Leuze electronic

the sensor people

SMART
SENSOR
BUSINESS

Sensor Studio

IO-Link USB-Master 2.0

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Subject to change without prior notice

Original Operating Instructions

© 2017
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1 General Information

1.1 Sensor Studio and IO-Link USB-Master

The Sensor Studio von Leuze electronic together with an IO-Link USB-Master is used to operate, configure and diagnose sensors and actuators (IO-Link devices) with an IO-Link interface.

The set at hand consists of several components. Delivery contents:

- IO-Link USB-Master V2.0
- International plug-in power supply unit
- High-Speed USB 2.0 cable, USB-A to Mini-USB
- Installation CD with software and drivers
- Brief manual

Every IO-Link device is described in its associated IODD file (IO-Link Device Description. After reading this IODD file into the software, the IO-Link device connected to the IO-Link USB-Master can be conveniently operated, configured and checked in several languages. If no device is connected, it can still be configured offline.

Configurations can be saved and opened as projects, thus allowing them to be transmitted to the IO-Link device at a later point in time.

2 Software and Hardware Installation

2.1 Software Installation

To install the Leuze electronic Sensor Studios, you will need the installation CD-ROM included in the delivery contents.

As an alternative, you can choose the article **SET MD12-US2-IL1.1 (50121098)** on www.leuze.com. Please download and unzip the ZIP archive **Software** to your local PC.

Apart from that, you need to have **administrator** rights on the computer on which the software is to be installed.

NOTICE

- Do not connect the IO-Link USB-Master to your computer yet.
- Install the software first!

2.1.1 Leuze electronic Sensor Studio

Insert the installation CD in the CD/DVD drive on your computer. Execute the **SensorStudioSetup.exe** file located in the **\01_SensorStudio_Vx.x.x** directory.

Please, follow the instructions on the screen.

2.1.2 IO-Link USB-Master

2.1.2.1 Driver Installation

That followed, execute the **IOLinkUSBMaster20_Setup.exe** file located in the directory **\02_IOLink\02a_IOLinkUSBMaster20_Vx.x.x**.

Please, follow the instructions on the screen.

2.1.2.2 Connecting the IO-Link USB-Master 2.0 to the PC

After successfully installing, connect the USB IO-Link Master to your computer using the USB cable included in the delivery contents.

After connecting the IO-Link USB-Master to the computer, the **Found New Hardware Wizard** starts to install the USB driver for the new device. The IO-Link USB-Master 2.0 is now ready for use.

2.1.2.3 Connecting an IO-Link Device

IO-Link devices (sensors/actuators) are connected to the IO-Link USB-Master at the M12 socket **IO-Link** via 3-, 4- or 5-pin cord sets with A-coded, M12 plug and socket.

NOTICE

- When connecting IO-Link devices with a current consumption of more than approx. 40 mA at +24 V DC, it is important to connect the plug-in power supply unit to the IO-Link USB-Master! This is also applicable for switch-on/starting currents where appropriate.

2.1.3 IO-Link Device DTM (User Interface + IODDs)

That followed, execute the **IOLinkDTM_Setup.exe** file located in the **\02_IOLink\02b_IOLinkDTM_Vx.x.x** directory.

Please, follow the instructions on the screen.

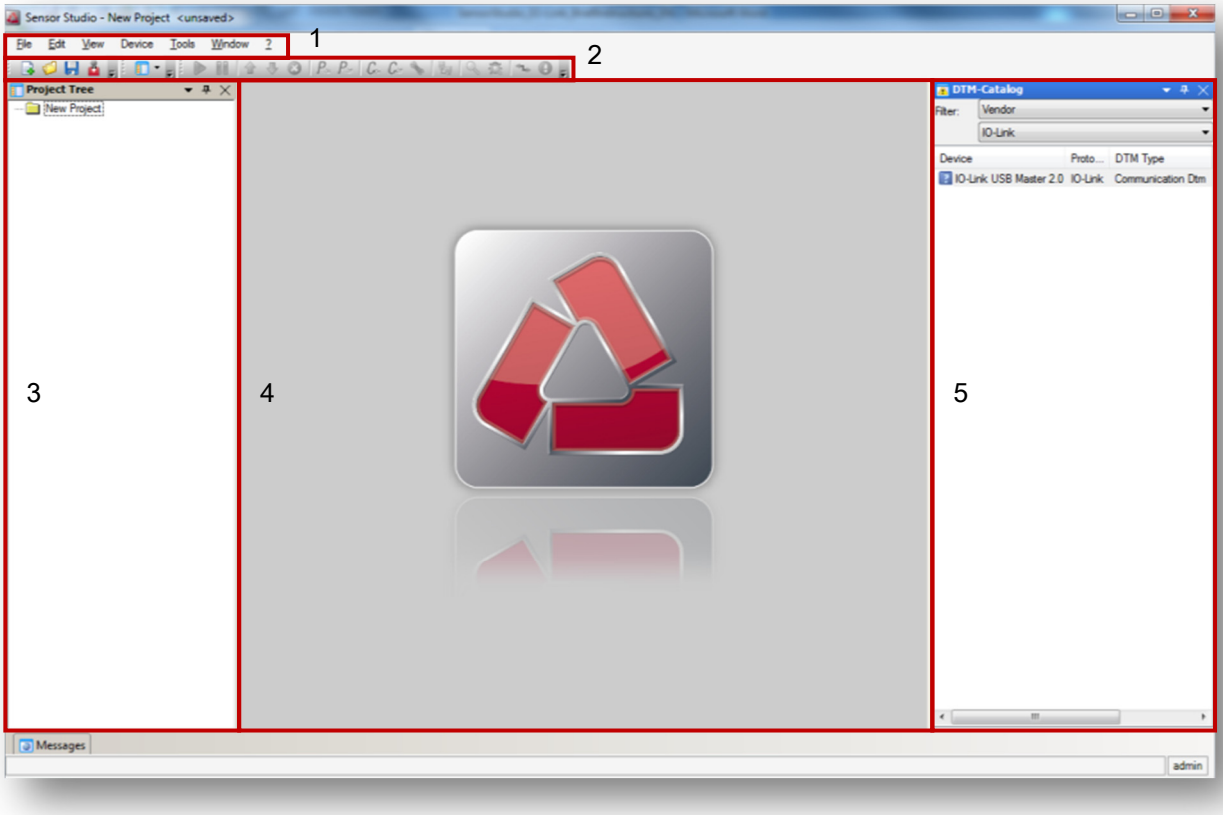
3 First Steps

3.1 Starting the Sensor Studio

To start the Leuze electronic Sensor Studio, double-click on the program icon on the desktop

or click on **All Programs** in the start menu and then on the **Leuze electronic ➔ Sensor Studio**.

3.2 Program Interface

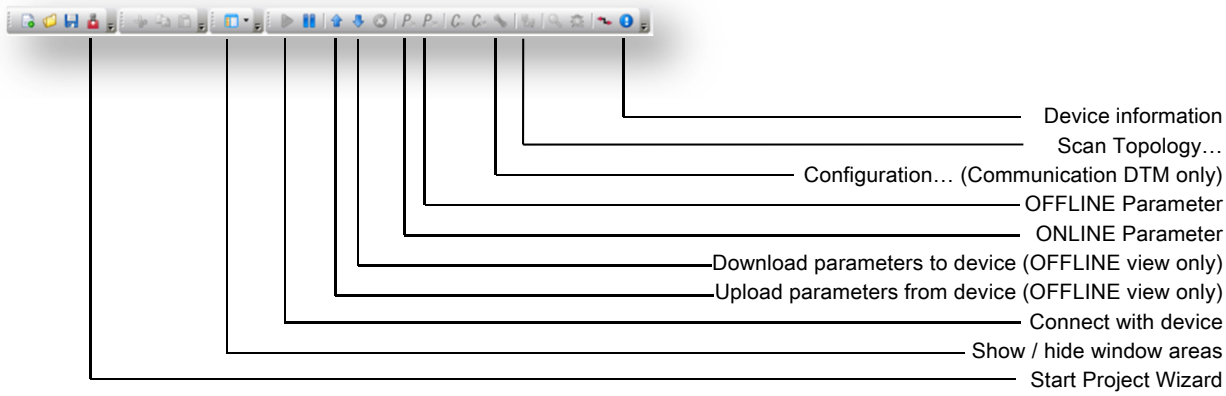


1. Menu Bar
2. Toolbar
3. Window area “Project Topology”
4. Window area “Device Data”
5. Window area “Device Catalog”

In the window area **Project Topology**, the configured devices are shown. In the first level of the topology the communication interface is shown; in the second level the sensor, which is connected to the interface follows.

In the window area **DTM-Catalog** all devices are listed, their communication DTM or Device DTM is installed. These can be filtered by manufacturer or communication interface.

3.3 The Toolbar



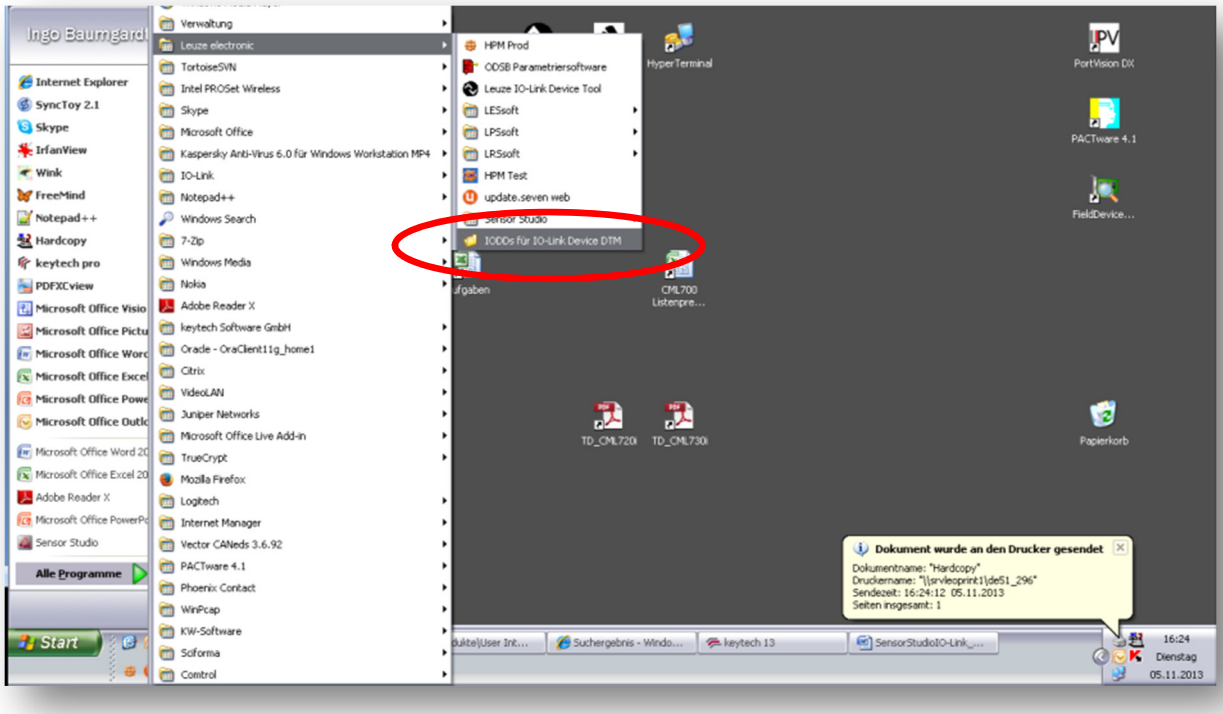
3.4 Import Device Description (DTMs + IODDs)

Device specific DTMs are always installed using a setup program referencing the DTM in the Windows registry. Therefore, you can at any time uninstall these programs using the Windows Control Panel.

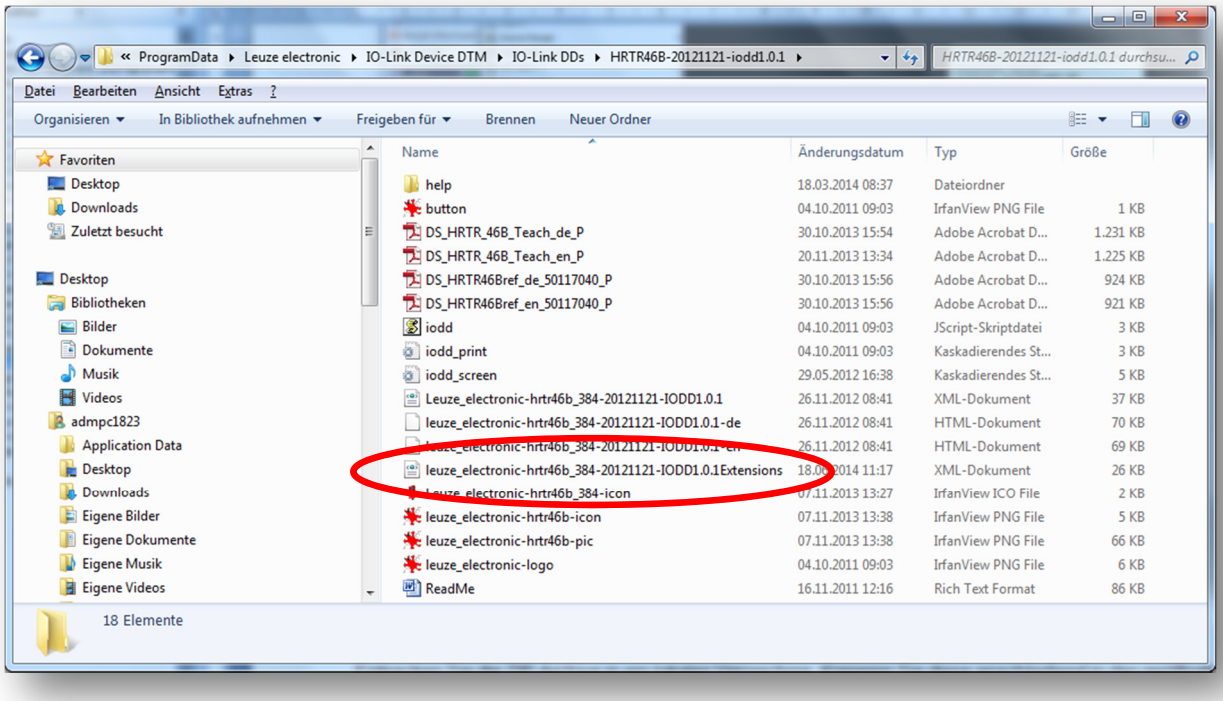
The setup of Leuze electronic IO-Link Device DTMs also contains the valid Leuze electronic IODDs and the necessary extensions for the operation with the Sensor Studio. For an update of the IODDs, simply run the setup of the current Leuze electronic IO-Link Device DTMs.

In order to manually add any IO-Link devices from Leuze electronic to the DTM-Catalog of the Sensor Studio, open the file directory containing the installed device descriptions IODDs:

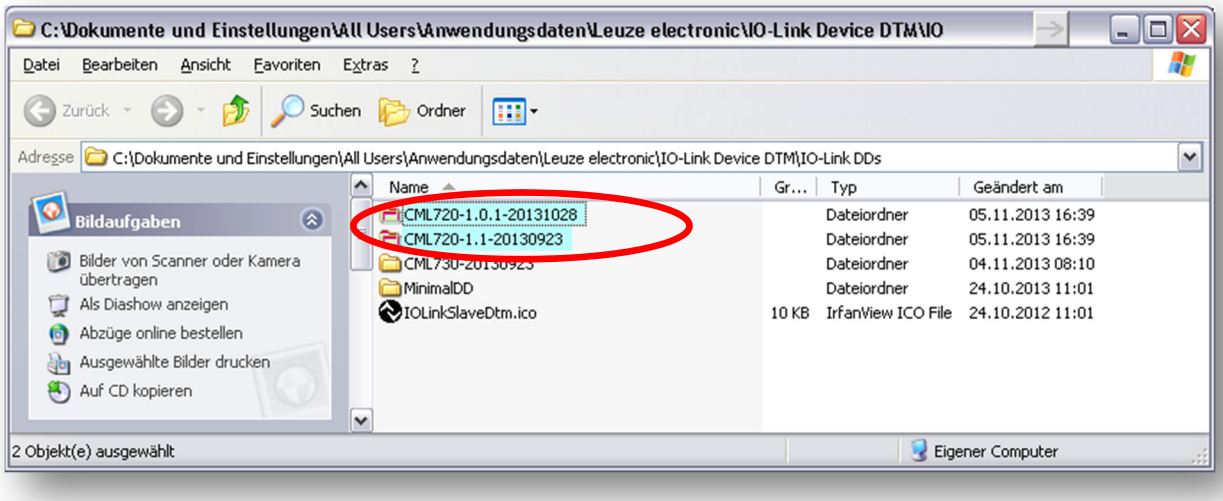
START ➔ All Programs ➔ Leuze electronic ➔ IODDS for IO-Link device DTM



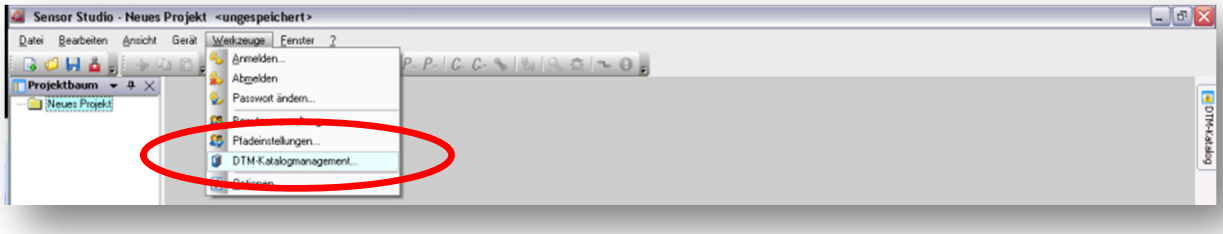
Please make sure having the required IODD extensions at hand in addition to the device-specific IODDs. The IODD extensions control the graphical visualization of the IO-Link parameter and process data in the Sensor Studio.



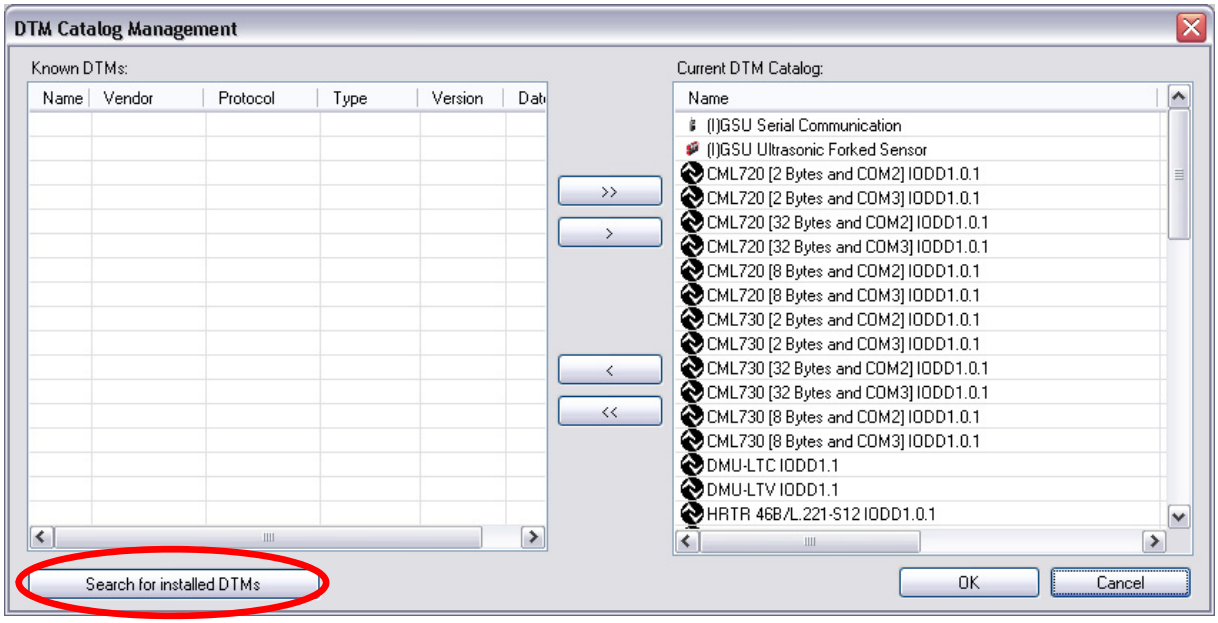
Please copy the file directory containing the IO-Link device description IODD and the corresponding extension file to **IODDs for IO-Link device DTM**:



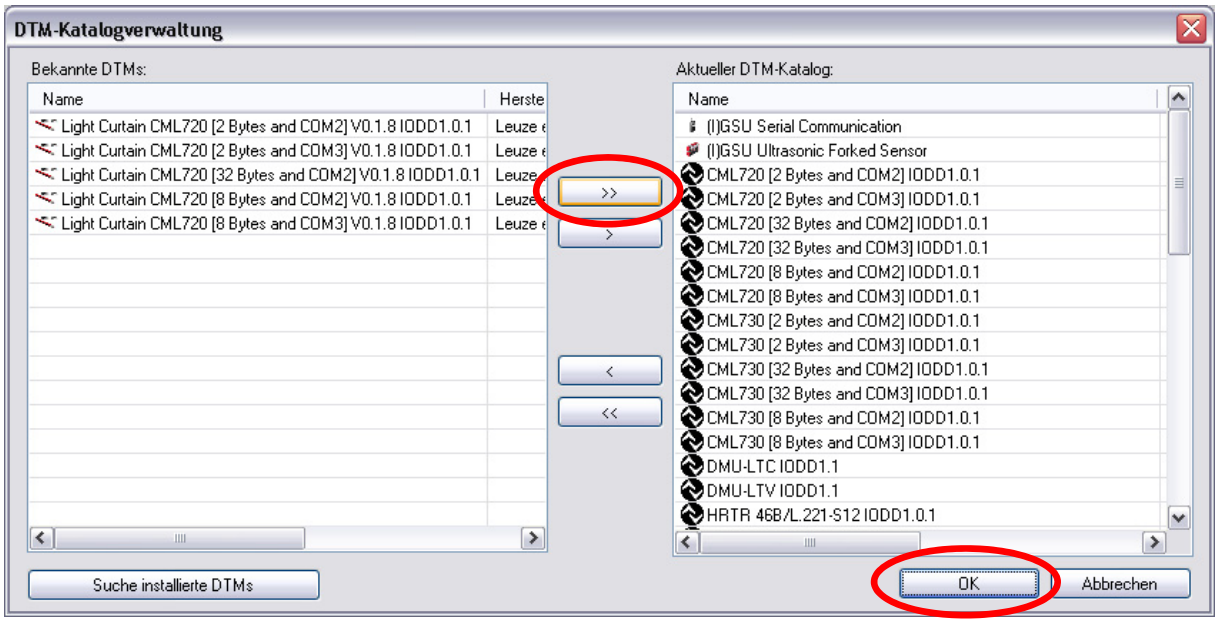
Having started the Leuze electronic Sensor Studio (see Chapter 3.1) please launch the device catalog management by selecting **Tools ➔ DTM-Catalog Management…**



Next, you may start the automatic search for new devices: ➔ **Search for installed DTMs**



Please transfer the newly found devices to your local catalog and confirm with OK:



Now, you can create a new Sensor Studio project to configure the newly installed devices (see Chapter 4).

3.5 Exit the Sensor Studio

When finished, the Sensor Studio can be closed by the command **Exit** in the **File** menu.

The last configuration can now be stored to the computer and can then be opened with the **Project Wizard** or by the command **Open** in the menu **File** again.

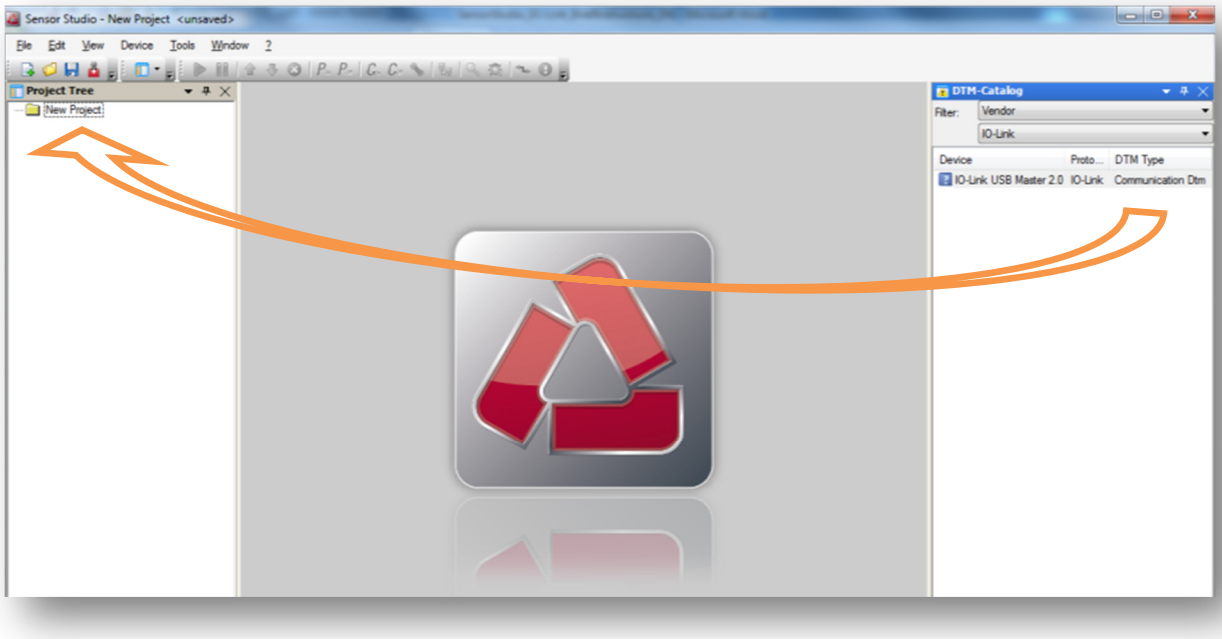
4 Device Configuration

4.1 Setting up a project

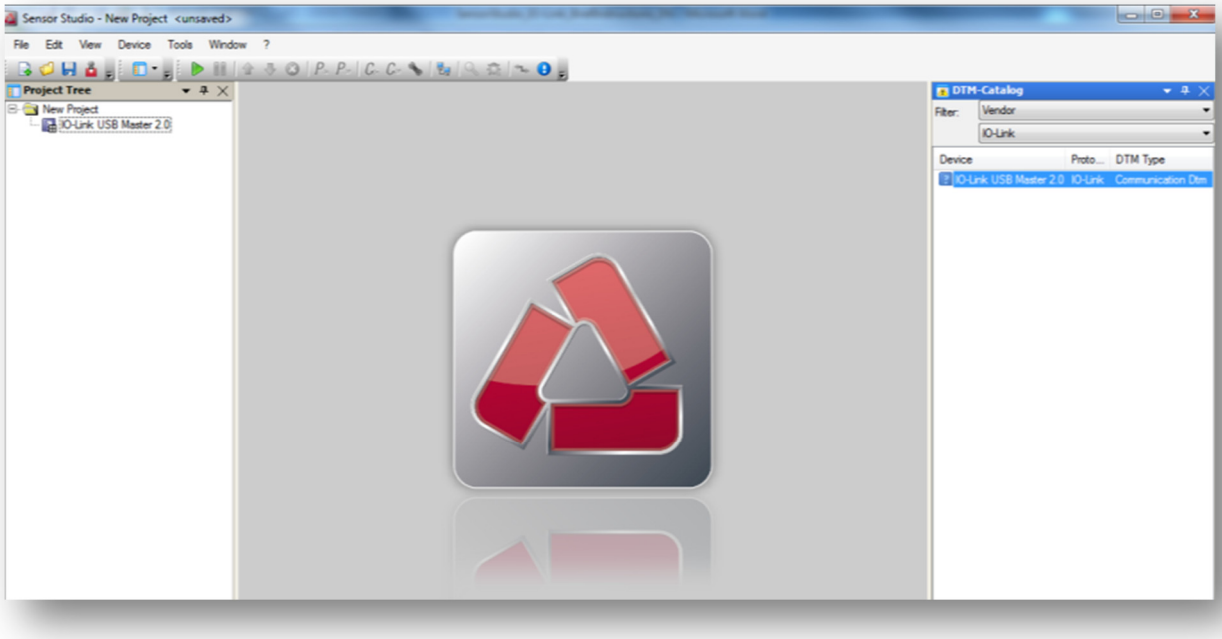
In the **File** menu select the **New** menu item to set up a new project.
The topology of the **Project Tree** is empty without any selected devices.

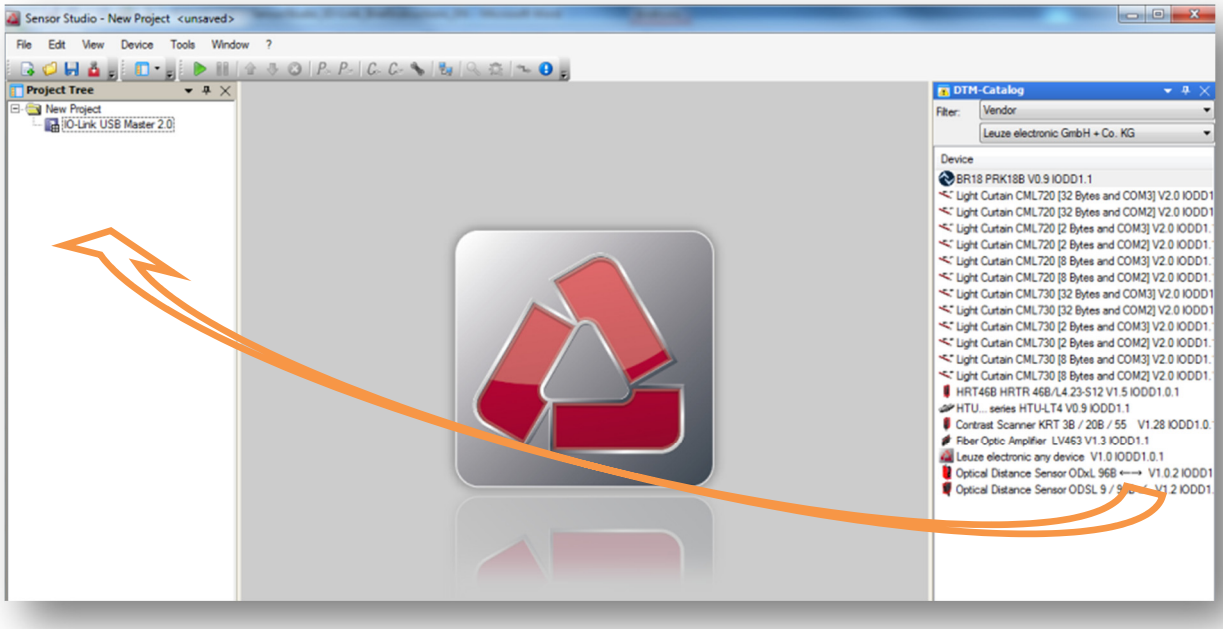
4.2 Set up a topology

4.2.1 Select a device from the DTM-Catalog

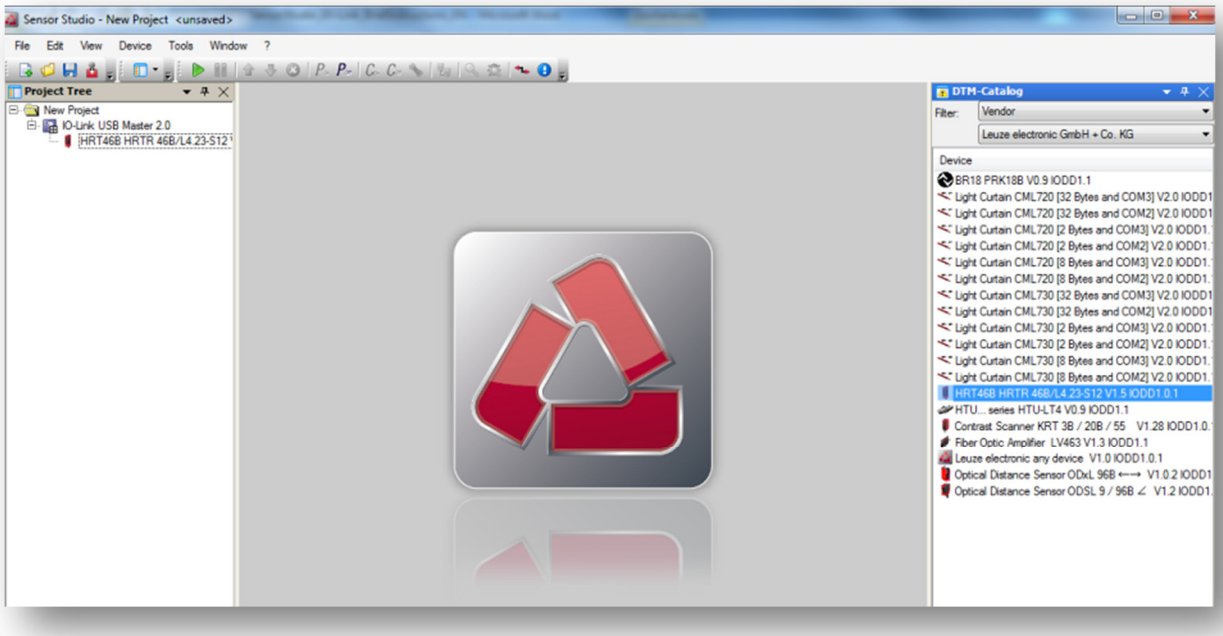


Select the IO-Link Master 2.0 USB as the communication interface out of the DTM-Catalog and connect it per Drag&Drop to the Project Tree. Preset the filter to Manufacturer and then **IO-Link**.



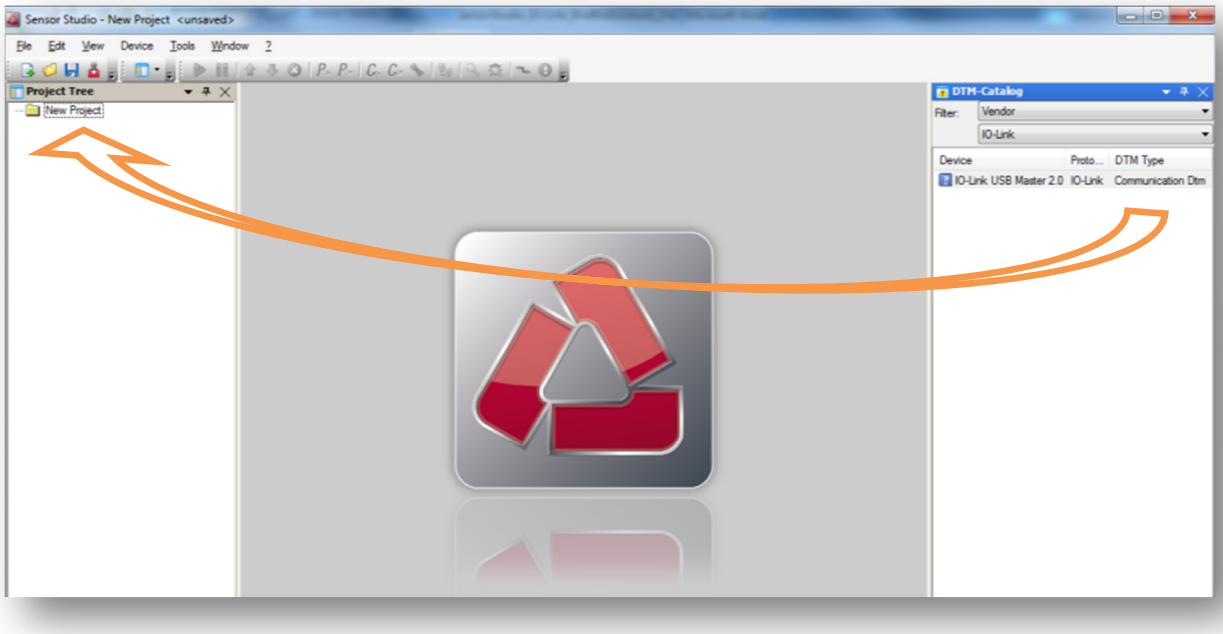


Then select the sensor you want to run on the IO-Link USB Master. Preset the filter of the DTM-Catalog to **Manufacturer** and then **Leuze electronic GmbH + Co. KG**.

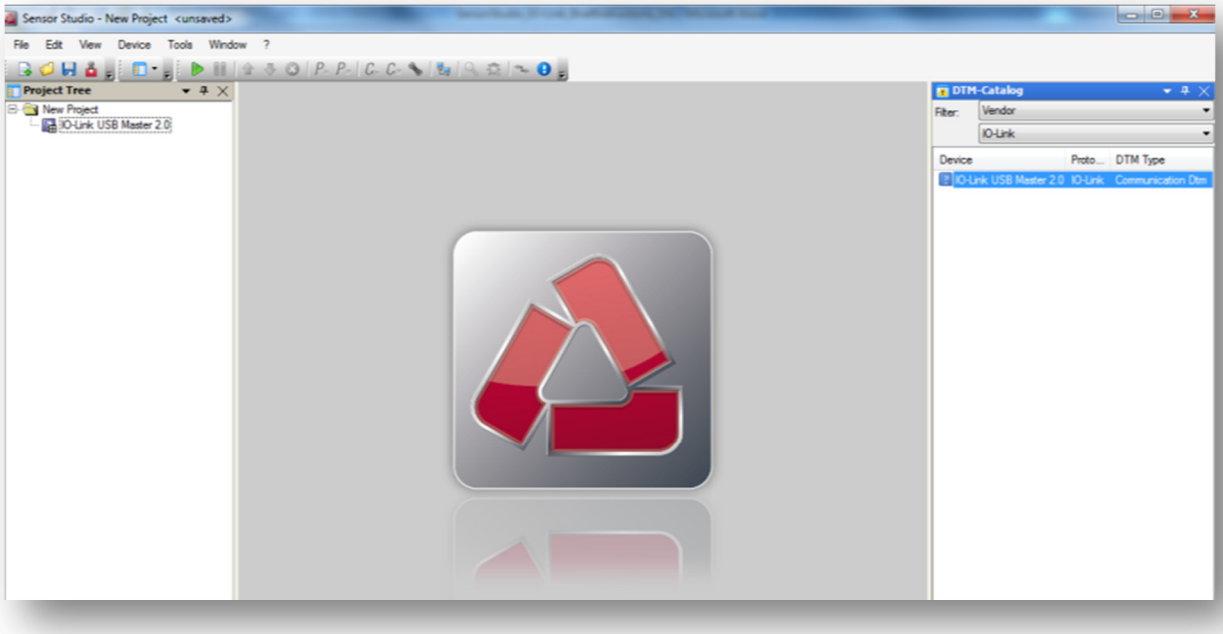


Next, you may start the communication with the device. To do so, please follow the description of Chapter 4.4.

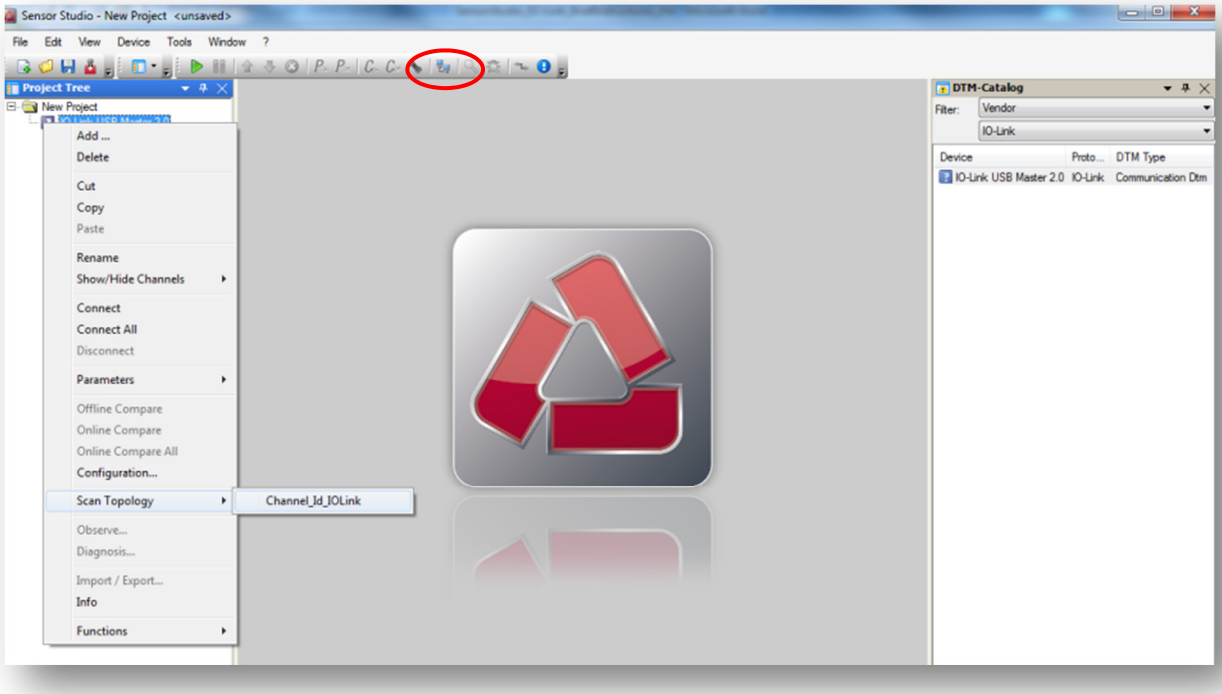
4.2.2 Select a device by IO-Link topology scan



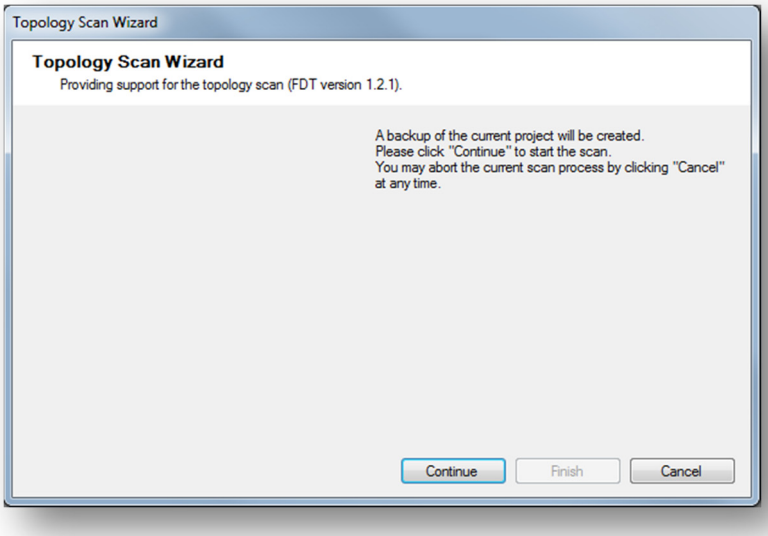
Select the IO-Link Master 2.0 USB as the communication interface out of the DTM-Catalog and connect it per Drag&Drop to the Project Tree. Preset the filter to **Manufacturer** and then **IO-Link**.



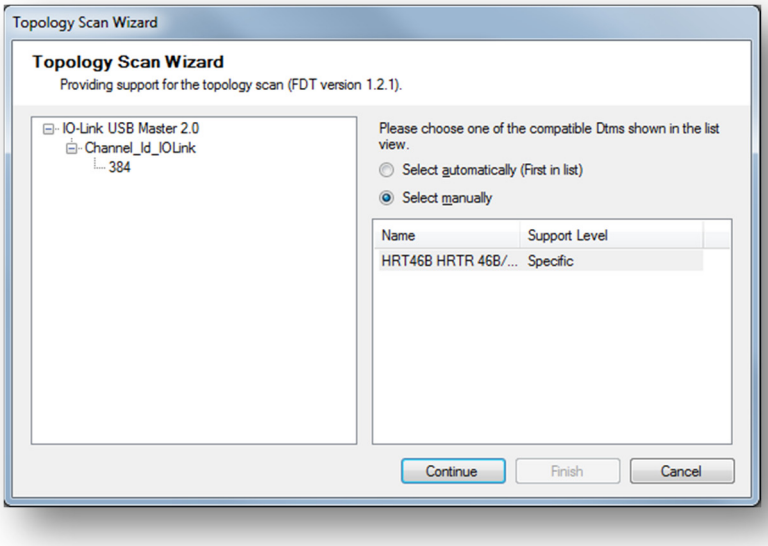
Click with the right mouse button on the entry **IO-Link USB master 2.0** in the Project Tree. From the context menu, select the function **Scan Topology… ➔ Channel_Id_IO link**.



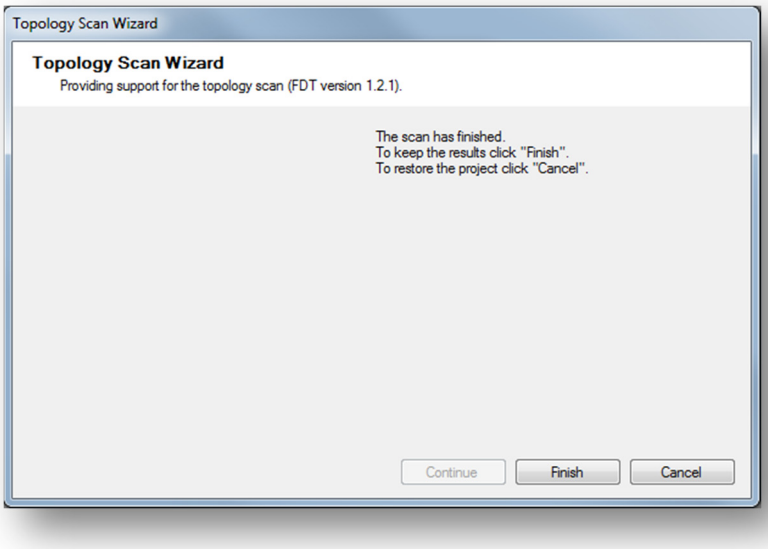
Alternatively, start the topology scan wizard from the toolbar. To do this, click the button **Scan Topology ...**



Start the topology scan with the button **Continue**.



Confirm the scanned device to be integrated in your project topology. Click to the button **Continue**.

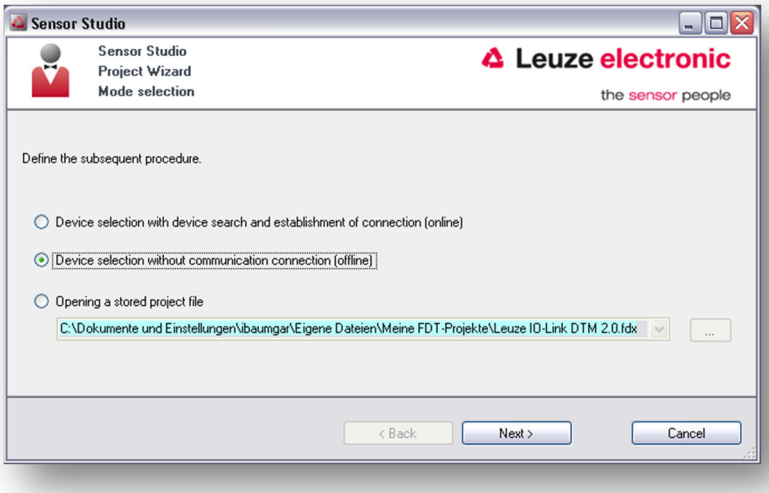


Confirm the final confirmation prompt, click to the button **Finish**. The Topology Scan Wizard now integrates the sensor selected in the project tree.

Next, you may start the communication with the device. To do so, please follow the description of Chapter 4.4.

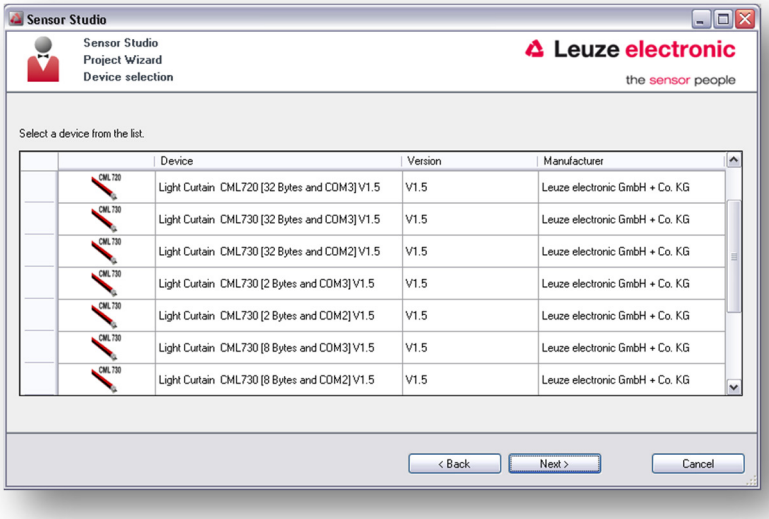
4.3 Select IO-Link Device with the Project Wizard

Prior to the main software, the Project Wizard helps you to establish the communication with the connected device:



Alternatively, you may start the Project Wizard by clicking on the button **Project Wizard** in the toolbar:

By clicking on the **Next >** button, a list containing all installed Leuze electronic IO-Link device descriptions (IODD) will be shown:



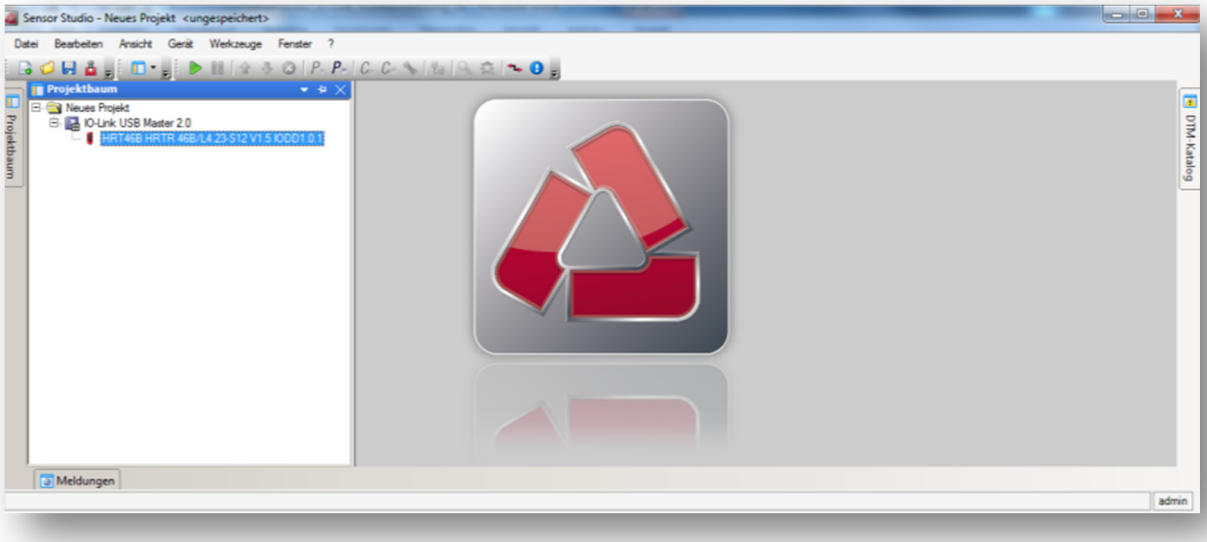
Select the reference of the connected IO-Link device. By clicking on the **Next >** button, the Sensor Studio will start with the OFFLINE view of the selected device

Next, you may start the communication with the device. To do so, please follow the description of Chapter 4.4.

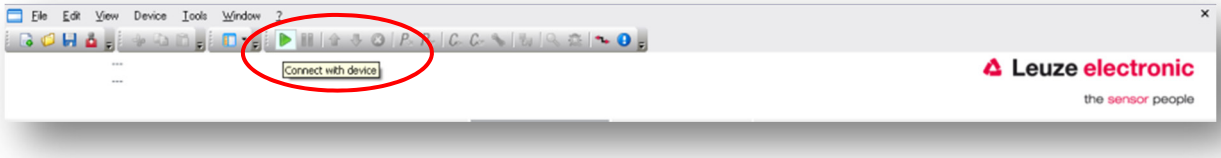
4.4 Connect with Device

Before you may change any configuration parameter of the device, or read any process data from the device, an online connection needs to be established.

Please select the device entry in the **Project Tree** with the left mouse button:



Next, you may start the communication by clicking on the button **Connect with Device**:



Now, you can configure the connected device. Please follow the descriptions in Chapter 5.

5 Device Configuration

The configuration of IO-Link sensors in the Sensor Studio can be done in two ways:

ONLINE-Configuration

During the ONLINE-Configuration, the data displayed in the Sensor Studio are the current device settings. Changes will be immediately effective in the device (see chapter 5.1).

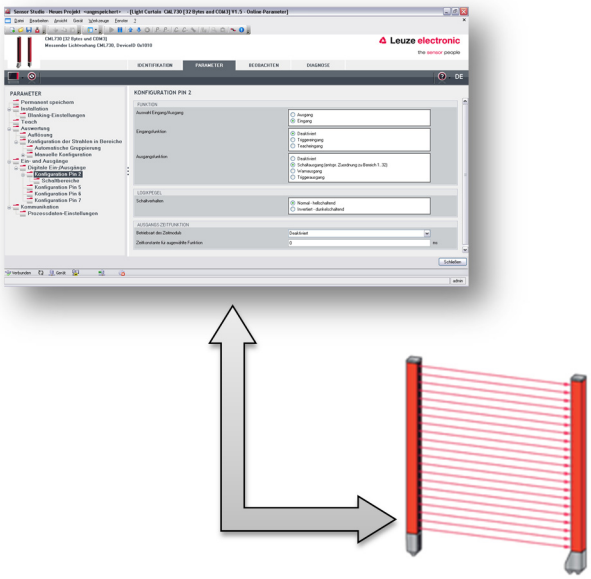
OFFLINE-Configuration

In the OFFLINE-Configuration, the individual parameters are kept in an instance dataset on the PC. Changes are initially effective only in this instance dataset.

In order to transfer the changes to the device a parameter download must explicitly be performed (see chapter 5.2).

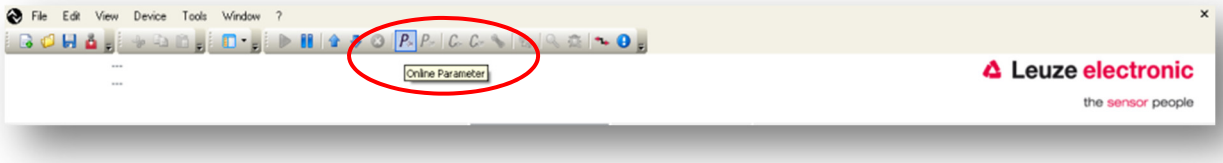
The instance dataset can be stored on the PC or can be reloaded from the PC using the OFFLINE view (see chapter 5.2.1).

5.1 ONLINE-Configuration



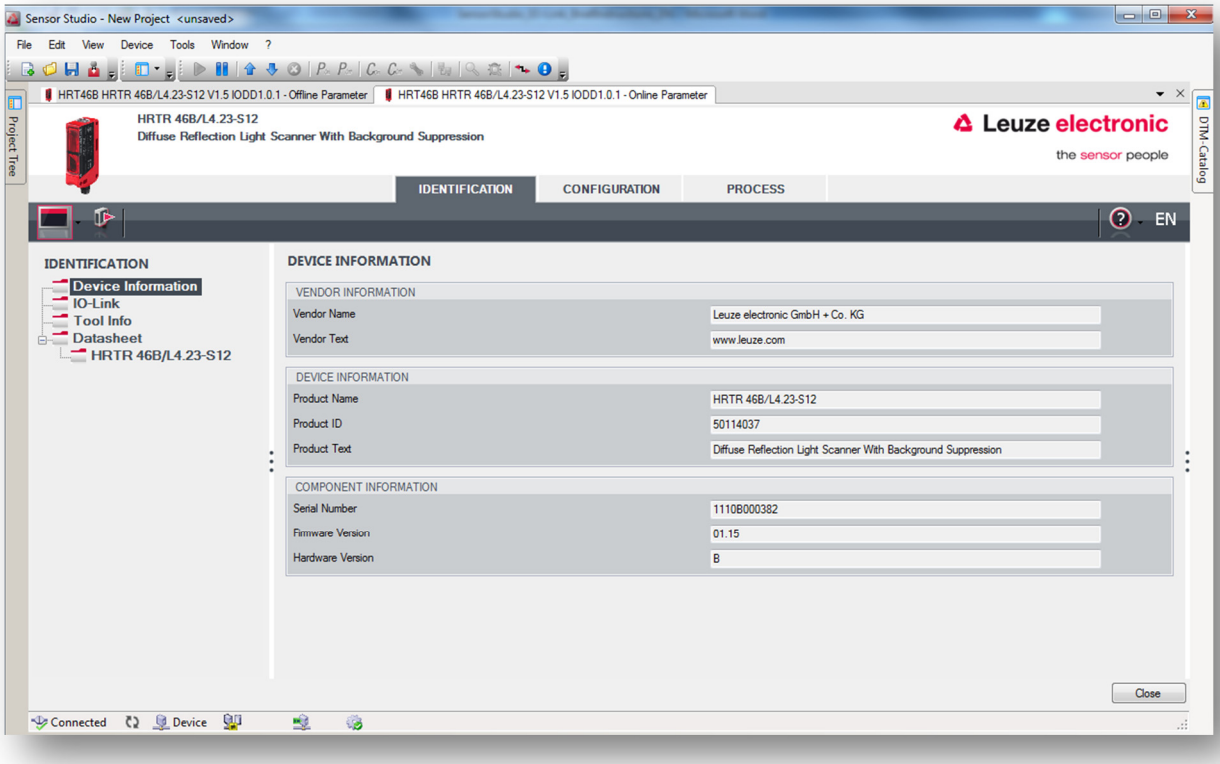
Select the **ONLINE configuration** if you want to test individual device functions. In this mode, changes are transferred and enabled immediately into the device.

By clicking on the button **Online Parameter**, the online view is started:

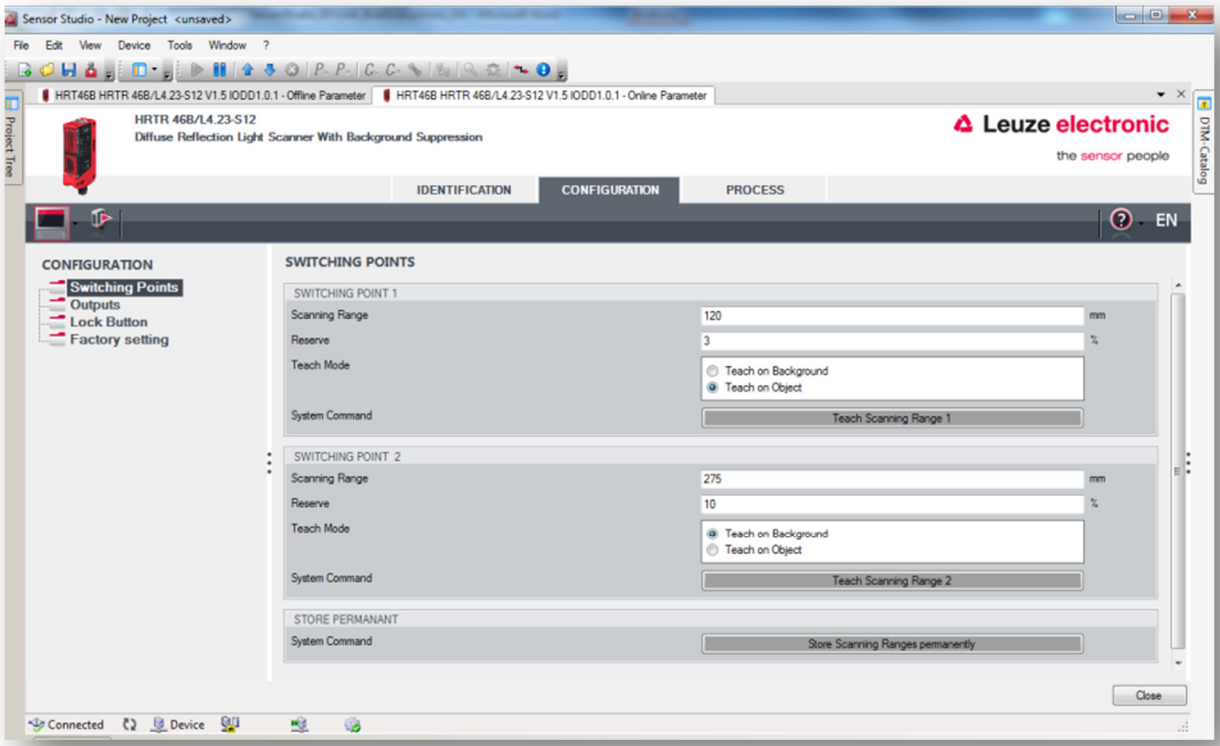


The IO-Link USB-Master is now synchronizing all parameters with the data of the connected device.

The register **IDENFIKATION** displays all relevant device characteristics and links to the technical documentation:

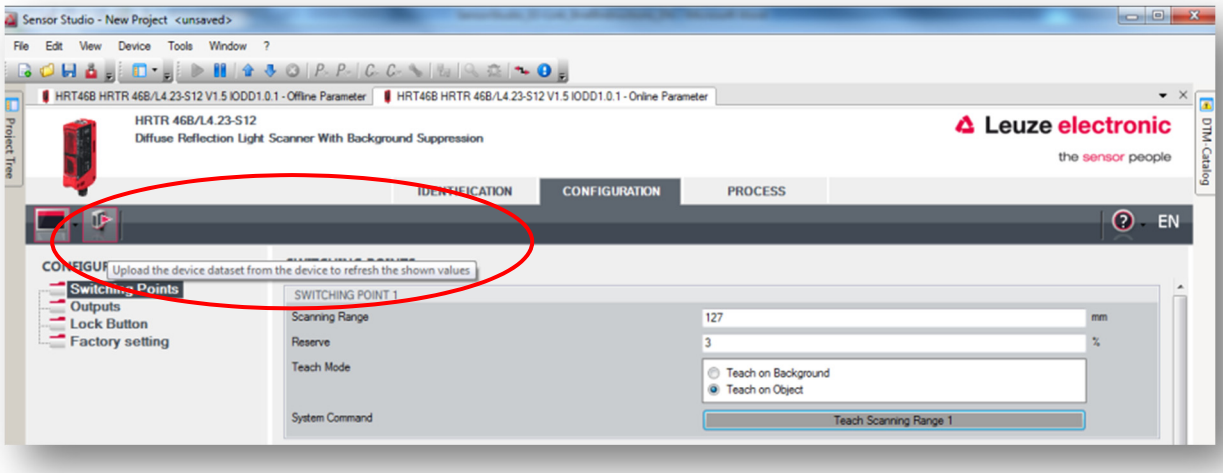


The register **CONFIGURATION** displays the actual device configuration:



Several views allow changing individual parameters. Changes will become effective immediately in the device.

To reload / update the configuration from the sensor, please click on the **UPLOAD** button in the DTM toolbar, only:



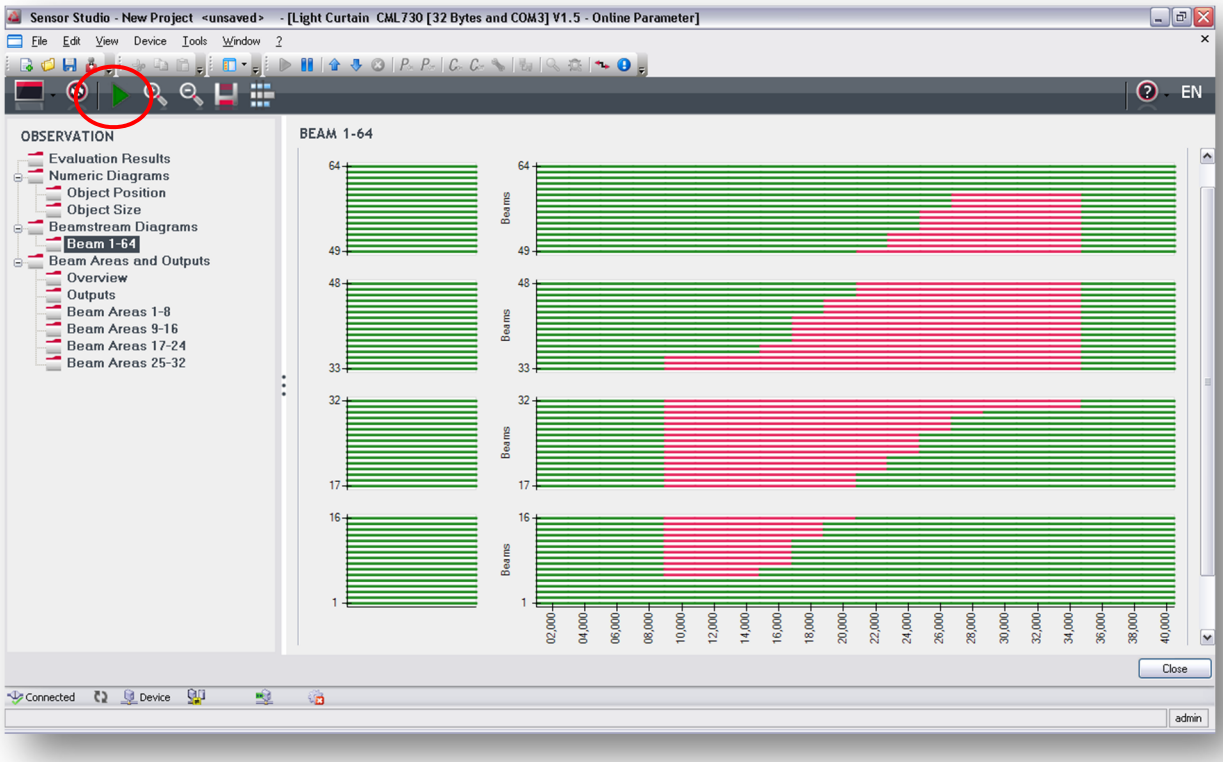
NOTICE

- The UPLOAD / DOWNLOAD buttons in the toolbar of the Sensor Studio are not effective in die ONLINE view of the IO-Link Device-DTM.

The register **OBSERVATION** offers different visualization of the measurement data of the device:

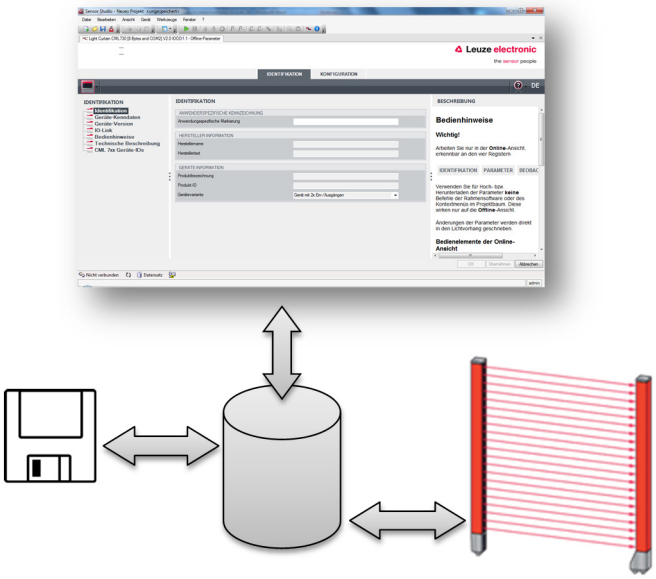
NOTICE

- The cyclic update of the measurement values is started by clicking on the button **START**.



Please refer to the Sensor Studio online help and the information given in the graphical user interface itself for additional functionality of the software.

5.2 OFFLINE-Configuration



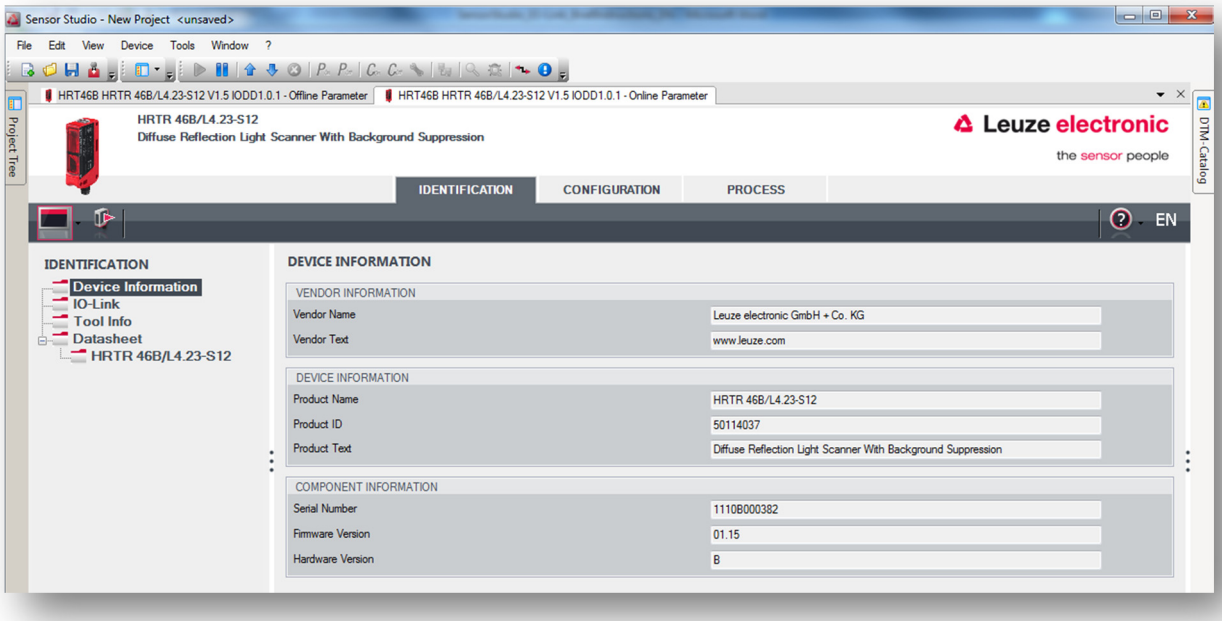
In the **OFFLINE-Configuration**, the individual parameters are kept in an instance dataset on the PC. Changes are initially effective only in this instance dataset.

The OFFLINE view shows only the registers IDENFICATION and CONFIGURATION. Cyclic process cannot be read from the device.

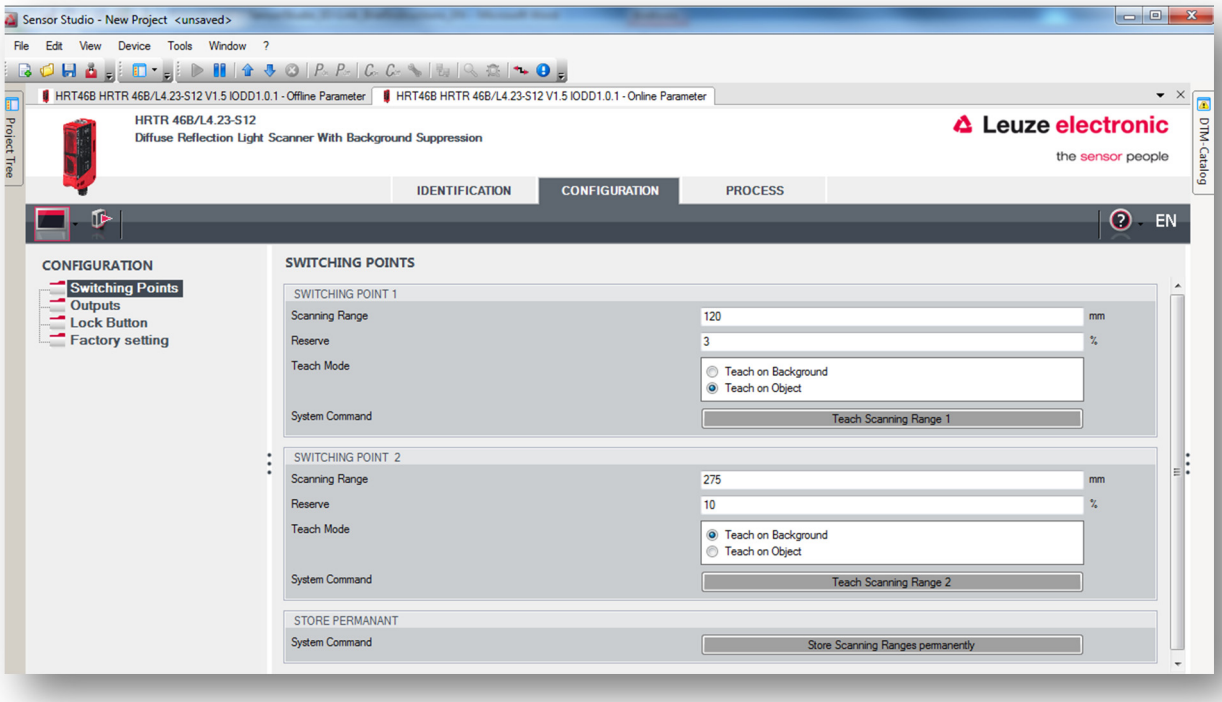
By clicking on the button **Offline Parameter**, the OFFLINE view is started:

To edit the data of the connected device, you need to upload the actual configuration from the device first. To do this, click the button **Upload from the device** in the toolbar of the Sensor Studio:

The register **IDENTIFICATION** displays all relevant device characteristics and links to the technical documentation:



The register **CONFIGURATION** displays the actual device configuration:



Several views allow changing individual parameters. Changes only become effective with a parameter download.

To do this, click the button **Download to the device** in the toolbar of the Sensor Studio:

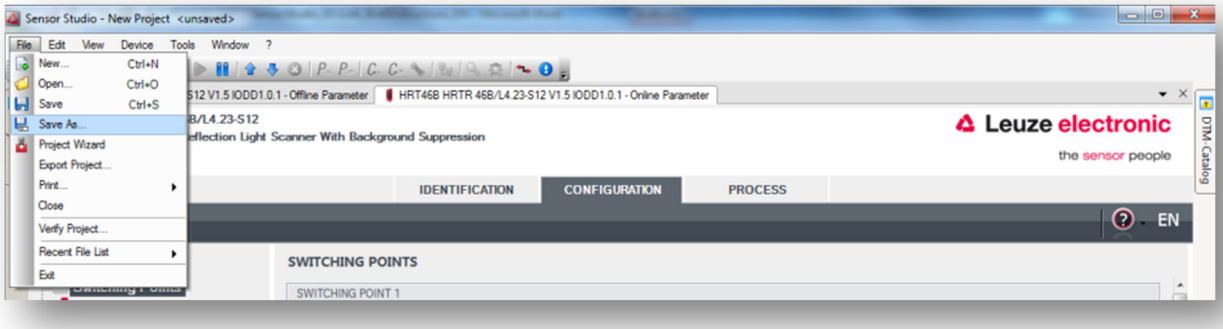
5.2.1 Save configuration to the PC

In the OFFLINE view, the instance dataset can be stored to the PC and loaded again from there. In this way, devices of the same type can be configured uniformly (duplicated).

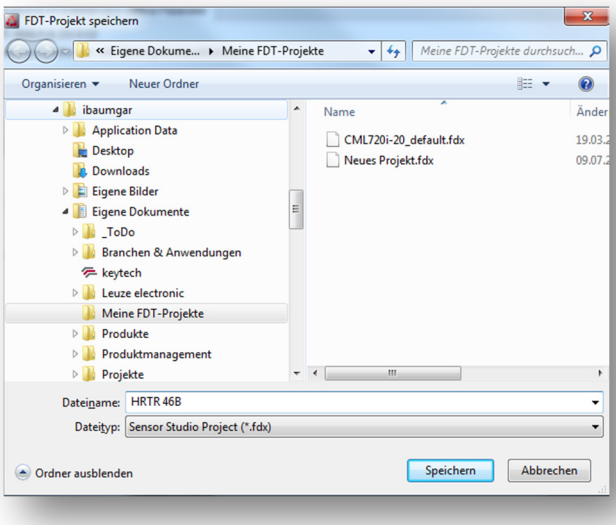
To do this, proceed as follows:

Please upload the actual configuration from the device. To do this, click the button **Upload from the device** in the toolbar of the Sensor Studio:

Next you can save the Sensor Studio project including all device settings to your PC. To do this, please select **Save as…** in the **File** menu:



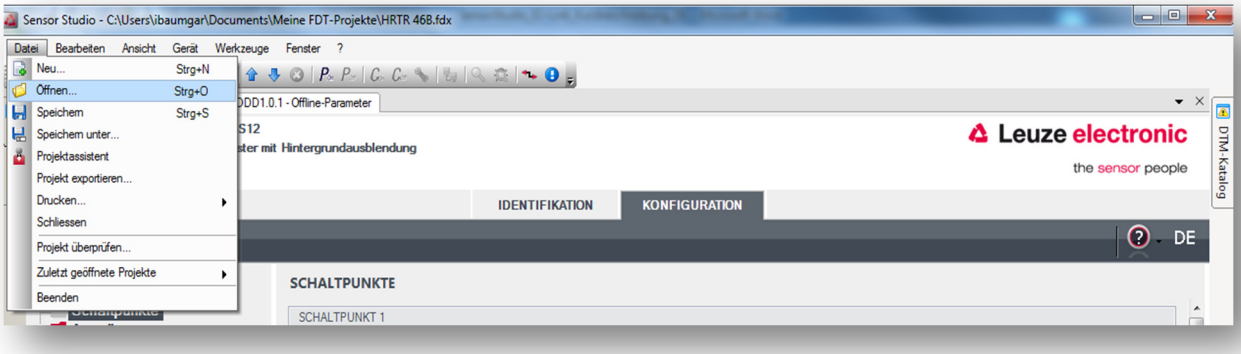
Define a representative name of your project:



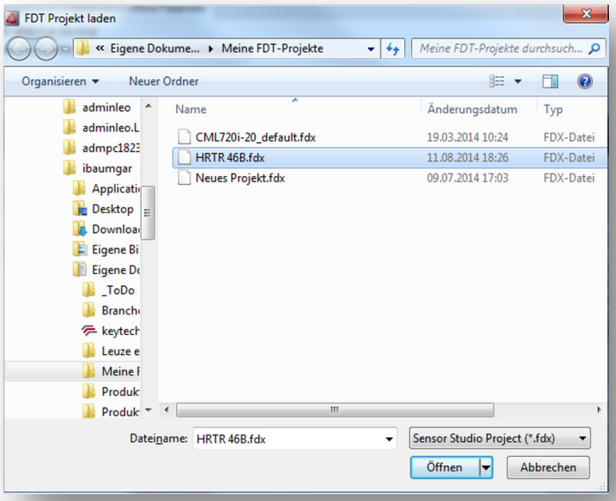
You can then close the project in Sensor Studio and, if desired, exit the program.

5.2.2 Load Configuration from PC

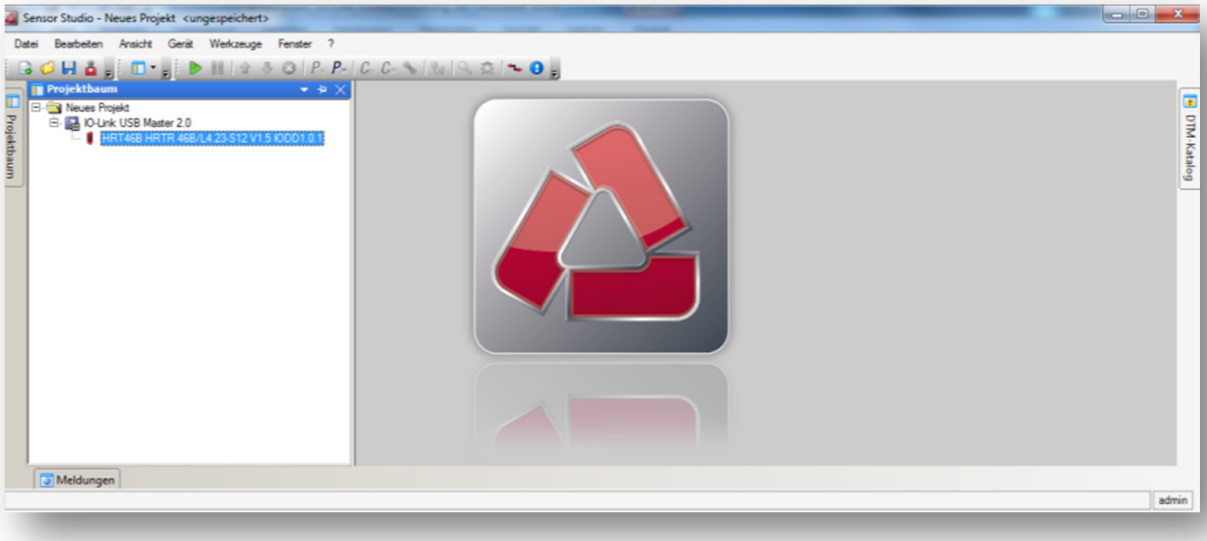
In order to download a stored configuration to a sensor, please start the Sensor Studios and then open the project file corresponding to the connected device. To do this, please select **Open**… in the **File** menu.



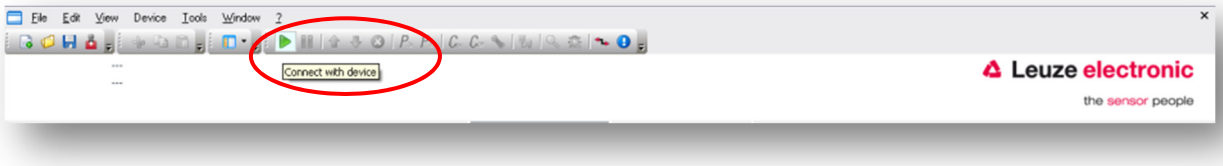
Confirm the file selection:



Activate the sensor in the **Project Tree** with the left mouse button.



Next, you may start the communication by clicking on the button **Connect with Device**:



By clicking on the button **Offline Parameter**, the OFFLINE view needs to be started…

Then the configuration can be transferred to the device.
To do this, click the button **Download to the device** in the toolbar of the Sensor Studio:

NOTICE

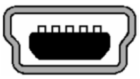
- Some sensors apply the configuration only in the volatile memory (RAM). To save the data permanently, an explicit SAVE command must be transmitted after downloading the parameters.
- Please follow the instructions of the technical description of the device.

6 Specifications IO-Link USB-Master

6.1 USB connection

The USB connection serves as communication interface between the interface and the PC. The connection can be realized through the enclosed cable.

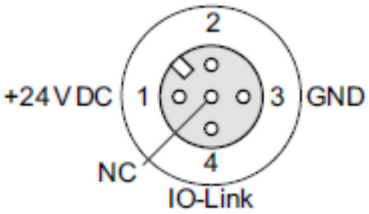
	Signal	Function
Pin 1	+5V	VBUS +5VDC/500mA
Pin 2	D-	Data -
Pin 3	D+	Data +
Pin 4	ID	not connected
Pin 5	GND	Ground



6.2 IO-Link connection

M12 connector, A-coded: Interface to a sensor / actor with IO-Link.

	Signal	Function
Pin 1	+24V	+24V 1.0 A / 80mA
Pin 2	SIO	SIO -
Pin 3	GND	0V
Pin 4	IO-Link	IO-Link
Pin 5		NC



6.3 LED display

The light emitting diodes on the USB IO-Link Master have the following meaning:

Inscription	Color	Meaning
PWR	Yellow	Indicates Power from USB Port
CH1 (C/Q)	Green	IO-Link Mode The LED blinks slowly, if there is no IO-Link connection, blinks fast in pre-operate and flashes if the IO-Link connection is active (operate).
	Yellow	SIO Mode
CH1 (DI/DO)	Yellow	Indicates state of SIO mode
Error	Red	Flashes in case of errors (short circuit, errors in data transmission).

7 Types and Accessories

SET MD12-US2-IL1.1		**50121098**
Including	IO-Link USB-Master V2.0	
	International plug-in power supply unit	
	High-Speed USB 2.0 cable, USB-A to Mini-USB	

7.1 Adapter cable for HRTR 46B, ODSL 9, ODS(L) 96B:

K-DS M12A-M12A-4P-2m-PVC		**50110126**
Cord set:	M12, 4 pins, male	
	PVC cable, length 2,000 mm	
	M12, 4 pins, female	
K-DS M12A-M12A-4P-5m-PVC		**50110125**
Cord set:	M12, 4 pins, male	
	PVC cable, length 5,000 mm	
	M12, 4 pins, female	

7.2 Adapter cable for KRT 3B / 53 / 55, LVS 463:

K-DS M8A-M12A-4P-0,3m-PVC		**50107276**
Cord set:	M12, 4 pins, male	
	PVC cable, length 300 mm	
	M8, 4 pins, female	

7.3 Adapter cable for CML 700i:

K-DS M12A-8P-4P-2m-L-PUR		**50120999**
Cord set:	M12, 4 pins, male	
	PUR cable, length 2,000 mm	
	M12, 8 pins, female	
K-DS M12A-8P-4P-5m-L-PUR		**50121000**
Cord set:	M12, 4 pins, male	
	PUR cable, length 5,000 mm	
	M12, 8 pins, female	