

# DNNF005

Software wTeach2



**Operating Instructions**

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# 1. Introduction

## 1.1. Intended Purpose and Use

Our general terms and conditions of business apply. By downloading the software, you acknowledge that you have read and accepted the general terms and conditions of business included on our website at [www.wenglor.com](http://www.wenglor.com). wTeach2 is used to configure wenglor sensors via an interface.

# 2. Installation

## 2.1. System Requirements

### Recommended Hardware

Processor: 1.6 GHz  
RAM: 2 GByte  
Hard disk: 200 MByte of available memory capacity

### Operating System

- Windows 7
- Windows 10

## 2.2. Installation Procedure

1. Download the latest version of wTeach2 from [www.wenglor.com/product/DNNF005](http://www.wenglor.com/product/DNNF005).
2. Run the setup program: "Install\_wTeach2x". Depending on your Windows version and the selected memory location, administrator rights may be required to this end.
3. Follow the instructions displayed by the installation program.
4. Depending on the utilized interface, the corresponding drivers should be installed.
5. The operating system's safety precautions are retrieved during initial installation. Communication with wTeach2 should be enabled in order to be able to make use of the full scope of wTeach2 functions.



wTeach2 software is installed.

The language setting for the software is the same as the one selected for installation. If a different language is desired, it can be selected under "Language" in the menu bar.

## 2.3. Updating the Software

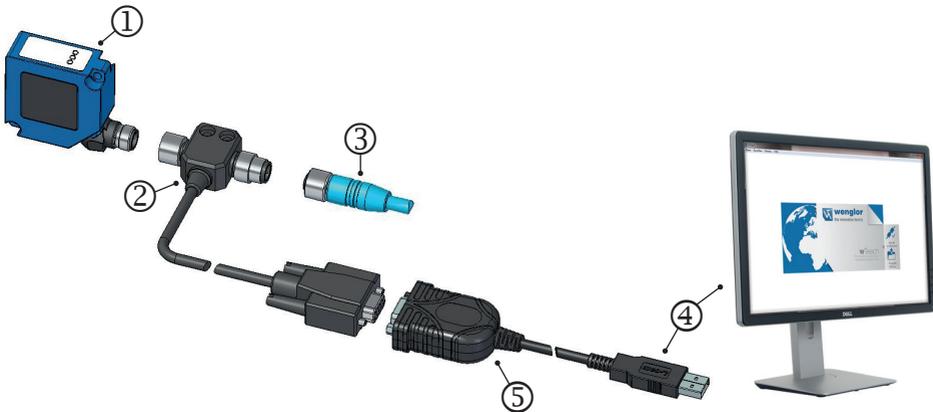
Updating is not executed automatically by the software. Software updates have to be performed manually.

1. Uninstall current wTeach2 software using the "Software" function in the Microsoft Control Panel.
2. The latest software version is available from the download area at our website: [www.wenglor.com](http://www.wenglor.com).
3. The new software is installed as described in section „2.2 Installation procedure“ on page 4.

## 3. Connection

### 3.1. RS-232

1. Sensor (from section „1.1 Intended Purpose and Use“ on page 4)
2. Connecting cable (S232W3)
3. Connecting cable
4. PC with RS-232 interface
5. Or USB adapter (AB-USB01)



### 3.2. RS-232 with adapter box

1. Sensor (from section „1.1 Intended Purpose and Use“ on page 4)
2. Adapter box with cable (A232)
3. Connecting cable
4. PC with RS-232 interface
5. Or USB adapter (AB-USB01)



### 3.3 NFC

1. Sensor (from section „1.1 Intended Purpose and Use“ on page 4)
2. NFC-USB-Tool (ZNNG021)
3. PC with USB-Port



### 3.4 IO-Link

1. Sensor (from section „1.1 Intended Purpose and Use“ on page 4)
2. IO-Link Master (EFBL003)
3. PC with USB-Port



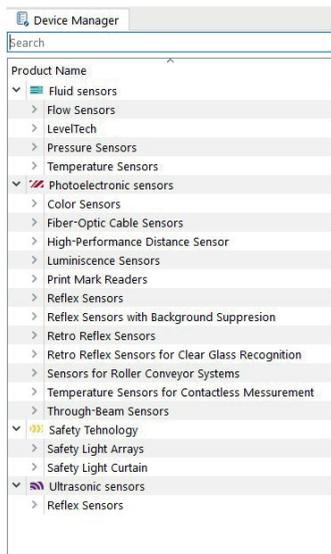
## 4. Software Layout

### 4.1. Getting Started



Before starting the program, it should be ensured that the sensor is connected to the computer. If the sensor is not connected until after the program has been started, the program has to be exited and restarted. After the program has been started, the following initial window appears and the software offers various options.

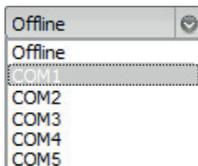
#### 4.1.1. Connecting a Device



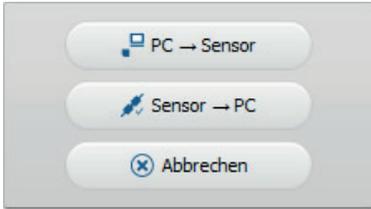
The software opens the “Device Manager” and a window for “Detected Devices”.

The software starts the device manager (File → Connect device). All of the sensors which can be connected to wTeach2 are listed in the device manager. After double clicking the desired sensor, a window for the respective sensor appears. Further windows can also be opened by double clicking again. Any desired number of sensors can thus be operated simultaneously in wTeach2.

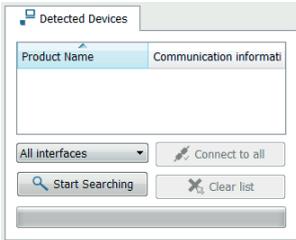
Offline settings can be entered to the open window.



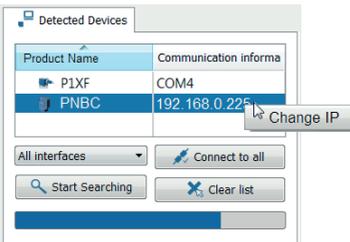
The interface has to be selected in order to connect the sensor.



A subsequent option makes it possible to transfer settings from the computer to the sensor (PC → Sensor), or to read in the settings from the sensor (Sensor → PC).



All sensors are searched for, detected and listed in the “Detected Devices” window along with the utilized interface. After subsequently double clicking a sensor, the respective window is opened and a connection is established immediately. At the same time, the sensor’s settings are transferred to the PC. After clicking “Connect all”, a connection is established with all previously detected sensors.



In the case of sensors with TCP/IP, the IP address can be changed directly by right clicking the appropriate sensor.

### 4.1.2. Opening a Project

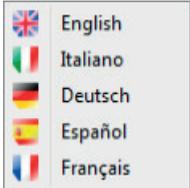


If a project file has been saved to the PC it can be opened, and any existing project can be selected (see section „5.1 Accessing and Saving Settings“ on page 11).

## 4.2. The Menu Bar

The “File”, “Language”, “Window” and “Help” menus are included in the menu bar.

### 4.2.1. Language Selection

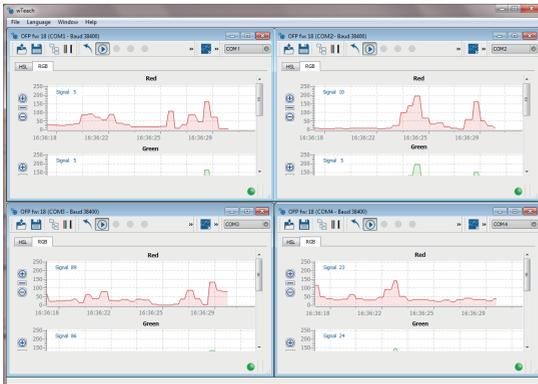
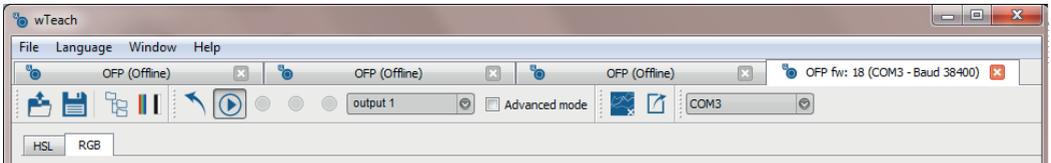


The system language is selected from the language menu in the menu bar. Selection can be made from amongst English, Italian, German, Spanish and French.

### 4.2.2. Window Arrangement

Any desired number of sensors can be connected in the running wTeach2 program. Each connected sensor appears in a separate window. Window arrangement can be varied, and the desired arrangement can be selected in the “Window” menu.

**Tabs:** The tabs option arranges the windows on top of each other. All of the tabs are visible at the top and the various sensor windows can be displayed by clicking the respective tab.

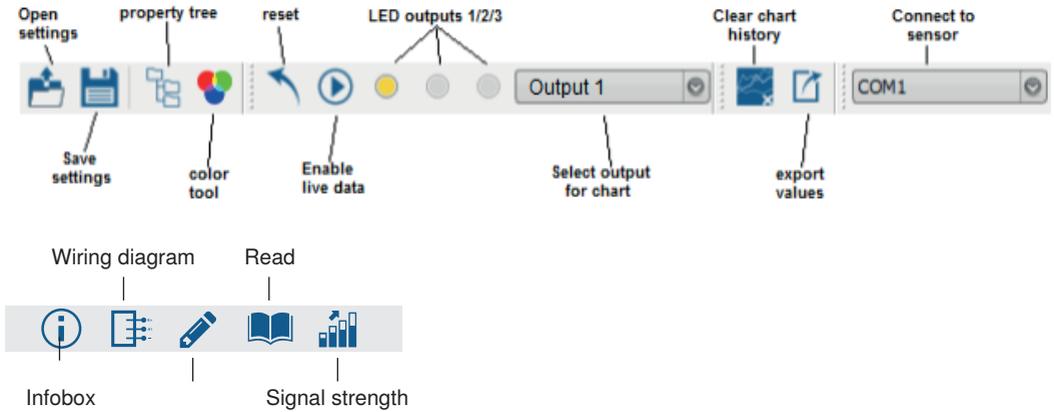


**Side by side:** The windows are arranged next to each other. With this option, all of the windows are in the foreground and visible.



**Cascade:** The windows are arranged individually, one on top of the other.

## 5. Functions



### 5.1. Accessing and Saving Settings

After clicking the open icon, a project which has been saved to the PC can be opened. Project files end with .wts. Sensor settings are stored to the projects. Projects can be edited both online and offline. If a project is opened online, the sensor's momentary settings are overwritten and a corresponding warning is displayed. Momentary sensor settings can be saved by clicking the memory icon. If the respective project will be subsequently transferred to another sensor (of the same type), it's then operated with the same settings and switching thresholds.

### 5.2. Reset

The sensor can be restored to its default settings by clicking the reset icon. Basic settings can be found in the operating instructions for the respective sensor.

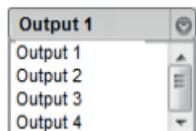
### 5.3. Live Data View

Time	Hue	Saturation	Lightness
15:12:51.746	287	123	420
15:12:51.852	287	123	420
15:12:52.033	165	388	241
Break →	Live data chart was interrupted		
15:32:34.342	341	91	24
15:32:35.108	409	130	45
15:32:35.251	307	87	285

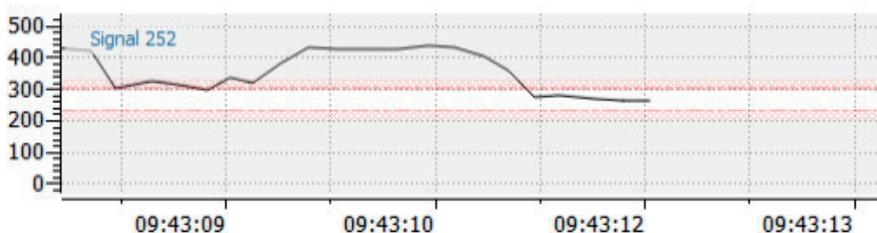
When the live data view is activated, momentary measured values are displayed and recorded in a progressive diagram. Values are only saved as long as the live data view is active. If the live data view is stopped and started again later, the interruption is apparent in any subsequent data export.

## 5.4. Outputs View 1 2 3 ✓

The switching outputs are simulated as LEDs in the top status bar in wTeach2. A yellow illuminated LED indicates that the respective output is switched. Depending on the sensor, there's also an error display or a signal strength display next to the output LEDs.



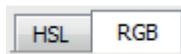
Furthermore, the individual switching thresholds of the outputs are also depicted in a diagram. Depending on sensor type, there are one or two switching thresholds for a given channel. The difference between the two thresholds is the window width. The threshold thickness corresponds to switching hysteresis, which can only be changed for certain sensors. Which diagram of which output appears in the foreground can be selected from the drop-down list or by clicking the respective output LED.



## 5.5. Deleting the Curve

In order to start a new measurement and save only subsequent values, the curve has to be deleted. This curve only involves values which have been measured, displayed and saved thus far, and has nothing to do with settings.

## 5.6. Export to a Spreadsheet Document



Values recorded using the live data view can be exported as a CSV file, and entered to and processed in a spreadsheet document.

If the sensor reads out values with different units of measure, the diagram with the desired values must be activated before clicking the export icon. You can switch between the various diagram views by clicking the respective tab above the diagram at the left-hand side.

## 5.7. Printing the Diagram View

The diagram currently displayed at the screen can be printed out.

## 5.8. Zoom Functions



**Zoom in the X direction:** You can zoom in or out by clicking the “+” or “-” icons under the diagram or diagrams.

If several diagrams are displayed, all diagrams are zoomed at the same time when zooming in the X direction. The standard view can be restored by clicking the “|” icon in the middle.

**Zoom in the Y direction:** You can zoom in or out by clicking the “+” or “-” icons next to the diagram. Zooming is also possible with the help of the mouse scroll wheel. The standard view can be restored by clicking the “-” icon in the middle. As soon as zooming in the Y direction has been completed, the Y-axis can be shifted. Press and hold the right mouse key with the mouse pointer on the diagram, and simultaneously move the mouse up or down to this end.

**Window zoom:** A specific area within the diagram can be enlarged with the window zoom function. Move the mouse pointer over the diagram until it turns into a cross hair. Press and hold the mouse key, and then select any desired area.

Click the “-” or the “|” icon for Y or X zoom respectively, in order to restore the standard view.

## 5.9. Color Tool



The Color Tool is used for Color Sensors and Print Mark Sensors. The object's current color is displayed here. The Color Tool window can be reduced in size or enlarged as desired.

**Color balancing:** A color balancing function is also included in the Color Tool.



In order to conduct **white balancing**, align the spot to a white object and acknowledge by clicking OK. The sensor is then calibrated to the respective white value.



In order to conduct **black balancing**, align the spot to a black object and acknowledge by clicking OK. The sensor is then calibrated to the respective black value.



The original color calibration can be restored by clicking “**Reset Color Balancing**”.

## 5.10 Read and write

The “Read” and “Write” modes can be found in the status bar for NFC sensors. Only one of these can be selected.

In the “Read” mode, the sensor’s settings are read into the software when it’s connected.

When “Read” has been activated, no settings can be made in the menu tree, and attention is drawn to the “Write” button instead.

In the “Write” mode, settings can be entered and the settings are written from the software to the sensor when it’s connected.

When both modes have been deactivated, settings can be entered but there’s no communication between the software and the sensor when it’s connected.

### 5.10.1 Signal strength

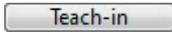
Signal strength is indicated for NFC sensors. Zero bars means not connected and 5 bars means full-power signal reception.



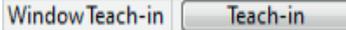
## 5.11. Menu Tree

The sensor-specific functions with which the sensor's settings can be changed are located in the menu tree. The most common functions are described in this section. Other functions can be found in the operating instructions for the respective sensor.

### 5.11.1. Teach-In

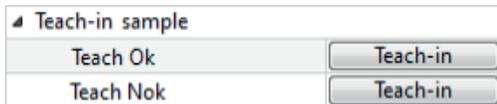


#### Window Teach-in:



In case of the Window Teach-in there are two switching points, the value at the time of the Teach-in is in between. The size of the difference between the two switching points is referred to as a window width (see section „5.10.3 Window Width“ on page 16).

#### Sample Teach-in:



Sample Teach-in is an additional Teach-in of an OK or NOK sample in order to adjust tolerance. Teach-in of an OK sample after a Teach-in (example Window Teach-in) tolerance is increased. In case of Teach-in a NOK sample tolerance is automatically decreased.

#### Foreground Teach-in:

The switching distance is automatically set to a distance which is slightly greater than the clearance between the sensor and the object. The sensor is thus activated for all objects whose distance to the sensor is equal to or less than the distance to the object used for the Teach-in procedure.

#### Background Teach-in:

The switching distance is automatically set to a distance which is slightly less than the clearance between the sensor and the background. The sensor is thus activated whenever an object is located between the background and the sensor.

#### Minimal Teach-in:

In reflex mode, teaching is in progress while the sensor is focused on the object. In the case of retro-reflex Sensors, Teach-In is made onto the reflector. In the case of through beam Sensors, the emitted light beam of the transmitter must hit the receiver optics for Teach-In. In this teach mode, the switching point is set just under the ongoing signal strength allowing for the signal quality.

#### Normal Teach-in:

In reflex mode, teaching is in progress while the sensor is focused on the object. In the case of retro-reflex Sensors, Teach-In is made onto the reflector. In the case of through beam Sensors, the emitted light beam of the transmitter must hit the receiver optics for Teach-In. In this teach mode, the switching point is set to half of the ongoing signal strength.

#### Maximal-Teach-in:

In this teach mode, the switching point is set to a minimum of the signal strength. The Sensor does not have to be aligned for Teach-in. In test mode, the Sensor detects an object within its detection range. In beam operating mode, the Sensor cannot be influenced by contaminations and only switches onto the real object.

### Two-Point Teach-in:

Two-point Teach-in	
Two-point object	Teach-in
Two-point background	Teach-in

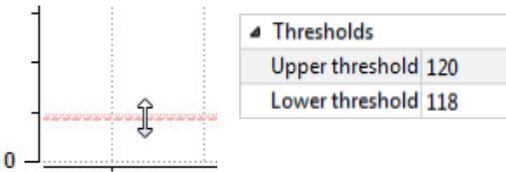
One Teach-in procedure is used to teach in the object, and another to teach in a second object or the background. Using both measured values acquired and saved in this way, the sensor calculates the switching point so that it lies between the two Teach-In points.

### Dynamic Teach-in:

Dynamic Teach-in	
Dynamic start	Teach-in
Dynamic stop	Teach-in

The sensor is switched to recording mode operation, allowing for automatic Teach-in. Measured values are recorded in this operating mode. After the recording mode has been exited, a switching point which lies between the minimum and maximum measured values is calculated.

## 5.11.2. Setting Switching Thresholds Manually

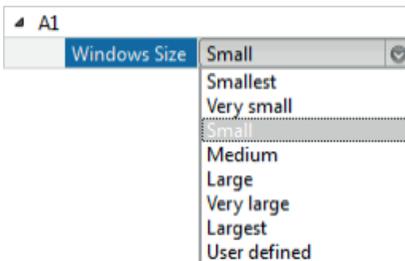


Depending on sensor type, there are one or two switching thresholds for a given channel. The difference between the two thresholds is the window width.

The switching thresholds can be shifted up or down by pressing and holding the mouse key with the mouse pointer in the diagram, and dragging up or down (Expert Menu On).

Depending on sensor type, they can also be entered to the menu tree numerically.

## 5.11.3. Window Width



In the case of sensors with window teach-in, window width is set automatically by means of the teach-in procedure. But it's also possible to set the value manually – either by changing the switching thresholds or with the help of the "Window Width" menu item. Selection can be made here amongst various options. After selecting "Customer-Specific", a numeric value can be entered.

In the case of Color Sensors, several window widths can be set for each output after selecting "Expert Menu On".

#### 5.11.4. Time Delay

ON Delay (ms)	200	 
OFF Delay (ms)	500	 

Time delay	
Enabled	Yes
Mode	OFF Delay
Value (ms)	0 ms

0 ms  
10 ms  
20 ms  
40 ms  
200 ms  
500 ms  
1000 ms  
2000 ms  
5000 ms

Time delay is set variously depending on sensor type. Values for on and off-delay can be entered numerically, or predefined options are offered by means of a selection list.

In the case of sensors with only one time delay function, either on or off delay is activated by selecting the corresponding mode. The value is specified via the selection list. Time delay is only active when the “Activate: Yes” menu item has been selected. No signal values are transmitted by these sensors during activated time delay, for which reason no diagram can be displayed in this mode.

#### 5.11.5. Fast Mode

<input checked="" type="checkbox"/> Fast mode (without led display)
---

IN order to increase speed in the fast mode, only signal values are transmitted via the interface. The switching status display is therefore deactivated in this mode.

## 6. Glossary

### 6.1. Definitions

<b>Release Delay</b>	The delay between the interruption of the light way between transmitter and receiver and the switching of the output.
<b>Off-Delay</b>	An adjustable -> Release Delay.
<b>Response Time</b>	Time required by the sensor or an evaluation unit in order to forward data to the output concerning an event which has occurred within the sensor's working range or at the input of the evaluation unit.
<b>On-Delay</b>	An adjustable delay of the -> Response Time.
<b>Pulse Length</b>	The Pulse Length defines how long the switching status is switched. This function can be combined with On-Delay.
<b>Exposure Time</b>	Time during which a light sensitive material is exposed to light.
<b>Output</b>	An electrical connection at the sensor to which a load or an analysis module is connected. The current function of the sensor is made available by means of electrical connection to the output .
<b>NPN Output</b>	A load or an analysis module is connected between the plus pole (incoming supply) and the output. When the sensor is switched, the output is connected to the minus pole via an electronic switch. NPN outputs may be equipped with a -> Pull-Up Resistor.
<b>Pull-Up Resistor</b>	A resistor which is integrated into the output of a sensor. As long as the sensor has not been switched, the output is connected to the plus pole via this resistor.
<b>PNP Output</b>	A load or an analysis module is connected between the minus pole (incoming supply) and the output. When switched the output is connected to the plus pole via an electronic switch. PNP outputs may be equipped with a -> Pull-Down Resistor.
<b>Pull-Down Resistor</b>	A resistor which is integrated into the output of a sensor. As long as the sensor doesn't switch, the output is connected to the minus pole via this resistor.
<b>Push-Pull Output:</b>	Works like an electronic switch, which switches the output alternately to the plus pole or the minus pole.
<b>Analog Output</b>	The output at which the sensor's measurement results are read out either as an analog voltage (e. g. 0,050 to 10 V) or an analog current (e. g. 4 to 20 mA).
<b>Error Output</b>	An output which is activated when the sensor is functioning within an unreliable range, for example as a result of contamination, incorrect alignment, ageing or a faulty operating status.
<b>Contamination Output</b>	An output which reads out a signal indicating that a sensor is operating in the -> Unreliable Range.
<b>Window Size</b>	Tolerance width for the three colors red, green and blue used with color sensors for the recognition of colors (a small window width results in high resolution color recognition).
<b>Color detection</b>	In the "Detection" operating mode, color windows are taught in to an output. The sensor detects the taught-in colors within a certain range if they are within the tolerance.
<b>Switching Hysteresis</b>	The difference between the making point and the breaking point. Data in percentages refers to the measuring or detection range.

<b>Teach-in</b>	A function by means of which the sensor is caused to automatically calculate and save future settings based upon momentarily acquired values by pressing a button or applying a control signal.
<b>Teach Mode FT = Window Teach-In</b>	In case of the Window Teach-In there are two switching points. The difference between the two switching points is referred to as a window. The size of the window is referred to as window width. The sensor is activated when an object is positioned within the window.
<b>Teach Mode VT = Foreground Teach-In</b>	Teaching in progress while the sensor is focused on the object. The switching distance is then automatically set to a distance which is slightly greater than the clearance between the sensor and the object. The sensor is thus activated for all objects whose distance to the sensor is equal to or less than the distance to the object used for the Teach-In procedure.
<b>Teach Mode HT = Background Teach-In</b>	Teach-In is performed while the sensor spot is aligned to the background. The switching distance is then automatically set to a distance which is slightly less than the clearance between the sensor and the background. The sensor is thus activated whenever an object is located between the background and the sensor.
<b>Teach Mode MT = Minimal Teach-In</b>	In reflex mode, teaching is in progress while the sensor is focused on the object. In the case of retro-reflex Sensors, Teach-In is made onto the reflector. In the case of through beam Sensors, the emitted light beam of the transmitter must hit the receiver optics for Teach-In. In this teach mode, the switching point is set just under the ongoing signal strength allowing for the signal quality. In beam operating mode, it is possible to detect clear glass or sheet products.
<b>Teach Mode NT = Normal Teach-In</b>	In reflex mode, teaching is in progress while the sensor is focused on the object. In the case of retro-reflex Sensors, Teach-In is made onto the reflector. In the case of through beam Sensors, the emitted light beam of the transmitter must hit the receiver optics for Teach-In. In this teach mode, the switching point is set to half of the ongoing signal strength.
<b>Teach Mode XT = Maximal Teach-In</b>	In this teach mode, the switching point is set to a minimum of the signal strength. The Sensor does not have to be aligned for Teach-in. In test mode, the Sensor detects an object within its detection range. In beam operating mode, the Sensor cannot be influenced by contaminations and only switches onto the real object.
<b>Teach Mode TP = Key potentiometer</b>	Allows for manual adjustment of the switching point through the use of plus and minus keys.
<b>Teach Mode DT = Dynamic Teach-In</b>	The sensor is switched to recording mode operation, allowing for automatic Teach-In. Measured values are recorded in this operating mode. After the recording mode has been exited, a switching point which lies between the minimum and maximum measured values is calculated.
<b>Teach Mode ZT = Two-Point Teach-In</b>	One Teach-In procedure is used to teach in the object, and another to teach in a second object or the background. Using both measured values acquired and saved in this way, the sensor calculates the switching point so that it lies between the two Teach-In points.
<b>External Teach Input</b>	An input at which sensor functions can be adjusted by applying an electrical signal.
<b>Trigger Input</b>	An input to which a Trigger Signal
<b>Trigger Signal</b>	An electrical signal which is applied to a Trigger Input in order to activate a specific device function.

<b>Dark Switching</b> (normally closed, NC)	A sensor output mode of operation. The output is activated when the receiver is not illuminated by light from the transmitter.
<b>Normally Closed Function</b> (NC, dark switching for optical sensors)	The output is activated as soon as an object reaches the switching point. In the case of through beam sensors, the output is deactivated as soon as the light beam is interrupted.
<b>Light Switching</b> (normally open, NO)	A sensor output mode of operation. The output is activated when the receiver is illuminated by light from the transmitter.
<b>Normally Open Function</b> (NO, light switching for optical sensors)	The output is deactivated as soon as an object reaches the switching point. In the case of through beam sensors, the output is activated as soon as the light beam is interrupted.

## 6.2. Symbol Descriptions

	<b>Access settings:</b> Previously saved settings are opened and transmitted to the connected sensor.
	<b>Save settings:</b> Selected settings (including thresholds) are saved to the selected disk drive.
	<b>Menu tree:</b> The various settings and functions of the individual sensors are selected in the tree menu.
	<b>Color Tool:</b> The Color Tool is a separate window in which the current color is displayed and specified as an RGB value. Color balancing is conducted here as well.
	<b>White balancing:</b> White balancing is executed after placing a white object in front of the sensor.
	<b>Black balancing:</b> Black balancing is executed after placing a black object in front of the sensor.
	<b>Reset color balancing:</b> Parameter values (white/black) are restored to their original values.
	<b>Reset:</b> The reset key returns the sensor to its default settings.
	<b>Selection of the output for the diagram view:</b> The output whose switching thresholds will appear in the diagram view is selected from this drop-down list.
	<b>LED switching outputs:</b> These symbols simulate the LEDs for the switching outputs. As soon as an output switches, the corresponding LED lights up yellow.



**Delete curve:**

The curve in the diagram view is deleted. Values can no longer be exported after deletion. A deleted curve cannot be restored.



**Export values:**

The values from the diagram view are saved as a CSV spreadsheet file and can be opened with a spreadsheet program.



**Print diagram view:**

The diagram currently displayed at the screen can be printed out.



**Teach-in:**

The momentary value is taught into the sensor by clicking the teach-in icon.



**Infobox:**

Provides information about the function which has been selected in the menu tree.



**Wiring diagram:**

Displays the wiring diagram of the (connected) sensor in a separate window.



**Read:**

Settings are read from the sensor into the software.



**Write:**

Settings are written from the software to the sensor.



**Signal strength:**

The bars indicate how strong signal transmission is between the sensor and the software.