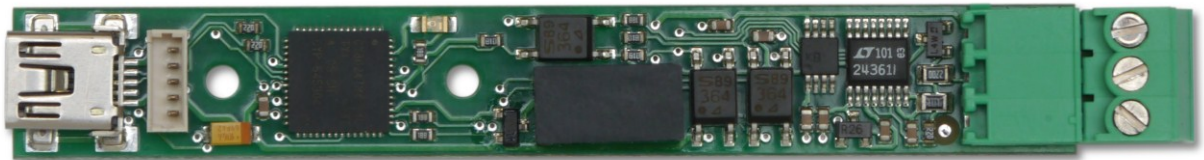


Oak Sensor 4-20 V1.3a.001 Test Instructions



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Contents

2. Oak 4-20 interfaces	3
2.1. Top Side Connectors: Physical Drawing.....	3
3. Test Material	4
4. General workflow for testing	6
5. Install and configure the Test program.....	6
5.1. Create the directory.....	6
5.2. Expand the delivered Zip File for the testing	6
5.3. Adjust the configuration.....	7
5.4. Additional Files in the Zip File	8
5.5. Run the Test program on Windows 7	8
6. Start the Test program	9
6.1. First connection of an “Oak 4-20” sensor.....	9
7. Test a serie of the “Oak 4-20” sensors	11
7.1. Logging of the test result.....	12
8. Send the test results back to Toradex	12
9. Test adapter	13

Related Document

- [1] Labeling Concept “Oak_Sensors_Labeling_Concept_YYYY-MM-DD.pdf”
- [2] Programming Instructions “Oak_Sensors_Programming_Instruction_YYYY-MM-DD.pdf”



2. Oak 4-20 interfaces

2.1. Top Side Connectors: Physical Drawing

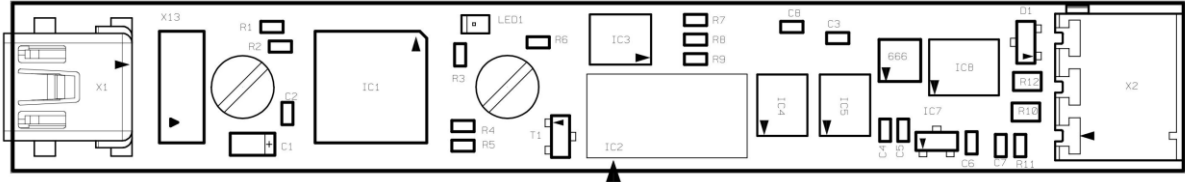
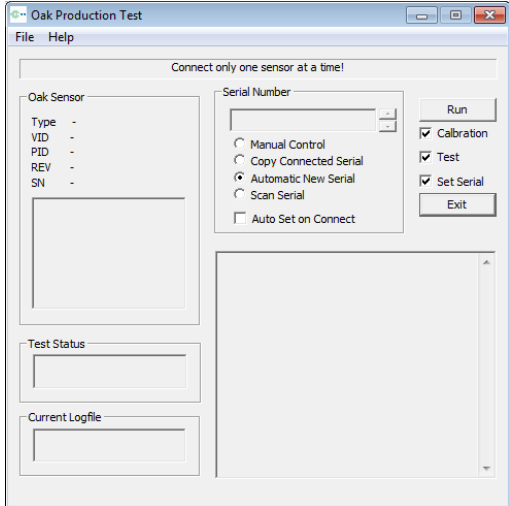




Fig.1 Oak 4-20 connectors – Top Side


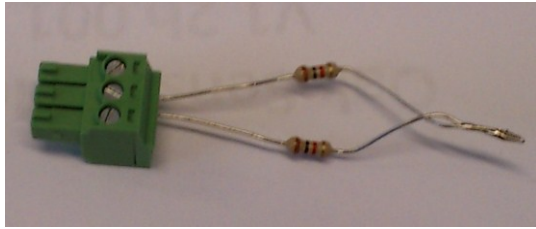


3. Test Material

To test this Oak Sensor the following Material must be present:

	<p>Program “Oak Production Test” delivered by Toradex</p>
	<p>2D Barcode scanner with USB Interface: Required quantity: 1</p>
	<p>USB Cable Type A–Mini B Required quantity: 1</p>



	<p>PC or Laptop with 2 USB connectors and installed Windows XP or Windows 7</p> <p>Required quantity: 1</p>
	<p>Test Adapter</p> <p>See chapter 9</p> <p>Required quantity: 1</p>
<p>05091300_Oak_4-20_V1_3a_001_ Prog_Test_Data.zip</p>	<p>Test Program for Oak 4-20</p> <p>This Zip file contains the Hex-File to program the Oak 4-20 Sensor and the Test program with the settings to test the Oak 4-20.</p>



4. General workflow for testing

All Oak Sensors are tested in a similar way.

- On a Windows, create a directory according the roles of chapter 5.
- Expand the delivered Zip file with the Test program in the chosen directory.
- Configure the test program.
- Run the tests for all sensors (the test program creates a log file for all sensors in the current directory).
- Copy the hex file which was used to program these tested Oak sensors in this directory.
- Compress the whole directory structure according the roles of chapter 5 with all files in a Zip file. Use the name of the delivered Zip file and your factory name at the end.
- **Send this Zip files back to Toradex**
- Toradex puts the content of these Zip files in their archive so that Toradex can look up the test log from every Oak sensor

5. Install and configure the Test program

5.1. Create the directory

Create the directory somewhere on the PC which is used for the test.

....\2012-01-04\Oak 4-20\

The **last two subdirectories** of the path must include the current data and the Oak Sensor type like shown above.

5.2. Expand the delivered Zip File for the testing

Expand the delivered Zip in temporary directories and copy the files of the subdirectory "Production_Test" in your directory.

In your directory "....\2012-01-04\Oak 4-20\" must be the followings files:

ini.xml	Configuration File
Oak_ProductionTest.exe	Test program with its associated files
oak.xml	
oak.xmt	
oak.xsl	
oaka.dll	
oaka.lib	
oakw.dll	
oakw.lib	



Remark: Unfortunately, the file "ini.xml" contains the setting for all sensors. In all test cases we use this file and the file name is always the same. Therefore it is easy to mix it up. That's the reason to use for every Oak Sensor type a separate directory to do the test and send all files of the directory back. With this way we get the log file, the used settings and test program back to register it in our database

5.3. Adjust the configuration

The file ini.xml contains the setting for all Oak sensors.

In the file is a section for the Oak 4-20:

```
..<P0x0009 Name ="Oak 4-20">
  <tol_current>
    0.001
  </tol_current>
  <current>
    0.010
  </current>
  <PN>
    0509
  </PN>
</P0x0009>
```

The test detects if the sensor see a current of ca. 10mA. Maybe this value must be adjusted a little (the value between <current> .. </current>.above).

The test program only checks if all parts of the sensor are working. The linearity, the tolerance of DAC etc. is not tested.



5.4. Additional Files in the Zip File

The directory “Hex-File” contains the file:

Oak_4-20_Firmware_Rxxx.hex

This is the program code for programming the flash (see [2]) and is not used for the testing.

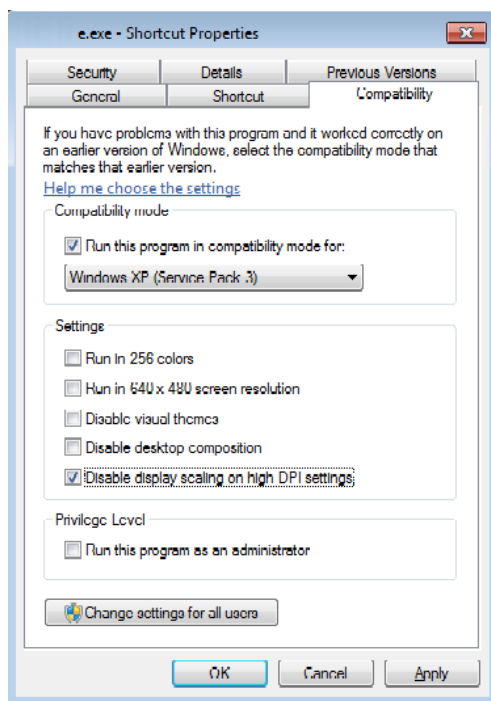
Please note that the version of the program is independent from the version of the product.

5.5. Run the Test program on Windows 7

If the Test program runs on Windows 7, sometime the output of the test results stops scrolling (the test is still running and at the end of the test all buffered outputs are show at once). Our impression is that this behavior is depending on the graphical setup of the Windows.

The following workaround can help:

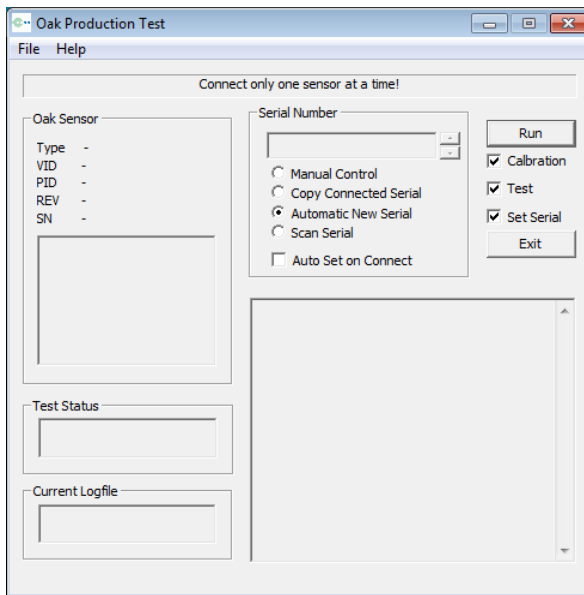
- Create link to start the Test Program
- Open the properties of this link (right mouse click)
- Setup the Compatibility as shown below





6. Start the Test program

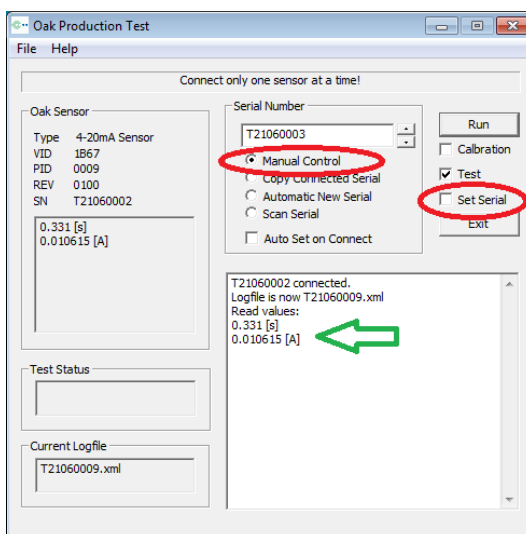
For the Test program is no installation needed. It can directly run by starting "Oak_ProductionTest.exe" (double click on it or the according Link).



6.1. First connection of an "Oak 4-20" sensor

First connect the testadapter to the "Oak 4-20" and the connect the USB cable.

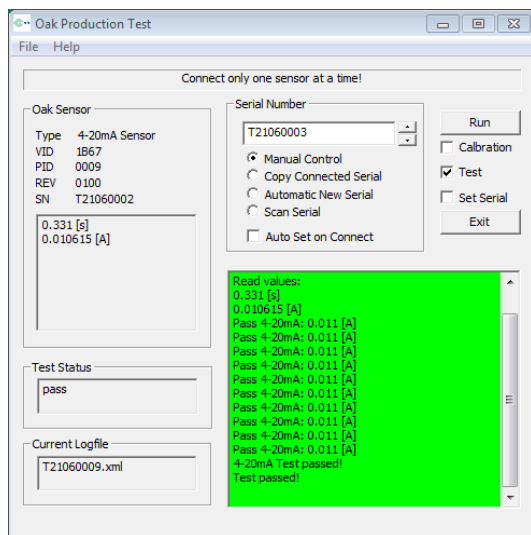
After an „Oak 4-20“ is connected the Test program shows on the left side Type, Serial number etc. In the log field the testprogramm shows the measured values (green arrow). Additional the Led on the "Oak 4-20" is flashing.





It is possible to run a test without writing the serial number back to the sensor and without creating a log entry in the log file. To do such tests the “Set Serial” must be unmarked and “Manual Control” must be enabled (see red oval in picture above) bevor the test ist start with the “Run Button”.

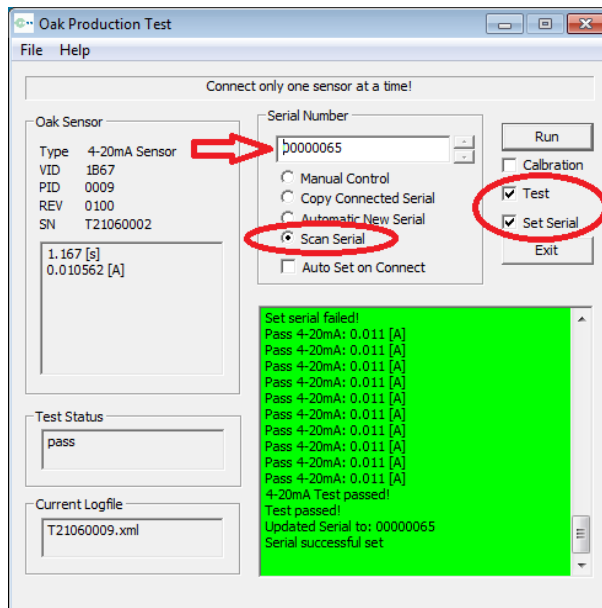
Depend on the test result the log field is green (passed) or red (fault).



Please note: the colors of the log screen is changed at the end of every tests. This means during a test the logscreen can stay red because the test bevor was faulty.



7. Test a serie of the “Oak 4-20” sensors



To test a Oak 4–20 Sensor the option “Test”, “Set Serial” and “Scan Serial” (see red oval) must be set.

- “Test” executes the test cycle
- “Set Serial” writes the “Serial Number” (see red arrow above) in the Flash of the Sensor at the end of the test sequence. But for that, the Serial Number must fulfil the specification for this sensor (product name, range of the serial-number etc).
- “Scan Serial” give you the option to scan the barcode with the “2D Barcode scanner” and automatically run the test right after the scan.

Remark: The field “Serial Number” (see red arrow) must be empty before a scan starts and the label must following the rules described in [1] otherwise an error message appears at the end of the test cycle.

The field “Serial Number” is cleared by connecting a sensor or by the user.

Important The serial number must be get from the lable with the barcode.

To do that, the folling tow points must be fulfill:

- The label must be printed according to the document
“Labeling Concept “Oak_Sensors_Labeling_Concept_YYYY-MM-DD.pdf” (see [1])
and **put on the sensor before the test** starts.
 - Option **“Scan Serial” must be used** for testing the production.
(other option can save a serial number in the flash witch is not in line with the serial number on the barcode)



7.1. Logging of the test result

All Test are log in the file "oak.xml" located in the same directory as the Test program is. This file can be shown with a HTML Browser which supports the XML format (nearly all of the current browser).

To show the logs open the File "T21060009.xml" with the browser (file open instead of putting a URL address).

8. Send the test results back to Toradex

As described in chapter 4 at the end we need

- the test program
- the settings (ini.xml)
- the log file(s)
- the program code for the firmware

back to archive.

Before you put all test files in a Zip archive copy the program file

"Oak_4-20_Firmware_Rxxx.hex" which was used to program the Oak sensor in the directory with the test program.

After that pack all files, including the two subdirectories above, in a zip file and mail it to Toradex.

Example:

The following directory contains the test program with all the files like setup, log etc.

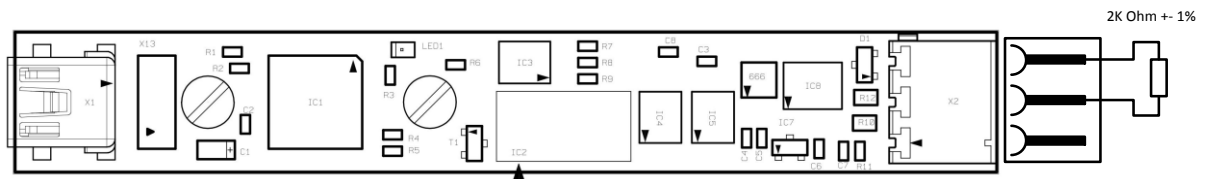
..\2011-11-29\Oak 4-20

Beside the files the Zip file should include the last two directories of your path. To do it commands the Zip program to zip all file of the directory "**2011-11-29**" including all subdirectories and files below.

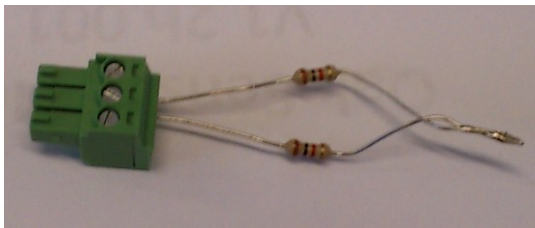


9. Test adapter

The Test adapter is single 2k Ohm resistor connected between 24V and the input. This register limits the current to approximately 10mA. It is possible to connect another resistor in the range from 1.8k to 2.2 but then the `<current>` but then must be adjusted in the ini file (see 5.3)



Schema of the Test adapter



Example of a Test adapter



Revision History

Date	File Name	Initial	Changes
2011-01-04	05091300_Oak_4-20_V1_3a_001_ Test_Instructions_2011-12-16	ub	Initial release

Date	Initial	Changes
2012-05-08	ub	Changed file name, introduced new Revision History (now version or date information in the file name because the file is not under version control). Replaced some photos with the right version. Moved the revision history to the end of the document.

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