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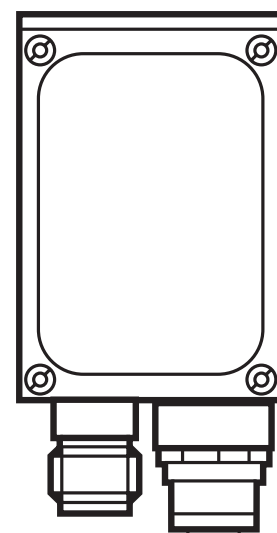


Installation Guide

**efector250<sup>®</sup>**

**O2Dxxx**

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# 1 Preliminary note

This document serves for the fast set-up of an O2Dxxx object recognition sensor from the company ifm syntron gmbh.

## 1.1 Symbols used

- ▶ Instruction
- > Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference
-  Important note  
Non-compliance can result in malfunction or interference.
-  Information  
Supplementary note

## 1.2 Warning signs used

### WARNING

Warning of serious personal injury.  
Death or serious irreversible injuries may result.

### CAUTION

Warning of personal injury.  
Slight reversible injuries may result.

### NOTE

Warning of damage to property.

# 2 Safety instructions

Please read the operating instructions "Object recognition sensor O2D" and the software manual "PC operating program for O2D" prior to set-up of the device.

[www.ifm.com](http://www.ifm.com) → Data sheet search → e.g. O2D224 → Operating instructions

Ensure that the device is suitable for your application without any restrictions.

Observe the operating instructions.

Non-observance of the instructions, operation which is not in accordance with the intended use, wrong installation or incorrect handling can affect the safety of operators and machinery.

The installation and connection must comply with the applicable national and international standards. Responsibility lies with the person installing the device.

Only the signals indicated in the technical data or on the device label may be supplied to the connections or wires.

## 3 System requirements

### 3.1 PC hardware

- PC with Pentium III processor or higher, clock frequency min. 500 MHz
- min. 128 MB RAM
- min. 35 MB freely available hard disc memory
- CD-ROM drive
- XGA compatible graphic card with min. 1024 x 768 pixel resolution
- Ethernet network card for 10Base-T/100Base-TX, TCP/IP protocol

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### 3.2 PC software

- Operating system Microsoft Windows 2000, XP, Vista or Windows 7.

## 4 Items supplied

1 multicode reader O2Dxxx, screwdriver to adjust the focus, installation instructions. The device is supplied without installation/connection accessories and software.

## 5 Accessories

### 5.1 Required accessories

- Crossover cable for parameter setting connection (Ethernet), M12 connector/RJ45 connector, 4 poles, 2 m, e.g. E11898.
- Connection cable for voltage supply and process connection, M12 socket, 8 poles, e.g. E11231.
- Operating software E2D200

### 5.2 Optional accessories

- Modular fixing systems
- Illumination unit
- Protective pane
- Diffuser

[www.ifm.com](http://www.ifm.com) → Data sheet search → e.g. O2D224 → Accessories

## 6 Electrical connection

### NOTE

The unit must be connected by a qualified electrician.

► Disconnect power before connecting the unit.

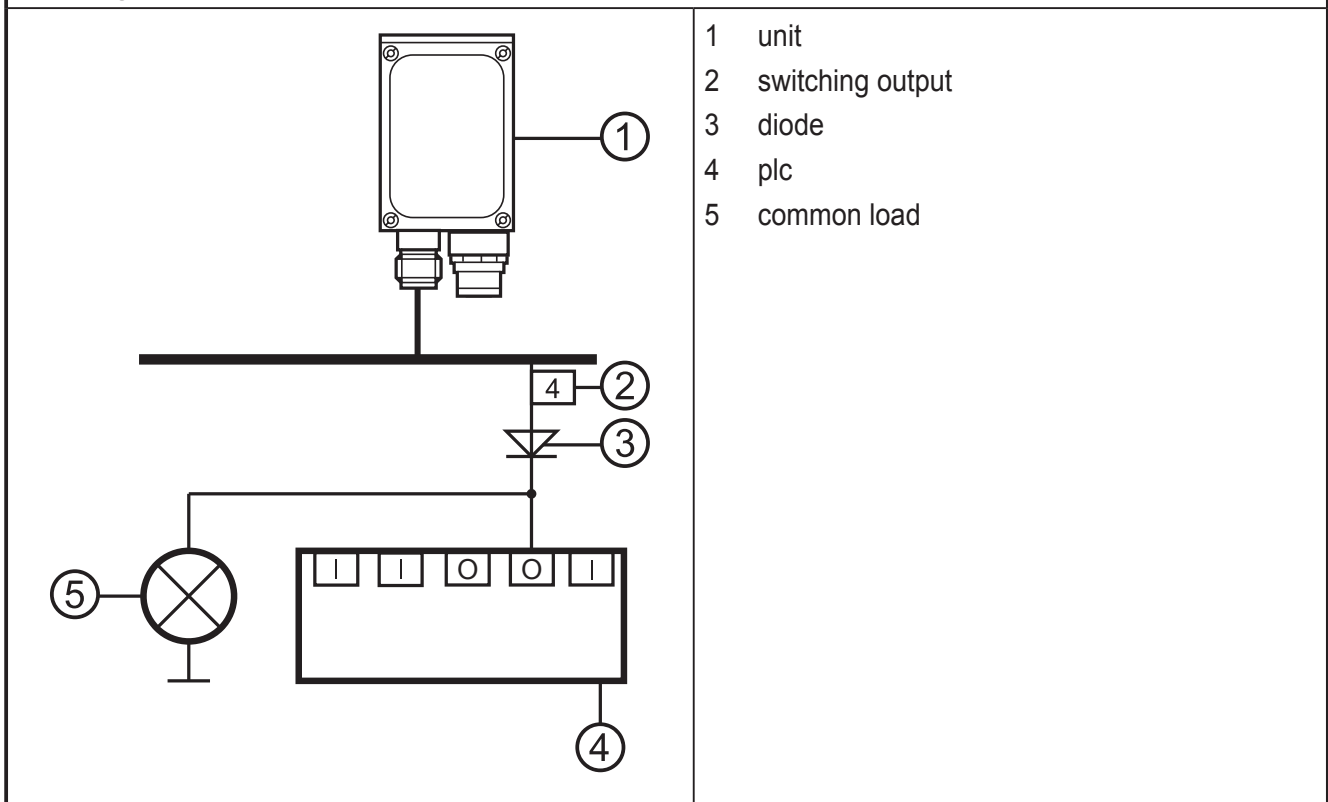
### NOTE

The voltage on pins 2, 4, 5, 6, 7 and 8 must not exceed the supply voltage on pin 1 (U+).

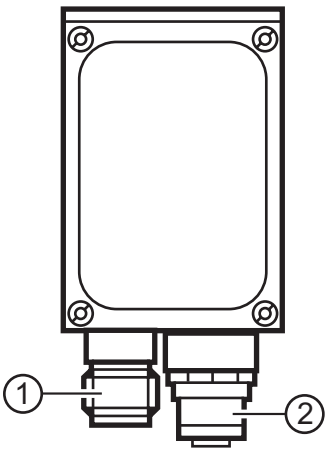
► Use the same power supply and protective equipment for

- the device (e.g. O2Dxxx),
- the signal generator at the inputs (e.g. trigger switch, plc),
- the signal pick-up at the outputs (e.g. plc).

As an alternative, a diode at the switching outputs can prevent feedback (see fig. below).

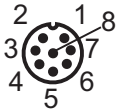


- Connect the parameter setting/process interface of the device via the crossover cable with the Ethernet interface of the PC.
- Supply the process interface of the device via an M12 socket.



**(1) Process interface**

M12 plug, A-coded, 8 poles (view on the unit)



- 1 U+
- 2 Trigger input
- 3 0 V
- 4 Switching output 5 / trigger output
- 5 Switching output 3 (ready)
- 6 Switching output 4 (OUT)
- 7 Switching output 1 / input 1
- 8 Switching output 2 / input 2

**(2) Parameter / process interface**

M12 socket, D-coded, 4 poles (view on the unit)



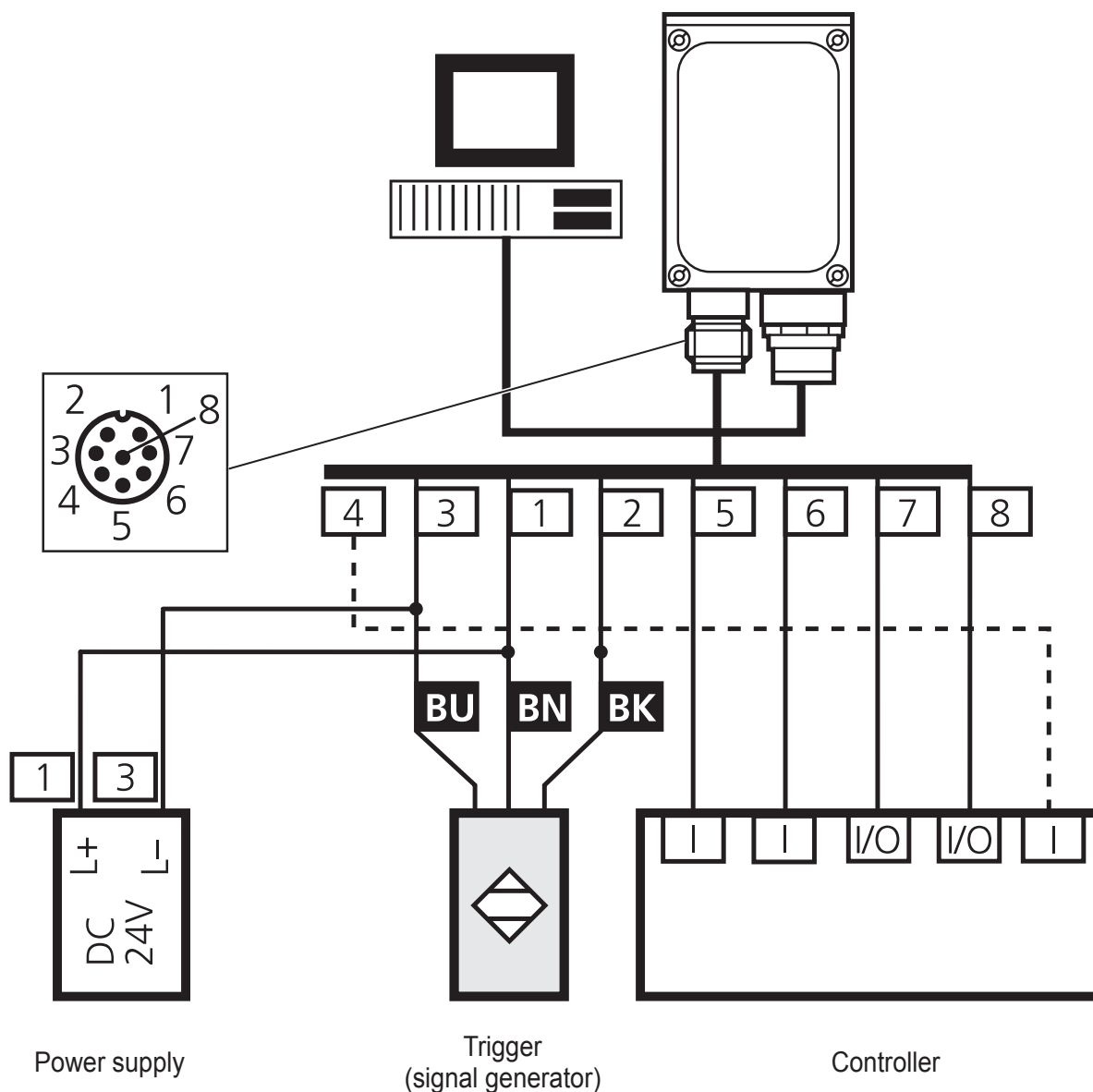
- 1 Ethernet TD +
- 2 Ethernet RD +
- 3 Ethernet TD -
- 4 Ethernet RD -
- S Shield

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For information about available sockets and connectors see:

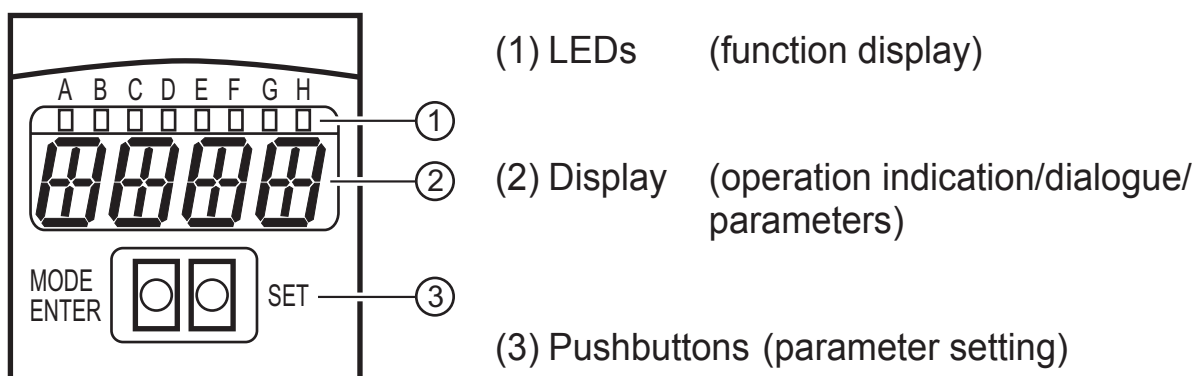
[www.ifm.com](http://www.ifm.com) → Product line → Connection technology

## 6.1 Example connection of an external trigger circuit



## 7 Operating and display elements

### 7.1 View of the unit





## 7.2 LEDs

LED	Name	Colour	Status	Meaning
A	Power	Green	On	Supply voltage applied Device ready for operation
			Flashing (2 Hz)	No configuration saved in the device (factory setting)
			Flashing (20 Hz)	Device fault
B	Eth	Green	On	Ethernet connection exists
			Flashing	Ethernet signal
C	Con	Green	On	Connected with PC operating program
D	IO	–	–	Not used
E	1	Yellow	On	Switching output 1 switched
			Flashing (20 Hz)	Short circuit switching output 1
F	2	Yellow	On	Switching output 2 switched
			Flashing (20 Hz)	Short circuit switching output 2
G	3	Yellow	On	Switching output 3 switched
			Flashing (20 Hz)	Short circuit switching output 3
H	4	Yellow	On	Switching output 4 switched
			Flashing (20 Hz)	Short circuit switching output 4

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## 7.3 Pushbuttons

Button	Function
MODE/ENTER	Changing to the parameter setting mode Selecting the parameters Confirming the parameter values
SET	Selecting the subparameters Setting of the parameter values - incremental by pressing briefly - scrolling by holding pressed

## 7.4 Display

### 7.4.1 Operating indicators

Display	Meaning
u[xxx]	Version number of the IO controller software (1st indication after power on)
Init	Device initialisation (2nd indication after power on)
nnnn	Firmware version (3rd indication after power on)
rEdY	Device ready for trigger (4th indication after power-on if an application is active with external triggering. Device waiting for triggering.)
WAIT	No active/valid configuration available Device is busy (4th indication after power-on if no configuration is active or valid = on delivery)
nr[xx]	Application successful (number of the application)
run	Device waiting for connection, no active application
LOAd	Loading a new application
donE	Loading a new application completed
uLoc	Pushbuttons unlocked
Lock	Pushbuttons locked Parameter values cannot be displayed and changed
FWUP	Firmware update running

### 7.4.2 Connection via the operating program

Display	Meaning
OnLI	Connection with the operating program
Parm	Parameter setting via operating program
Moni	Monitor mode
SerP	Service mode

### 7.4.3 Error messages

Display	Meaning
FAIL	Application not successful
ErrP	Selection of a non-existing application via switching inputs
ErrD	Critical hardware error
SC	Short circuit of a switching output
DHCP noIP	No DHCP server found. Both character strings are displayed alternately.

## 8 Software

The program E2D200 can be ordered as a CD/DVD or downloaded:

[www.ifm.com](http://www.ifm.com) → Service → Download → Industrial imaging → O2D2xx operating software.



Note the hints in the download area concerning the current versions.



Administrator rights may be required for the installation of the software. Contact your administrator or responsible IT staff.

The PC operating program can be started directly from the CD/DVD or can be installed on the PC.

### 8.1 Install the program

- ▶ Insert the CD/DVD in the drive.
- > The start menu opens.
- ▶ Select the menu item "Install efector dualis".
- > Observe the notes of the installation routine.
- > The program is installed.



If the autostart function for CD/DVD drives is deactivated and the start menu does not open automatically:

- ▶ Start the "O2Dstart.exe" file in the main directory of the CD with a double click.
- > The start menu opens.
- ▶ Select the menu item "Install efector dualis".
- > Observe the notes of the installation routine.
- > The program is installed.

### 8.2 Connection setting



The IP address ranges of the sensor and the PC must match.

#### 8.2.1 Network setting

	IP address range (network)	Factory setting (host)
Object recognition sensor O2Dxxx	192.168.0	49
	=	≠
PC	192.168.0	xx

Example:

IP setting multicode reader: 192.168.0.49

IP setting PC: 192.168.0.2

## 8.2.2 Factory setting O2Dxxx object recognition sensor

O2Dxxx object recognition sensor parameters	Description	Factory setting
DHCP	Dynamic Host Configuration Protocol	Off
IP	IP address	192.168.0.49
nETm	Subnet mask	255.255.255.0
GWIP	Gateway address	192.168.0.201

The screenshot shows the 'Network parameters' tab of the O2Dxxx configuration interface. It contains the following fields and values:

- IP address: 192.168.0.49
- Subnet mask: 255.255.255.0
- Gateway: 192.168.0.201
- Speed and duplex mode: Automatic recognition (dropdown menu)
- XML-RPC port: 8080
- Video port: 50002
- TCP/IP port: 50010
- MAC address: 00:02:01:20:AA:59

Buttons at the bottom include 'DHCP mode', 'Sensor reboot', and 'Assign'.

O2Dxxx

The screenshot shows the 'Internet Protocol Version 4 (TCP/IPv4) Properties' dialog box in Windows. The 'General' tab is selected. The 'Use the following IP address' radio button is selected. The IP address is set to 192.168.0.10, the Subnet mask is 255.255.255.0, and the Default gateway is empty. The 'Obtain DNS server address automatically' radio button is also selected. The Preferred DNS server and Alternate DNS server fields are empty. The 'Validate settings upon exit' checkbox is unchecked. The 'Advanced...' button is visible at the bottom right.

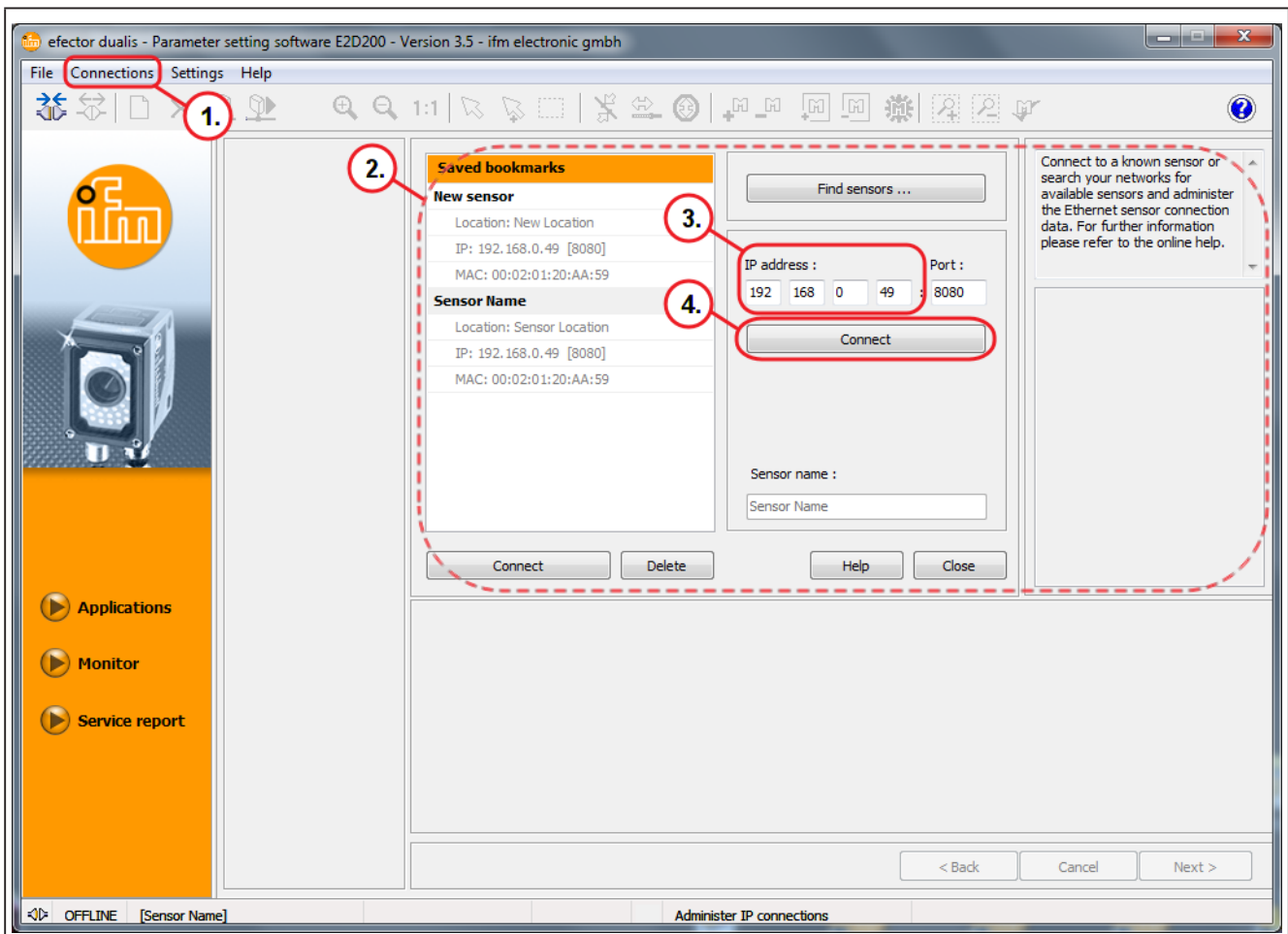
PC

### 8.3 Program start

When the program is started, the article number, the program designation and the version number are displayed for approx. 5 sec. Then, a neutral user interface without any preset applications appears.

- ▶ Connect the sensor with the PC operating program.
- ▶ Start the PC operating program.
- > The default language is English.
- ▶ Click on [Settings].
- ▶ Click on [Language] and select a language.
- ▶ Click on [Connections] (1.) and [IP address ...].

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- > The input fields for the IP address appear (2.).
- ▶ Enter [IP address] (3.) 192.168.0.49.
- ▶ Apply preset port number 8080.

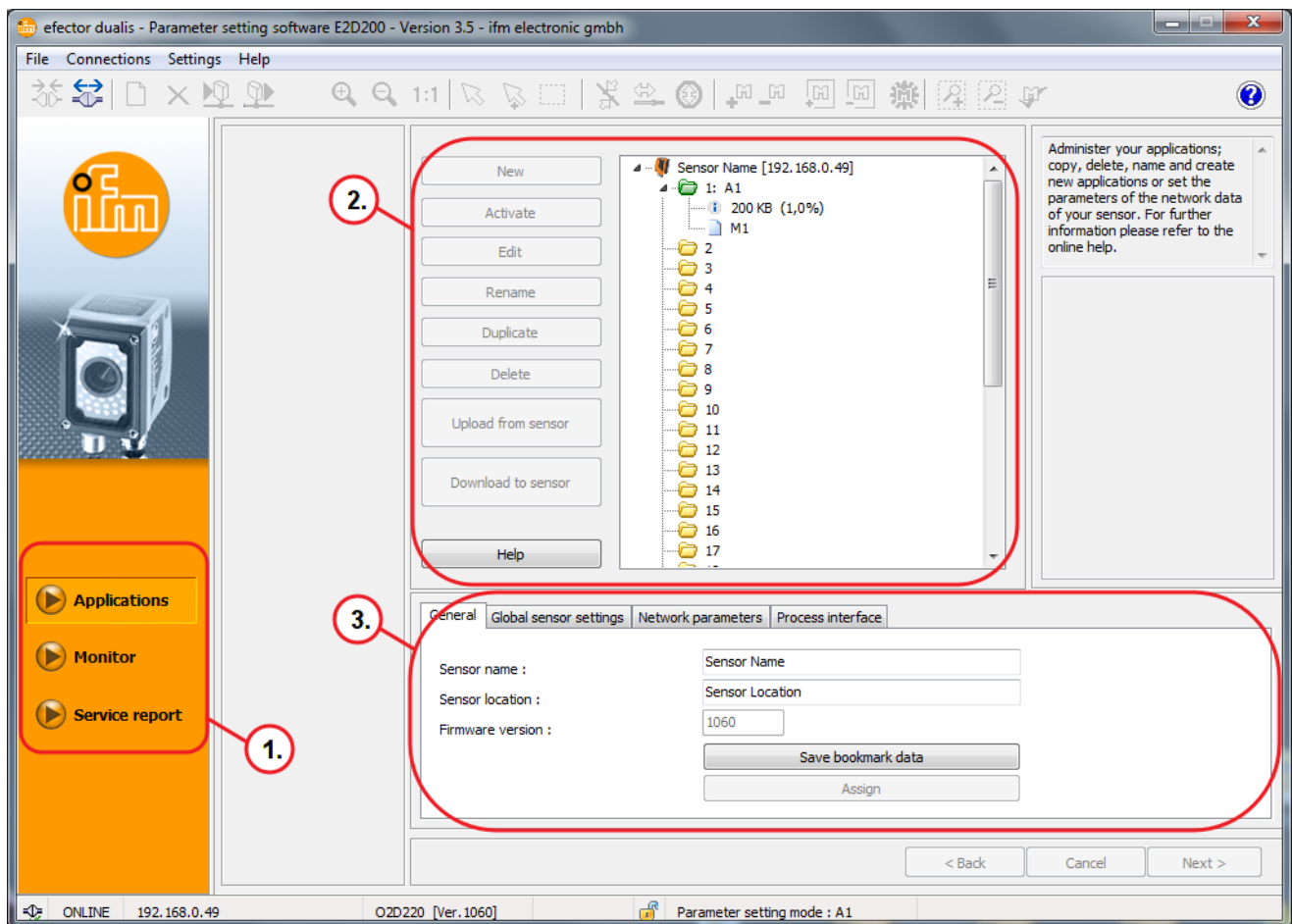


If a firewall is active on the PC, the ports 8080 and 50002 must be enabled for image transmission.

- ▶ Click on [Connect] (4.).
- > Change of status: OFFLINE → ONLINE

- No active application file saved on the device:  
The user interface changes to the application mode; the mode [Applications] is activated.
- Active application file saved on the device:  
The user interface changes to the monitor mode; the [Monitor] mode is activated.

## 8.4 Basics on the user interface

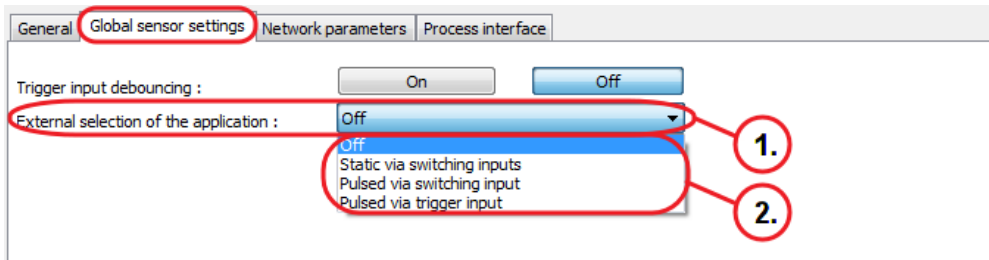


Pos.	Operating element	Contents
(1.)	Mode	<ul style="list-style-type: none"> <li>• Applications: create, edit, delete etc.</li> <li>• Monitor: display or visualisation of the images, contours, tolerances, search zones, results.</li> <li>• Service report: display evaluations and reports, save images etc.</li> </ul>
(2.)	Administer applications	<ul style="list-style-type: none"> <li>• Up to 32 applications (parameter sets) can be saved.</li> </ul>
(3.)	General administration	<ul style="list-style-type: none"> <li>• Enter application-specific information such as the device name and location.</li> <li>• Display the firmware version of the device.</li> </ul>

## 8.5 Global sensor settings

The external selection of the application can be activated in the application menu.

- ▶ Select the tab [Global sensor settings] under "General administration".
- ▶ Select the required function (2.) under "External selection of the application" (1.).
- ▶ Click on [Assign] (2.) to assign the change.



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- > If a function was activated under "External selection of the application", it is possible to select a saved application by changing the level at pin 7 or 8 or the trigger input of the process interface. (→ 6)



For further information about the external selection of the application we refer you to the operating instructions of the sensor: [www.ifm.com](http://www.ifm.com) → Data sheet search → e.g. O2D224 → Operating instructions.

## 8.6 Create an application



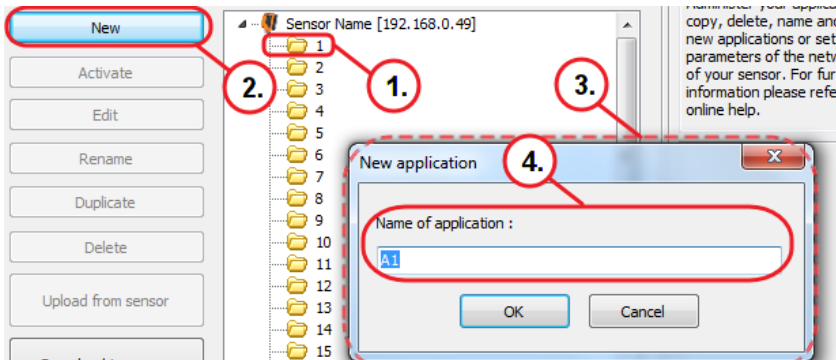
New applications can only be created in an empty memory location.

### Requirement:

- The application contains all application-relevant parameters.
- The device is able to execute the reading/verification mode independently.
- The following settings and indications are carried out step by step.
  - Image quality
  - Model definition
  - Process interface
  - Trigger configuration
  - Function test

**Create example:**

> Administer applications (→ 8.4).



- ▶ Select the folder (1.).
  - ▶ Click on [New] (2.).
  - ▶ The pop-up window "New application" (3.) opens.
  - ▶ Enter the name of the application (4.).
  - ▶ Click on [OK].
- > View changes to "Image quality".



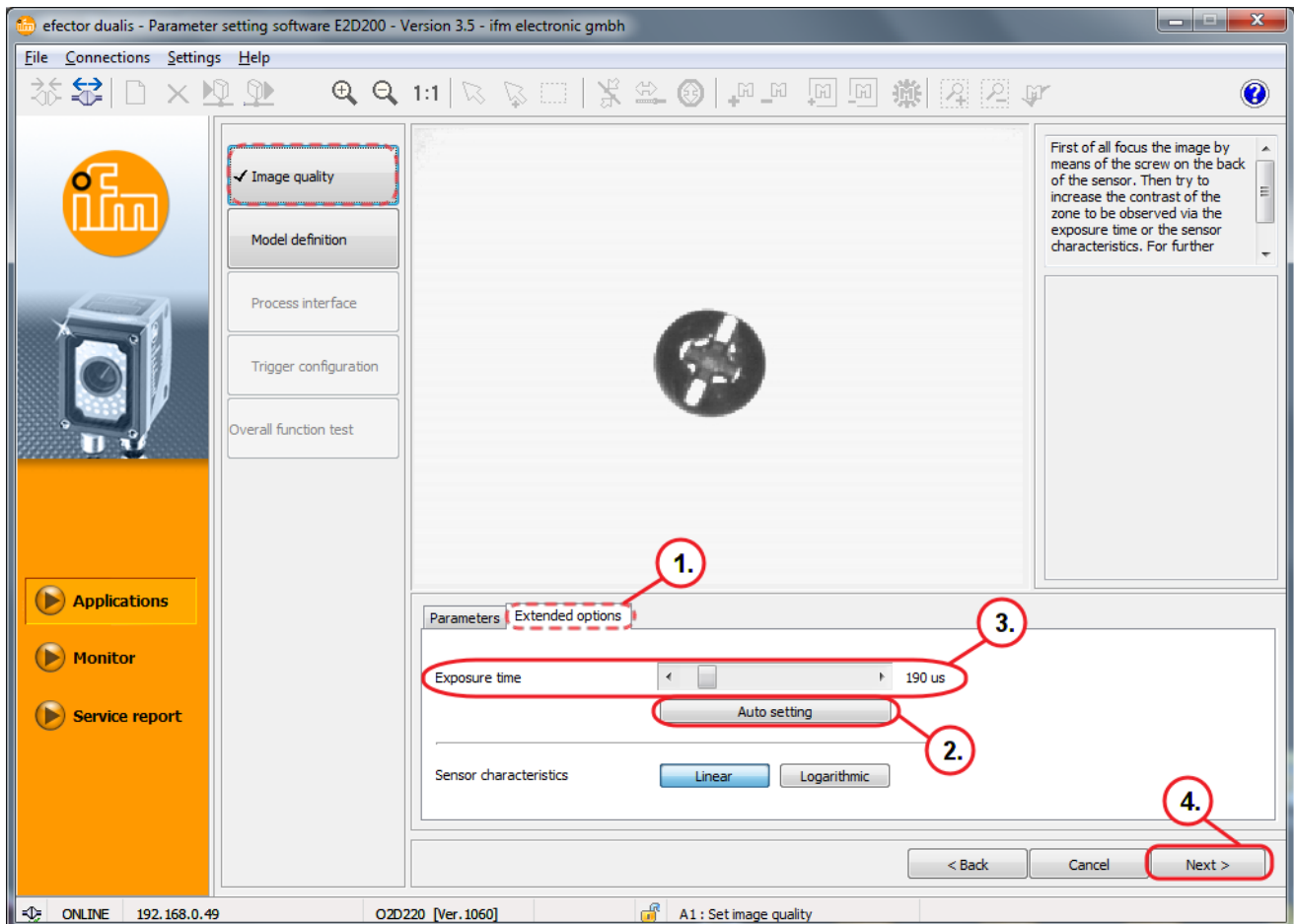
## 8.7 Image quality

In this module the image quality for optimum evaluation is set.



Highly contrasting objects can be optimally evaluated. Ideally, the object contrasts clearly with the background.

- Select [Extended options] (1.).



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- Optimise the focus via the setting screw on the back of the device.
- Click on [Auto setting] (2.) or manually adjust the [Exposure time] (3.).



[Auto setting] (2.) defines the ideal application parameters only to a limited extent.



Manual setting of the [Exposure time] is recommended.

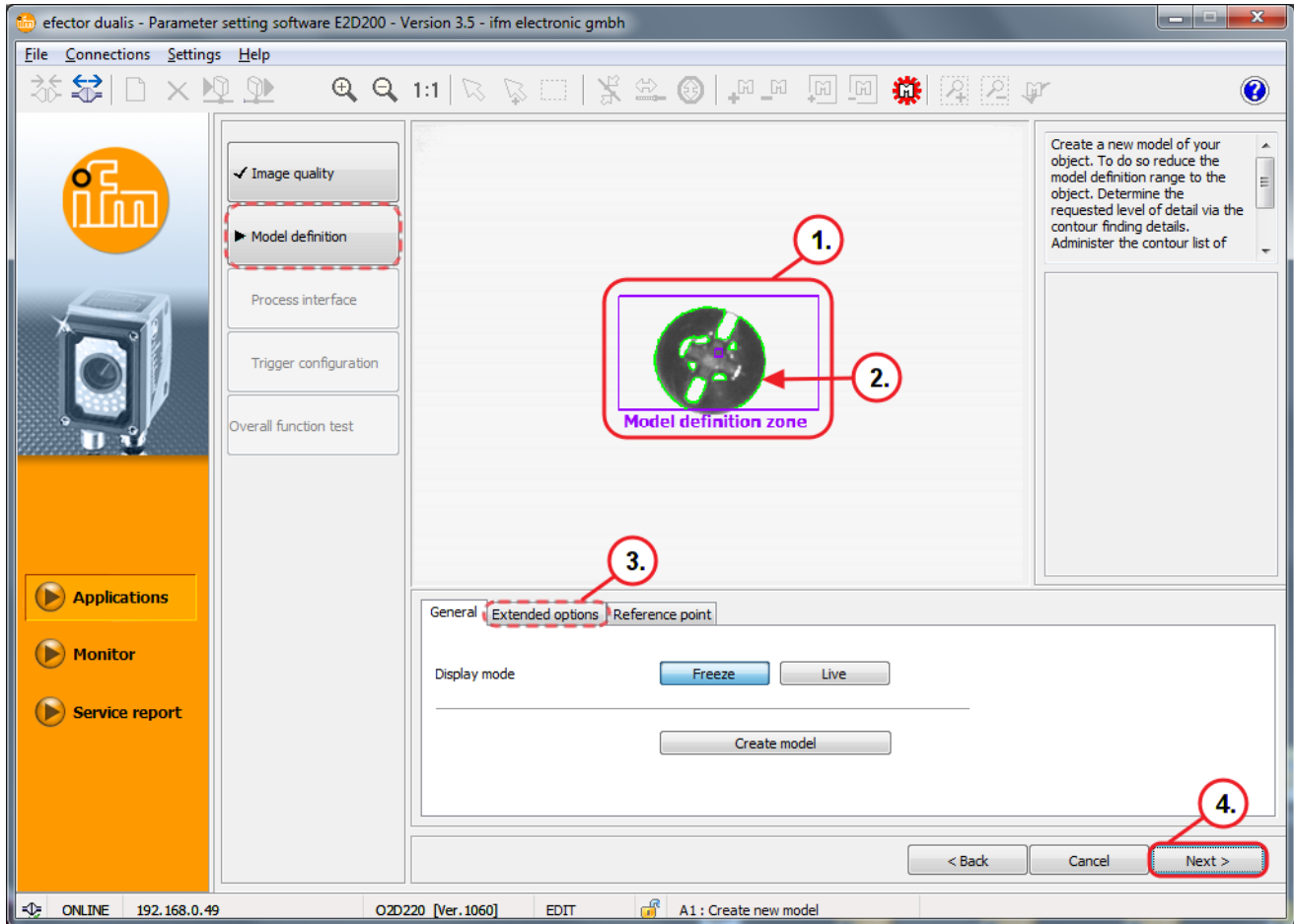


For applications with low lighting an external light source can be necessary. This ensures reliable recognition of objects.

- Click on [Next] (4.) when the sensor image is in focus and all parameters are adapted to your requirements.
- > View changes to "Model definition".

## 8.8 Model definition

In this module a model of the object is defined.



- Use the mouse pointer to draw the [Model definition zone] (1.) tightly around the object.
- > Within the model definition zone, the contour is automatically determined and shown by a green line (2.).



Contours which were found and not evaluated are marked with blue lines.



The model definition zone is ideally limited to the object. This reduces the image size and the memory load.

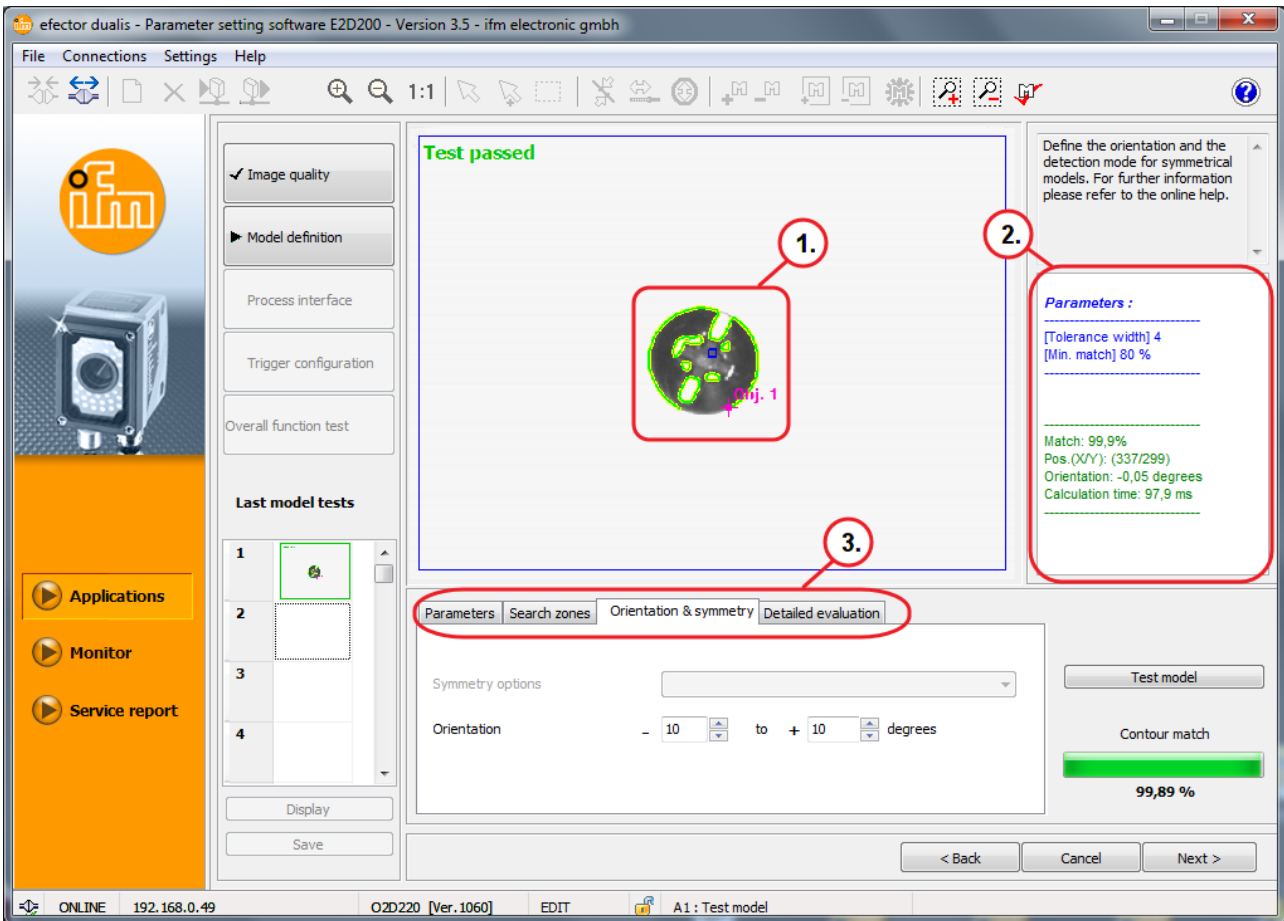


Further parameters can be set under "Further options" (3.): selecting contours, selecting sections, setting the contrast threshold and the sensitivity.

- Click on [Next] (4.) when all parameters correspond to the requirements.
- > View changes to the "Model test".

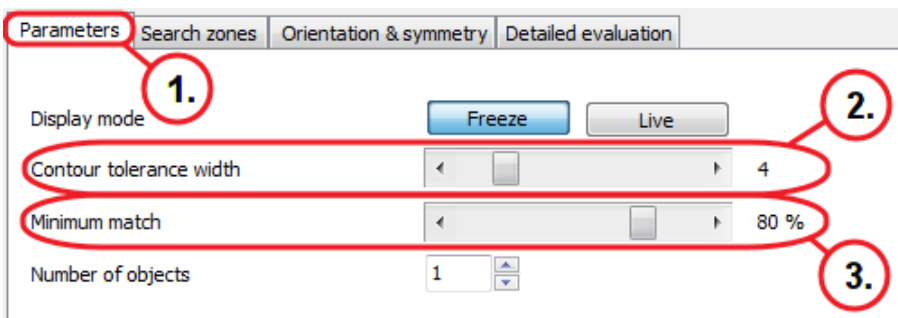
## 8.9 Model test

In this module an automatic test is carried out.



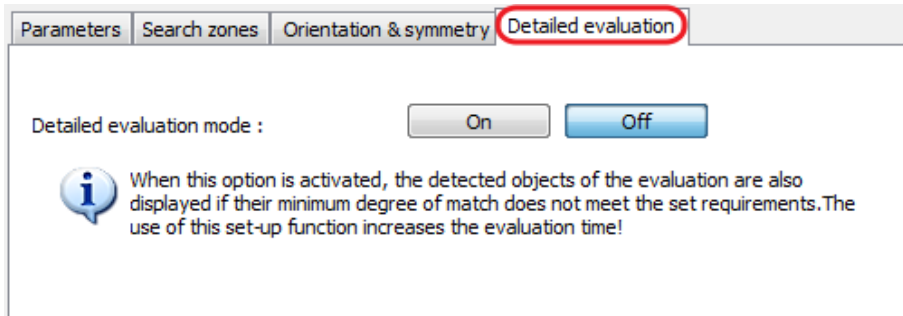
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- > The green contour and the yellow tolerance line mark the object (1).
- > The result output field (2.) shows the result of the model test.
- > The model test (3.) can be adjusted via the tabs.



- > The tab "Parameters" (1.) is displayed.
- ▶ Set the [Contour tolerance width] (2.) and [Minimum match] (3.).
- > The "Contour tolerance width" is shown as a yellow line along the contour. It indicates the maximum permissible tolerance of the contour.
- > The "Minimum match" corresponds to the minimum degree of match in % which is necessary to indicate the contour as recognised.

- Select the tab "Detailed evaluation".

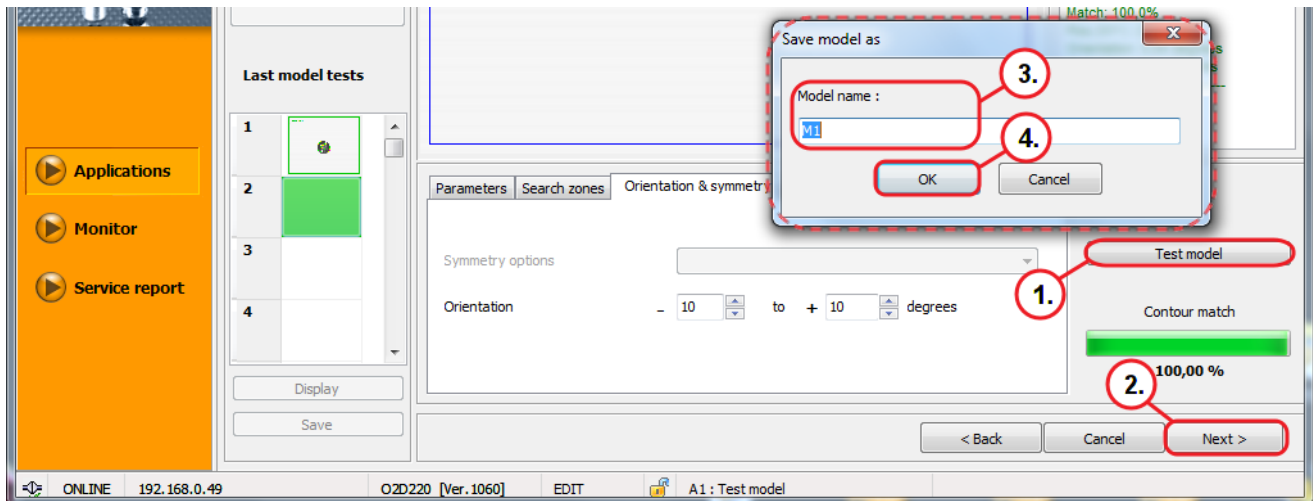


When this function is activated, even models which are detected below the degree of match (min. 30%) are displayed in the configuration mode.



Detailed explanations of all setting options can be found in the software manual.

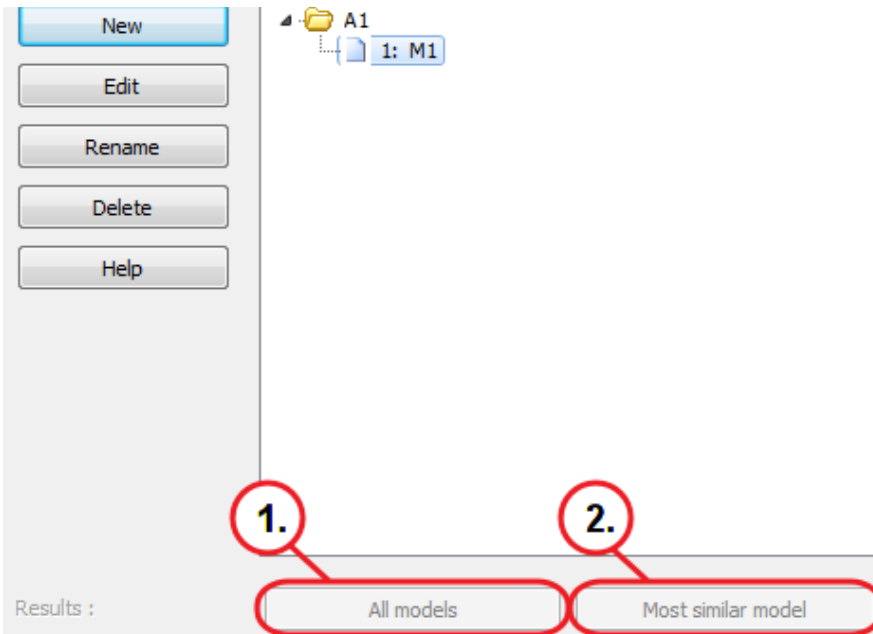
[www.ifm.com](http://www.ifm.com) → Data sheet search → e.g. O2D224 → Operating instructions  
→ Software manual V3.5



- Click on [Test model] (1.).
- > The test is carried out and evaluated.
- Click on [Next] (2.) when all parameters have been set in the menu item "Test model" according to the requirements.
- Enter the name in the pop-up window "Save model as" (3.).
- Click on [OK] (4.).
- > View changes to "Administer models".

## 8.10 Administer models

Each application can contain one or several models. The models are administered via the model administration menu.



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If several models are used, the following modes are available:

Mode 1:

- ▶ [All models] (1.).
- > In this mode the evaluation is considered as passed when all defined models are found in the image field.

Mode 2:

- ▶ [Most similar model] (2.).
- > All defined models are searched, but only the model with the highest match is provided as the result.
- ▶ Click on [Next].
- > View changes to "Process interface".

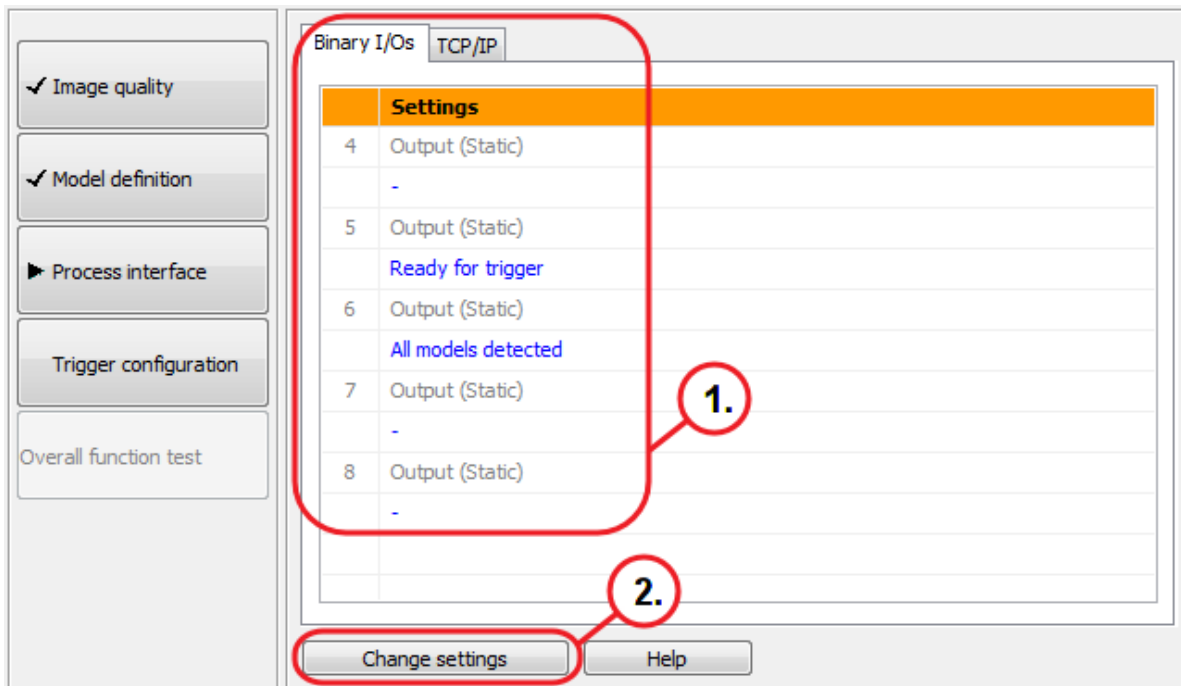
## 8.11 Configure the process interface

In this module the process interface is configured. Default parameters are preset for the sensor outputs. It is recommended to use these settings to start with.

> The current configuration "Binary I/Os" (1.) is displayed.

In the following figure the output 6 switches as soon as:

- the set object is present,
- the set object is recognised as good.



► Click on [Change settings] (2.) when the parameters are to be changed.



Detailed explanations of all setting options can be found in the software manual.

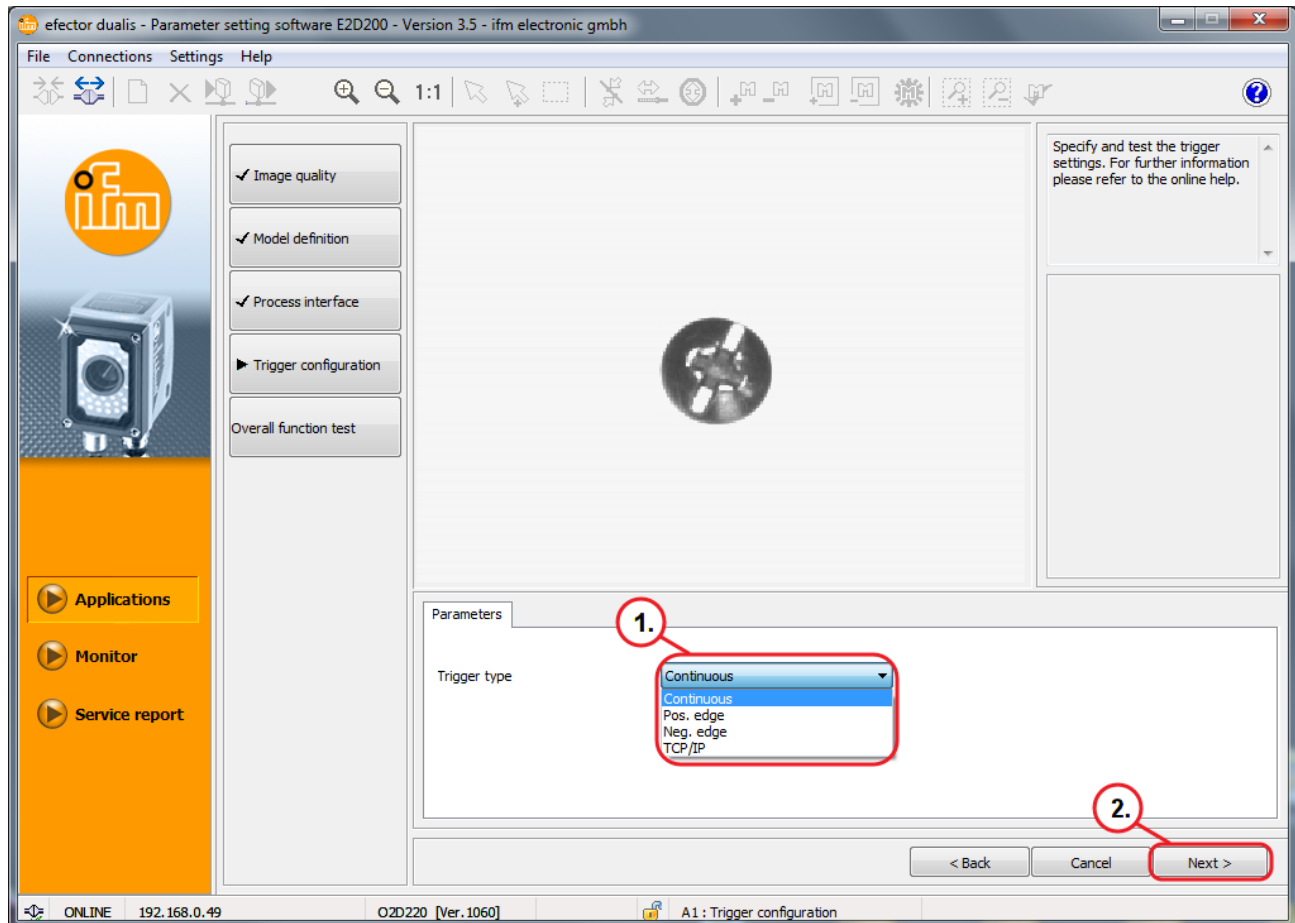
[www.ifm.com](http://www.ifm.com) → Data sheet search → e.g. O2D224 → Operating instructions  
→ Software manual V3.5

► Click on [Next].

> View changes to "Trigger configuration".

## 8.12 Trigger configuration

In this module the trigger type is set.

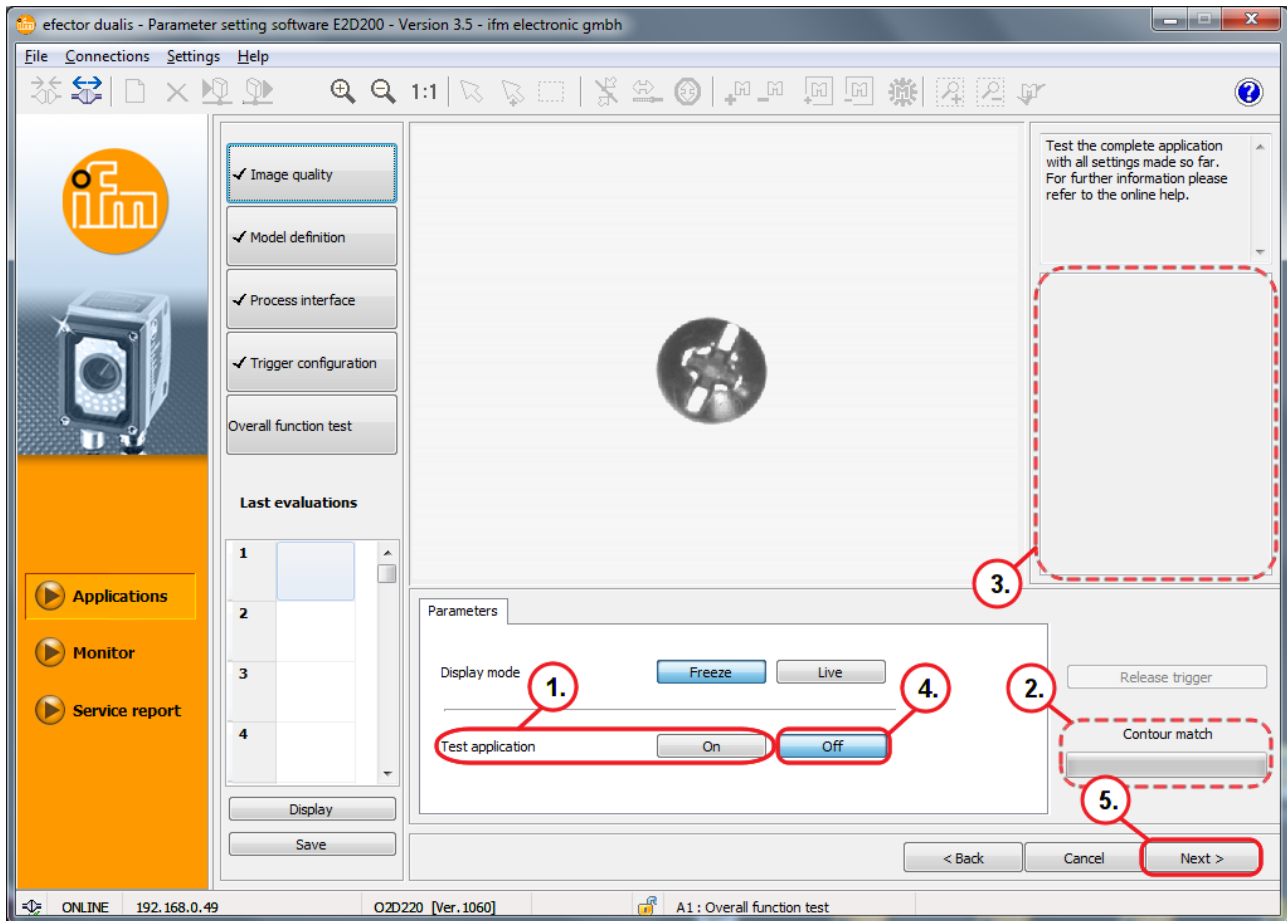


- ▶ Select the trigger type in the pull-down menu (1.).
- ▶ Click on [Next] (2.).
- > View changes to "Function test".

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## 8.13 Function test

In this module all settings of the new configuration are tested.



- Click on [On] for Test application (1.).
- > "Contour match" (2.) shows the degree of match of the object in percent.
- > The result output field (3.) displays:  
number of models / evaluation time / objects / degree of match / position / orientation ...
- > Click on [Off] for Test application (4.).
- Click on [Next] (5.).
- > The dialogue window "Do you want to save the application?" appears.
- Confirm with [Yes] or discard the application with [No].



Detailed explanations of all setting options can be found in the software manual.

[www.ifm.com](http://www.ifm.com) → Data sheet search → e.g. O2D224 → Operating instructions  
→ Software manual V3.5