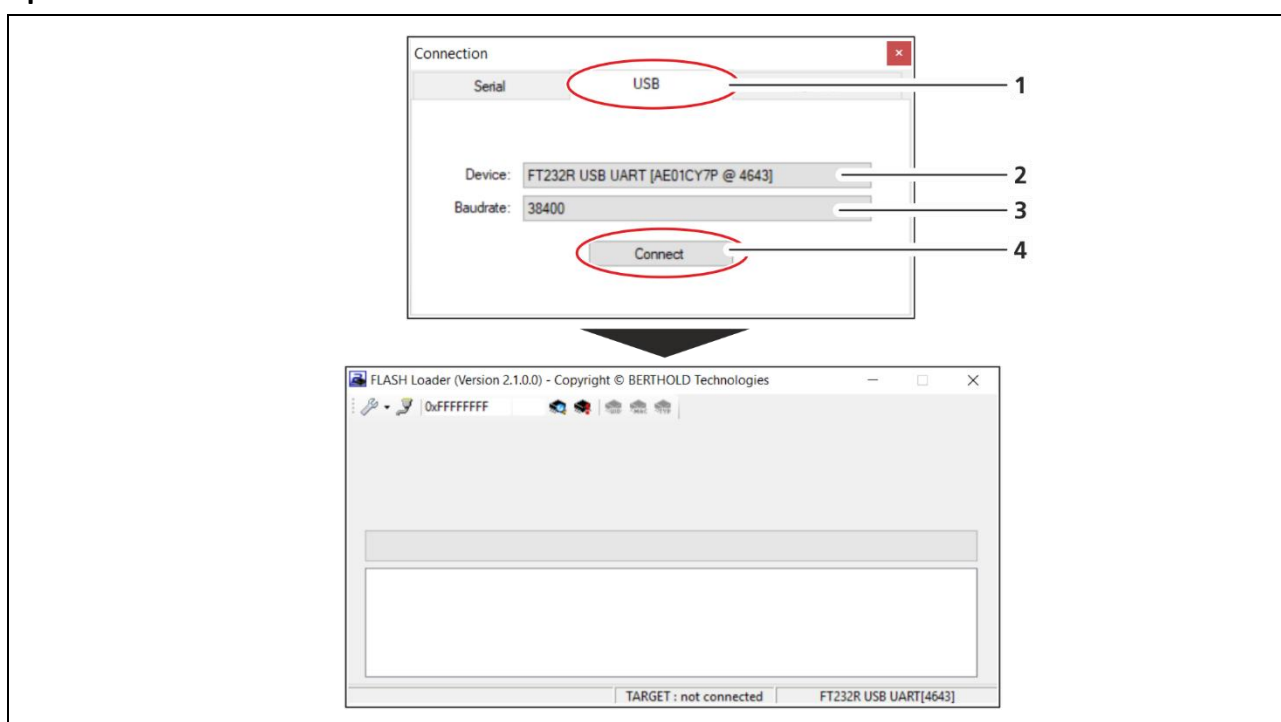


Fig. 3 Set up the connection PC – Service modem

19. Start the “FLASH Loader” software and click on the tab “USB” (Fig. 3, Pos.1).
20. Select the service modem under “Device” (Fig. 3, Pos.2).
21. Select 38400 Baud under “Baudrate” (Fig. 3, Pos.3).
22. Click on <Connect> (Fig. 3, Pos.4).
  - ▶ The connection to the service modem is established and a new window “FLASH Loader” opens.

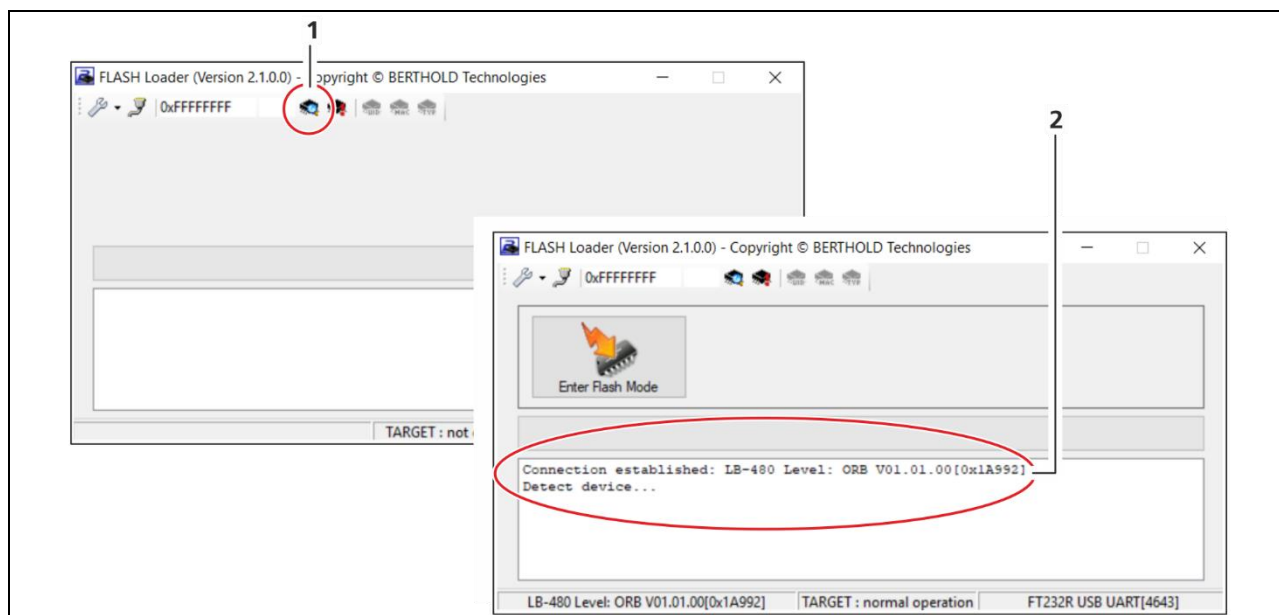



Fig. 4 Set up the connection to the detector

23. Click on the “Detect Device” button  (Fig. 4, Pos.1) to establish the connection to the detector.

### IMPORTANT



The present broadcast address 0xFFFFFFFF can only be used if a single detector is connected via the RS485 interface and coupled slave detectors have been removed via HART® (see chapter 2 Preparation via HART®).

- The detector has been found and the connection is established. The button <Enter Flash Mode> is displayed and the message “Connection established: ...” (Fig. 4, Pos.2) appears.

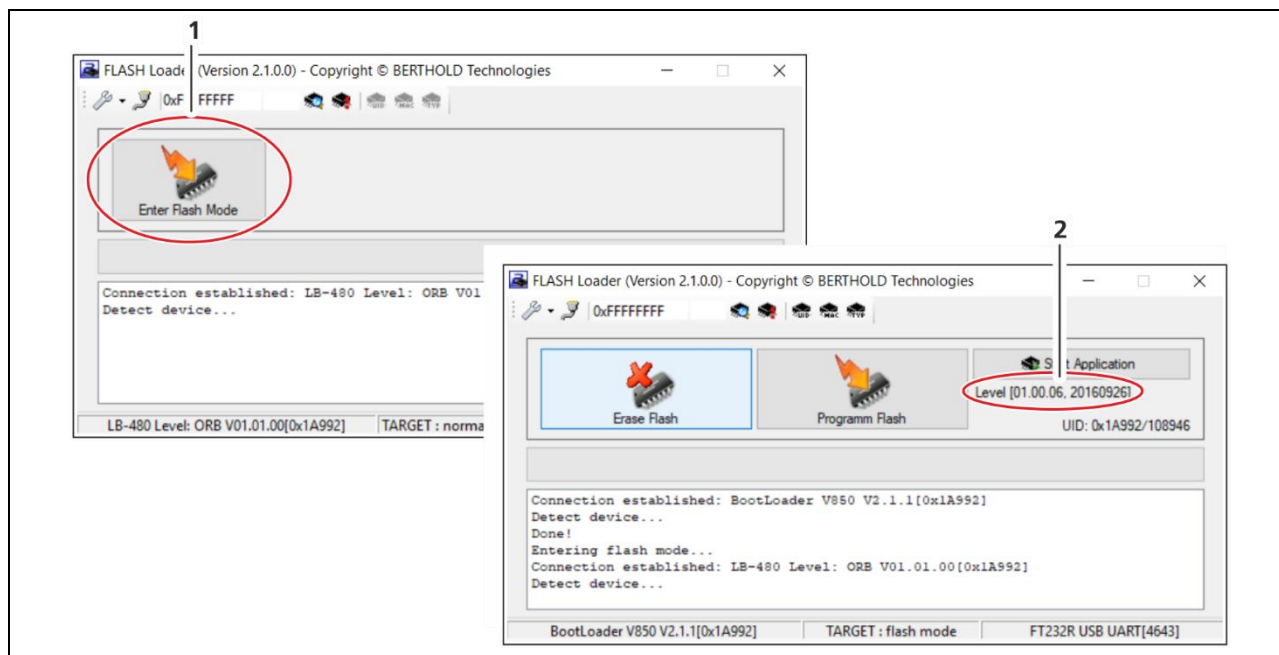



Fig. 5 “Flash Mode” and installed embedded software

24. Click on the button <Enter Flash Mode> to open the programming function (Flash Mode) (Fig. 5, Pos.1).

- The Flash Mode is started, and the version of the installed embedded software is displayed (Fig. 5, Pos.2).

### IMPORTANT



If the “Enter Flash Mode” command does not execute, the detector can be reset with the “Force Flash” button  to open the programming functions.



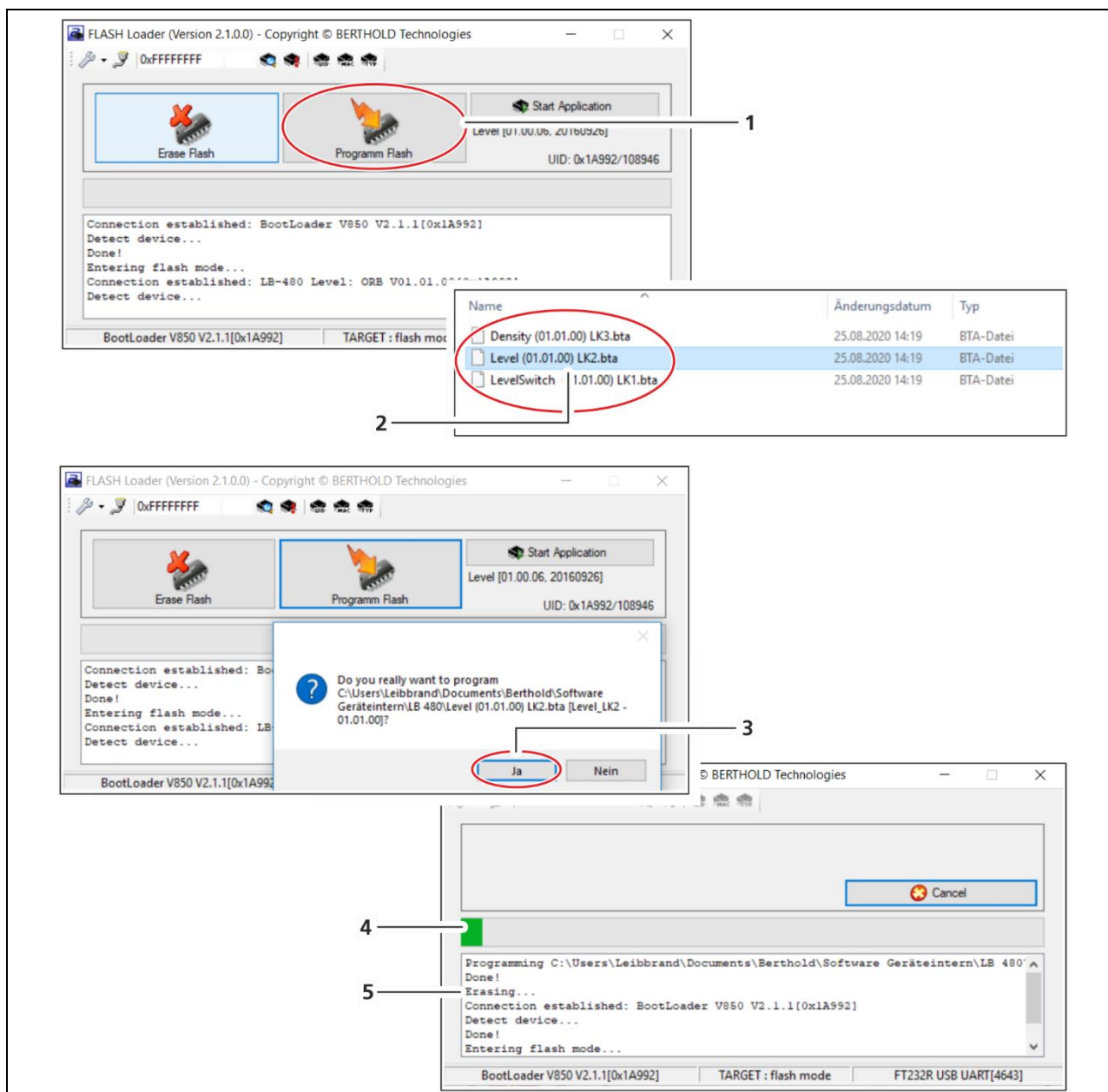


Fig. 6 Select new software in "Flash Mode"

25. Click on the button <Programm Flash> (Fig. 6, Pos.1).
  - The window "Open file" appears.
26. Select the software file (.bta) e.g. "01.01.00." (Fig. 6, Pos.2) and click <Open>.

#### NOTICE



**For master detectors, load software file "Level"!**

27. Confirm with <Yes> (Fig. 6, Pos.3).
  - The old installation is deleted (Fig. 6, Pos.5) and the new embedded software is installed.

#### NOTICE



**Do not click <Cancel>!**

The installation process can take up to one hour if the transfer rate is low. Only interrupt the installation if the process bar (Fig. 6, Pos.4) does not change for a long time.

- In the case of an interruption, check all connections and restart the installation.



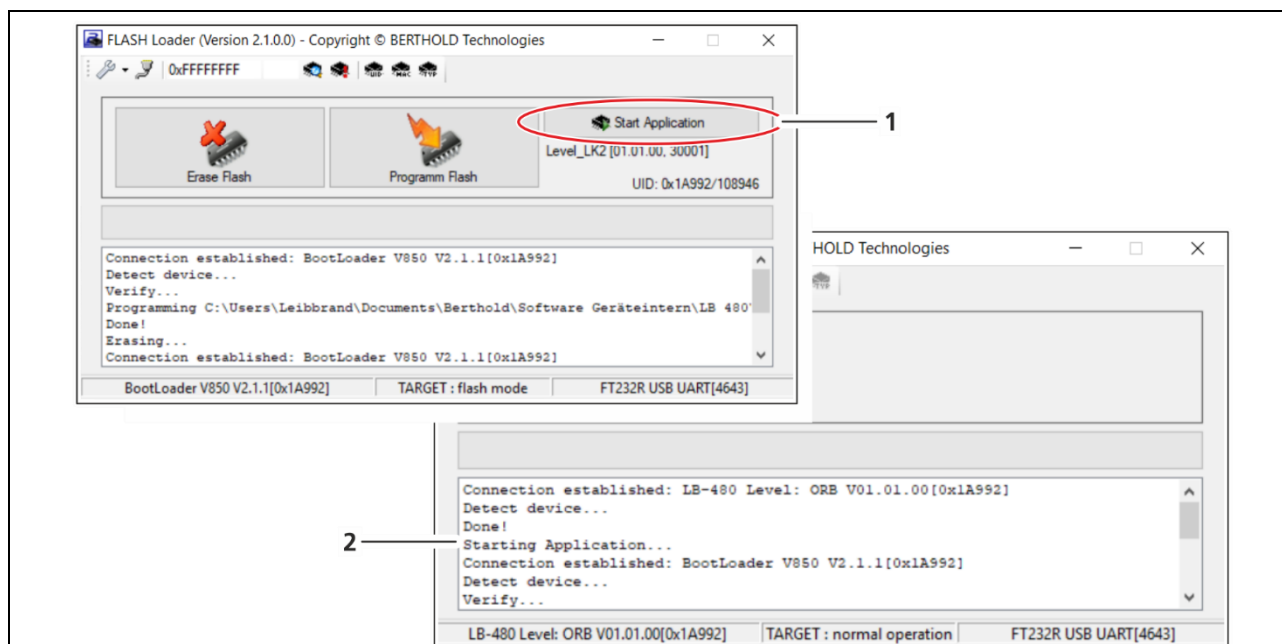


Fig. 7 Start embedded software

28. After successful installation, click the button <Start Application> (Fig. 7, Pos.1).

- ▶ The new embedded software has been installed correctly (Fig. 7, Pos.2) and the required resets (Factory Reset and Software Reset) can be performed.

29. The *FLASH Loader* is only needed again when the slave detectors are updated. Now close the software to access the interface with *LB 480-PC UserInterface Level* in the following steps.

## Reset the master detector

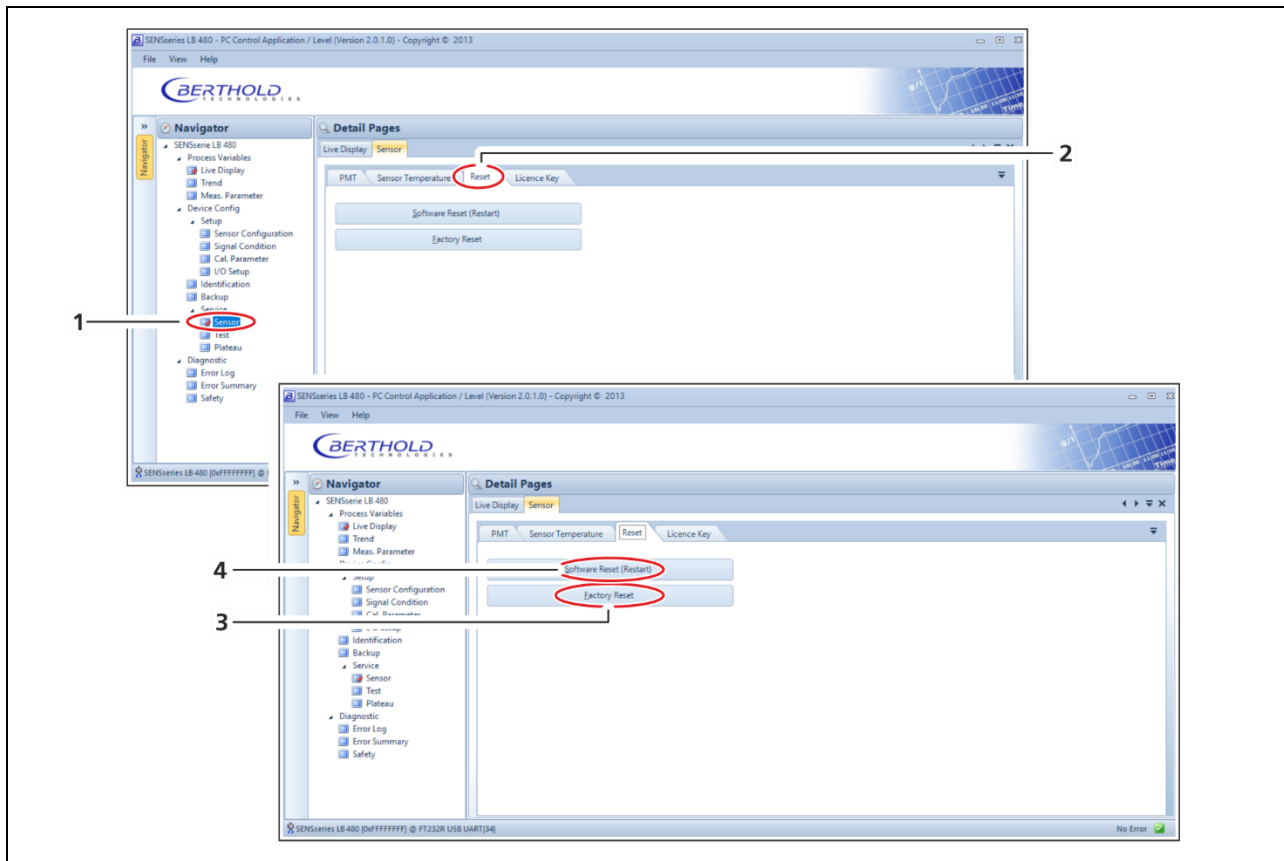


Fig. 8 Factory Reset and Software Reset (SW-Reset)

30. Open the software *LB 480-PC UserInterface Level* (Baudrate 38400) and click in the menu tree on **Device Config ► Service ► Sensor** (Fig. 8, Pos.1).
31. In the tab "Reset" (Fig. 8, Pos.2) click on the button <Factory Reset> and confirm with <Yes> (Fig. 8, Pos.3).
  - The master detector is reset to factory settings.
32. After the factory reset, perform a software reset by clicking on the <Software Reset> button (Fig. 8, Pos.4).
  - The software update of the master detector is complete and the previously saved calibration data and settings can be restored.

## Restore calibration data and settings

The transfer of the backup data to the master detector is done by the Berthold software *LB 480-PC UserInterface Level*. Alternatively, you can enter the previously written down parameters.

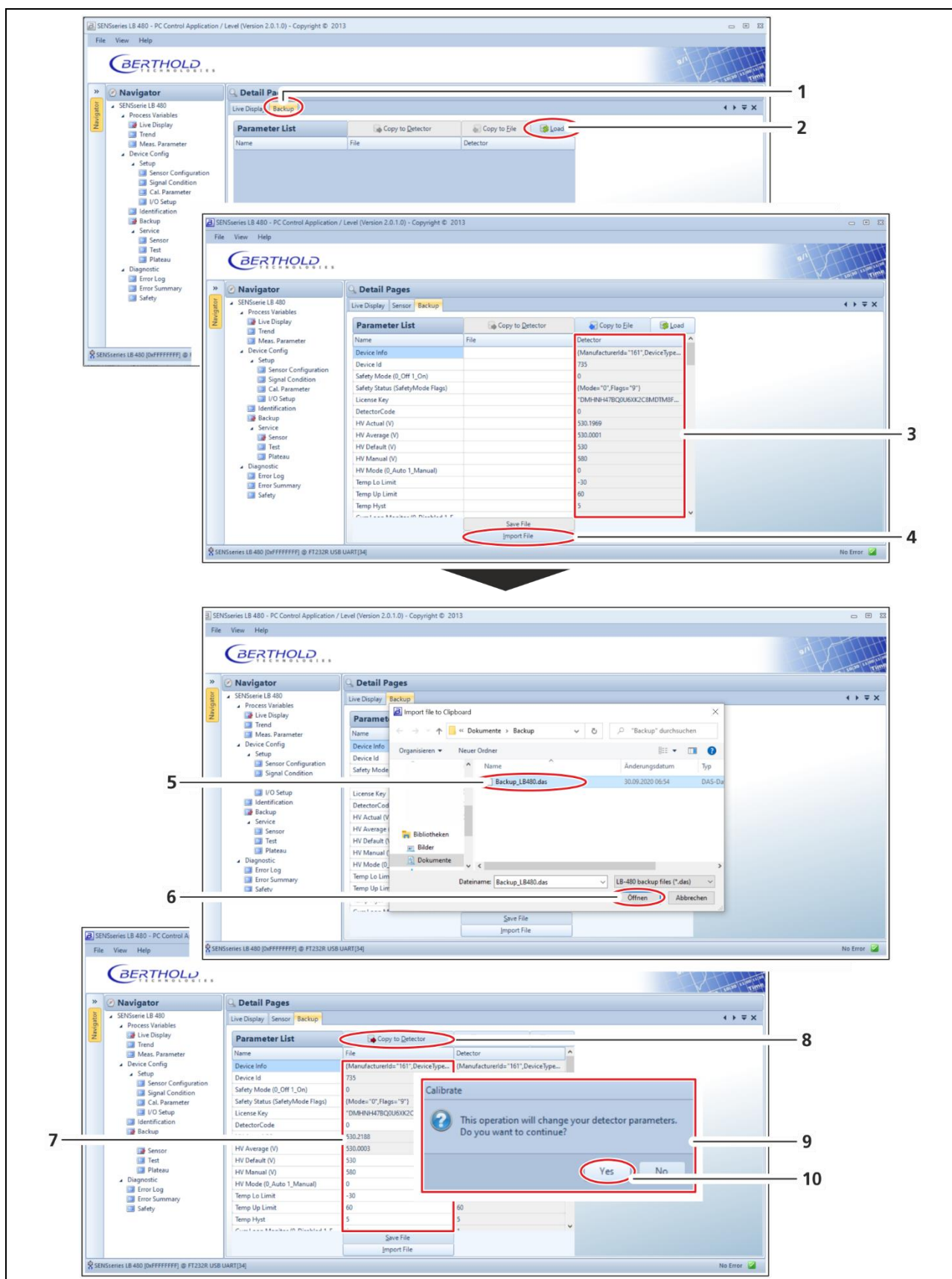


Fig. 9 Transfer the data to the master detector

33. Open the software *LB 480-PC UserInterface Level* in the menu tree **Device Config ► Backup** (Fig. 9, Pos.1) and click on the button **<Load>** (Fig. 9, Pos.2).
  - All default values are displayed in the column "Detector" (Fig. 9, Pos.3).
34. Click on the button **<Import File>** (Fig. 9, Pos.4).
35. Select the backup file created in step 17 (Fig. 9, Pos.5) and click on the button **<Open>** (Fig. 9, Pos.6).
  - The stored calibration data and settings are displayed in the column "File" (Fig. 9, Pos.7).
36. Click on the button **<Copy to Detector>** (Fig. 9, Pos.8).
  - A confirmation window (Fig. 9, Pos.9) is displayed.
37. Click on the button **<Yes>** (Fig. 9, Pos.10) to transfer the data to the master detector.
  - The calibration parameters and the settings are now restored.
38. *LB 480-PC UserInterface Level* is no longer needed. Now close the software to access the interface with *FLASH Loader* in the following steps.

#### 4 Update slave detector

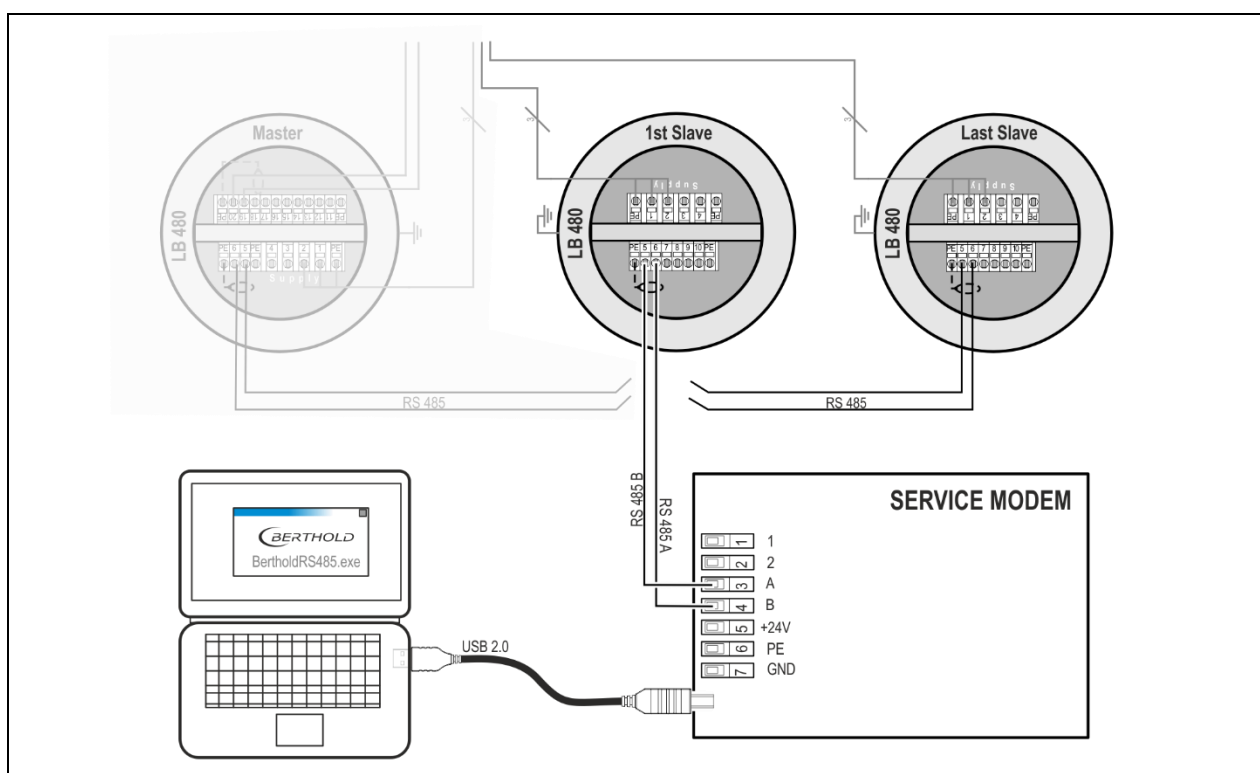


Fig. 10 Connection diagram Slave detector – Service modem – PC

39. Disconnect the connection to the RS485 interface of the master detector and connect the RS485 connection to the slave detector instead.
40. If necessary, disconnect the RS485 connection to the next slave detector (terminals 9 and 10).

Terminal detector		Terminal service modem
5	RS485 A	3
6	RS485 B	4

41. The power supply to the detector must not be interrupted during the software update.
  - The detector is correctly connected to the PC via the service modem and the embedded software of the slave detector can be updated.
42. Repeat steps 19 to 29 to update all slave detectors with the new embedded software. In step 26, however, select

the level switch software file (LevelSwitch e.g. 01.01.00.bta) for the slave detector and click <Open>.

## NOTICE



For slave detectors, load software file “Level Switch”!

43. If the new embedded software is correctly installed on the slave detectors, the necessary resets (factory reset and software reset) can be carried out using the *LB 480-PC UserInterface LevelSwitch* software (see steps 30 to 32).
- ▶ When all slave detectors have been updated, the RS485 connection to the service modem can be removed.

## 5 Restoring connection lines

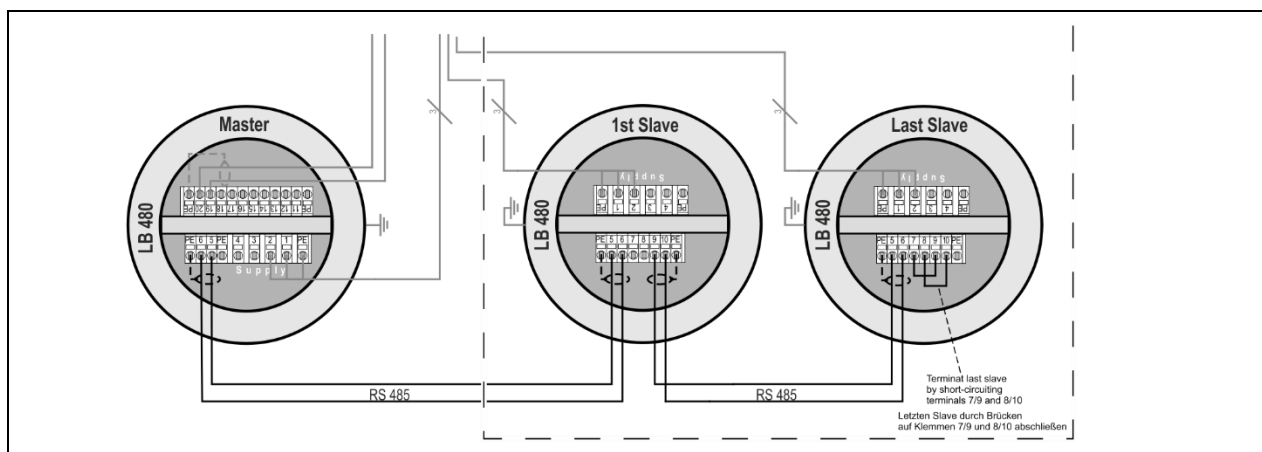


Fig. 11 Connection diagram cascaded system

44. Restore the RS485 connections between the detectors.
45. Close the wiring compartment (lid, cable glands) of each detector according to the instructions in the safety manual / explosion protection manual and the operating manual of the detector.
- ▶ The connection lines are correctly restored.

## 6 Putting the system into operation via HART®

46. Add all slave detectors via the HART® communicator or host: **Device Config ▶ Setup ▶ Sensor Configuration ▶ Config Slave Detectors ▶ Add Slave**. To do this, assign a detector number between 1 and 16 to each slave detector and enter in “Device ID” the Device ID number you wrote down for each slave detector before installation.
47. Check the measuring range limits. To do this, simulate CPS values in the test menu under **Device Config ▶ Setup ▶ Service ▶ Test**.
  - ▶ There should not be any error messages at the master detector and the current measured value must be plausible.
48. Deactivate the simulation.
49. If necessary, open the menu path **Device Config ▶ Access** to restore the previous state (see chapter 2 Preparation via HART) for write protection or safety mode.
  - ▶ In multi-detector mode, all connected slave detectors are also set to Safety Mode as soon as the master detector is set to Safety **ON**.
  - ▶ The software update of the cascaded system was successfully performed.