Test Program for tec5 Operating Electronics
and Spectrometer Systems

AdminTool

Manual

Version 2.02

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AdminTool Test Software

The AdminTool is a test program for tec5 operating electronics and spectrometer systems. This test software and the device drivers are included in the hardware package.

AdminTool offers the following capabilities:

- Primary functional tests
- Data acquisition and simple graphical and numerical display of the recorded data
- Setting of parameters for the used sensors as well as wavelength calibration coefficients
- Calibration between two spectrometer channels
- Setting of parameters of a fiber-optic multiplexer
- Light source

AdminTool contains a comprehensive help text.

Supported interface electronics:

- PD-PCI01V1
- PD-USB01
- PD-ETH01
- COE-USB11

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1 Installation with the Test and Parameterization Software AdminTool

AdminTool is used to test or configure the tec5 operating electronics and spectrometer systems. It enables the acquisition and display of pixel data which can be exported as an ASCII file for further processing. It also offers the possibility to reference two sensors against each other. This calibration data can be used by an application software to calculate the transmission and absorption data.
The AdminTool is based on the function library SDACQ32MP.

2 Installation of AdminTool

Remark: The related instrument drivers have to be installed before!

>>>Step 1:

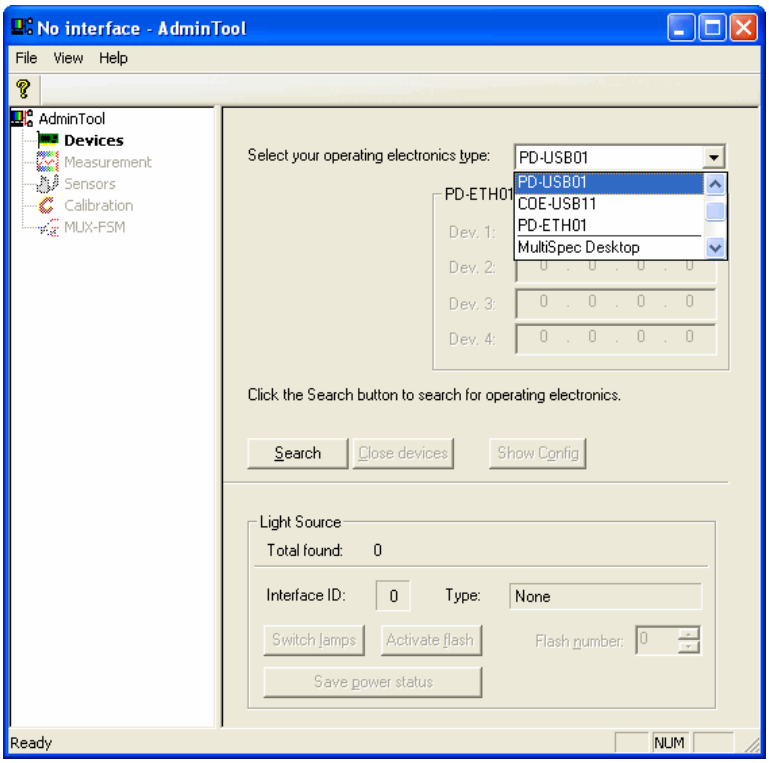
- Insert the ‚tec5 tools' CD or the tec5USA Info CD
- Directory ‚Software & Drivers'
- Directory 'Software-Tools'
- Directory 'AdminTool'
- Start program 'sdacq32at.exe'
- Follow the instructions of the setup program
- The computer reboots at the end of the setup procedure

>>>Step 2: Start AdminTool

- Start the application program named AdminTool via
  Start / Program / tec5 SDACQ function library/ SDACQ32 Admin
  or click the Shortcut Icon (if installed)

2.1 Devices - Selection of Hardware

AdminTool has a twofold structure.



The left collumn shows the individual panes, while the right one shows the details of the selected pane. The entries listed in gray are not available.

>>>Step 3: Selection and activation of operating electronics – reading of configuration data

- At first, please select type of operating electronics from the drop down list ‚Select your operation electronics type':
  - ‚PD-PCI01V1' or MultiSpec^{Desktop}
  - ‚PD-USB01V1' or MultiSpec$^{Desktop/USB}$
  - ‚PD-ETH' or MultiSpec^{ETH}

    → **Additional entries needed, see chapter 2.1.1**
- Press the Search button to start the search.

Now AdminTool tries to communicate with the hardware.

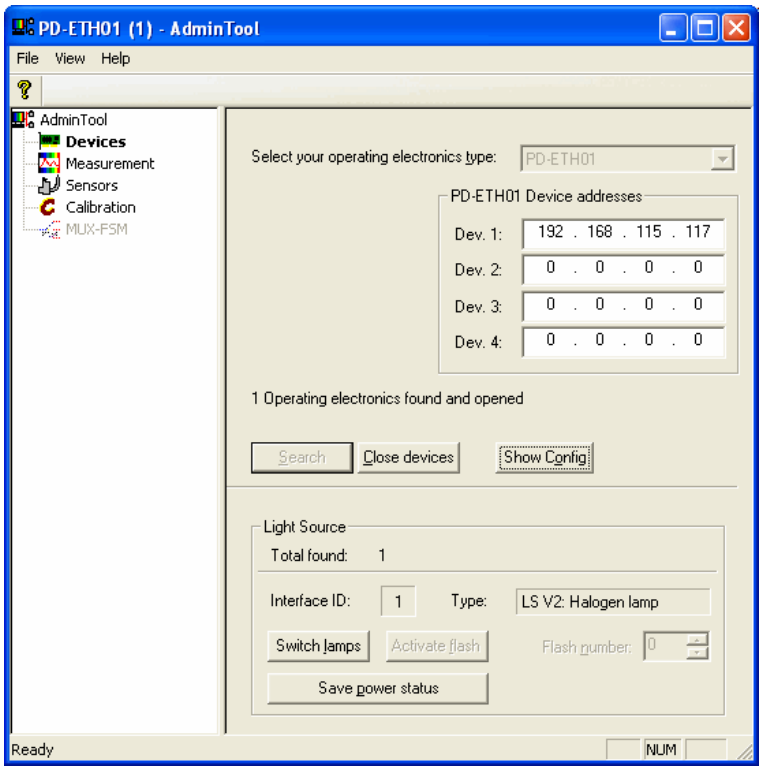
After the search operation is finished, the number of found electronics is displayed. If the search process was successful you get the message „**1 (or more) operating electronics found and opened**“

>>>Step 4: Light Source Module

When working with MultiSpec Systems available **light source module(s)** will be displayed. The light source can be switched on/off by software. To do so the toggle switch ‚Shutter' on the front plate of the light source cassette has to be in ‚automatic' position.

Only light source module(s) which are controlled by the internal I2C Bus of the MultiSpec systems will be displayed.
Please notice that the ignition of the D2 light source takes approx. 1 minute.

The light source can be switched on with the button “Switch lamps” (for Deuterium and Halogen) or with “Activate flash” (for Xe flash lamp).



If you do not work with an Ethernet electronics please proceed to chapter 2.2.

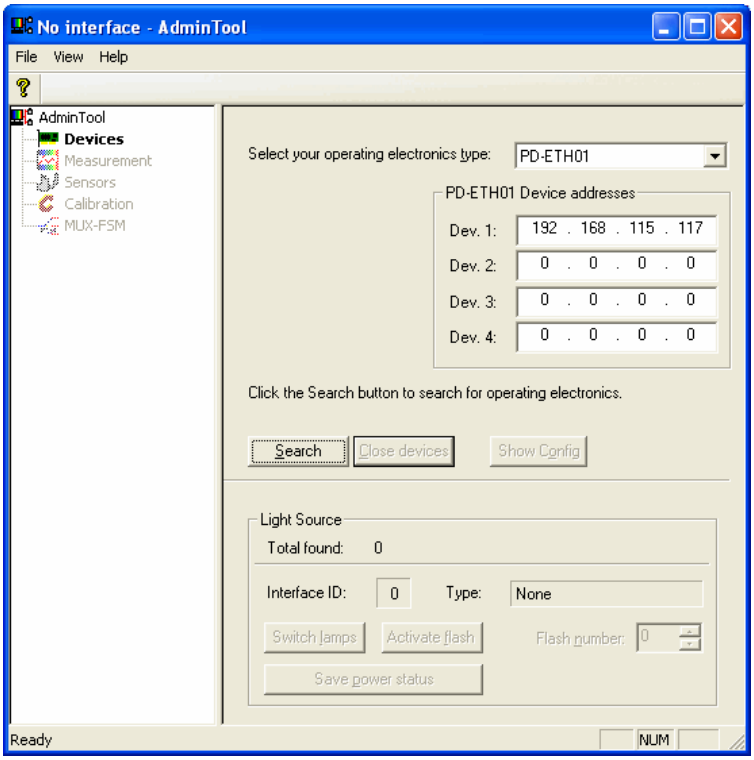
2.1.1 Additional Instructions for MultiSpec Systems with Ethernet Electronics

Before You Start

The default IP addresses of your PD-ETH01 devices are listed at the accompanying document “Prüfprotokoll (extern)”. You will need to assign your computer a static IP address within the same range as the PD-ETH01 devices IP addresses. See chapter 2.1.1.1 or 2.1.1.2 if you need assistance in assigning a static IP address for your network adapter.

After assigning the IP address you can change the preset IP addresses of your PD-ETH01 devices at your convenience.

The Ethernet operating electronics is supported from AdminTool version >1.7 (and SDACQ32MP.dll version 2.0) on.



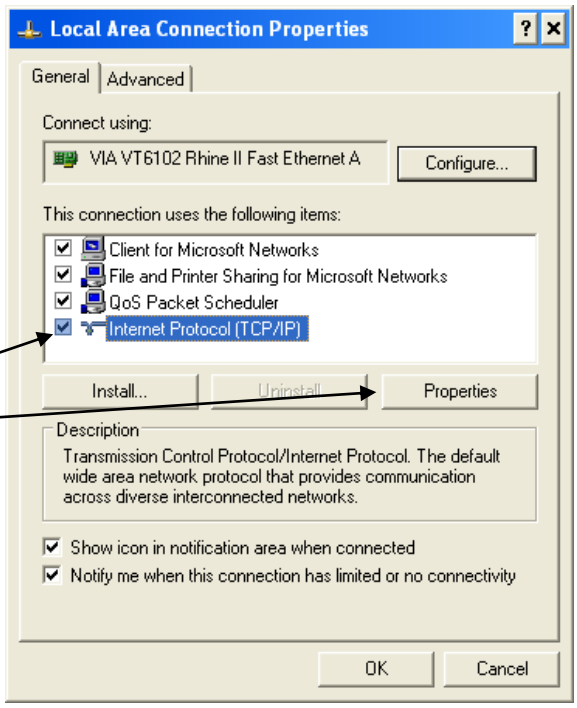
- ”Select your operating electronics type“ PD-ETH01
- Enter the”PD-ETH01 Device addresses„ of your electronics. See accompanying document “Prüfprotokoll (extern)”
- Click “Search”: the AdminTool searches your system for Ethernet devices

Now you can proceed as described in chapter 2.1.

2.1.1.1 Assigning a Static IP Address in Windows XP

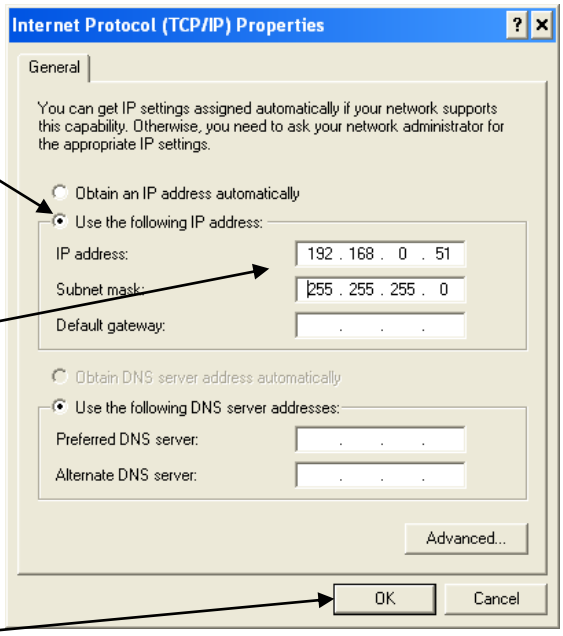
Please execute the following steps to assign a static IP address at your workstation.

Go to **Start** → Double-click **on Control Panel** → Double-click on **Network Connections** → Right-click on **Local Area Connections** → Click **Properties**



Highlight **Internet Protocol (TCP/IP)** and click **Properties**

Select **Use the following IP address** in the Internet Protocol (TCP/IP) Properties window.



If there is nt any further network, sign in your IP address and subnet mask. The IP address must be within the same range as the PD-ETH01 devices.

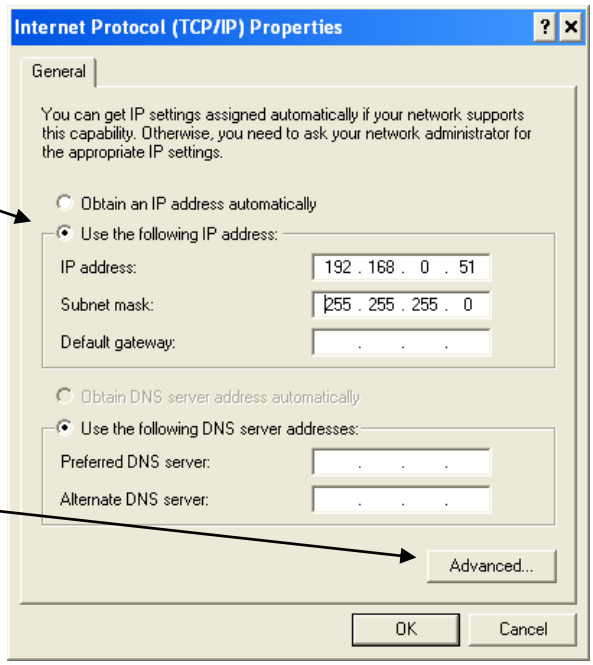
For example the IP address of your device is 192.168.0.50, you can assign 192.168.0.51 for your computer. Subnet mask is 255.255.255.0.

Click **OK**

Attention: In most instances you have to sign in the IP address in addition to an already existing static IP address.
In this case, please execute the following steps.

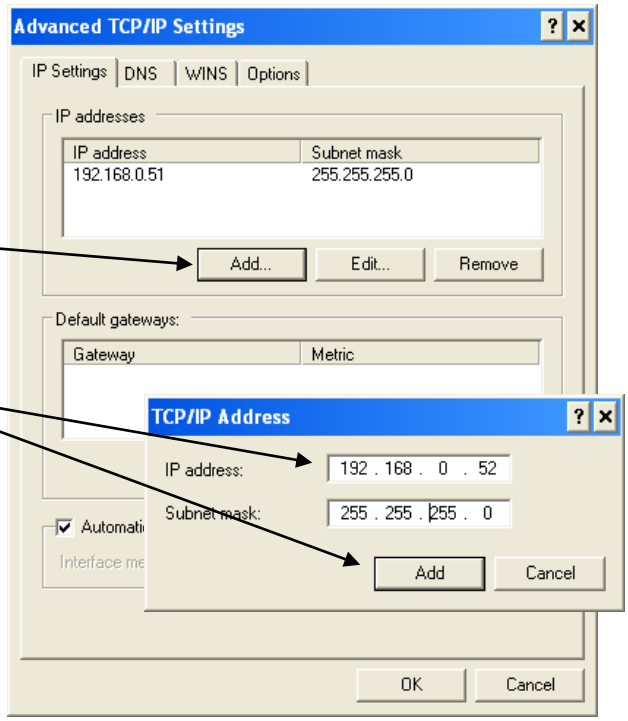
Select **Use the following IP address** in the Internet Protocol (TCP/IP) Properties window.

Click **Advanced…**



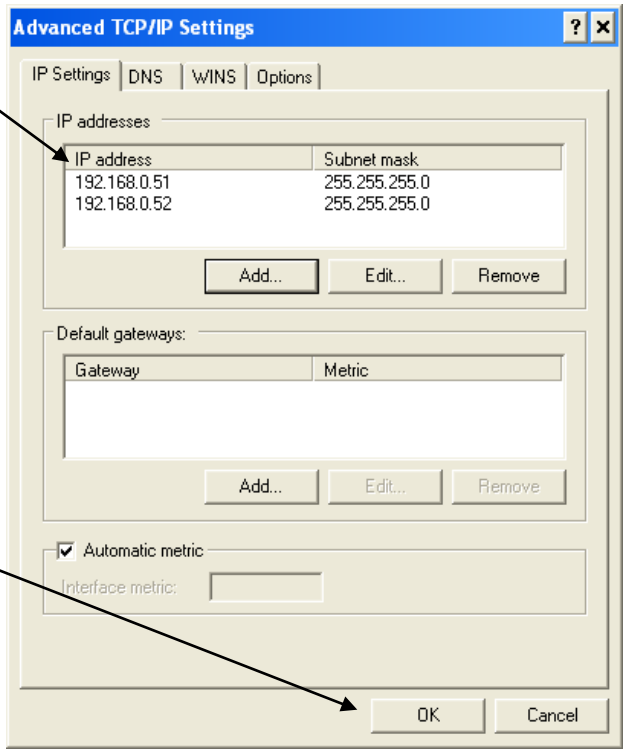
Click **Add…**

Sign in the new address according to the explanation above and click **Add**



Now, two static IP addresses are assigned.

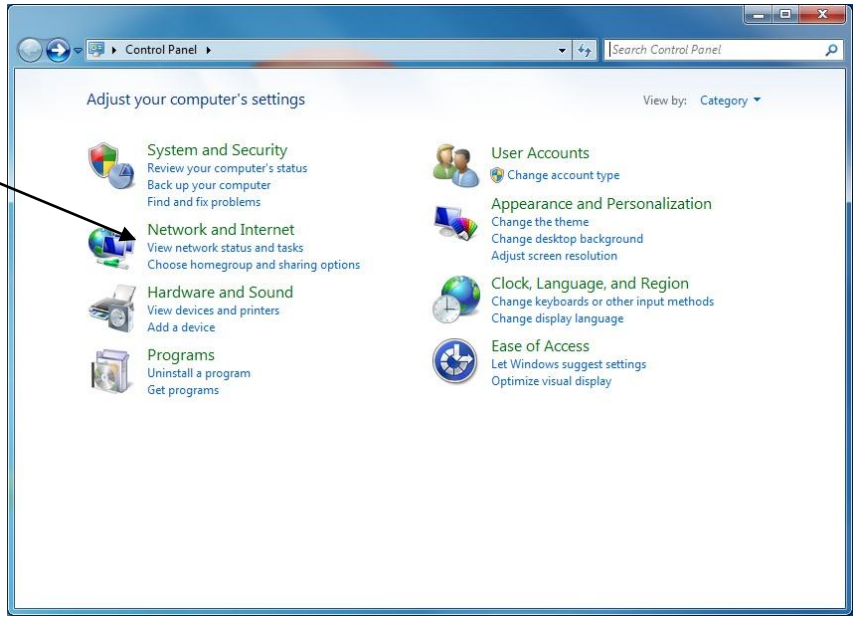
Click **OK**



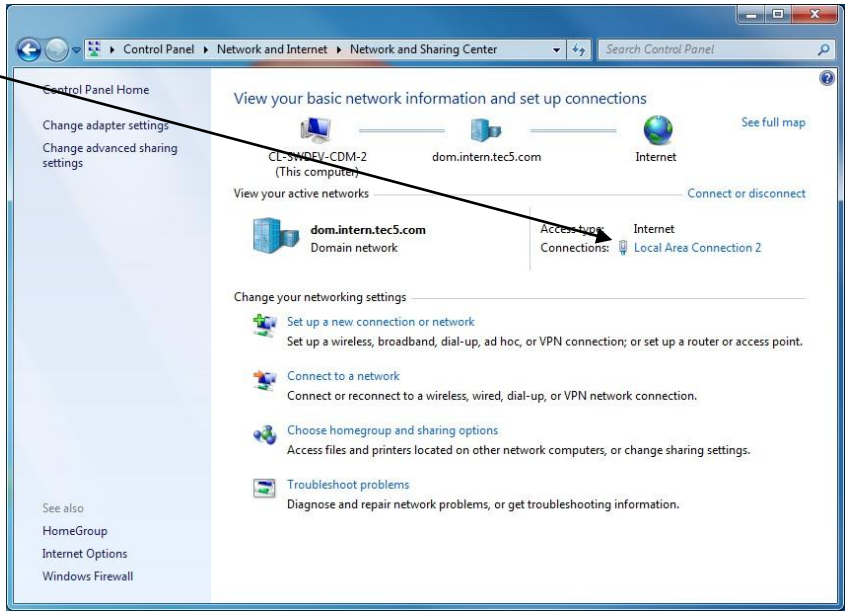
2.1.1.2 Assigning a Static IP Address in Windows 7

To assign a static IP address in Windows 7 execute the following steps.

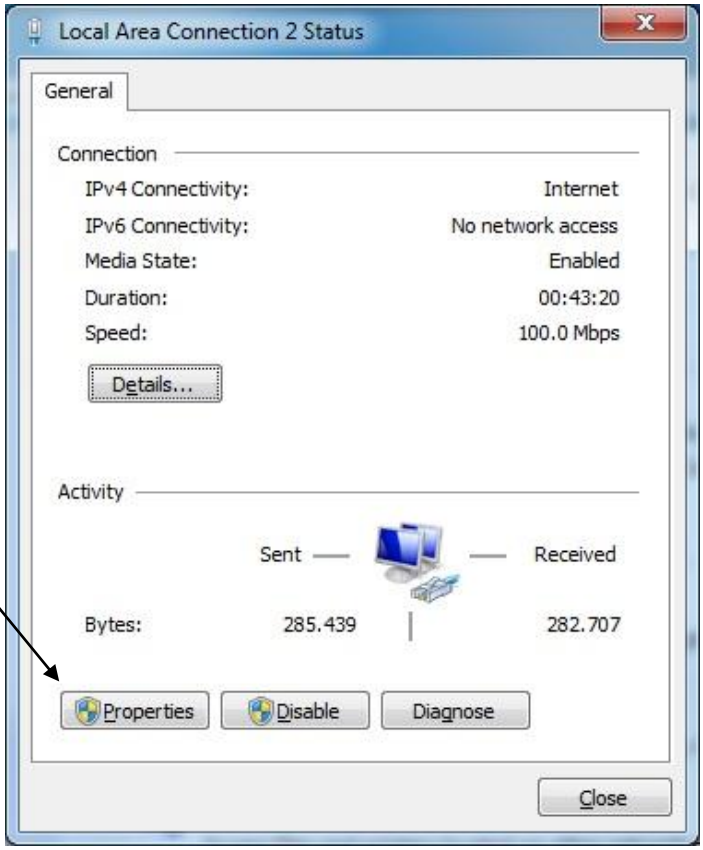
Go to **Start** → Double-click **on Control Panel** → Double-click on **View network status and tasks**



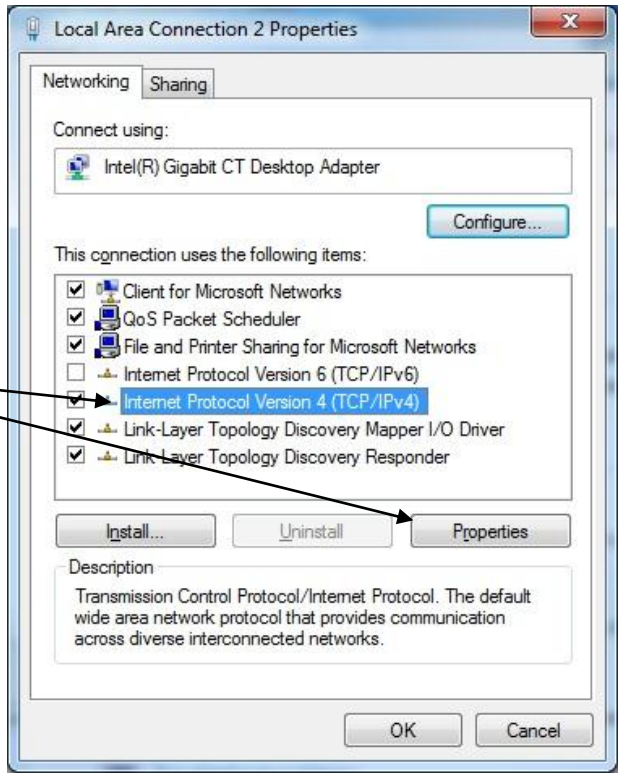
Click on **Local Area Connections**



Choose **Properties**



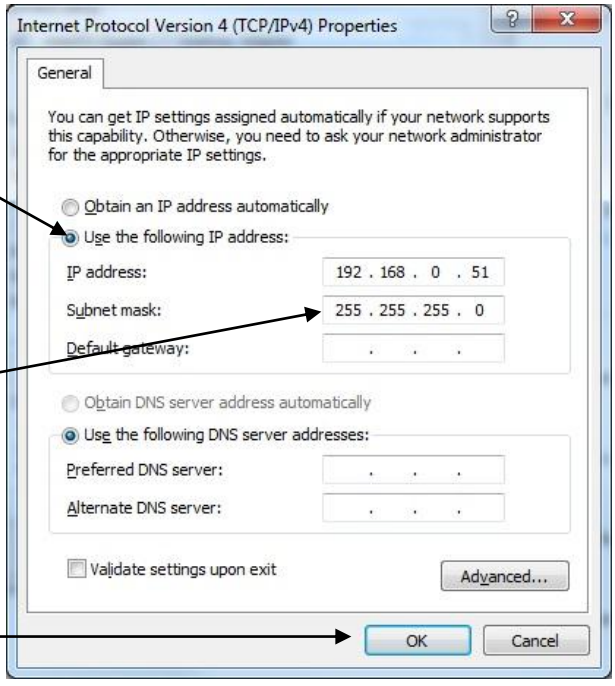
Choose **Internet Protocol Version 4 TCP/IPv4)** and click **Properties**



Select **Use the following IP address** in the Internet Protocol (TCP/IP) Properties window.

If there isn´t any further network, sign in your IP address and subnet mask. The IP address must be within the same range as the PD-ETH01 devices. For example the IP address of your device is 192.168.0.50, you can assign 192.168.0.51 for your computer. Subnet mask is 255.255.255.0.

Click **OK**



Attention: In most instances you have to sign in the IP address in addition to an already existing static IP address.
In this case, please execute the following steps.

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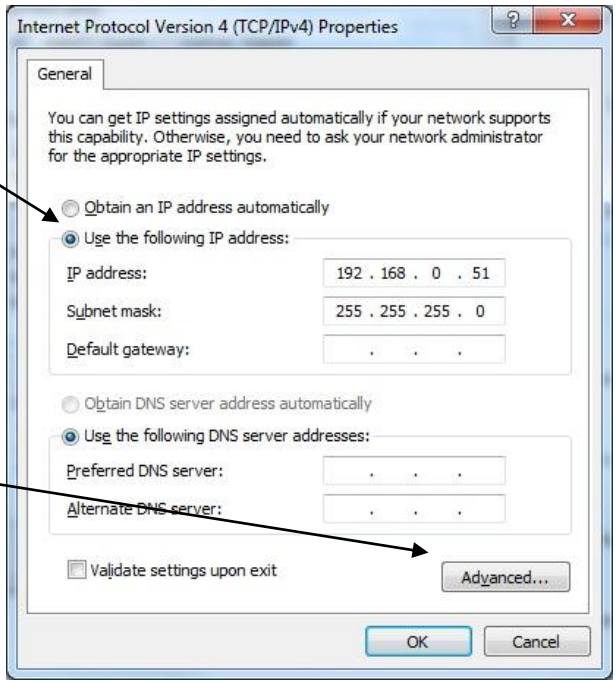
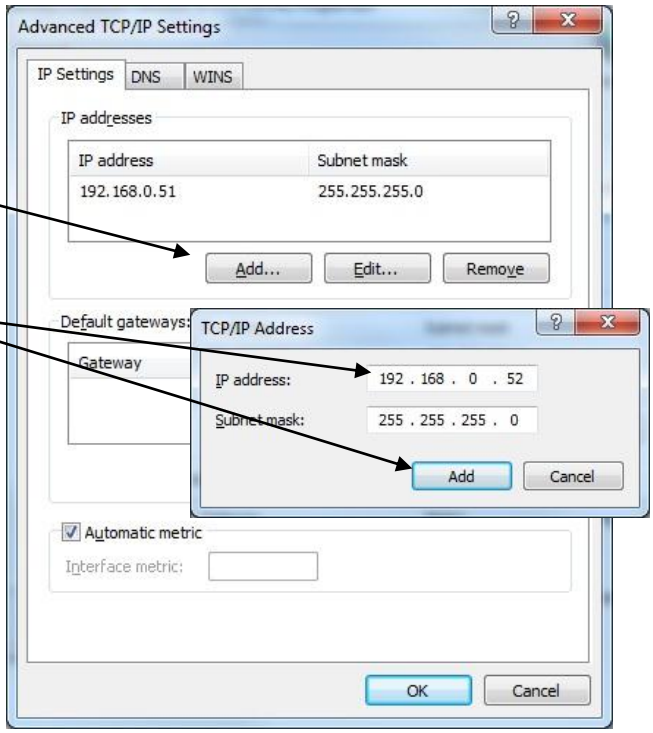
Select **Use the following IP address** in the Internet Protocol (TCP/IP) Properties window.

Click **Advanced…**



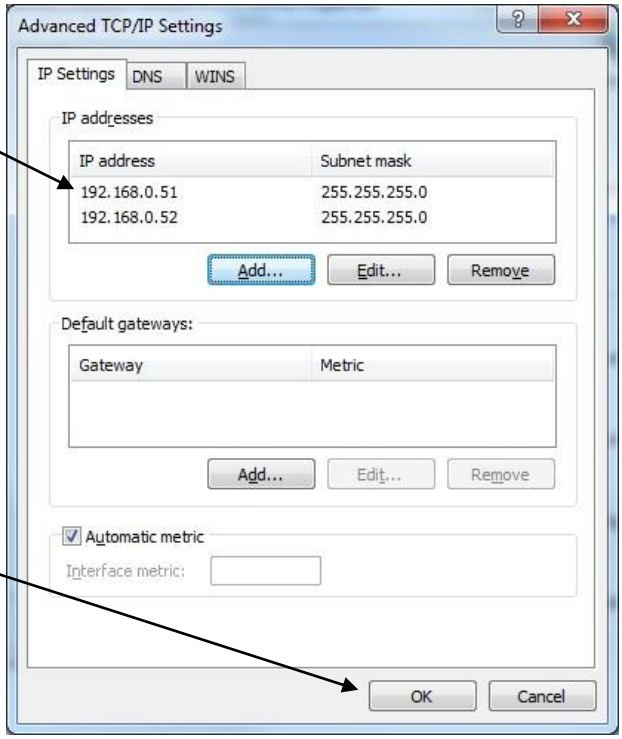
Click **Add…**

Sign in the new address according to the explanation above and click **Add**



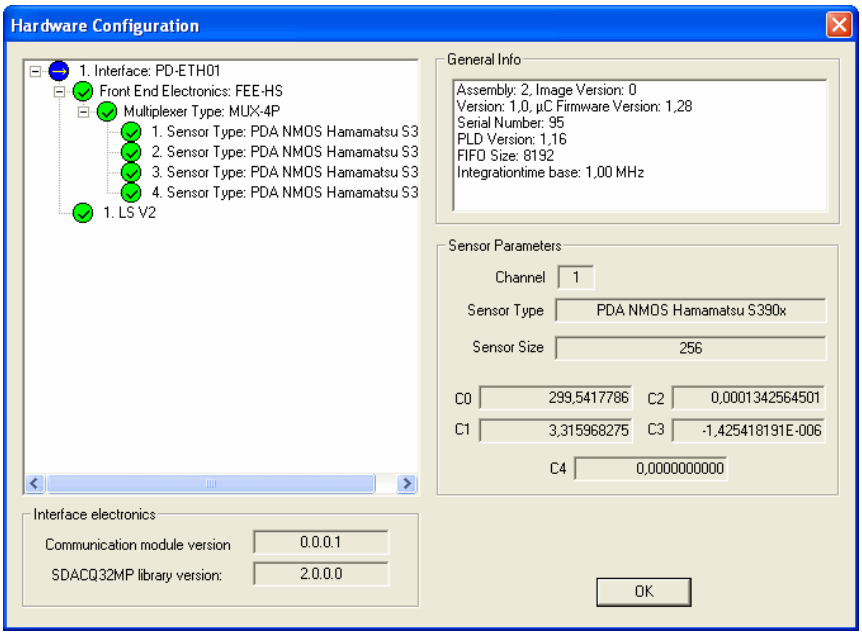
Now, two static IP addresses are assigned.

Click **OK**



2.2 Show Config – Display the Current Hardware Configuration

To display an overview of the hardware components push the button "*Show Config"*. Click on the name of any component on the left side, then the related information of the important parameters is displayed, e.g. firmware / PLD Version. In case a spectral sensor or spectrometer is attached, the saved calibration coefficients are shown.

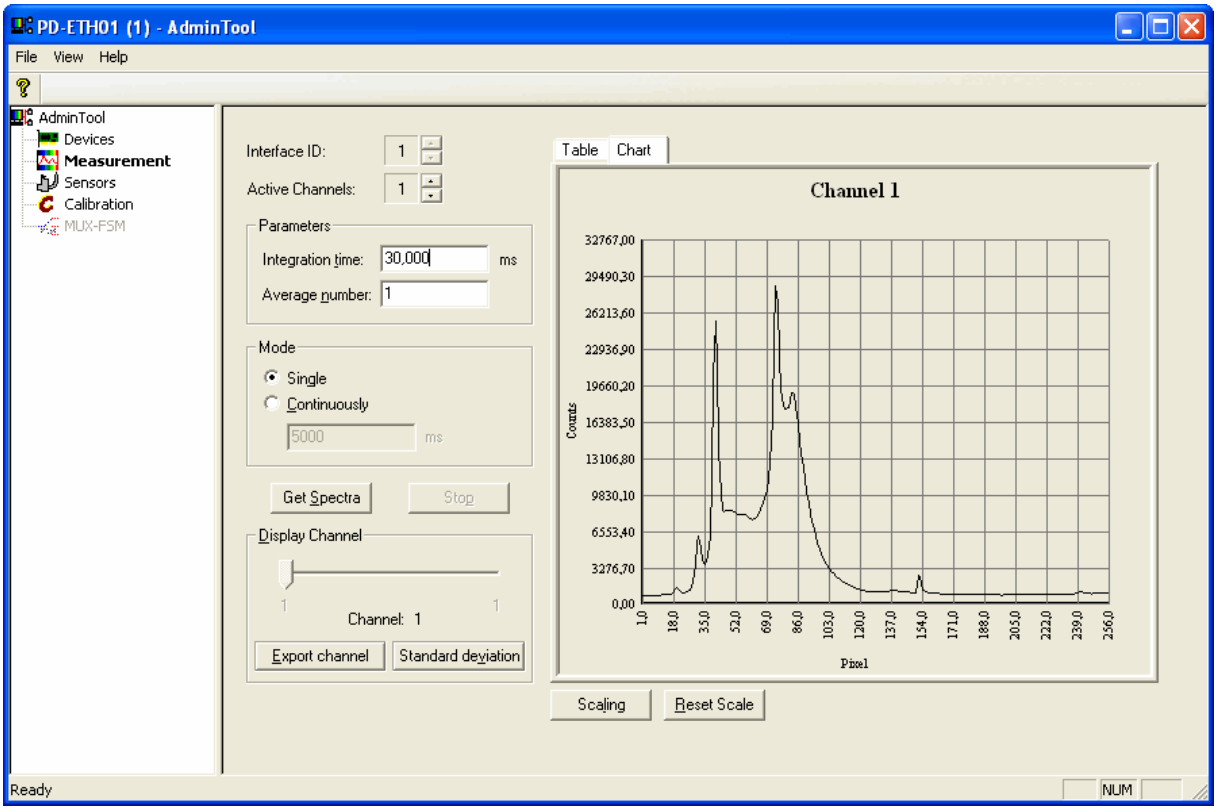


2.3 Measurement - Acquire Spectral Data

The *Measurement* pane provides the possibility to perform, display and save test measurements. Please note that all data are pixel related.

>>>Step 5:Record spectral data and display numerical or graphically

- Set ‚Integration time' (i.e. 30 ms)
- Set number of spectra to average (i.e. 1)
- Set ‚Mode' (single or continuous measurement)
- Set a delay time between two spectra acquisitions (i.e. 5000 ms)
- Select display type ‚Table' or ‚Chart'
- Start acquisition via button ‚Get Spectra'
- Stop acquisition via button 'Stop'' in case of continuous measurements



Remark:

If parameter values are beyond their allowed limits, these values are automatically set to the next valid value. There is only one window respectively one table to display all data. The *Display channel* slider is used to select the individual channels.

The export of data is handled only channel by channel, too. The selected / displayed channel is saved. The format is ASCII with a header as an option. Please use *Export channel* button to save the data.

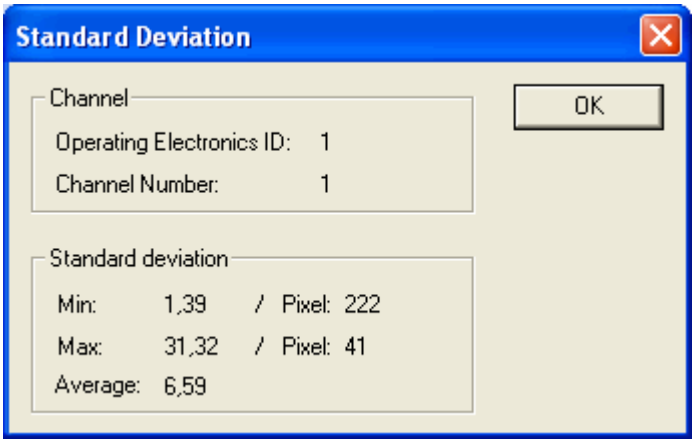
In case of a multiplexer please check first that the number of physically available channels (number of spectral sensors) matches the settings of *Active Channels*. Then you can use the *Display channel* slider to select the individual channels.

Note: The test software AdminTool currently supports only the simultaneous operation mode. When the operating electronics is equipped with a MUX you need at least 2 spectrometers attached! Otherwise you will get error messages.

The software offers two different measurement modes. In ‘Single Mode’ the data will be acquired one time for each channel. At the ‘Continuous Mode’, data will be acquired periodically according to an adjustable time interval. This interval can be set in the small window below the “Continuously” button.

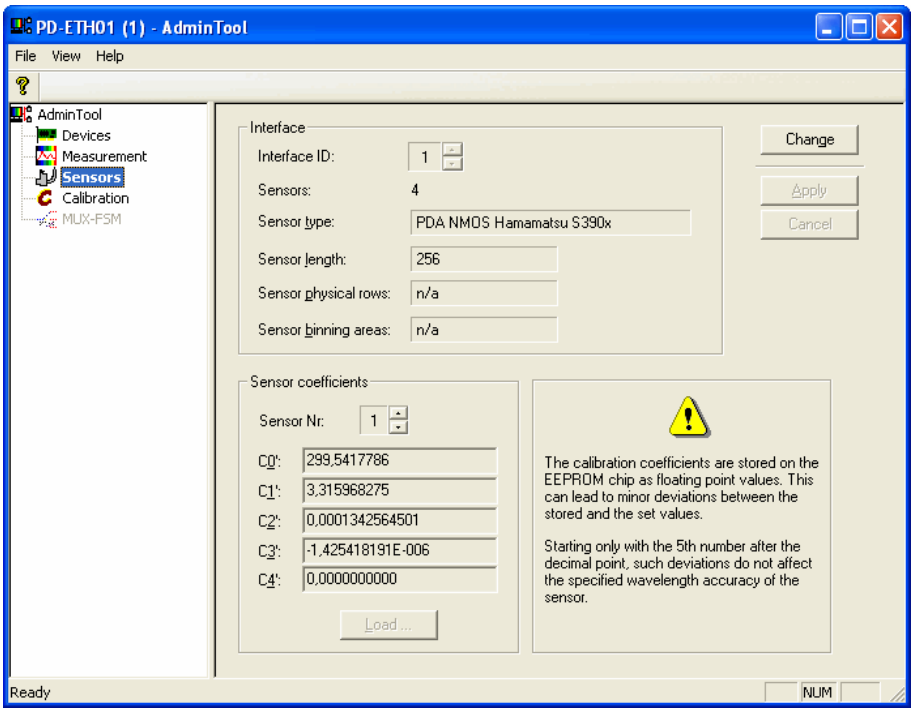
Table and chart show only one channel, the channel can be choosen via the *Display Channel* slider. To save the pixel-related data of the selected channel as an ASCII file (. txt) click the ‘Export channel' button.

You may also calculate the standard deviation of the selected channel by clicking the *Standard deviation* button. The software acquires 20 spectra and calculates the standard deviation. The results are shown in an additional window:



2.4 Sensors - Setting the Parameters for the Sensor Modules

The *Sensors* pane shows the configuration of the sensor channels for each interface. You may also change the values for the calibration coefficients, the array length (number of rows and binning area in case of a CCD), and type of sensor / chip if required and appropriate. These data are saved to the EEPROM chip, which is part of the FEE board.



At first, the interface electronics has to be selected. *Sensor type* and *Sensor length* have to be the same for all chips operated by one operating electronic. *Sensor physical rows* are normally 1 (see CCD below for exceptions). A configuration of different sensor types controlled by one electronic is not supported yet. Are each spectrometer channel has its specific set of wavelength calibration coefficients.

Remark: Please check that the correct calibration coefficients are stored. Compare the saved values with the C0' to C4' values on the Carl Zeiss certificate. Please note that you have to use the 'prime' coefficients. This certificate you find enclosed in the spectrometer box or attached to your operating manual (see as well next paragraph). In case of multiple spectral sensors, the parameter *Sensor No.* enables you to select the individual ones.

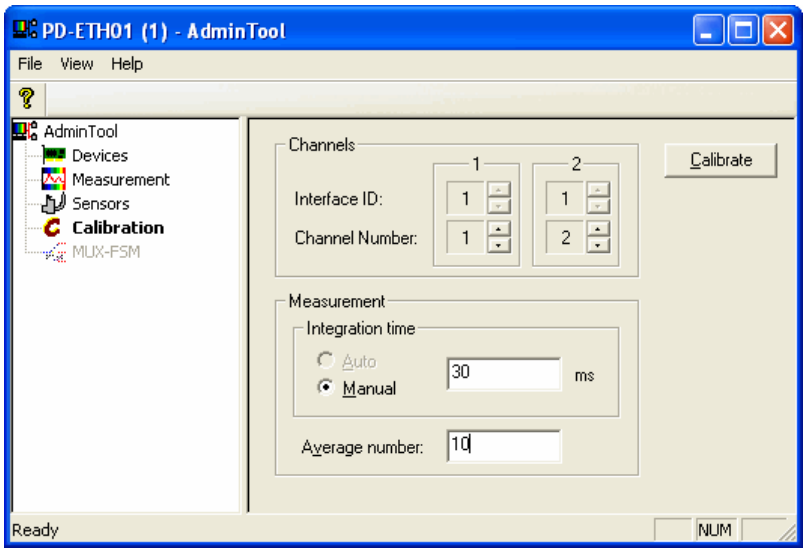
Remark: The calibration coefficients are stored on the EEPROM chip as floating point values. Because of this, minor deviations between the stored and the set values can occur. These deviations, starting only with the 5th number after the decimal point, do not affect the specified wavelength accuracy of the sensor.

If you want to modify a setting click the *Change* button. You may select another sensor type/size from the list or enter new coefficients. You may also load them from an **csv** file supplied by the vendor.

To apply your changes click the *Apply* button, otherwise click *Cancel*.

2.5 Calibration - Creation of Calibration File for Multi-Channel Operation Based on Multiplexer

Note: This calibration is not used by the AdminTool. Therefore, the *Calibrate* dialog is not required for using the AdminTool.



Different spectral sensors – even of the same type – vary in their optical features. In case of a multi-channel operation with multiple spectral sensors (i.e. one dedicated for referencing) sample and reference channels should be calibrated in respect to each other. Then the calibration data can be directly used to

determine the transmission / absorption values.
AdminTool generates such calibration data and saves it as a file, which can be further used by an application software.

You can set the integration time manually or automatically. The optimal value will be at about 80 % of the saturation level.

To perform the calibration measurement hit the “Calibrate” button.

2.6 MUX-FSM – Setting Parameters for a Fiber-optical Multiplexer

The pane *MUX-FSM* allows to set the parameters for a fiber-optical multiplexer. Push the Change button to enable selections. This is only possible if no electronic multiplexer is part of your system.

There are two possible settings for the type of the multiplexer:

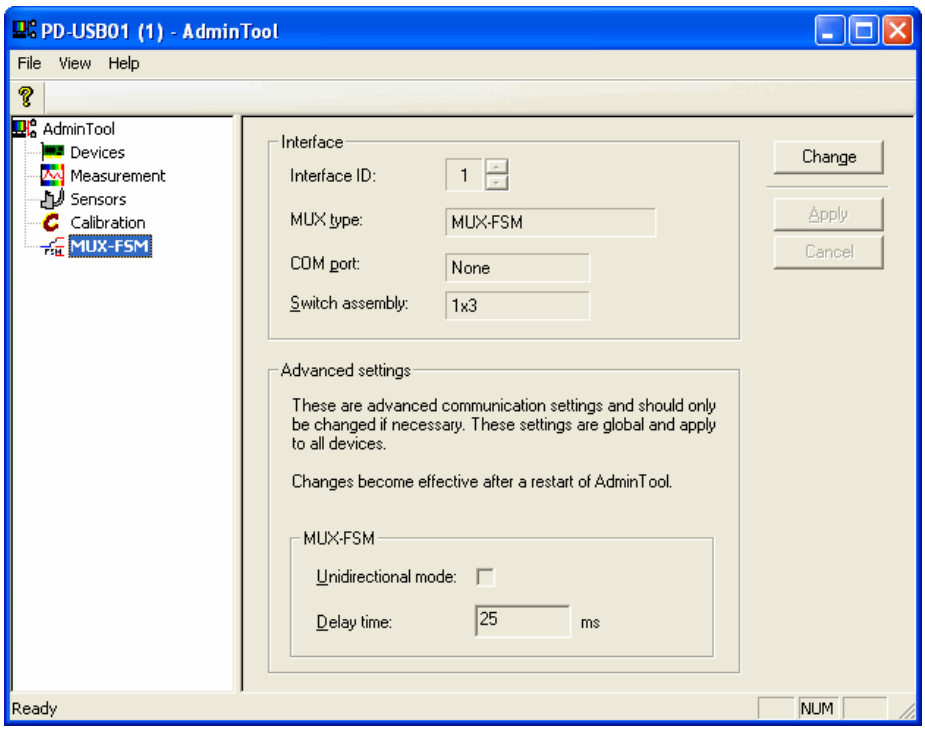
NO MUX: System is operated without a fiber-optic multiplexer

MUX-FSM: System is operated with a fiber-optic multiplexer

If a fiber-optic multiplexer is connected, there are two more options available

COM port: Set the COM port you have the multiplexer connected to

Switch assembly: Set the number of used channels



2.7 Error Messages

In the following the most common error messages and possible causes are listed.
There may also be messages that are not included in this list.In this case or if the respective errors are going to persist do not hesitate to contact tec5.

- **"No Operating electronics found"**

➔ Is the PCI board installed properly? (MultiSpec^{Desktop})
➔ Did you enter the correct IPaddress? (MultiSpec^{ETH})
➔ Did you set the network properly? (see chapter 2.1.1.1 or 2.1.1.2) (MultiSpec^{ETH})
➔ Please check the cable connection between PC and system (all systems)
➔ Are the latest device drivers installed correctly? (all systems)

- **"<n> Operating electronics found (<x> not usable) - <m> opened"**

➔ Did you connect the sensor cassette properly? (all systems)
➔ Did you connect the Front End properly? (MultiSpec^{Desktop})

- **"Device with ID <ID> is not usable. Make sure the Front End is connected and initialized correctly.\n Error: <Error text> (<Info>)"**

➔ Did you connect the sensor cassette to the system properly or did you connect the Front End properly?
➔ If the respective errors are going to persists, please note the displayed error code and contact tec5.

- **"The version of the EEPROM image of device with ID <ID> is unknown.\nInfo: <Info>"**

➔ Check the version of hardware and software. It is possible that the system is not used with compatible version numbers. In this case please contact tec5.

- **"The device with ID <ID> is already in use.\n Do you want to authorize yourself in order to use the device now?\n\n**
  Note: Upon successful authorization the previous client will lose the connection."

➔ Another user has signed in at the system.
➔ **Attention!** On confirmation of the message with "JA", the second user will lose the contact to the system. Make sure that the system is currently not used.

- **"The authorization has been denied by the device with ID <ID>."**

➔ Another user has signed in at the system.
➔ You do not have the required authorization code to interrupt the existing connection.

- **"The device with ID <ID> is not ready for operation."**

➔ Check the current status of the Ethernet electronics by entering the IP address via a web browser. If the respective errors are going to persist, do not hesitate to contact tec5.

- **"The device could not be initialized. Measurement functionality is not available."**

➔ Are all sensors ready for operation? PGS sensors and CCD sensors need some lead time to reach operating temperature.

- **"The calibration coefficients are not valid. Ensure they match the values on the test certificate."**

➔ Are the correct coefficients of the sensor module and settings stored correctly? (See chapter 2.4)

- **"Failed to write parameters to registry"**

➔ The parameters of the MUX-FSM could not be stored correctly in the file. Check if you have the appropriate write permissions (Windows) and make sure that the Windows file system works properly.

- **"Due to lack of permissions in the registry these parameters cannot be changed."**

➔ The parameters of the MUX-FSM could not be stored correctly in the file. Check if you have the appropriate write permissions (Windows).