ZEISS InProcess Manual

V. 2.11.2

Users must be familiar with the user manual to operate the device. Therefore, please familiarize yourself with the contents. In particular, make sure to follow the instructions explaining how to handle the device safely. This document is subject to change with additional of technical development. The user manual is not subject to updates by revision services.

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Version	2.11.2
Date:	May 2021

Subject to technical changes

Contents

1 Introduction

1.1 Hardware requirements

1.1.1 Minimum hardware requirements

- Windows 10 (32 Bit)
- Processor Intel Core 2 Duo
- 2 GB RAM
- 1 GB free hard disk space
- Screen solution 1024 x 720 pixels

1.1.2 Recommended hardware requirements

- Windows 10 (64 Bit)
- Processor Intel i5
- 4 GB RAM
- 15 GB free hard disk space
- Screen solution 1920 x 1080 pixels

1.2 Software activation

To activate InProcess after installation, please refer to the **ZEISS License Activation** document. The document can be found in the Start menu (All Programs→ZEISS→InProcess→Documentation).

1.3 System options

1.3.1 Devices without embedded controller

For operation of devices without embedded controller, the local system configuration has to contain the necessary information about all devices intended for the use. Details about this configuration are described in chapter 1.4 of this document.

1.3.2 Devices with an embedded controller (EC)

For operation of devices with embedded controller, the local system configuration will not be used. Instead, the system configuration is located within the controller. It can only be altered by ZEISS service personnel. The details about the system configuration described in chapter 1.4 of this document do not apply.

The measurement functions of these devices can be configured and monitored using the separate program: "InProcess Client".

1.3.3 Devices connected to a network computer

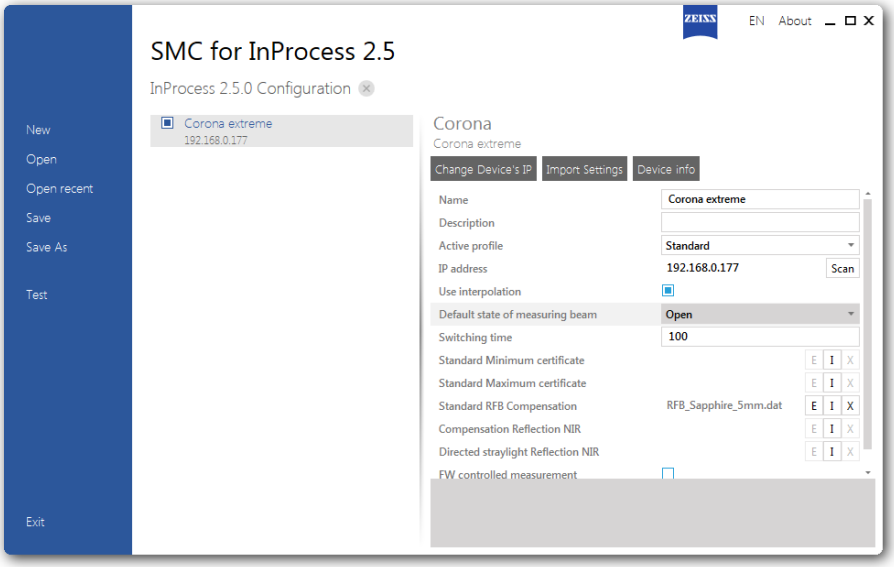
In order to operate devices that are connected to another network computer, the local system configuration of this network computer must contain the necessary information about all of the devices that are to be used. The configuration must be performed on the network computer using the "InProcess Service Manager" auxiliary program. You need administrator rights in order to run this program. Details about this configuration are described in chapter 1.4 of this document.

The measurement functions of these devices can be configured and monitored using the separate program: "InProcess Client".

1.4 System configuration

The system configuration for InProcess contains information about all spectrometer devices to use including compensations as well as measurements and certificates of reference standards. It also contains settings for the Measurement History, the Event log, and the SQL database.

Device settings of local configurations can be edited using the Spectrometer Management Console (SMC) that is installed along with InProcess. The SMC can be launched from the start menu (All Programs → ZEISS → InProcess).



More extensive structural changes to the local configuration can be made using the OSIS Management Console ("OMC for InProcess"). This program is installed along with InProcess. It can be launched from the start menu (All Programs → ZEISS → InProcess → Tools).
"OMC for InProcess" can also be opened via the "InProcess Service Manager" program in order to configure the measurement operations that are to be available on the network.

1.4.1 Default configuration

The default system configuration installed with InProcess is using a Corona extreme spectrometer configured for the IP-address 192.168.0.177.

1.4.2 System configuration templates

The following system configuration templates are available with the Agri license:

AURA handheld NIR – This system configuration is intended for the operation of an AURA handheld NIR. It is to be used on the internal PC of the AURA handheld NIR in order to ensure compatibilty with the product template "AURA handheld NIR".

Corona extreme (Simulation) – This system configuration is intended for the operation of one simulated Corona extreme device with profiles for the standard sapphire flange, the TURNSTEP accessory, and the flange for tubes with GEA VARINLINE® housing. The device is calibrated by default and provides wheat spectra from 950 nm to 1650 nm.

Corona extreme – This system configuration is the default configuration of InProcess. It is intended for the operation of one Corona extreme device with profiles for the standard sapphire flange, the TURNSTEP accessory, and the flange for tubes with GEA VARINLINE® housing. By default the device with the IP-address 192.168.0.177 is expected.

CORONA PLUS 45 NIR – This system configuration is intended for the operation of one CORONA PLUS 45 NIR device. By default the device with the IP-address 192.168.0.100 is expected.

Corona process (Simulation) – This system configuration is intended for the operation of one simulated Corona process with profiles for the default and spare lamp. The device is calibrated by default and provides wheat spectra from 380 nm to 1650 nm.

Corona process – This system configuration is intended for the operation of one Corona process device with profiles for the default and the spare lamp. By default the device with the IP-address 192.168.0.177 is expected.

The following system configuration templates are available with the ThinFilm license:

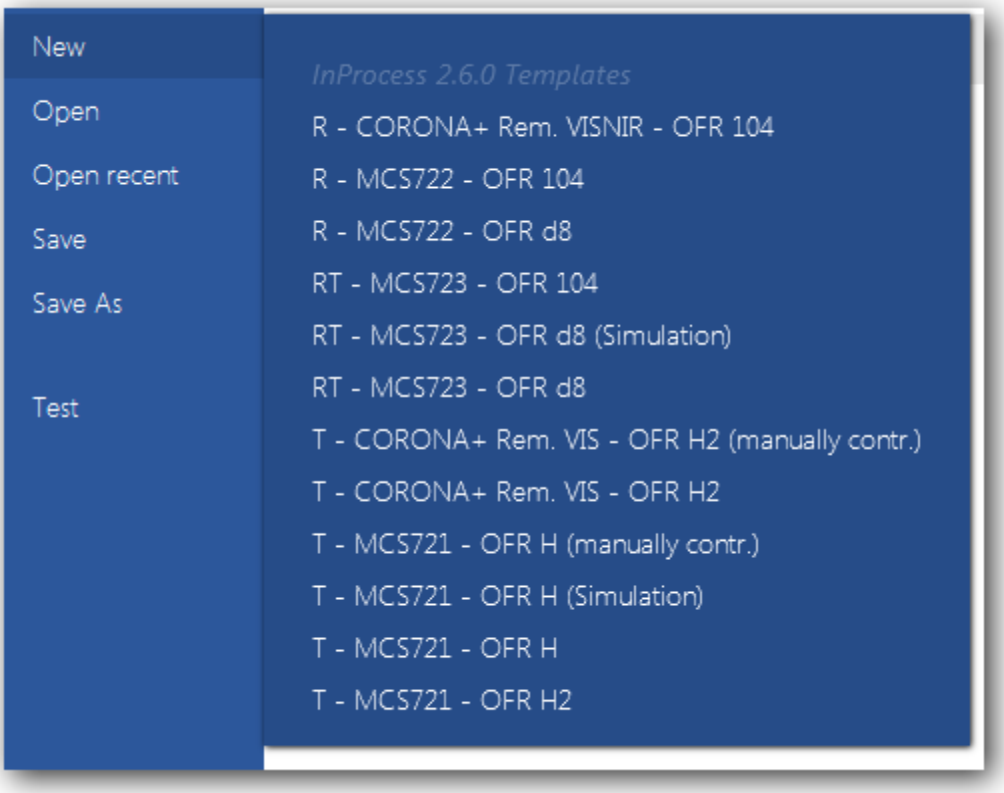
R – CORONA+ Rem. VISNIR – OFR 104 – This system configuration is intended for the operation of one CORONA PLUS Remote VISNIR DB in combination with the probe OFR 104. By default the device with the IP-address 192.168.0.100 is expected.

R – MCS722 – OFR 104 – This system configuration is intended for the operation of one MCS722 in combination with the probe OFR 104. Two profiles for the operation of the two lamps are configured. By default the device with the IP-address 192.168.0.177 is expected.

R – MCS722 – OFR d8 – This system configuration is intended for the operation of one MCS722 in combination with the probe OFR d8. By default the device with the IP-address 192.168.0.177 is expected.

RT – MCS723 – OFR 104 – This system configuration is intended for the operation of one MCS723 in combination with the probe OFR 104. Two profiles for the operation of the two lamps are configured. By default the device with the IP-address 192.168.0.177 is expected.

RT – MCS723 – OFR d8 (Simulation) – This system configuration is intended for the operation of one simulated MCS 723 device. The device is calibrated by default and provides reflection as well as transmission spectra from 380 nm to 1050 nm. The normalized reflection and transmission spectra correspond successively in 100 nm steps to those of a 200 to 2000 nm thick SiO_2 layer on N-BK7.



RT – MCS723 – OFR d8 – This system configuration is intended for the operation of one MCS723 in combination with the probe OFR d8. By default the device with the IP-address 192.168.0.177 is expected.

T – CORONA+ Rem. VISNIR – OFR H2 (manually contr.) – This system configuration is intended for the operation of one CORONA PLUS Remote VIS SB in combination with the probe OFR H2. The lamp is not switched by the device. Instead requests to switch the lamp are displayed. By default the device with the IP-address 192.168.0.100 is expected.

T – CORONA+ Rem. VISNIR – OFR H2 – This system configuration is intended for the operation of one CORONA PLUS Remote VIS SB in combination with the probe OFR H2. The lamp is controlled by the device. By default the device with the IP-address 192.168.0.100 is expected.

T – MCS721 – OFR H (manually contr.) – This system configuration is intended for the operation of one MCS721 in combination with the probe OFR H. The lamp is not switched by the device. Instead requests to switch the lamp are displayed. By default the device with the IP-address 192.168.0.177 is expected.

T – MCS721 – OFR H (Simulation) – This system configuration is intended for the operation of one simulated MCS 721 device. The device is calibrated by default and provides transmission spectra from 380 nm to 1050 nm. The normalized transmission spectra correspond successively in 100 nm steps to those of a 200 to 2000 nm thick SiO_2 layer on N-BK7.

T – MCS721 – OFR H – This system configuration is intended for the operation of one MCS721in combination with the probe OFR H. The lamp is controlled by the device. By default the device with the IP-address 192.168.0.177 is expected.

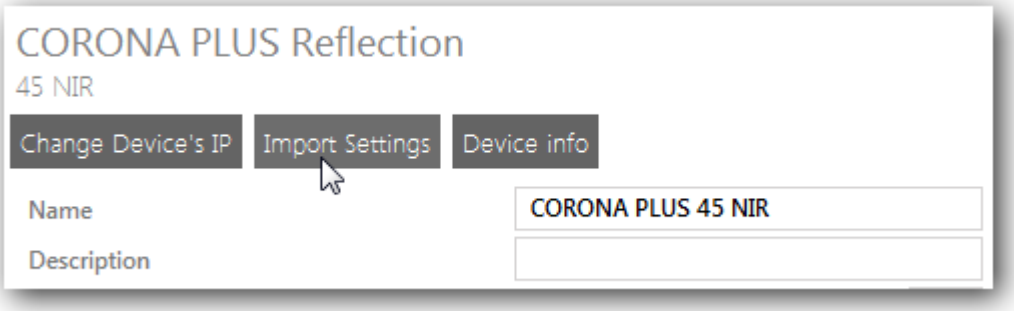
T – MCS721 – OFR H2 – This system configuration is intended for the operation of one MCS721in combination with the probe OFR H2. Two profiles for the operation of the two lamps are configured. Thus, the appropriate lamp is controlled by the device. By default the device with the IP-address 192.168.0.177 is expected.

1.4.3 Import device configuration

The system configuration templates are generic and do not contain device-specific configuration like compensation-parameters.

For some devices, e.g. CORONA PLUS 45 NIR, the device-specific configuration is provided on a Device-CD as part of the delivery-package. This CD contains an **.oscx**-file that has to be imported into the system configuration.
Note: For other devices, e.g. the Corona extreme and the Corona process, the import step does not need to be performed because the data is stored in the device and is imported automatically.

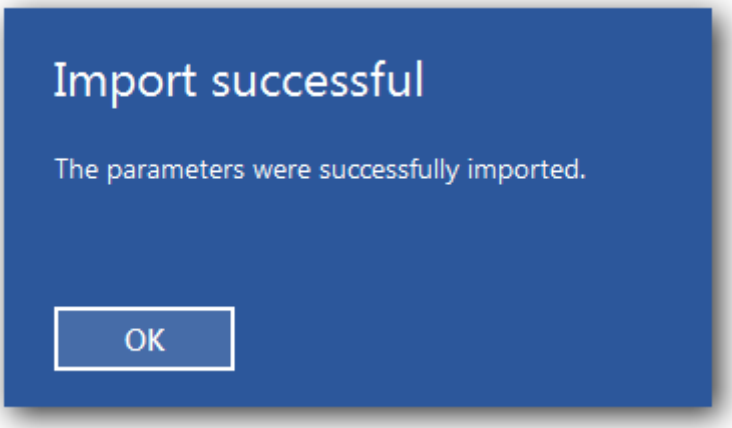
To perform this action, select the appropriate spectrometer in the central section of the SMC program. Then click on **Import Settings** in the menu on the upper right. Please make sure the device is connected to the computer and is available for communication.



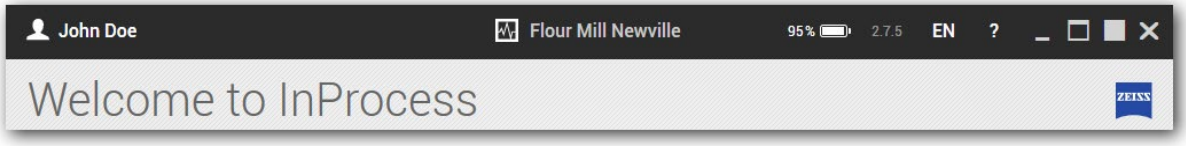
Note: When using the OMC, use the command "Import settings from file" from the context menu of the corresponding device.

Select the .oscx-file from the CD and close the dialog with OK. The SMC will initialize the device and try to set compensation and reference parameters.

If an error occurs during the process, an error dialog will appear with information about the problem. If the process is finished, the SMC will display a completion dialog.

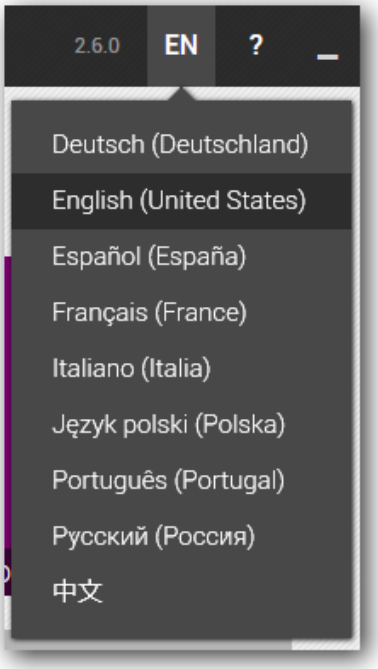


1.5 Title bar



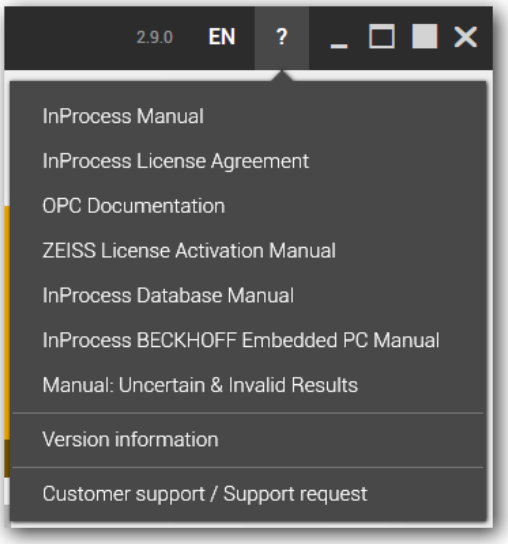
The following information is displayed in the upper part of the program window:

- **The user who is currently signed in**



- The symbol for active product executior (if applicable)

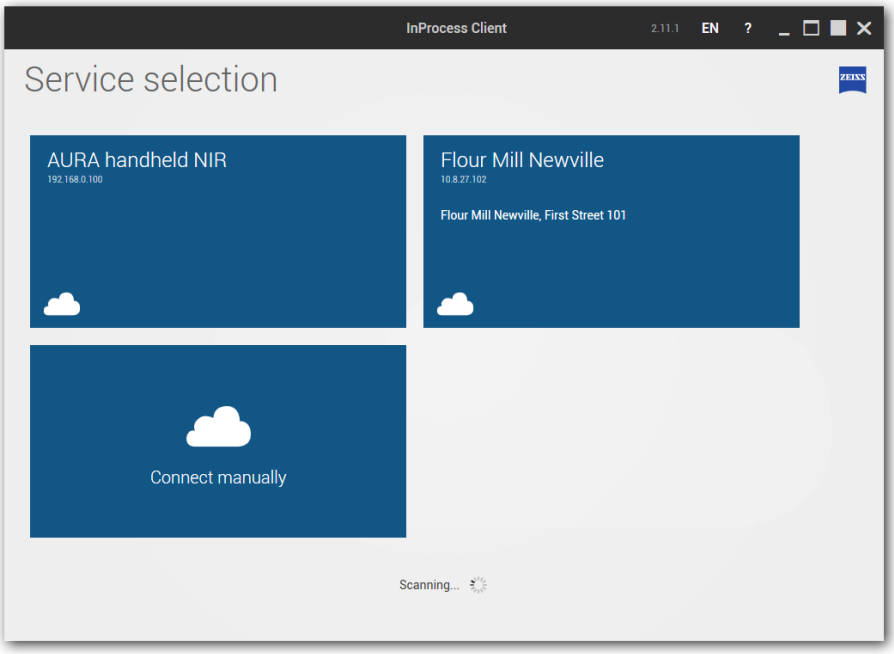
- The name of the selected service
- The battery status (if applicable)
- The program version
- The currently selected language (there are 9 languages available.)
- ? for navigation to the help documents



- Buttons for minimizing or maximizing of the program, for full screen mode and to exit the program

1.6 Service selection (only for "InProcess Client")

"InProcess Client" is a separate program used to work with a network service or a device with an embedded controller. The first step is the **Service selection**.



In case devices with an embedded controller, e.g. AURA handheld NIR, are connected to the computer or in case computers with a running InProcess-service are present somewhere in the network, entries for these network services will be shown. The selection of such a service establishes a network connection with the embedded controller or the remote computer. The user then arrives at the login screen, and the "InProcess Client" program behaves just like the standard "InProcess" program.

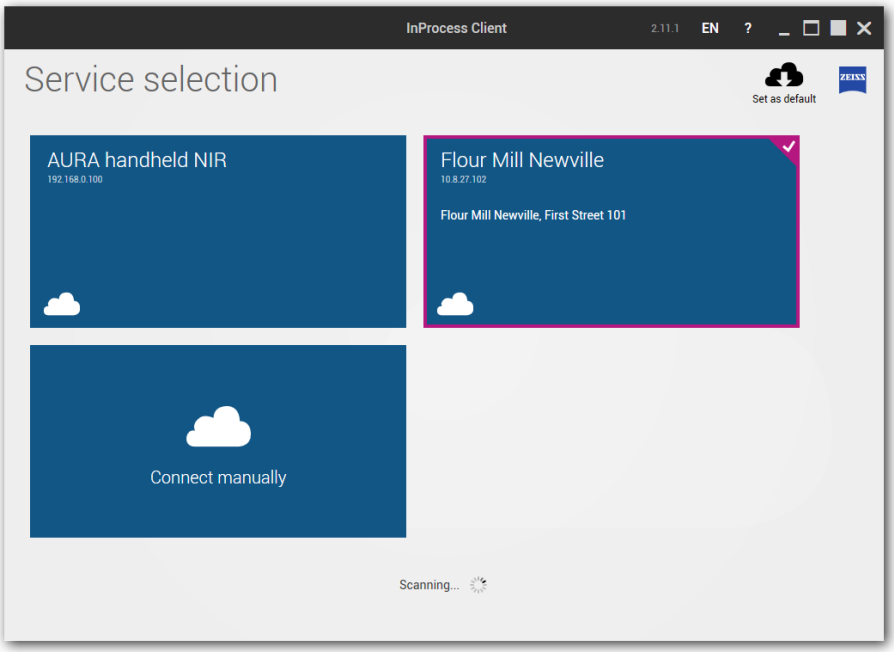
A network service entry may not show up in the service selection screen for the following reasons:

- the network does not allow UDP communication (see chapter 1.6.1)
- the network service's version is 2.6.x or older

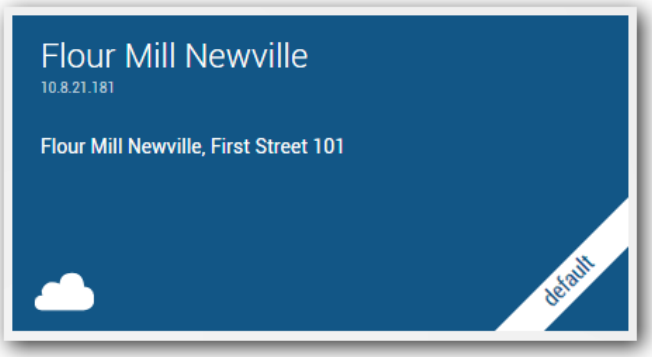
If InProcess Client and the network service or embedded controller have different versions, a connection **cannot** be established. In this case the entry will be shown grayed out.

Further information can be found in chapter 1.6.2.

If the user wants to connect to a service automatically after launching the program, the relevant service can be set as a default. To do so, select the desired service-entry with a right click.



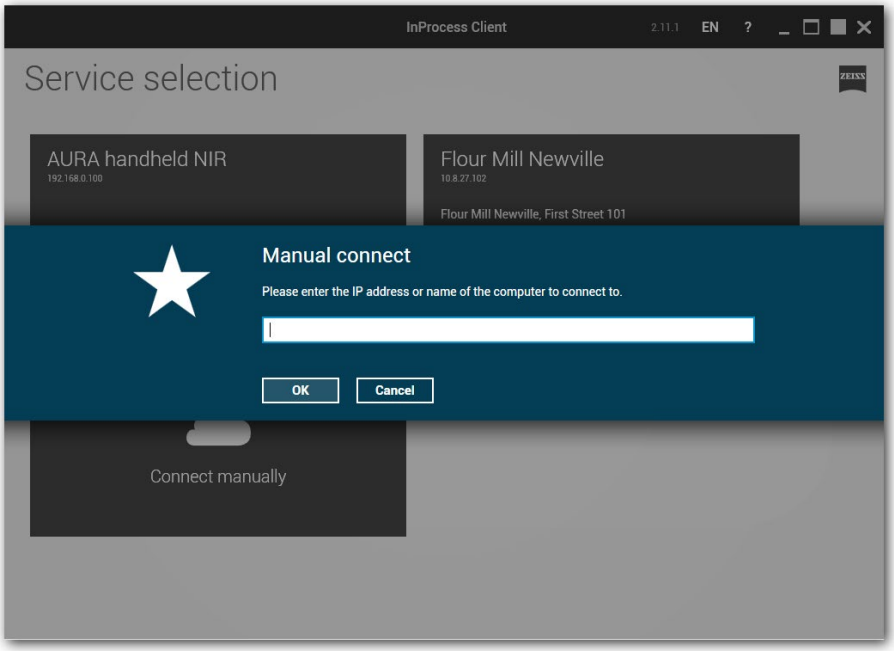
Afterwards, the user can use the **Set as default** button from the top right corner to set the selected service as the default.



1.6.1 Manual connect to a network service

In case your network configuration does not allow UDP network communication to discover network services, you can manually connect to such a service. To do so, select the **Connect manually…** entry and enter the IP-address of the desired computer.

Note: The standard IP-address of a "AURA handheld NIR" is 192.168.0.100.



If InProcess Client and the network service or the embedded controller have different versions, a connection **cannot** be established. Further information can be found in chapter 1.6.2

1.6.2 Version conflicts

The version of the InProcess Client program must exactly match the version of the network service or embedded controller. Otherwise, the tile in the service selection page will be shown grayed out. Upon selection of the tile you can retrieve detailed information about the reason of the incompatibility.

Case 1 – Service is more recent than InProcess Client

If the InProcess version on your computer is too old, you will get the following error message.

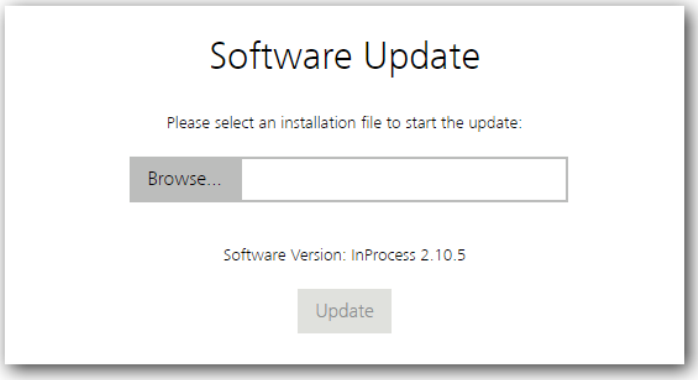
In this case, you need to update InProcess on your computer. Contact the ZEISS service for the latest version or visit the following web site:
http://download.zeiss.de/spectroscopy/software/inprocess/

Case 2 – Service older than InProcess Client

If the version of the network service or the embedded controller is too old, you will get the following error message.

In this case, you need to update the network service. Carry out the update at the remote computer. Contact the ZEISS service for the latest version or visit the following web site:
http://download.zeiss.de/spectroscopy/software/inprocess/

If you need to update a AURA handheld NIR with embedded controller, you can use an internet browser.
Enter the following string in the address bar: http://192.168.0.100:7280/
Note: The above-mentioned IP address, 192.168.0.100, is the default IP address of a AURA handheld NIR. If your device has a different address, use this address. The port number 7280 needs to remain the same.



The following window will open:
Note: If you do not see this window, your device might not be able to be updated in this fashion. Please contact the ZEISS support.

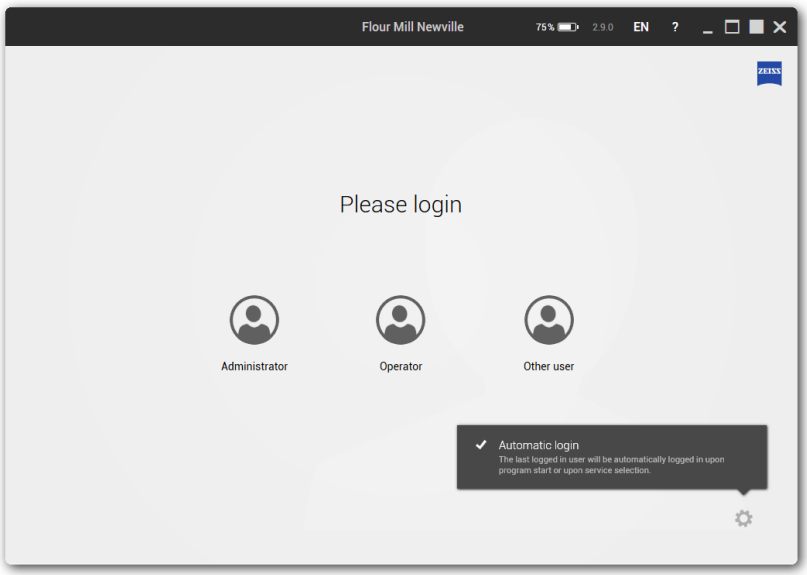
To perform the update select "BROWSE…" and subsequently navigate to the appropriate "bundle"-file. This file is located in the InProcess directory.
(default path "C:\Program Files (x86)\ZEISS\InProcess\System Update")
Alternatively, you can find the file on the InProcess installation medium within the folder „Additional Software & Documentation\System Update".

2 Users

After the initial installation of InProcess, two users are preset: an administrator and an operator. The administrator has unrestricted user rights, the operator has restricted user rights.

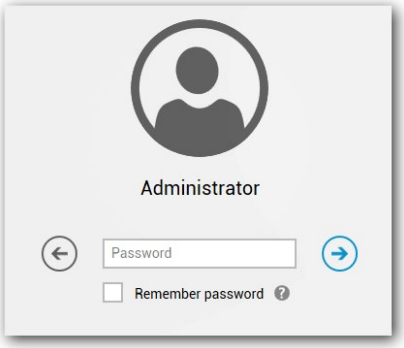
2.1 Logging in and out

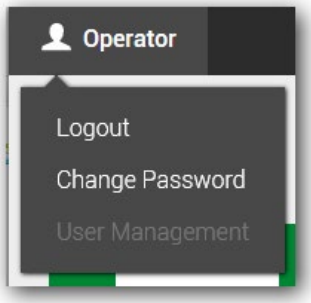
All of the (visible) users are displayed on the login screen. Other (invisible) users, such as the internal support user, can be accessed via **Other user**.



Note: this login screen is usually skipped, because the option **Automatically login** is selected by default. The last user to log in will be automatically logged in again on launching the program, or on selecting a service.

If a password has been configured for the user account, the password input screen will appear. Provided that the corresponding user permission has been granted, the user password can be remembered by the computer so as to enable automatic login.



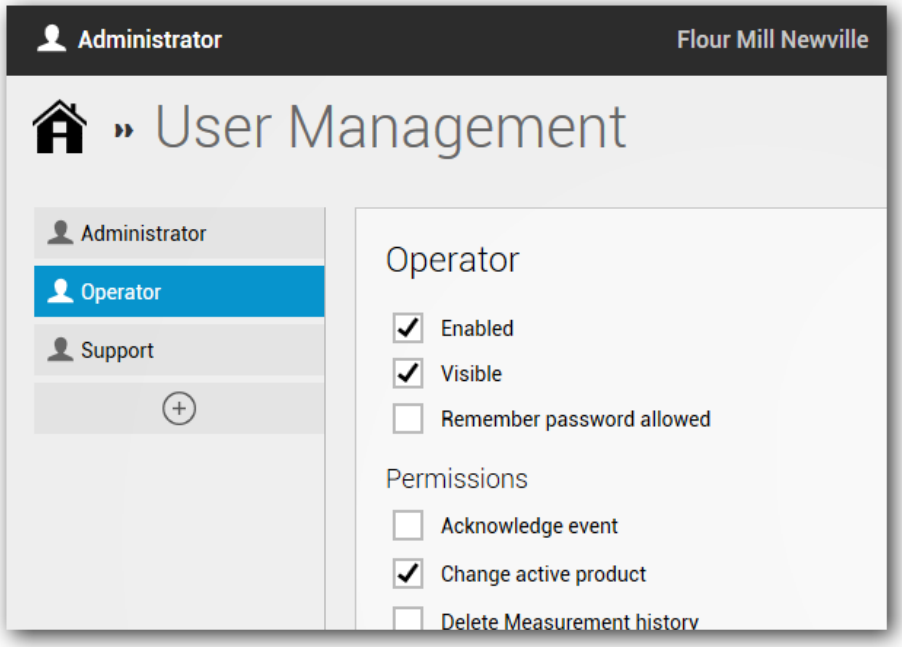


Users log out via the button in the title bar. This also takes you to **User Management**.

Note: If the **User Management** button is not available, the current user does not have the necessary permission.

2.2 User Management

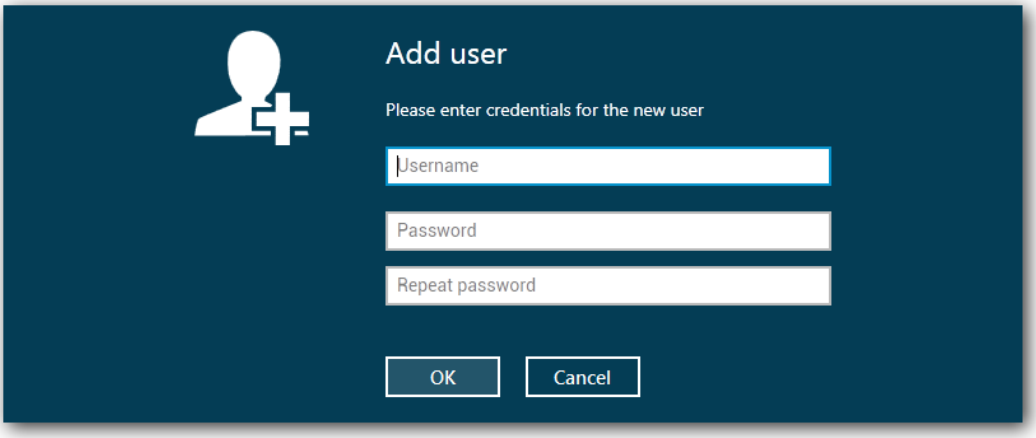
The User Management functions are used to add and remove users and to change their permissions.



The "Support" user is only available to ZEISS customer support. This user can be used if the user-configuration is corrupted and no login is possible.
If this authentication method is not desired due to security concerns, this account can be deactivated.

Adding a new user

By clicking on the '+'-entry from the user-list, a new user can be created. The following dialog can be used to enter the Username and Password of the new user. An empty password is allowed.



Modifying an existing user

After selecting an existing user from the user-list, the user-configuration can be modified. On the top right corner are buttons to Remove or Rename as well as to Change the Password of the selected user.

The Enabled option for the user determines whether the user is generally allowed to log in. (*Note:* The user who is currently logged in cannot deactivate himself.)
The Visible option determines whether or not the user name will appear as an icon on the login screen.
The Remember password allowed option determines whether the user is able to save his password on the computer to enable automatic login.

The "Permissions" list displays all of the available program functions that can be restricted for InProcess users:

Acknowledge event – Users without this privilege will not be able to acknowledge system events.

Change active product – Users without this privilege will not be able to change the currently used product in the measurement screen.

Delete Measurement history – Users without this privilege will not be able to delete data from the Measurement history.

Exit application – Users without this privilege will not be able to close the application.

Export Measurement history – Users without this privilege will not be able to use the 'Export' function in the Measurement history.

Open Diagnostics – Users without this privilege will not be able to open the Diagnostics area from the Home-screen.

Open Event log – Users without this privilege will not be able to open the Event log from the Home-screen.

Open Measurement history - Users without this privilege will not be able to open the Measurement history from the Home-screen.

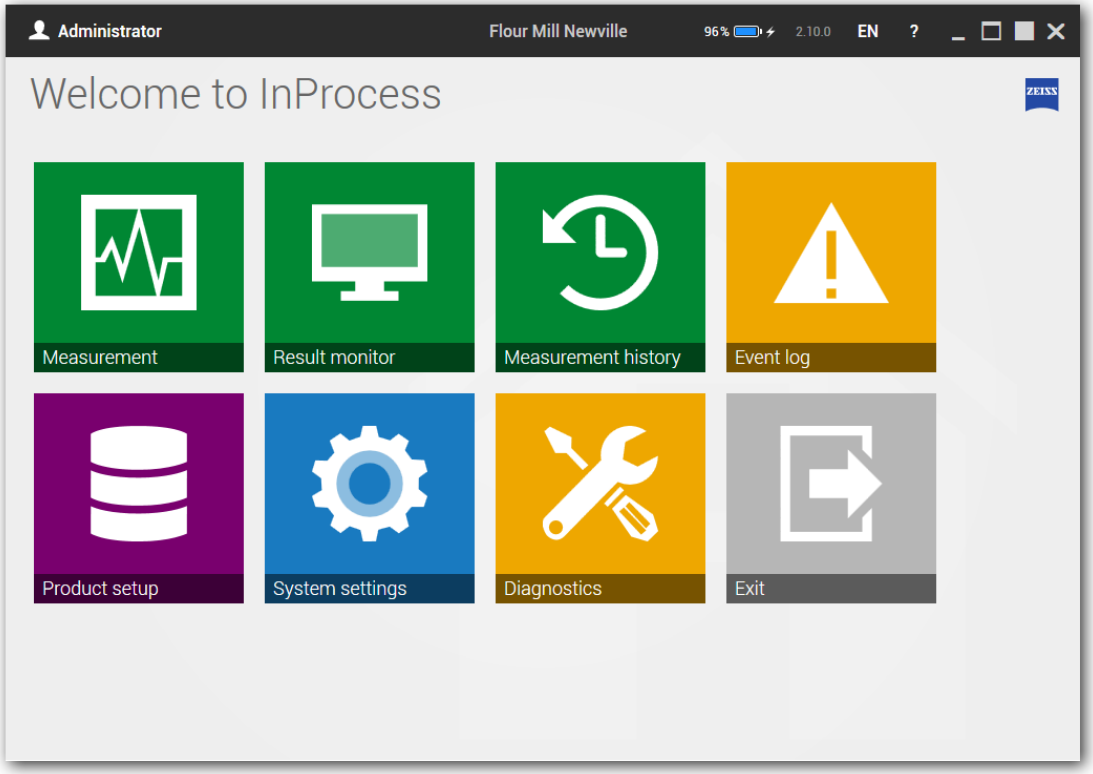
Open Product setup - Users without this privilege will not be able to open the Product setup from the Home-screen.

Open System settings - Users without this privilege will not be able to open the System settings from the Home-screen.

Open User management - Users without this privilege will not be able to open the User Management.

3 Home

After successfully connecting to the selected service, the Home-screen is shown.



From here, you can navigate to the main functions of the application. If a user does not have permission to use particular parts of the program, the corresponding buttons will not be displayed.

Measurement – Control the current measurement. Change the active product. View current measurement data and results.

Result monitor – Monitor the measurement results of several products running simultaneously.

Measurement history – View past measurement data and results. Export data.

Event log – View and acknowledge events that occurred during the runtime of the application.

Product setup – Configure product configurations that can be used for Measurement.

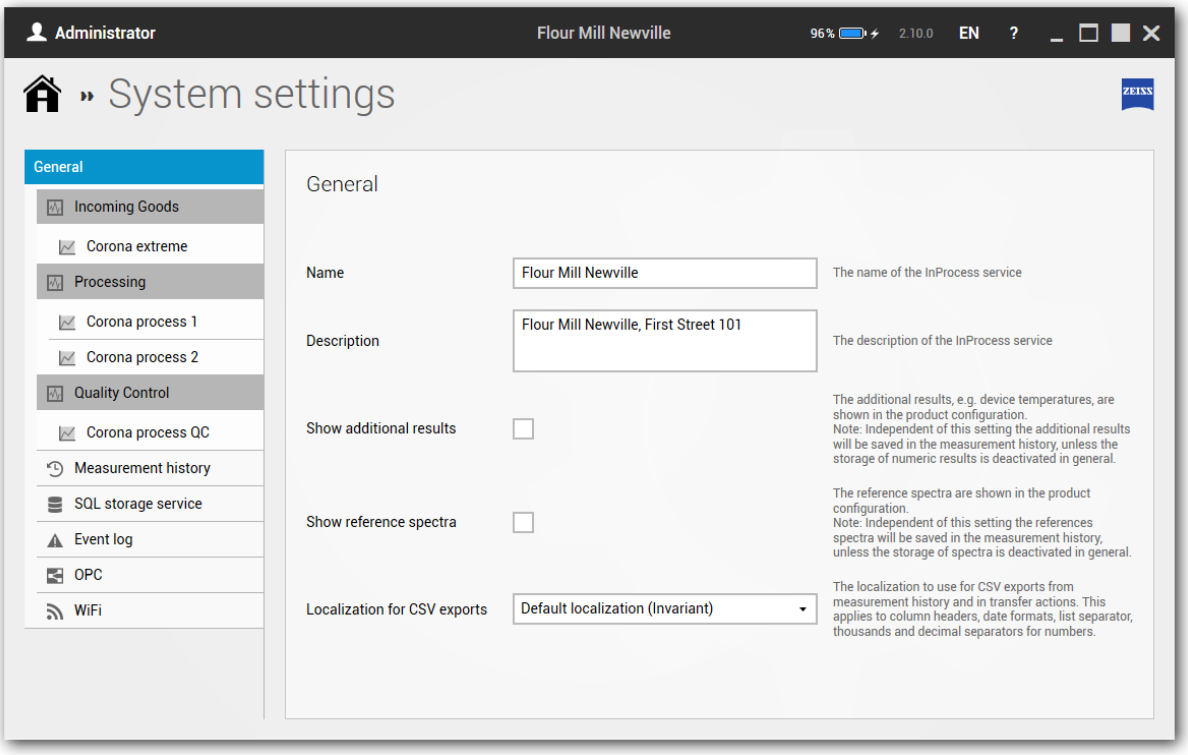
System settings – Configure application wide settings.

Diagnostics –Perform and view diagnostic operations for the software and devices.

Logout – Perform a logout and return to the Login-screen or exit the program.

4 System settings

The System settings-screen contains all options that can be modified for the current service.



4.1 General

The General settings contain name- and description-options for the service.

Name - The name is displayed as the title of the entry in the Service selection as well as the application title after the connection to a service is established.

Description - The description is displayed as the content of the entry in the Service selection.

Time – In case a network service is used, the current system time of the remote computer is displayed.
The time and time zone of that computer will be matched with the settings of your local computer upon 'Synchronize'.
For an AURA handheld NIR device, it is possible to configure the time and time zone here.

Show additional results - The additional results, e.g. device temperatures, are shown in the product configuration.
Note: Independent of this setting the additional results will be saved in the measurement history, unless the storage of numeric results is deactivated in general.

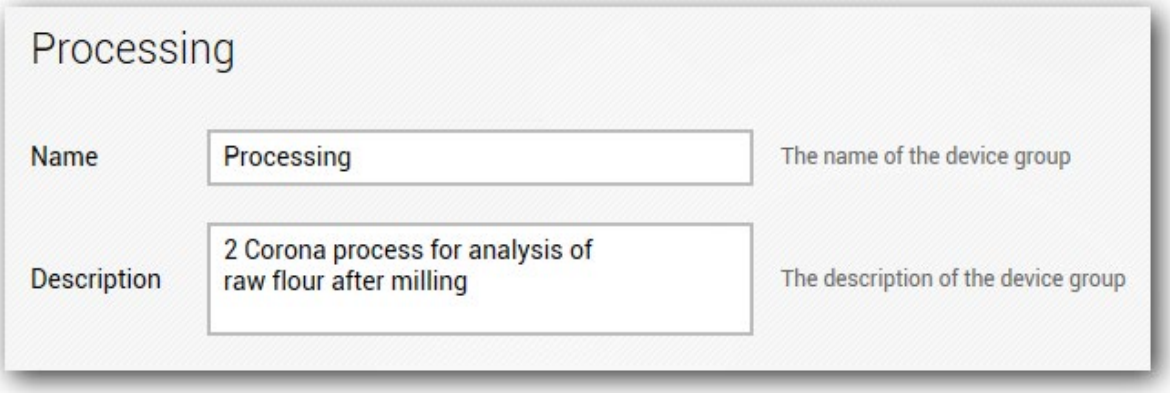
Show reference spectra - The reference spectra are shown in the product configuration.
Note: Independent of this setting the references spectra will be saved in the measurement history, unless the storage of spectra is deactivated in general.

Localization for CSV exports - The localization to use for CSV exports from the measurement history and in transfer actions. This applies to column headers, date formats, list separator, thousands and decimal separators for numbers.
There are two options: "Default localization (Invariant)", in which the format settings of the so-called "invariant culture" are used, and "Operating system settings", i.e. the formats of the operating system's current regional settings.

4.2 Device groups

Each spectrometer needs to be assigned to one device group. Each device group will be assigned to execute one product. A service can comprise several device groups and therefore several products can be measured parallel (E.g. 3 device groups such as Incoming goods, Processing and Quality Control with the assigned products Grain, Raw Flour and Flour, respectively).

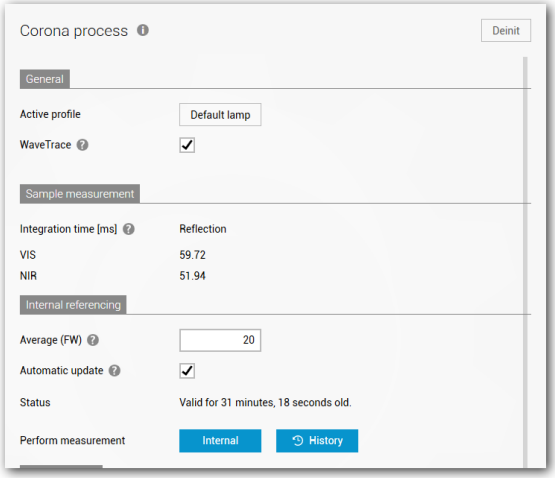
All device groups are listed underneath the 'General'-entry. The name and a description for each device group can be edited.

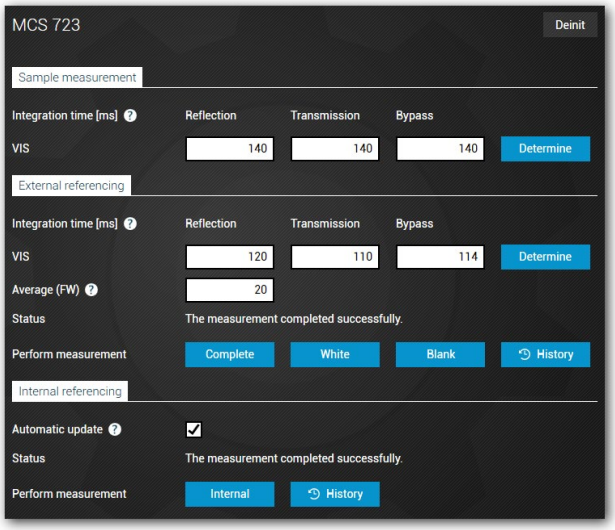


The definition of new device groups and the assignment of devices to the groups is made with the 'OMC for InProcess' (All programs → ZEISS → InProcess → Tools).

4.3 Device settings

The settings for device options are located underneath the device group that the device is part of. The options available depend on the device type.





Active profile – In case the device contains multiple profiles, the active profile can be changed by pressing the button containg the name of the current profile. In the dialog, select the desired profile and press Select. The device will reinitialize with the new parameters of the selected profile.

WaveTrace – Activate this function to compensate for potential influences on wavelength accuracy. These can be caused by temperature, aging or other environmental influences within the scope of technically unavoidable changes. The monitoring is then carried out automatically and potential changes are returned to the default settings.

Note: WaveTrace is only visible after a measuring device has been initialised. If it is not displayed, this function is not supported by your measuring device.

Integration time (Sample measurement) – Integration times of the sample measurement. They are derived from the integration times of the current external reference measurement, the synchronization setting and an optional factor (to optimize the signal to noise ratio). If configured, the values can be set manually provided that no product that utilizes this device group is in execution.

Automatic update (External referencing) – Activate this option to allow an automatic renewal of the photometric calibration of the device. The external reference will be launched automatically when a pre-defined time interval has elapsed. Furthermore, the measurement will be launched when the current extermal reference measurements are considered uncertain or invalid.
Note: This option is only available for devices with auto-referencing capability.

Integration time (External referencing) – Integration times of the external reference measurement. These are approximate values based on past measurements. The values are usually re-determined before a measurement. If configured, the values can be set manually provided that no product that utilizes this device group is in execution. For some device types, not all values can be configured because the values are coupled or, in any case, are automatically determined.

Average (FW) – Number of averages for all external and internal reference measurements performed with this device.

Status – State of the reference measurement with information on uncertain, invalid, or outdated measurements.

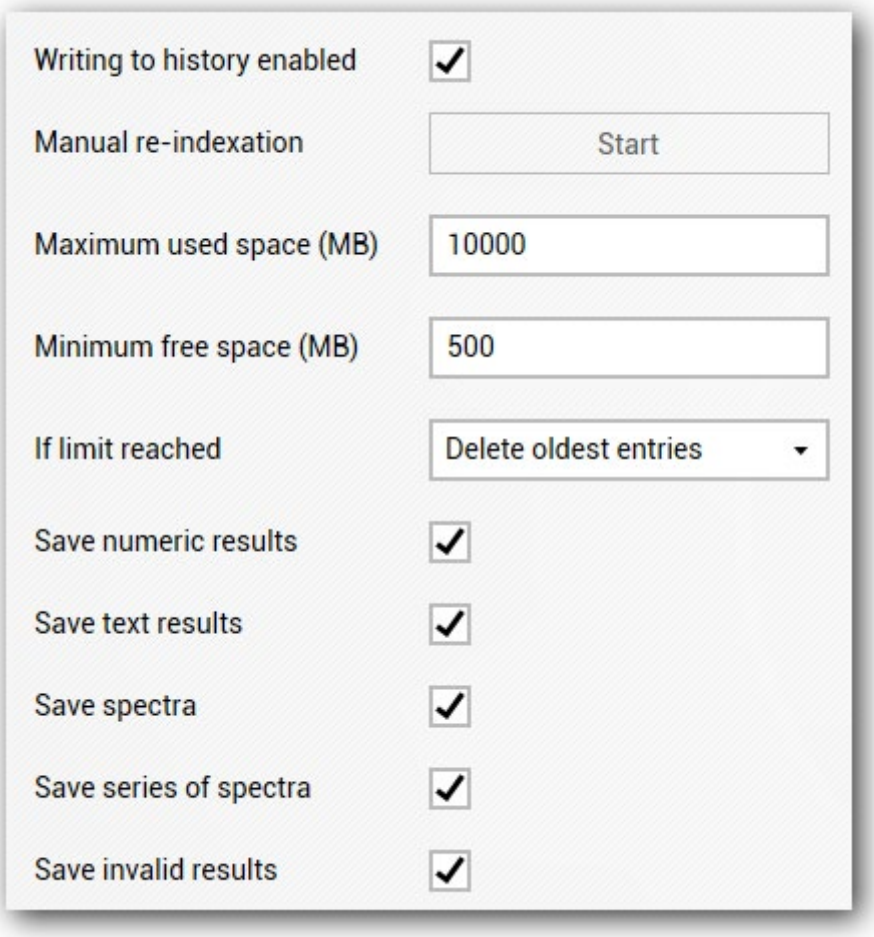
Perform measurement – Reference measurements can be requested manually. The button History allows experts to access detailed information abtout the last measurements.

Automatic update (Internal referencing) – Activate this option to allow an automatic update of the photometric calibration of the device. The internal reference will be launched automatically when certain criteria are met, e.g. the temperature of the device changed or a pre-defined time interval has elapsed. Furthermore, the measurements will be launched when the current internal reference measurements are considered uncertain or invalid.

Lamp Status – Displays the status of the lamp and the hour meter. For some spectrometers the "Reset" button can be used to reset the lamp operating hours counter, e.g. after a lamp replacement.

4.4 Measurement history

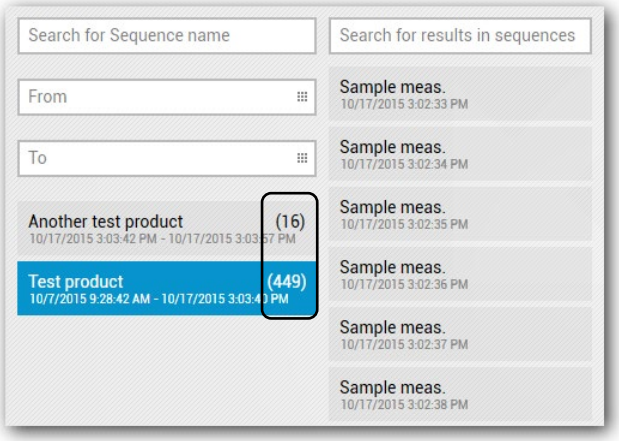
The system settings for the Measurement history contain global configuration settings for quota-management and result constraints.



Writing to history enabled - New results will be stored in the measurement history.

Manual re-indexation - In the case of a corruption of the measurement history's index a manual re-indexation can be launched to fix the issue in a suitable moment. The access to the measurement history is blocked for the duration of the re-indexation process.

Maximum used space – The maximum number of Megabytes that are used to store results. If this limit is reached, the behavior set for the 'If limit reached'-option is applied.
Note: This value can easily be increased to 500,000 MB (500 GB). However, the functionality of the Measurement History is no longer guaranteed on all systems when the overall number of sequences of all products exceeds half a million. The number of already stored sequences of each product is shown in the measurement history behind the product name (see chapter 8.1).



Minimum free space – The minimum number of Megabytes that have to be available as free space on the hard drive to continue storing results. If this limit is reached, the behavior set for the 'If limit reached'-option is applied.

If limit reached – Sets the behavior how the measurement history will react if one of the limits is reached.

> Delete oldest entries – If the limit is reached, start deleting the oldest entries in the measurement history.
>
> Stop writing new entries – If the limit is reached, stop writing new entries into the measurement history.

Save numeric results –Numeric results (e.g. predicted results, color values, number inputs) are saved to the measurement history.

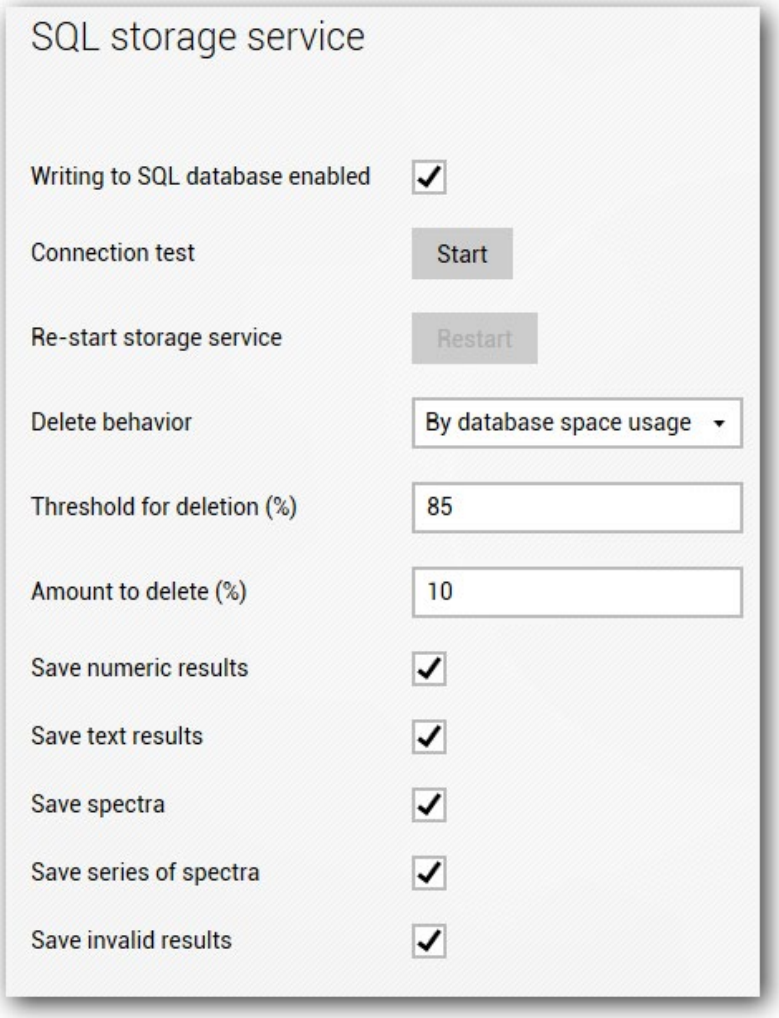
Save text results – Text results (e.g. text from input dialogs) are saved to the measurement history.

Save spectra –Spectral results (i.e. sample/reference spectra) are saved to the measurement history.

Save series of spectra – Series of spectra are saved to the measurement history.

Save invalid results – Results that were tagged "invalid" are saved to the measurement history.

4.5 SQL storage service



Writing to SQL database enabled - New results will be stored in the SQL database.

Connection test – A basic connection test to the SQL server is performed.

Re-start storage service – The storage service can be re-started here in case of a previous shut down of the service.

Delete behavior – Sets the behavior how the database will delete data:

Off – Data will not be deleted. When the database is full, new data will not be stored.

By database space usage – If the limit specified below is reached, the oldest entries in the database will be deleted.

By date – Data older than the limit specified below will be deleted. If the database is full, new data will not be stored.

Save numeric results –Numeric results (e.g. predicted results, color values, number inputs) are saved to the SQL database.

Save text results – Text results (e.g. text from input dialogs) are saved to the SQL database.

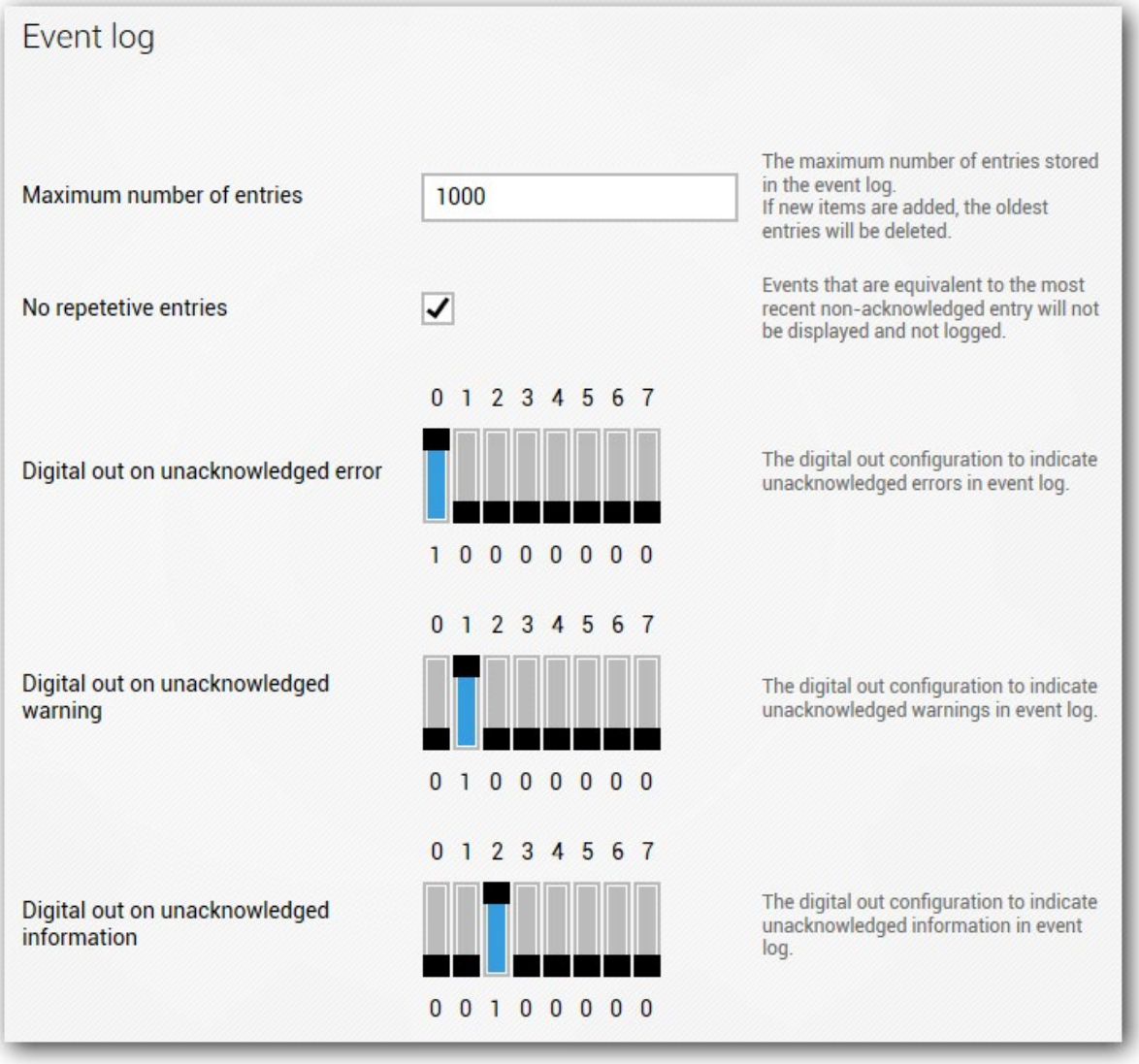
Save spectra –Spectral results (i.e. sample/reference spectra) are saved to the SQL database.

Save series of spectra – Series of spectra are saved to the SQL database.

Save invalid results – Results that were tagged "invalid" are saved to the SQL database.

Further information on the SQL database of InProcess is available in the document "InProcess Database Manual.pdf". It can be accessed from the start menu "All programs – ZEISS – InProcess – Documentation" or directly from the help menu of InProcess (see chapter 1.5).

4.6 Event log



Maximum number of entries - If the number of entries exceeds this limit, old entries will be deleted.

No repetitive entries – Events that are equivalent to the most recent non-acknowledged entry will not be displayed and not logged.

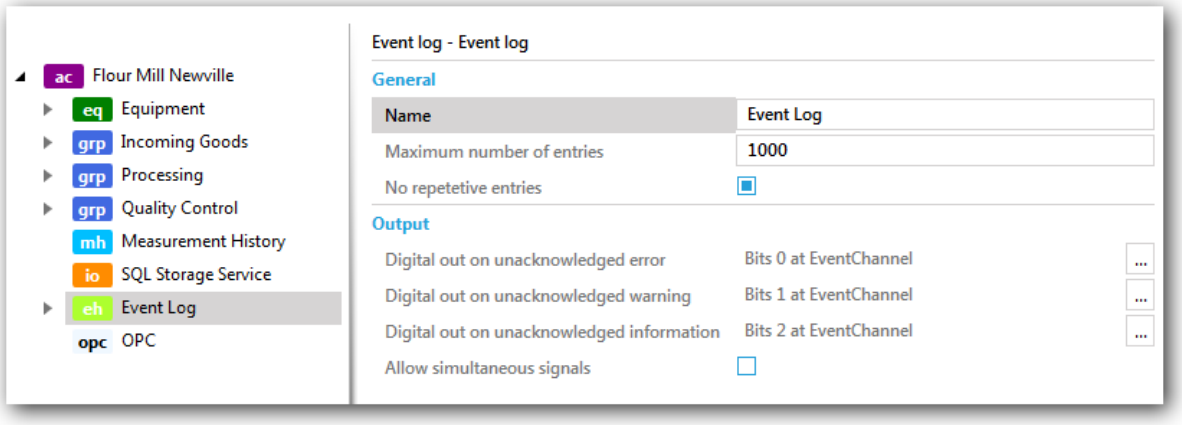
Digital out on unacknowledged error / warning / information – The digital out pattern to indicate the presence of an unacknowledged information, warning and error, respectively.
Note 1: This feature is only available, if the configuration described below was carried out with the OMC for InProcess.
Note 2: Only the severest message is indicated by default, i.e. if an unacknowledged error and information is present only the error state pattern will be set. If it is necessary to set the digital pattern independently, activate the option "Allow simultaneous signals" in the OMC for InProcess.

Configuration of the digital channel to signal unacknowledged messages

The configuration of a digital channel to signal unacknowledged messages needs to be carried out with the OMC for InProcess.

Add an existing digital channel (doc) under the tree element “Event Log”.
Note: This digital channel must be part of a device group. It can be a digital channel of an existing spectrometer, of a Profibus data package or of a BECKHOFF clamp.

Use the button “…” for each message type for which signalization of unacknowledged messages is desired. In the subsequent dialog, choose the digital channel and the desired bit pattern. If this configuration is only carried out for error and warning but not for information, only errors and warnings will be signaled. The bit patterns can be changed anytime with InProcess.



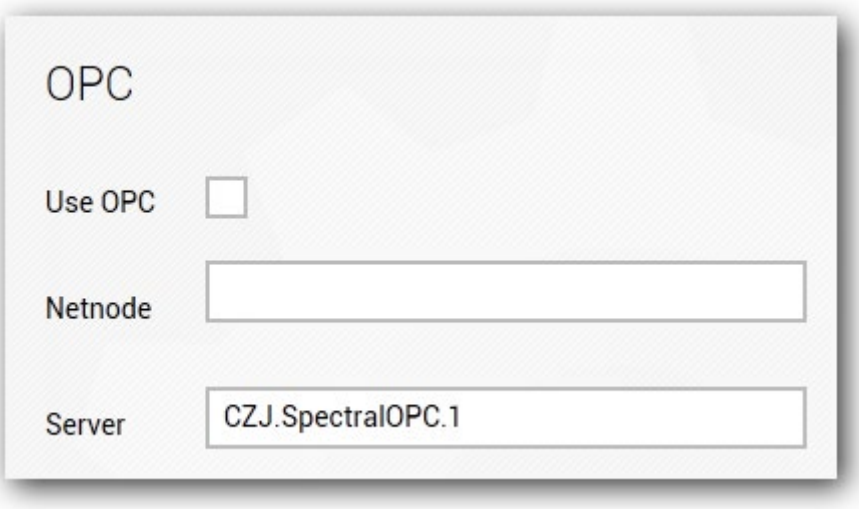
By activating the option “Allow simultaneous signals”, the bit patterns of the different message types are set independently. By default, this option is deactivated, i.e. only the bit pattern of the severest message type is signaled.

4.7 OPC

The system settings for OPC control whether and where InProcess is supposed to connect to an instance of the Carl Zeiss OPC Server.

For detailed information about the usage of OPC with InProcess, please refer to the **OPC Documentation**. You can find this document in the help menu or via the Windows Start menu-All programs-ZEISS-InProcess-Documentation.

If you want to connect to an OPC server as part of a device with an embedded controller, please also refer to the **OPC Documentation**.



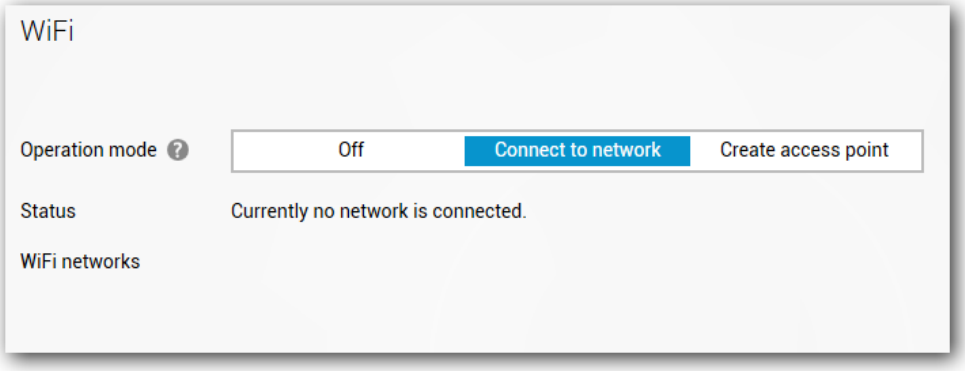
Use OPC – Determines whether OPC is activated.

Netnode – Sets the name or IP address of the computer to connect to. If this field is left empty, an attempt to connect to the local computer is made.

Server – The name of the OPC server that is connected to.

4.8 WiFi

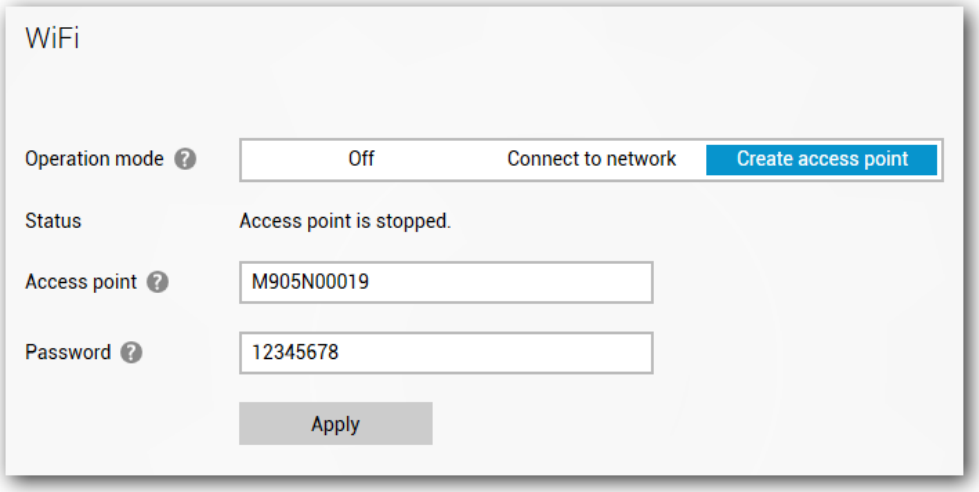
The system settings for WiFi define how the AURA handheld NIR is utilized for network communication.



Operation mode - You can either establish a connection with an existing network or use the AURA handheld NIR to create an access point for other participants, e.g. your laptop.

Status – Here you see the current status of the network adapter.

WiFi networks – Here a list with the available WiFi networs is shown. Clicking on an item will establish a connection if you have permission.



Access point – Name of the WiFi access point (SSID). Other network devices can connect to this WiFi network.

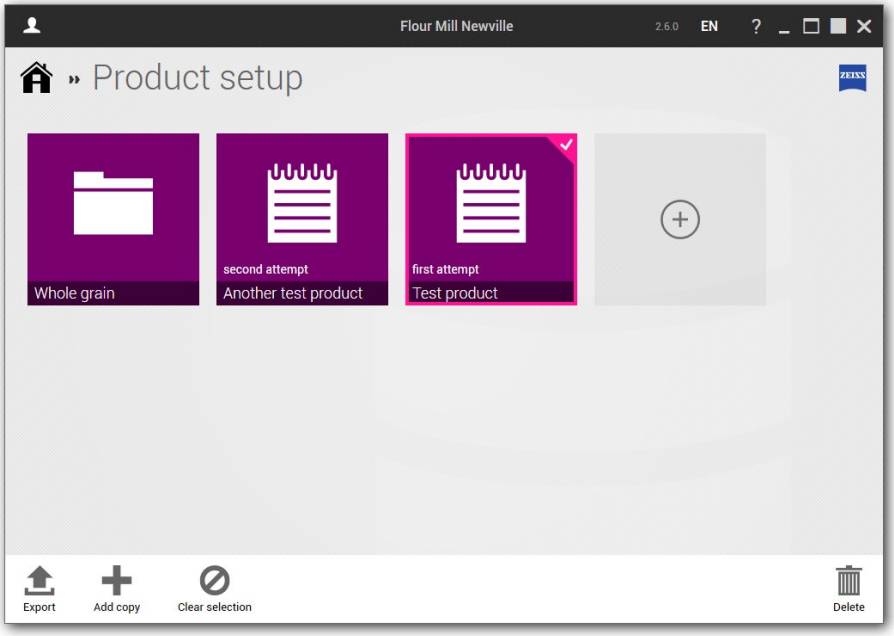
Password – The password to access this network.

5 Product setup

A product in the context of InProcess is the sum of the configurations for a certain application, i.e. sequences, calculations, evaluations, data transfers and data visualizations. The Product setup is used to configure these product definitions.

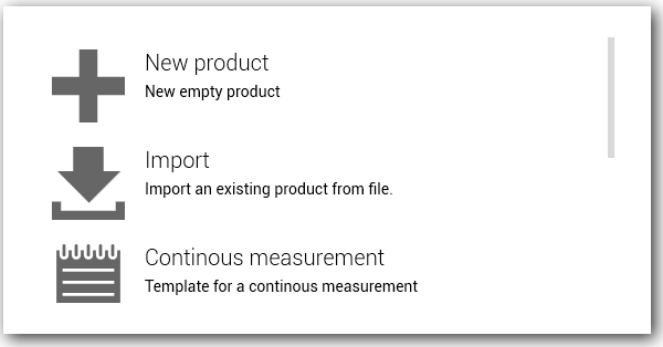
The main screen of the Product setup displays a list of all available products. It is possible to create product categories in order to preserver clarity.

By performing a right click on existing products from the list, the user can Delete, Export or create Copies of selected items.



Adding a new product

To add a new product, first select the '+'-element from the end of the list. In the popup, all options to create a new product are displayed.



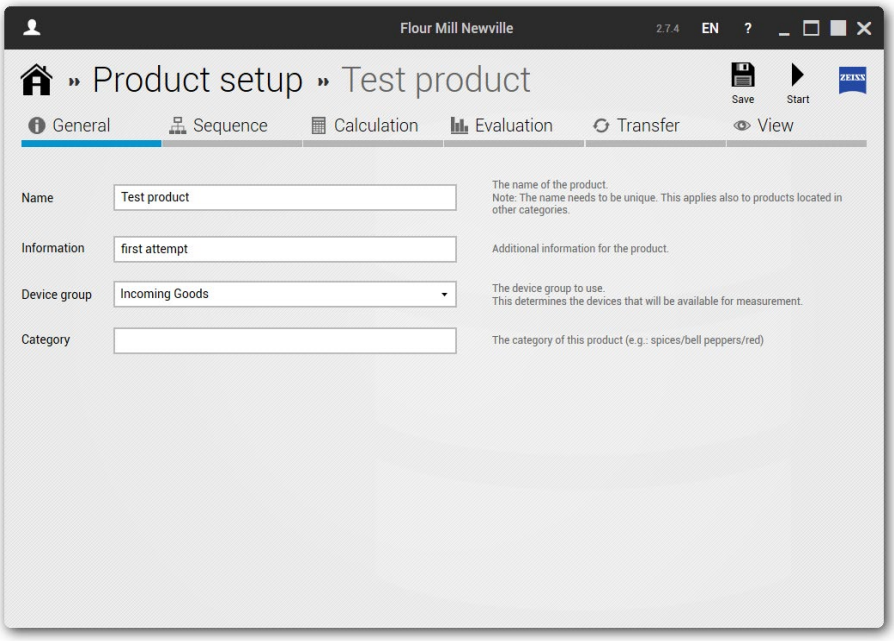
New product – Creates a new empty product.

Import – Adds a new product by selecting a product-file from the hard disk.

All subsequent items in the list are **Templates** that can be used to add new products with predefined configurations.

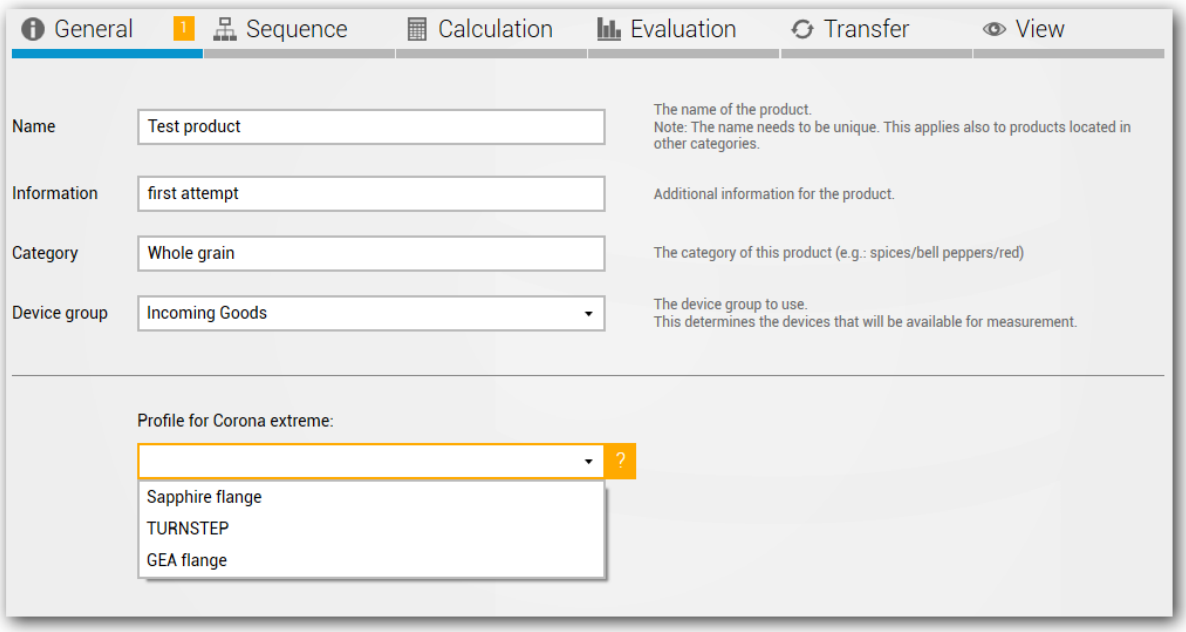
Modifying an existing product

Product settings can be modified by left clicking on an existing item. In the upper right corner, the settings can be saved at any time or the product execution can be started unless there are configuration errors that are marked in red.
The settings are categorized in six sections.



5.1 General

The General product configuration contains general settings for the product.



Name – The name of the product. This setting will be used to identify the product throughout the application. The name has to be unique for the list of all products.

Information – An additional information for the product that is displayed as a secondary title.

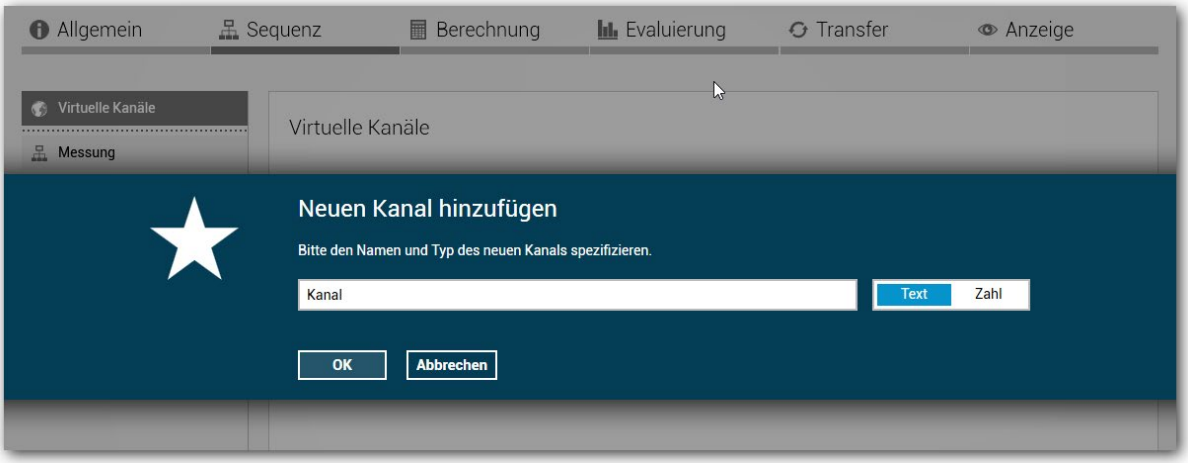
Category – Products can be arranged in categories to remain a clarity when a large number of products is to be managed. If a categorie is entered here, a folder with the name given here will be created automatically.
In the above example the “Test product” would be moved to the category “Whole grain”.
A “/” can be used to create an additional sub-category.

Device group – The device group that this product is using. If your system configuration includes more than one group, you need to select which group of devices are to be used.

Profile selection – If different Profiles for different application scenarios are configured for one or several devices of the selected Device group an additional section is displayed at the bottom of the page. In this section, the intended Profile for each of these devices needs to be selected. If necessary, the profile change is automatically carried out at Product start.

5.2 Virtual cannels

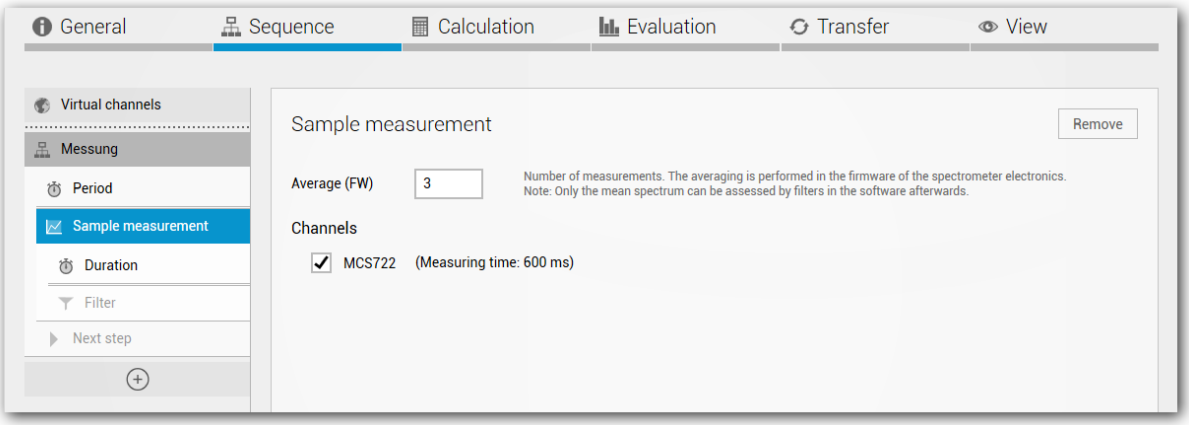
Virtual channels allow the buffering of values (number or text) to transfer them from one sequence to another or to enable e.g. a state register for a more complex sequence processing. Above the sequence list under "Virtual Channels" you can create channels by clicking the "Add" button.



For example, to use the result of a text input in as ID in another sequence, the result of the text input must first be written to a virtual channel in the "Transfer" step. It can then be read back again in another sequence by adding an action "Textual input", e.g. to be saved as an associated value with a measurement.

5.3 Sequence

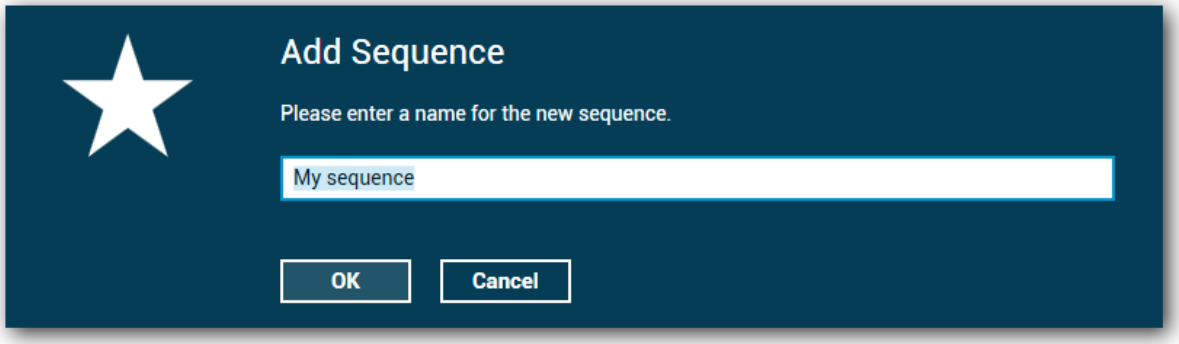
The Sequences configuration contains a list of independent sequences that are used to control the measurement regime of the product.



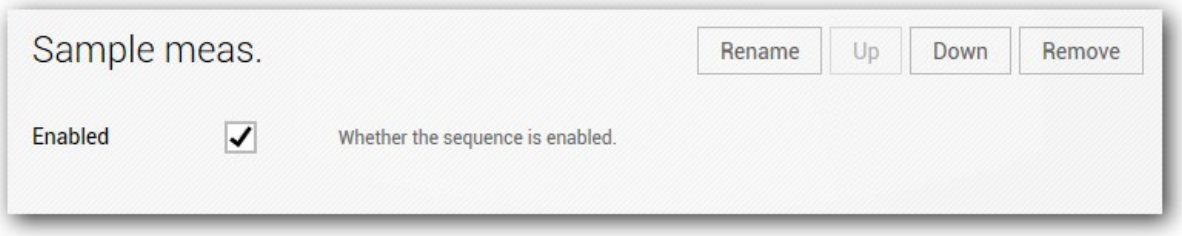
Management of sequence lists

A new sequence can be added by pressing the ‚+'-Button that's always the last entry in the sequence list.

Enter the name of the sequence in the dialog and select OK. A new sequence with the name entered will be added to the list.



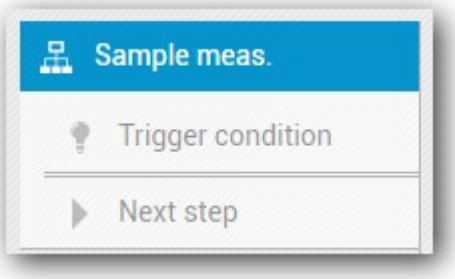
A sequence can be renamed, removed from or moved up or down in the sequence list by using the buttons on the top right corner of the entry.



Enabled – This options determines wether this sequence will be omitted during the execution of the product. If this option is not checked, this sequence will not be used.

Sequence structure

A sequence consists of one trigger condition determining when the sequence will be executed. When the condition is fulfilled, the list of all steps of this sequence will be executed consecutively.



The following list contains descriptions about all available triggers that can be selected when selecting the 'Trigger condition' placeholder for a measurement sequence. A comprehensive list about the configuration details of each trigger can be found in chapter 11.1 of this manual.

Button – The sequence will be launched when a button with a custom caption is pressed.

Button or digital in – The sequence will be launched when a predefined state occurs on a digital input channel or when a button with a custom caption is pressed.

Delayed trigger – The sequence will be launched delayed after a predefined condition occured.

Digital in – The sequence will be launched when a predefined state occurs on a digital input channel.

Numerical input – The sequence will be launched when the current value from a numerical input channel fulfills a configured condition.

OPC – The sequence will be launched when a predefined state occurs on an OPC tag.

Period – The sequence will be launched periodically when a predefined time period has elapsed.

Period and digital in – The sequence will be launched periodically when a predefined time period has elapsed as long as a predefined state persists on a digital input channel.

System event – The sequence will be launched when a predefined system event occurs.

TURNSTEP - The sequence will be launched when the button on the TURNSTEP or on the TURNSTEP ST is pressed.

The following list contains descriptions about all available actions that can be placed in any order as part of the 'Next step' placeholder for a measurement sequence. A comprehensive list about the configuration details of each action can be found in chapter 11.2 of this manual.

Delay – Delays the following actions for a defined time.

Dialog – Displays a dialog with a custom message.

Digital out – Assigns a predefined state to a digital output channel.

Input dialog – Displays a dialog where information can be entered.

Numerical input – Reads values from selected numerical input channels.

Numerical output – Use a predefined value to modify a numerical output channel. *Note:* If this numerical output channel is a Beckhoff Analog Out channel the numerical output value will be transformed to a current between 4 and 20 Milliampere. The definition of which numerical output value corresponds to 4 and 20 mA, respectively, can be set by advanced users in the OMC program.

OPC input – Receives the current values from OPC tags.

OPC output – Assigns a predefined value to an OPC tag.

Pause – Pauses the current execution.

Reference measurement – Performs measurements of a reference with the selected devices.

Reference measurement (resistance) – Performs measurements of a resistance reference with the selected devices. (Only available with ThinFilm license)

Reset cache – Resets the statistics cache.

Sample measurement – Performs measurements with the selected devices.

Sample measurement (resistance) – Performs resistance measurements with the selected devices. (Only available with ThinFilm license)

Select view – Changes to the desired view during product execution.

Status output – Assigns a new status to one or several status channels.

Stop – Stops the current product execution.

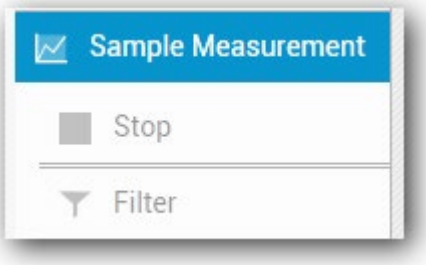
Textual input – Reads a current value from a textual input channel.

Textual output – Writes a configured value to a textual output channel.

TURNSTEP - Controls the rotation speed of the TURNSTEP or the TURNSTEP ST.

Wait for trigger – Delays the following actions until a predefined event has occured.

In addition to the trigger condition and executable steps, the sample measurement contains two sub-options, the Stop definition and the Filter definition. These two configurations are optional.



When a Stop definition is used the sample measurement is repeated several times. Hence, a series of spectra is generated. This result is provided under Calculation – Measurement and carries the tag '(All scans)'. Additionally, the mean of these spectra is calculated. Hence, a software averaging of spectra is achieved.
This averaging is independent of the option 'Average(FW)'. In the latter case the averaging occurres in the spectrometer electronics.

The following list contains descriptions about all available stop definitions that determine for how long the sample measurement is repeated. A comprehensive list about the configuration details of each stop definition can be found in chapter 11.3 of this manual.

Button – Stops the measurement when a button with a custom caption is pressed.

Count – Stops the measurement when a defined measurement count is reached.

Digital in – Stops the measurement when a defined state occurs on a digital input channel.

Duration – Stops the measurement when a defined time period has elapsed.

OPC – Stops the measurement when a defined state occurs on an OPC tag.

The Filter definition allows to verify the result of a sample measurement. This feature is especially useful in combination with the Stop definition, because only the spectra of a series of spectra that pass the filter will be used for the calculation of the average spectrum. Under Calculation – Measurement results the results with the tags '(Passed scans)' and '(Discarded scans)' will be available.
A comprehensive description about the configuration details can be found in chapter 11.4 of this manual.

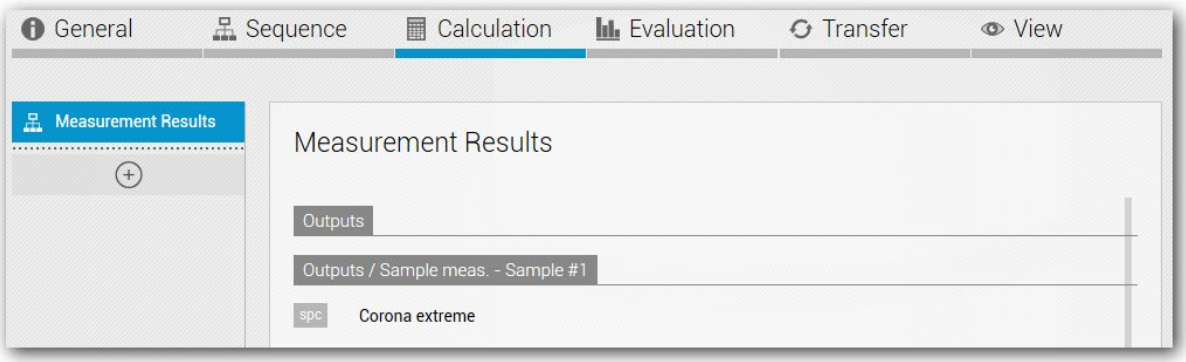
Combined filter – Combines the result of multiple filters with a boolean operator.

Gate and tunnel filter – Filters measured spectra based on configured maximum and minimum limits.

Validity filter – Filters measured spectra based on their validity.

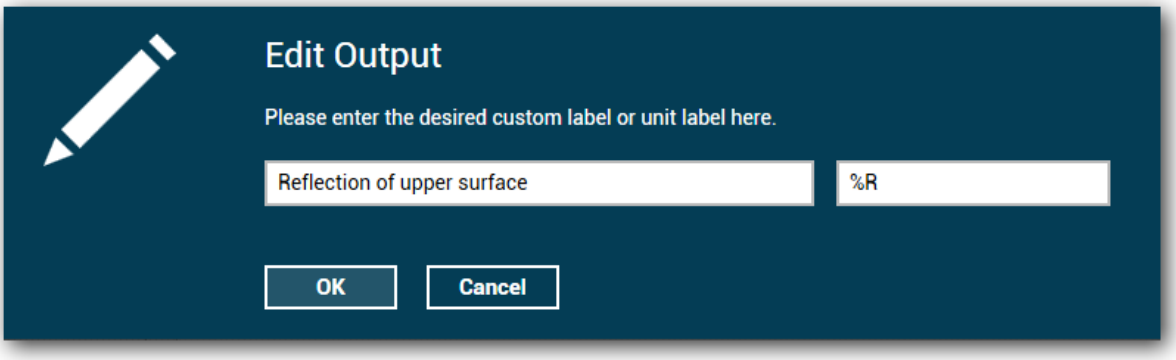
5.4 Calculation

In this section the calculation of results, which are derived from the primary measurement results, are configured.
Note: Calculation methods of third party tools, e.g. model files of „The Unscrambler“, will be added as local copies to the product definition. The sum of the size of all files must not exceed 100 MB.



Measurement Results

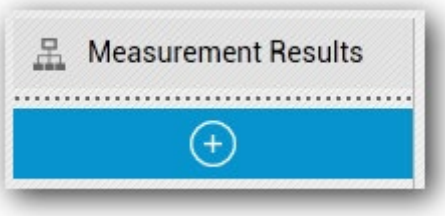
The ‘Measurement Results’ entry presents an overview of all results that will be produced by the configured sequences.
The names of the results can be changed by clicking upon the current name. Furthermore, a custom unit can be defined.



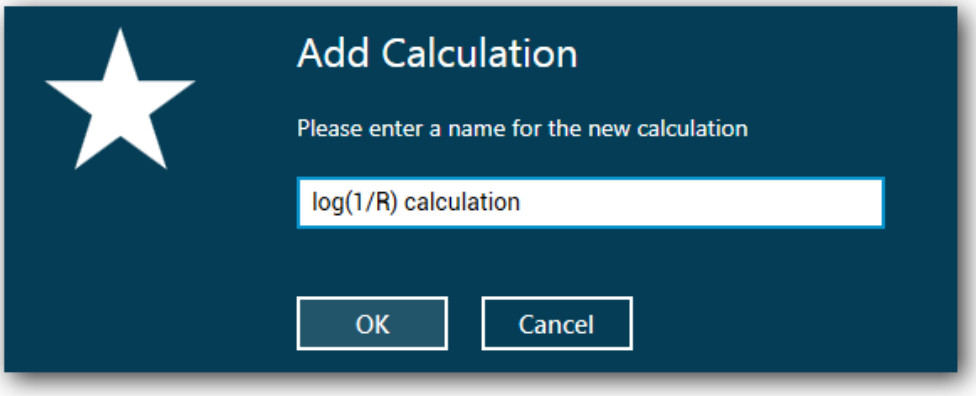
Reference spectra and additional results of the used devices (e.g. operating temperatures) are by default not listed here and are not available for calculations, evaluations and views.
Activate the option “Show additional results” and “Show reference spectra”, respectively, in the “General” section of the “System Settings” to make these results available.

Management of calculations

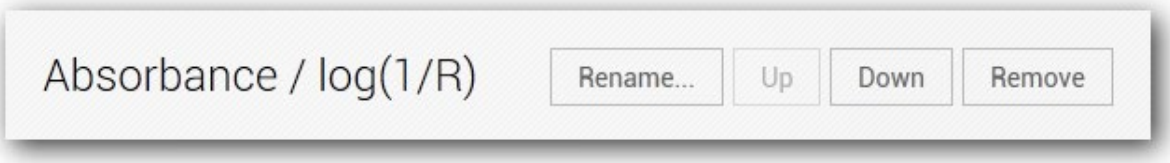
A new calculation can be added by pressing the ‚+'-Button that is always the last entry in the calculation list.



From the list presented on the right, select the desired calculation. After selecting the type, enter the name of the new entry in to the dialog. Subsequently the new calculation is added to the list on the left.



A calculation can be renamed, removed from or moved up or down in the calculation list by using the buttons on the top right corner of the entry.



The following list includes descriptions about all available calculations that can be added to the calculation list. A comprehensive list about the configuration details of each calculation can be found in chapter 11.5 of this manual.

Absolute value of the difference |x-y| - Calculates the absolute difference between two given values. (Only available with ThinFilm license)

Absorbance / log(1/R) – Transforms a reflection/transmittance spectrum into a log(1/R)/absorbance spectrum.

Absorptance / 1-R-T – Transforms a reflection/transmittance spectrum into a 1-R-T/absorptance spectrum. (Only available with ThinFilm license)

Batch statistics – Calculation of statistical key figures on the values of a resettable batch cache.

Color – Calculates color values from a spectrum.

Color distance – Calculates the color distance to the color of a reference sample.

Derivative – Calculates the n-th derivative of a spectrum.

Film layer thickness (FFT) – Calculates film layer thickness with the fast fourier transformation (FFT) algorithm. (Only available with ThinFilm license)

Formula – Customizable calculation by entering a formula.

Glass in building (ISO9050:2003, DIN EN 410) – Calculates solar characteristics according to ISO 9050:2003 and DIN EN 410 based on a reflection/transmission/absorbance spectrum. (Only available with ThinFilm license)

Grams – Predicts sample properties from a spectrum. (Only available with Agri license)

Interpolation – Interpolates a spectrum within predefined wavelengths.

Min/Max – Determines the minimum and maximum of a spectrum. (Only available with ThinFilm license)

Moving average – Calculates the moving average for a scalar value. (Only available with Agri license)

Multiglazing (ISO 9050) – Calculates the reflection and transmission spectra that can be expected for a double or triple glazing based on the ISO 9050 norm. (Only available with ThinFilm license)

OLUC v9.8 – Calculates classification criteria from a spectrum. (Only available with Agri license)
Installation notes can be found in chapter 11.5 of this manual.

OLUP v10 – Predicts sample properties from a spectrum with the Unscrambler X Prediction Engine. (Only available with Agri license)
Installation notes can be found in chapter 11.5 of this manual.

OLUP v9.8 – Predicts sample properties from a spectrum. (Only available with Agri license)
Installation notes can be found in chapter 11.5 of this manual.

Ordinate value at given wavelength – Returns the existing or interpolates the discrete ordinate value for a specific wavelength. (Only available with ThinFilm license)

Process capability index – In process inprovement efforts, the process capability index or process capability ratio are statistical measures of process capability: the ability of a process to produce output within specification limits. (Only available with ThinFilm license)

SCOUT – Calculates layer parameters using the SCOUT software. (Only available with ThinFilm license)
Installation notes can be found in chapter 11.5 of this manual.

SensoLogic – Predicts sample properties from a spectrum. (Only available with Agri license)

Spectral mean value – Calculates the spectral mean value of a spectrum within a given wavelength range.

Text formatting – Generates a string from inputs via a user-defined formatting pattern.

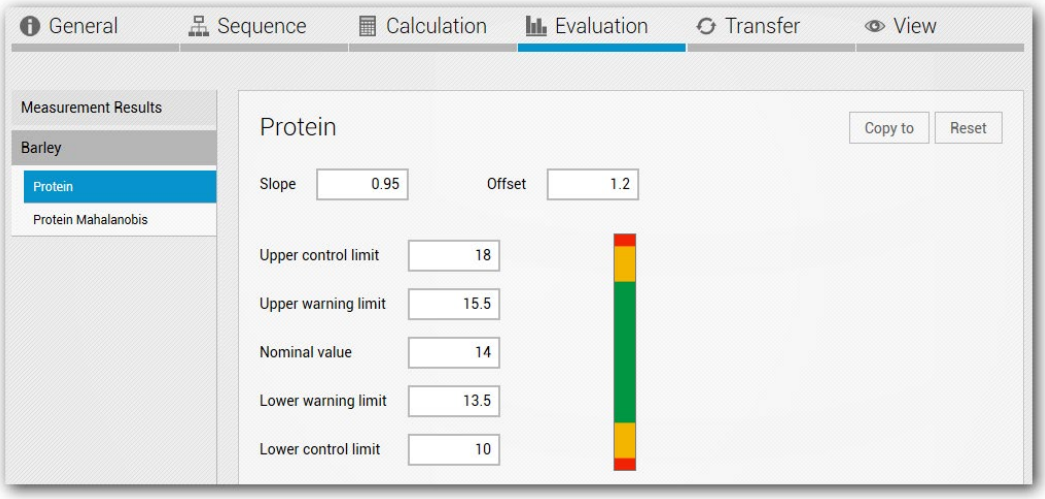
UCal – Predicts sample properties from a spectrum. (Only available with Agri license)
Installation notes can be found in chapter 11.5 of this manual.

5.5 Evaluation

The Evaluation configuration can be used to set evaluation limits for all results. From the left of the screen, select the result for which the evaluation limits are to be defined. The entries in this list are grouped by the producing calculation and if applicable the categories within the calculation.
There are two types of evaluations, for numerical values and for spectra.

5.5.1 Evaluation of numerical results

The evaluation information is displayed in the Measurement screen for the numerical values and their trends.



In this section, the evaluation limits are defined. Furthermore, an offset and slope adjustment can be defined.

Slope – Defines the value that is multiplied with the calculated value.

Offset – Defines the value that is added to the calculated value.

Upper control limit– Defines the upper control limit. Results above this value are treated as error values.

Upper warning limit – Defines the upper warning limit. Results above this value and below the upper control limit are treated as warning values.

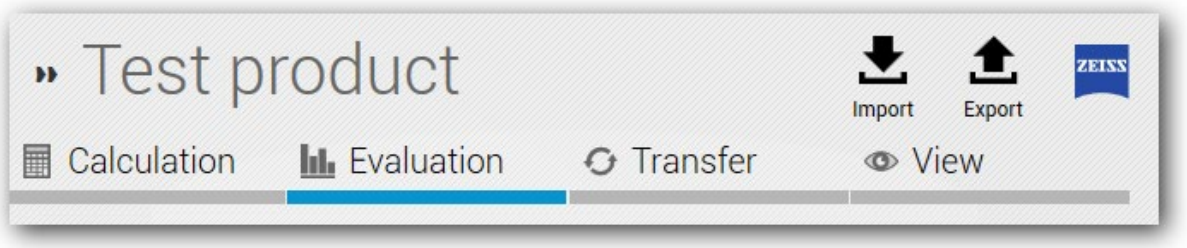
Nominal value – Defines the nominal value to expect for this result.

Lower warning limit – Defines the lower warning limit. Results below this value and above the lower Error limit are treated as warning values.

Lower control limit – Defines the lower error limit. Results below this value are treated as error values.

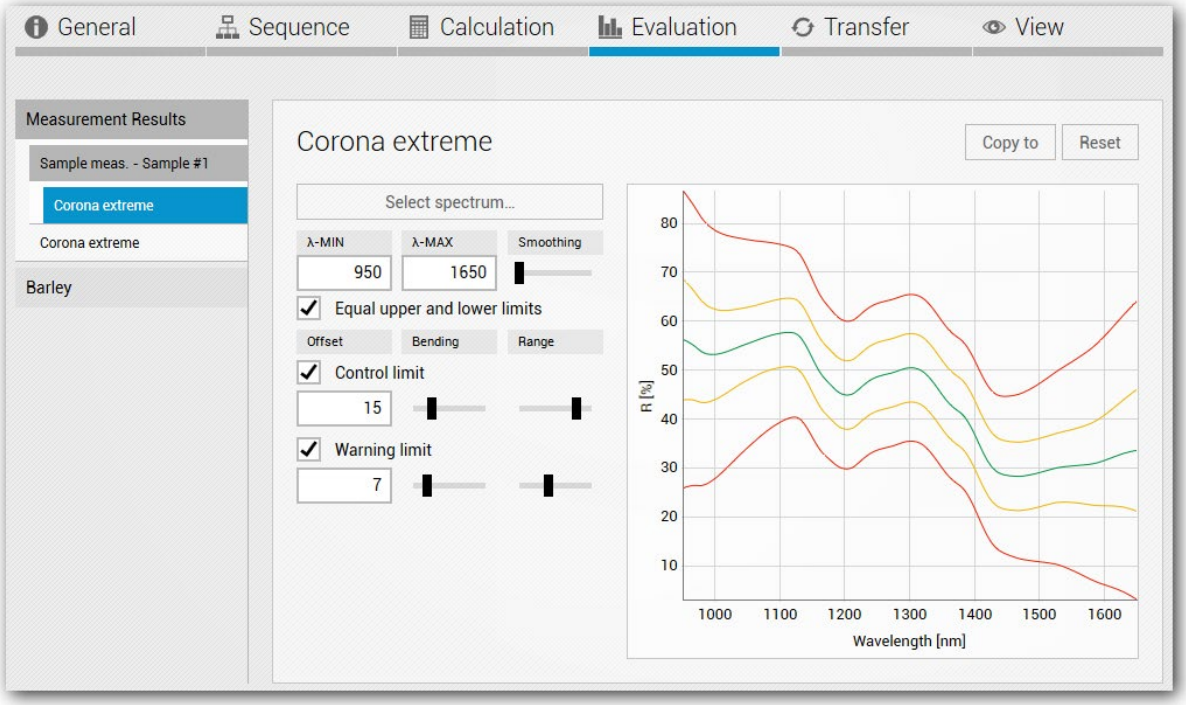
BIAS-file import and export

The slope and bias values as well as the evaluation limits can be imported from or be exported into a BIAS-file. The buttons for the import and export are located in the top right corner of the program.



5.5.2 Evaluation of spectral results

The spectral evaluation information is displayed in the Measurement screen for the spectral result display



To configure warning and control limits for a spectrum a nominal spectrum needs to be selected. Subsequently the following options become available:

λ-MIN – Defines the lower wavelength limit for the evaluation. The spectral range below this wavelength will not be evaluated.

λ-MAX – Defines the upper wavelength limit for the evaluation. The spectral range above this wavelength will not be evaluated.

Smoothing – Defines the extent of the smoothing operation that is applied to the nominal spectrum.

Equal upper and lower limits – Unchecking this option allows to configure the upper and lower control and warning limit spectra independently.

Control / Warning limit – Unchecking this option deactivates this particular evaluation.

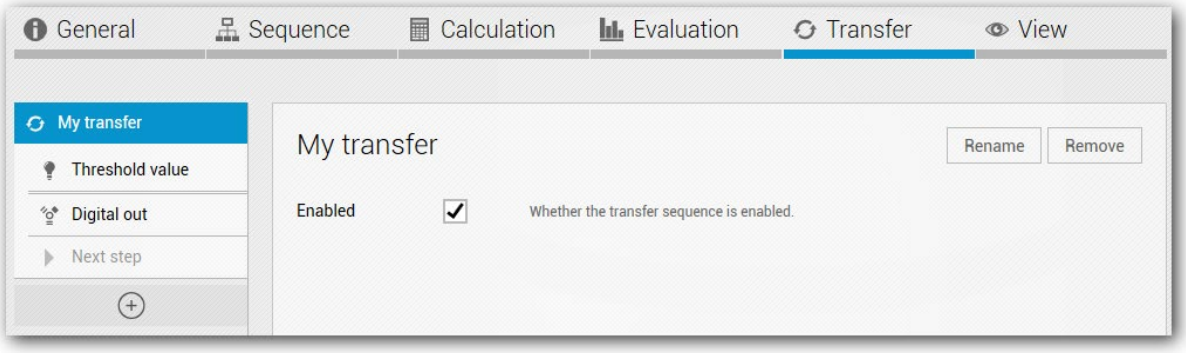
Offset – The offset between nominal and limit spectrum.

Bending – Parameter for adjusting the distance between nominal spectrum and the limit spectra at the spectral edges.

Range – Parameter for adjusting the size of the spectral edge for the bending operation.

5.6 Transfer

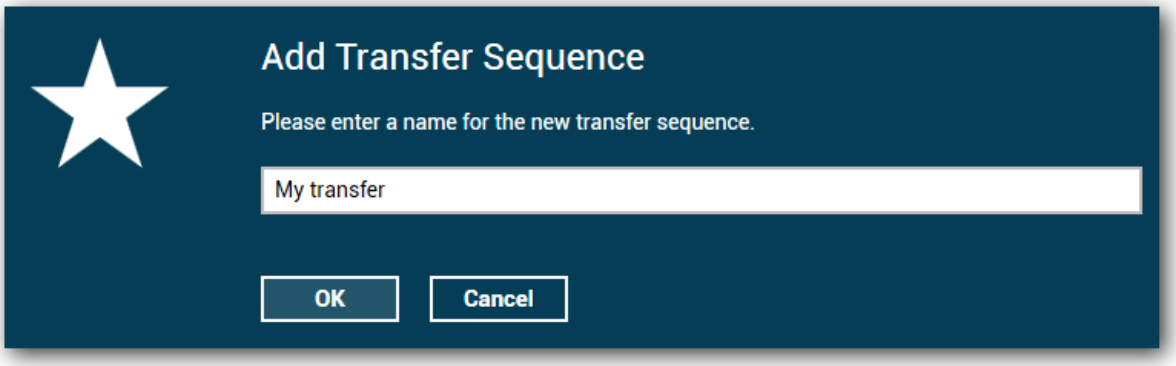
The Transfer configuration serves to forward measurement and calculation results. It allows integrating the measurement devices into a process environment. Since these outputs might be utilized as trigger conditions in the Sequence section, a closed loop configuration can be achieved.



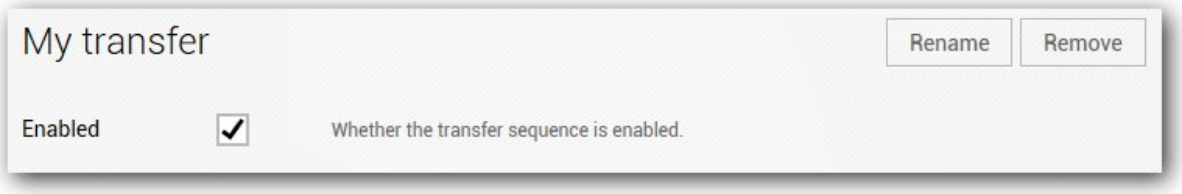
Management of transfer sequence lists

A new transfer sequence can be added by pressing the ‚+'-Button that's always the last entry in the transfer sequence list.

Enter the name of the transfer sequence in the dialog and select OK. A new transfer sequence with the name entered will be added to the list.



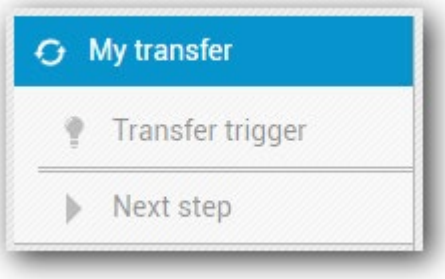
A transfer sequence can be renamed, removed from or moved up or down in the sequence list by using the buttons on the top right corner of the entry.



Enabled – This options determines wether this transfer sequence will be included during the execution of the product.

Transfer sequence structure

An transfer sequence consists of one trigger condition that determines when the sequence will be executed. When the condition is fulfilled, a list of transfer sequence steps will be executed consecutively.



The following list contains descriptions about all available transfer sequence trigger conditions that can be selected when selecting the 'Transfer trigger' placeholder. A comprehensive list about the configuration details of each trigger can be found in chapter 11.6 of this manual.

Combination – Combines multiple triggers with a Boolean operator.

Custom range – The transfer sequence will be launched when a result lies within or outside a pre-defined value range.

Ranges of Evaluation – The transfer sequence will be launched when a result lies within a certain evaluation range. (e.g. in the range above the upper control limit)

Result available – The transfer sequence will be launched when a result is available.

Treshold value – The transfer sequence will be launched when a result lies above or below a pre-defined threshold value.

Validity – The transfer sequence will be launched when a result has a specified validity.

The following list contains descriptions about all available transfer actions that can be placed in any order as part of the 'Next step' placeholder. A comprehensive list about the configuration details of each transfer action can be found in chapter 11.7 of this manual.

Digital Out – Assigns a predefined state to a digital output channel.

Export: spectra – Exports spectra as dat, spc, or csv file.

Export: values & text – Exports numeric or text results to a csv file.
Note: The format options of the exported file can be defined in the System settings (see chapter 4.1).

Numerical output – Assigns a result to a numerical output channel. *Note:* If this numerical output channel is a Beckhoff Analog Out channel the numerical output value will be transormed to a current between 4 and 20 Milliampere. The definition of which numerical output value corresponds to 4 and 20 mA, respectively, can be set by advanced users in the OMC program.

Numerical output (constant) – Use a predefined value to modify a numerical output channel.

OPC Output – Assigns a predefined value to an OPC tag.

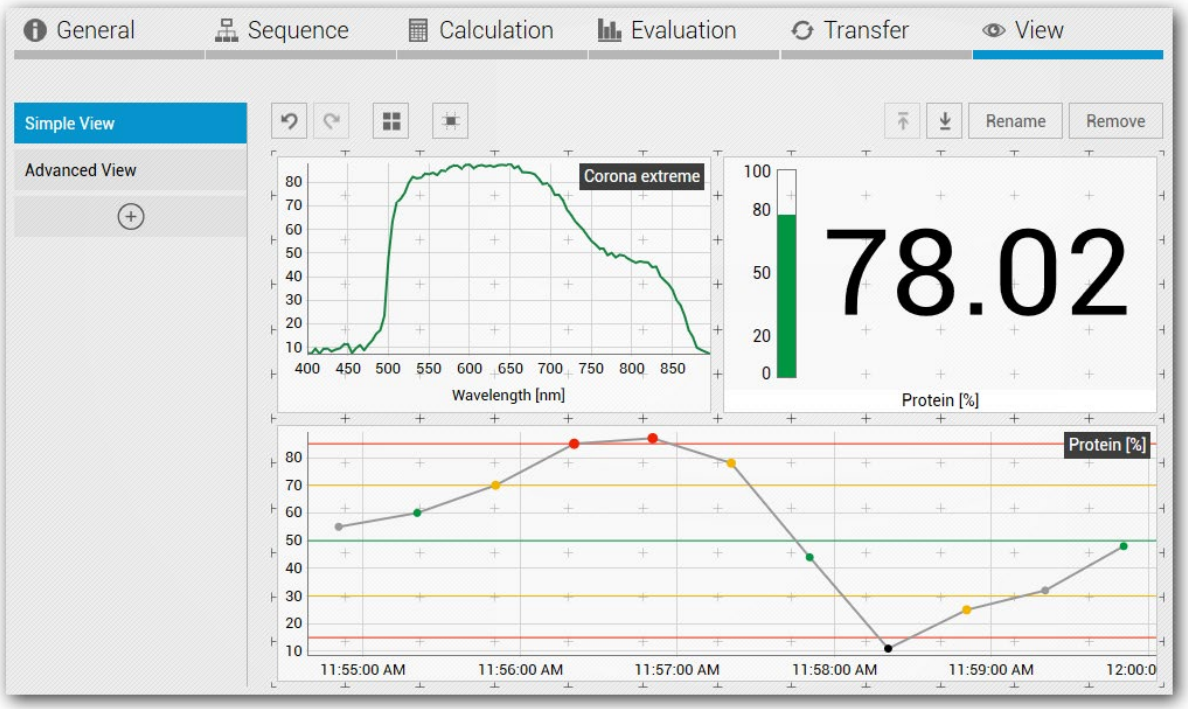
Select view – Changes to the desired view during product execution.

Status output – Assigns a new status to one or to several status channels.

Textual output (with result) – Assigns to a textual output channel a combination of a predifined string, the value of a result, an the timestamp of a result.

5.7 View

The View configuration contains a list of freely configurable views that can be used for the product in the Measurement screen.

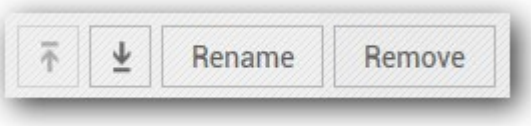


Management of views

A product can contain several views, e.g. a simple view for the most important information and an advanced view for detailed analyses in special situations. A new view can be added by pressing the ‚+'-Button that's always the last entry in the list of views.

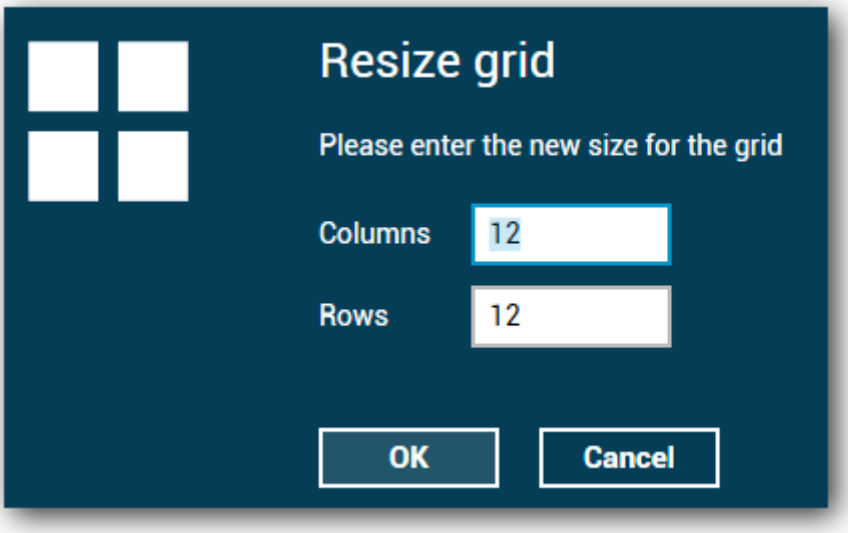
Enter the name of the view in the dialog and select OK. A new view with the name entered will be added to the list.

A view can be renamed, removed from or moved up or down in the view list by using the buttons on the top right corner of the entry. In case more than one view is defined, the first view of the list will be used as the default view after the product is launched.

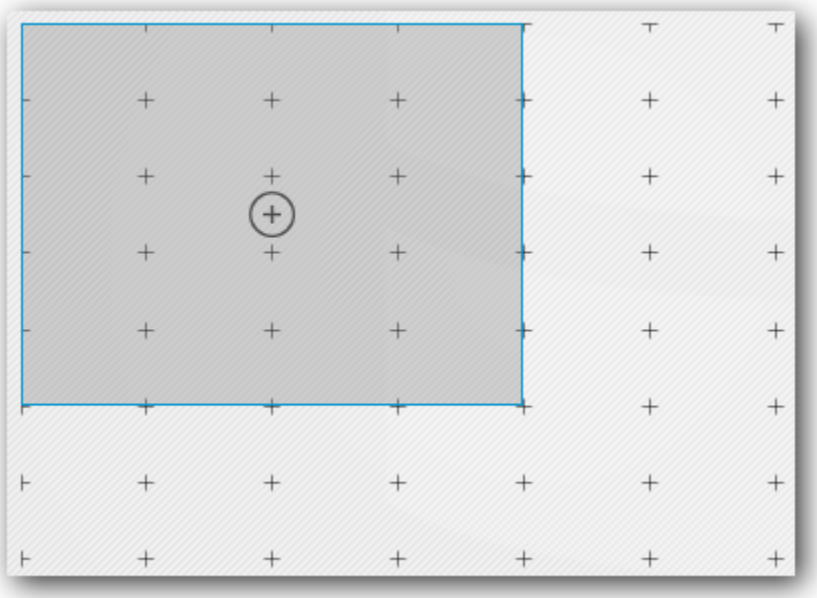


Using the grid to place results

After selecting a newly created view, a configurable grid with the standard size of 12 x 12 elements is shown. The number of elements can be lowered using the following button and the subequent dialog.



To place a result in the grid, first select the area of the grid that the result shall be using. This can be accomplished by selecting a number of elements by left-clicking on one corner of the desired area and dragging the selection until the desired elements are highlighted.



Afterwards, press the selected area to open the view result dialog. Within the dialog, you first have to select the graph type. Depending on the selection, all available results for this graph type are automatically displayed in the second tab of the dialog. The view options displayed within the third tab of the dialog also depend on the selected graph type.

Spectrum – Configure the results to show, scaling behavior of both axes, font sizes and display options.

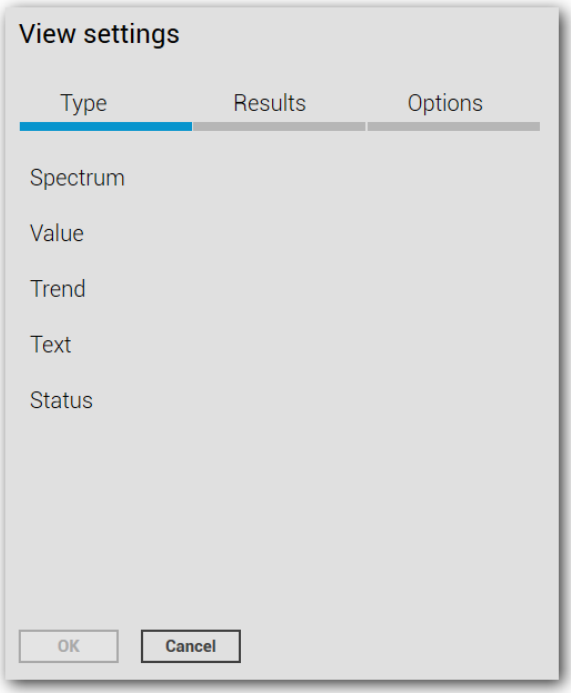
Value – Configure the number of decimals displayed for numerical (scalar) values and the font size.

Trend – Configure the scaling of the X-axis, the length of the Y-axis (time based in minutes, element count or with a default value of 50 trend-points) and font sizes. Also enable/disable data point display.

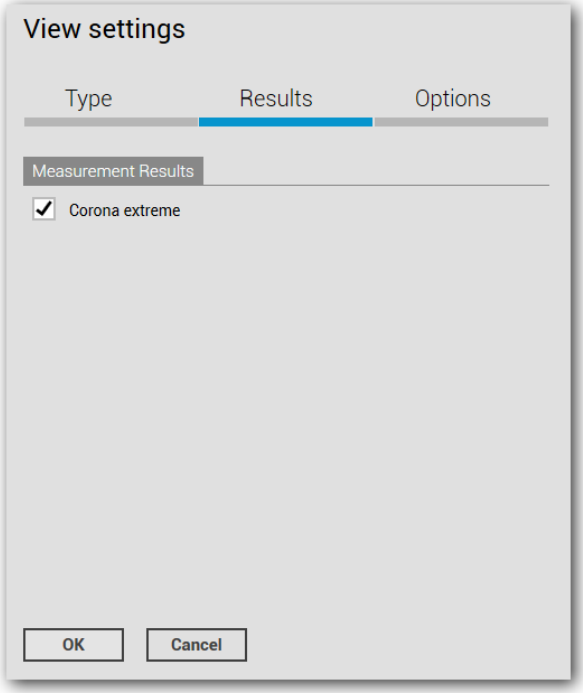
Text – Configure the font size.

Status – Configure the font size.

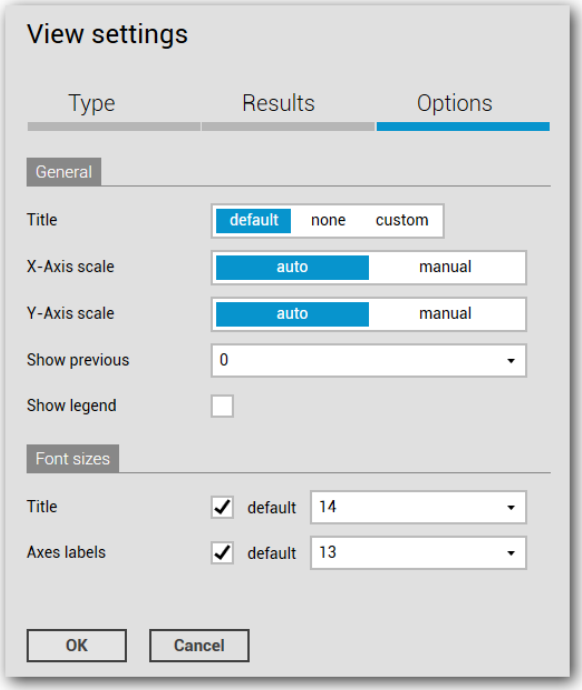
Select graph type



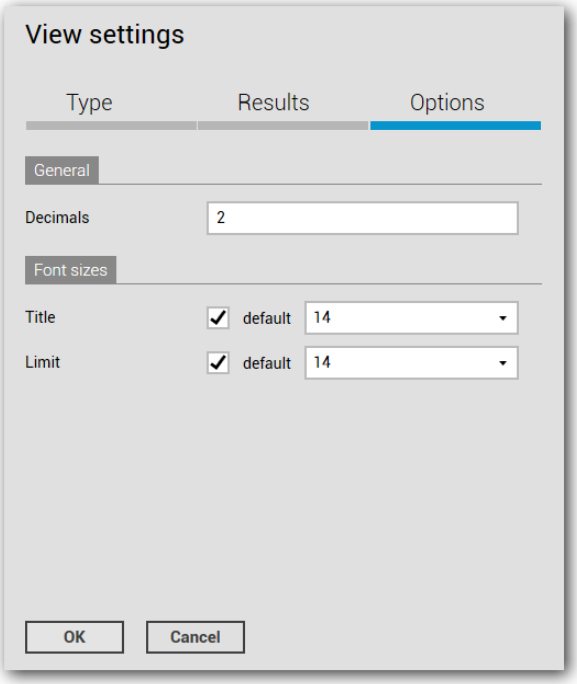
Result selection



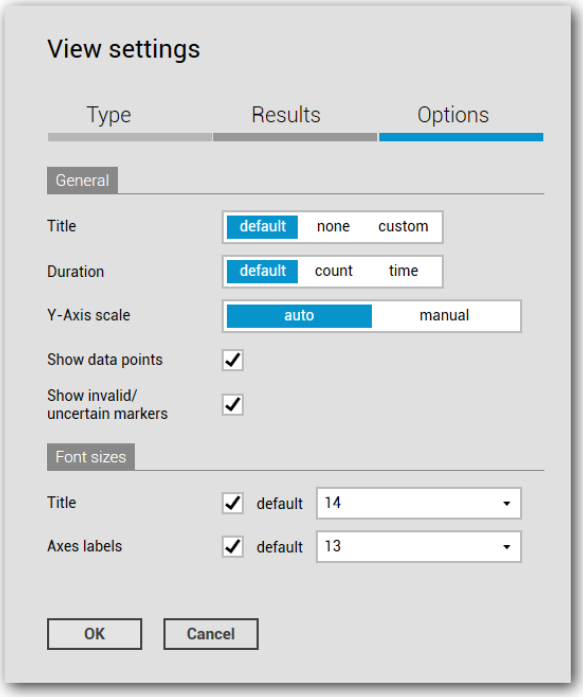
View options “Spectrum”



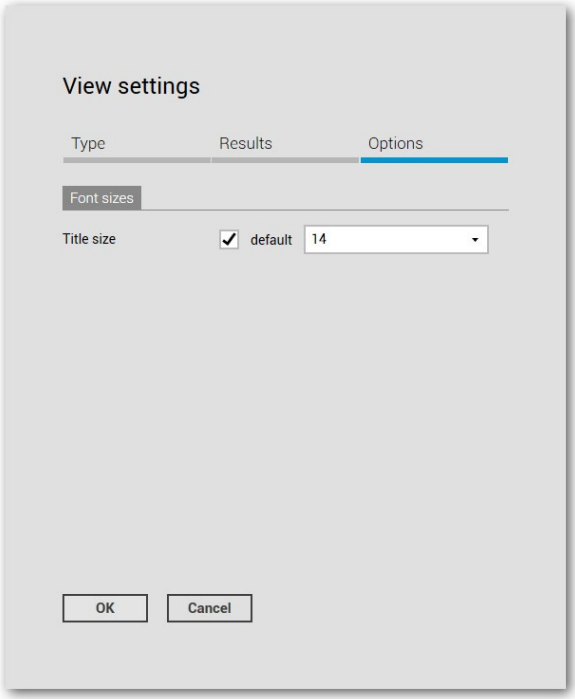
View options “Value”



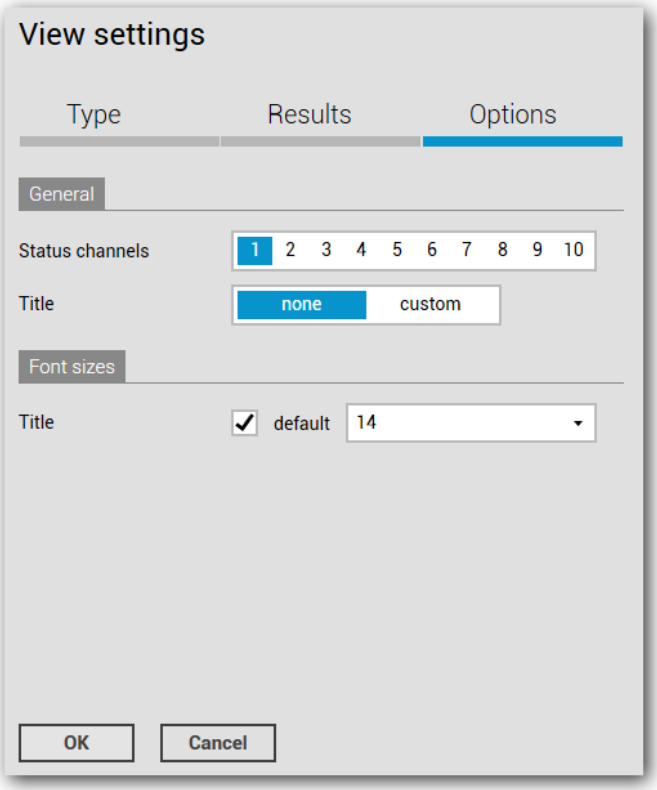
View options “Trend”



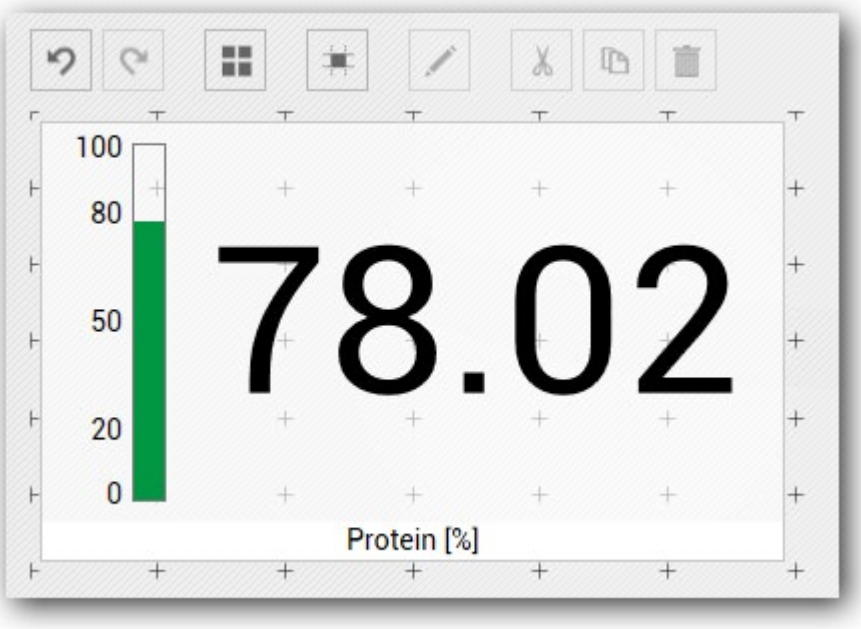
View options “Text”



View options “Status”



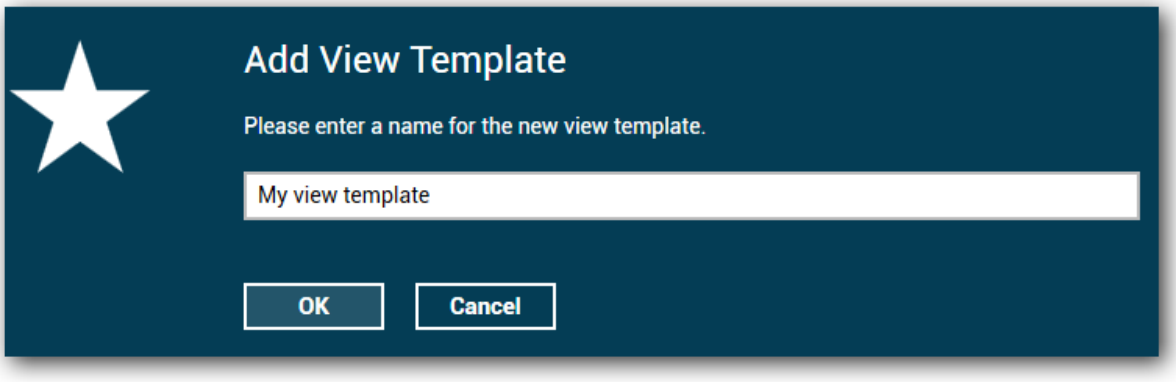
After placing a result upon the grid, the view element can be selected. Subsequently the element can be moved, its size can be changed, it can be moved or copied to the clipboard area, or it can be deleted.



Saving a view template

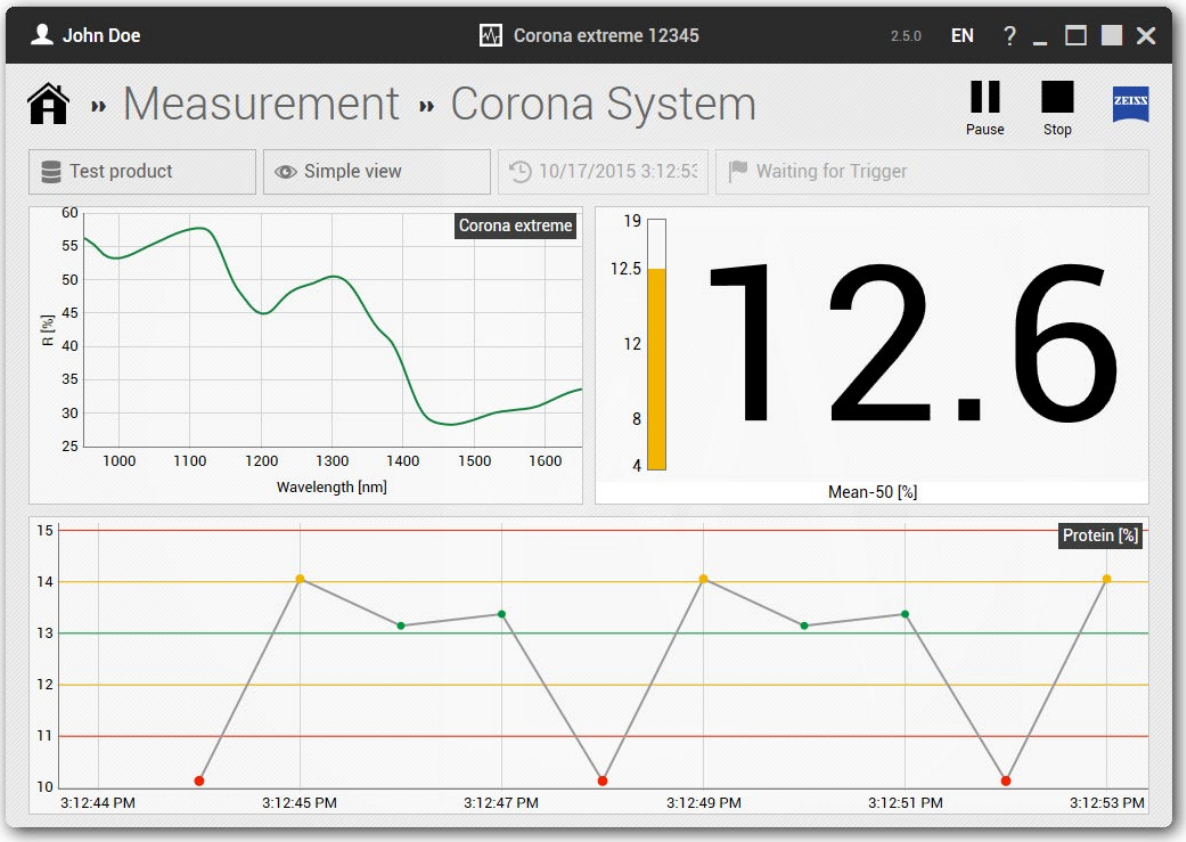
Once you are satisfied with your configuration of a view you can save a view template by pressing the depicted button.

After giving the template a name it will be available as soon as you add a new view.



6 Measurement

The Measurement-screen is used to execute configured products, view results and interact with a running measurement process.

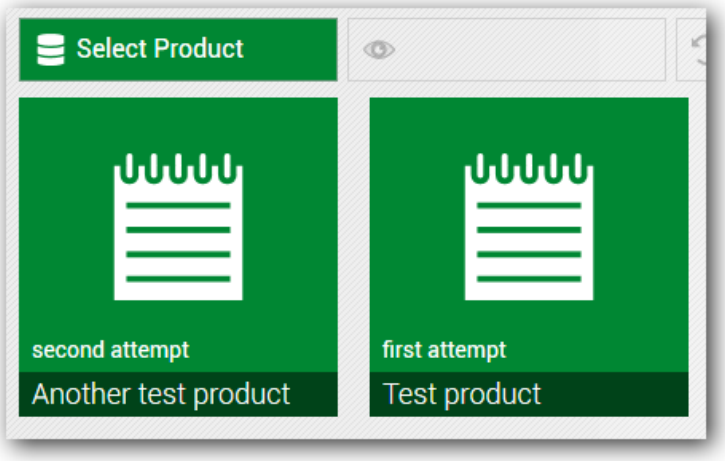


6.1 Switching between Device Groups

If the system configuration contains more than one Device Group, switching between the statuses of the systems can be accomplished by clicking on the name of the current system and selecting the desired Device Group from the popup.

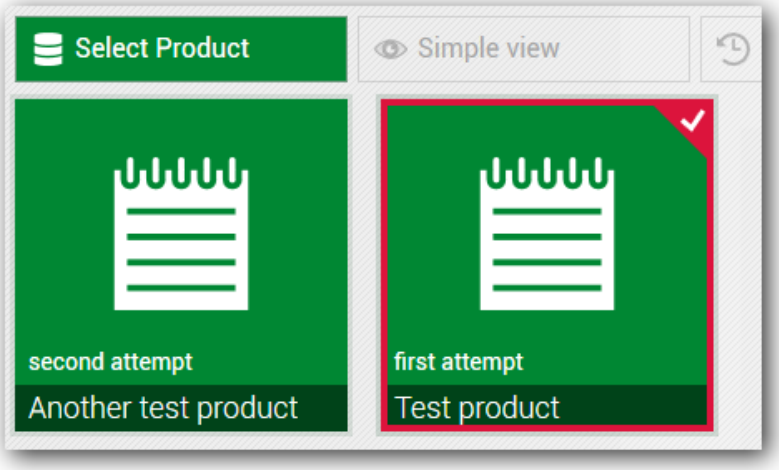
6.2 Select and switch product

When there is no product running, a list of all configured products for the Device Group will be shown.

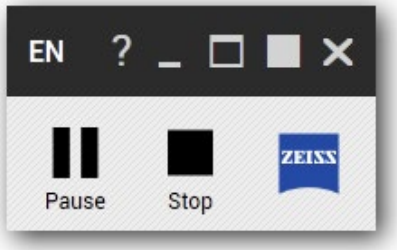


Selecting one of the items will start the execution of the product. This will display the first View configured. The Device Group will be put into the state 'Waiting for trigge', i.e. the software will wait until any trigger condition to start a sequence is fulfilled. Afterwards the result will be shown.

To switch the current product on favor of another product, click on the left element from the top of the screen that contains the name of the current product. From the list, select the new product to use.

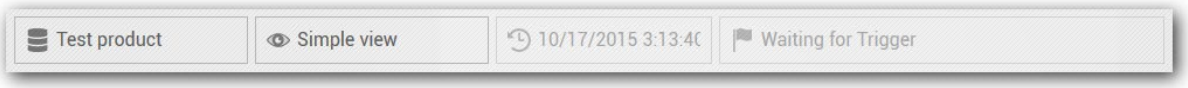


To stop or pause the current product, use the buttons on the top right of the screen.



6.3 Status display

The top bar of the measurement screen contains information about the product and view that are currently used. Additionally, information about the time and name of the last executed sequence is shown. The last element shows the current status of the sequence execution.



6.4 Switch the active View

To switch between different configured views for the current product, select the second buttom from the top bar that contains the name of the current view. From the view list on the left side of the screen, select the desired view.

6.5 Display or delete a recent measurement

To view the last measurement from the measurement history again directly after a sample measurement or to delete it if necessary, select the third button in the upper bar that displays the measurement time of the current sequence.

Select a measurement sequence from the list on the left to display the results again in the current view. To delete a measurement sequence click on the trash can icon.

7 Result monitor

The "Results monitor" enables the real-time display of measurement results from several device groups in one view and the display of results for several products.

Interactive intervention in product processing, such as pressing buttons or using input dialogs, is not possible. The displays are updated at the end of a sequence in the device group.

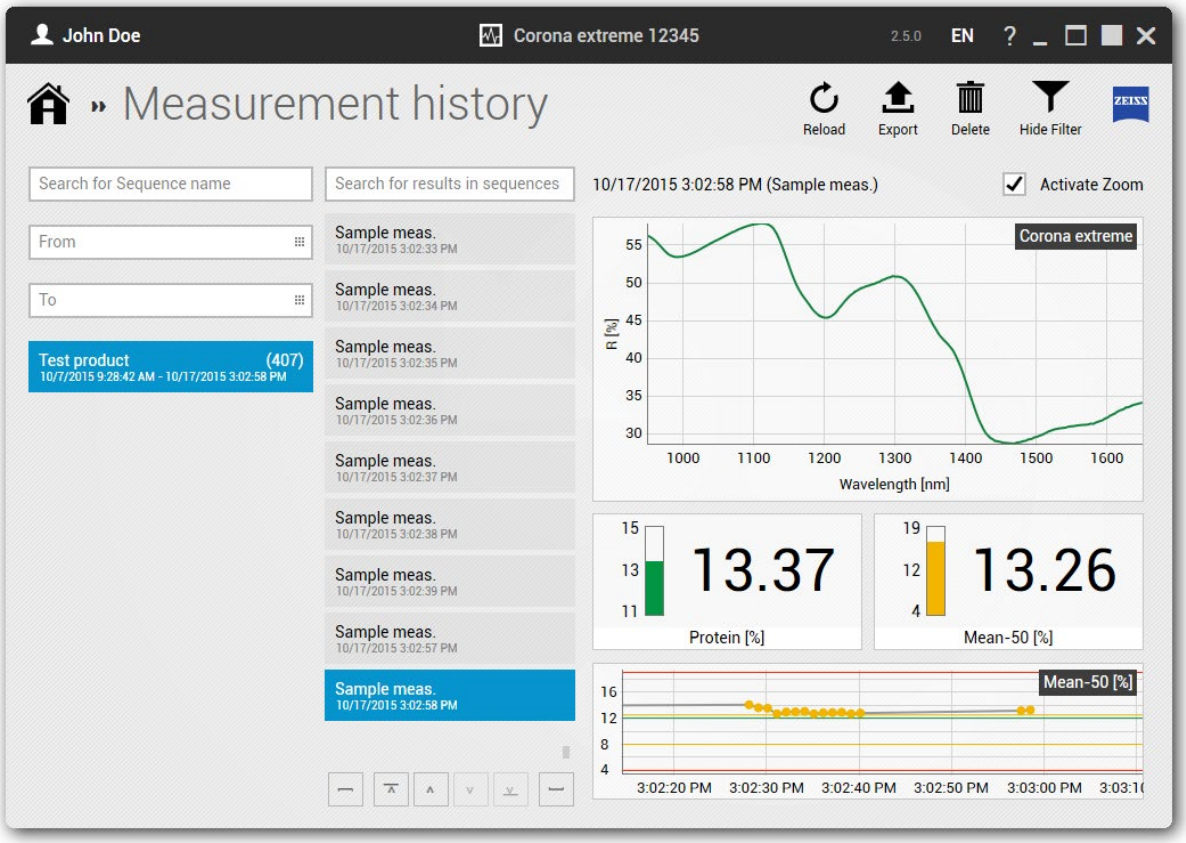
The display configuration is similar to the product configuration procedure described in Chapter 5.7.

For a result display, e.g. for a moisture value to work across several products, the calculation that calculates the moisture value and the moisture value itself must have the same name in all products and be calculated from the measurement of the same spectrometer.

The configured displays are stored on the server during operation via a server client instance and are available at connected clients.

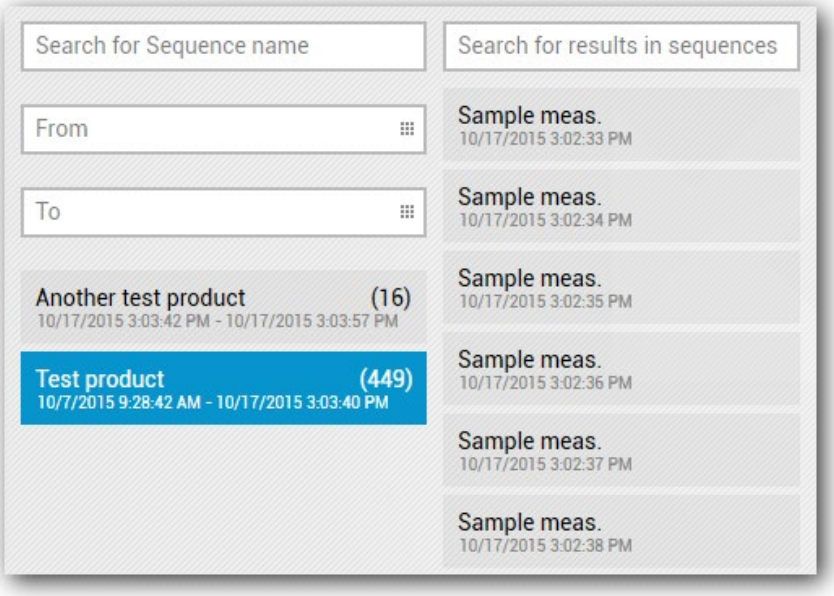
8 Measurement History

The Measurement History screen enables the access of past measurement data. The measurement data is arranged by sequences. A sequence summarizes all results that were measured during its execution or were derived from its measurement results.

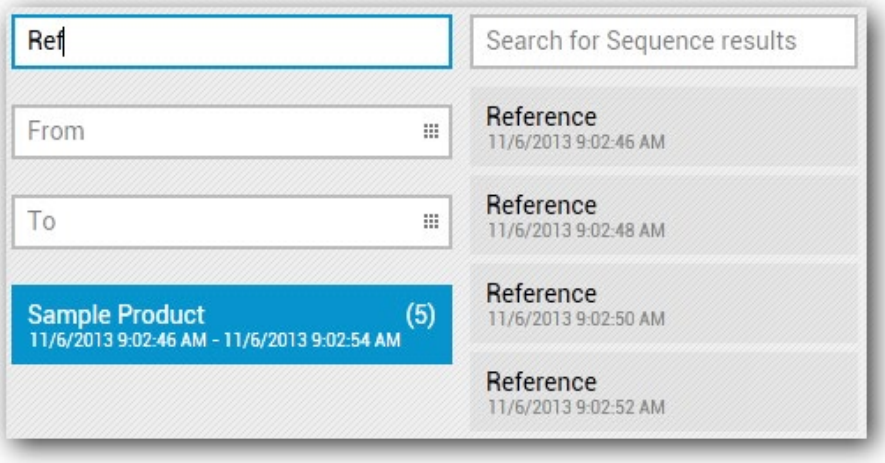


8.1 Select product and apply sequence filters

After entering the Measurement History, a product needs to be selected. On the left of the screen, a list of all available products including the number of available sequences and the time span of these sequences' dates is displayed.



After selecting a product from the list, all available sequences will be displayed in the sequence-list next to it. The most recent entries can be found on top of the list. The number of sequences displayed in the list can be reduced by defining filter-criteria. Available filter criteria are the names of the sequences (to be entered in 'Search for Sequence name') as well as the date and time of the sequence execution (to be entered in 'From' and 'To', respectively).



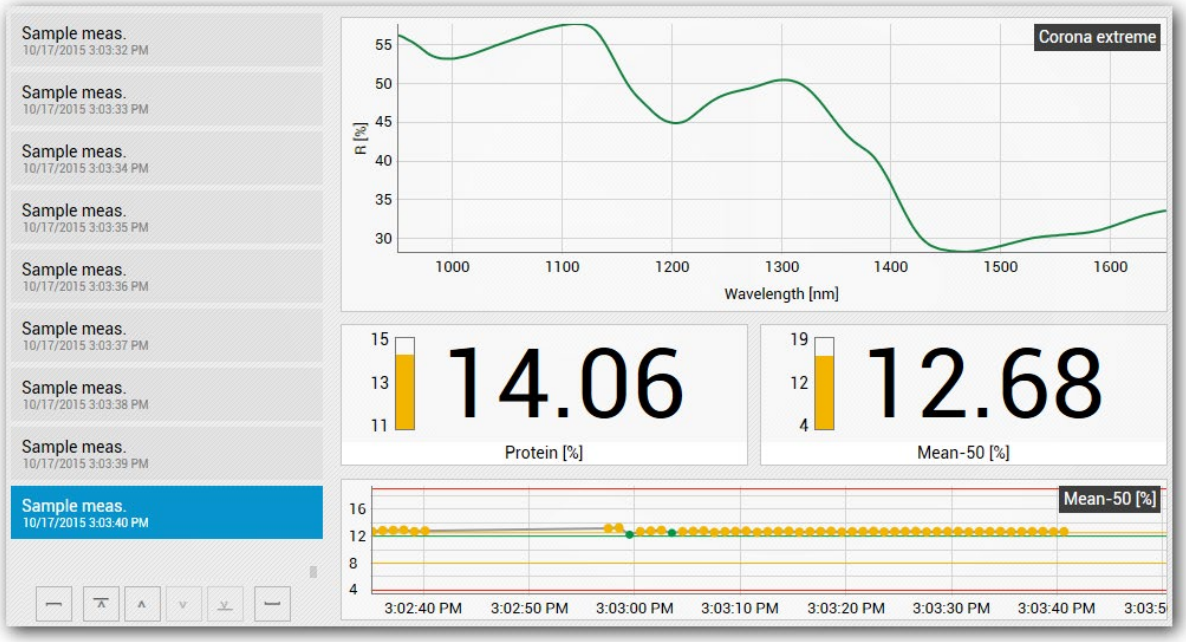
The filter-options can be hidden by pressing the 'Hide Filter'-button located in the top right corner of the 'Measurement History' screen.

8.2 Search for Sequence results

The number of sequences in the list can be further reduced by entering text in the ‘Search for Sequence results’ input field above the list. In this case, each sequence is scanned for text results that match the search criterion.
E.g., an ‘Input dialog” was used to enter the sample name ‘test run 444’. To list all the sequences that were part of the ‘test run’ measurements, you can use the ‘Search for Sequence results’ function.

8.3 Select sequence and navigation

After selecting a sequence from the sequence-list, the results that are part of this sequence can be placed on the grid in the same way as it is done in the view-configuration.



When all desired results are arranged, press “Explore data” to freeze the view. This will enable the following features:

- Zoom for spectra and trend diagrams
  Hint: Holding the Ctrl key during zooming allows enlarging a rectangular area.
- Checking / unchecking of spectra in the legend of a diagram that holds multiple spectra
- If “uncertain” or “invalid” tags are displayed, the reason can be explored by clicking on the tag.

To navigate through the sequence-list, the navigation bar below the list can be used.

Sets the current sequence's date as the 'To' filter-option. This makes the current sequence the first displayed in the list. All sequences above that are more recent will be filtered out.

Navigates to the first, i.e. the most recent, sequence in the list.

Navigates to the previous sequence in the list.

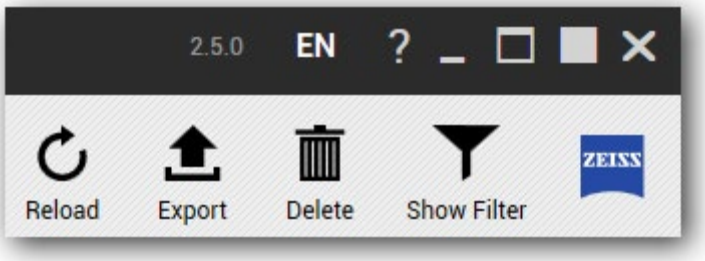
Navigates to the next sequence in the list.

Navigates to the last, i.e. the oldest, sequence in the list.

Sets the current sequence's date as the 'From' filter-option. This makes the current sequence the last displayed in the list. All sequences below that are older will be filtered out.

8.4 Result export

To export data from the Measurement history, a product and a sequence have to be selected. Only then, the Export button is accessible in the top right corner of the program.
After pressing 'Export', the dialog containing the options tab for this result is shown, if a result from the grid is already selected. Otherwise, you need to select the result in the dialog.

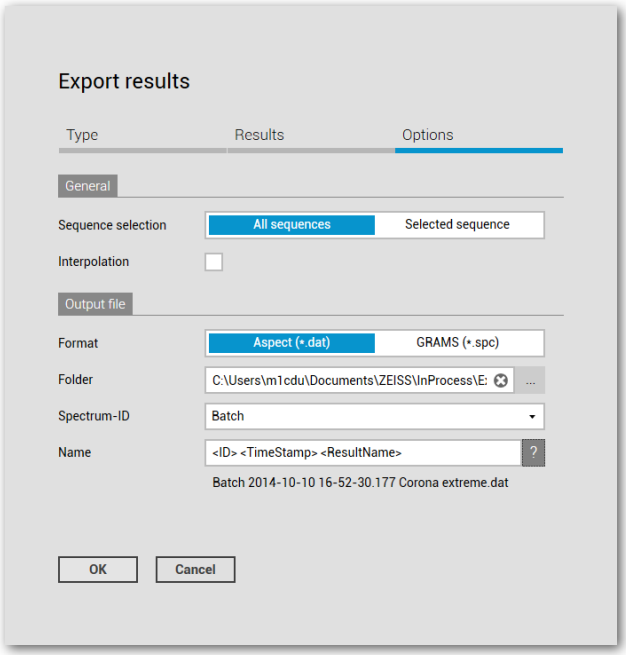


There are currently two supported result types: spectra (.dat/.spc) and values (.csv). Depending on the type selection, the desired results can be chosen from the list of all available results for this export type in the second tab.

8.4.1 Spectral data export

For spectra export, first select which results to include. Options are all sequences of the current list or only the current sequence. Furthermore, the spectrum can be interpolated prior to the export.

The output files can be set up by selecting the file format and folder. If a text result is available, it can be used to label the output files according to the value in the same sequence.



The following predefined placeholders can be used for naming the result file:

<ID> - The value of the text result selected under 'Spectrum-ID'.

<ResultName> - The name of the result.

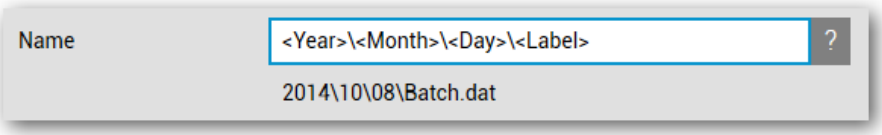
<ValidityInfo> - 'invalid' or 'uncertain' will be added to the file name, if applicable.

<TimeStamp> - The timestamp of the sequence including date, time and milliseconds.

<Date> - The date of the sequence including year, month and day.

<Time> - The time of the sequence including hours, minutes and seconds.

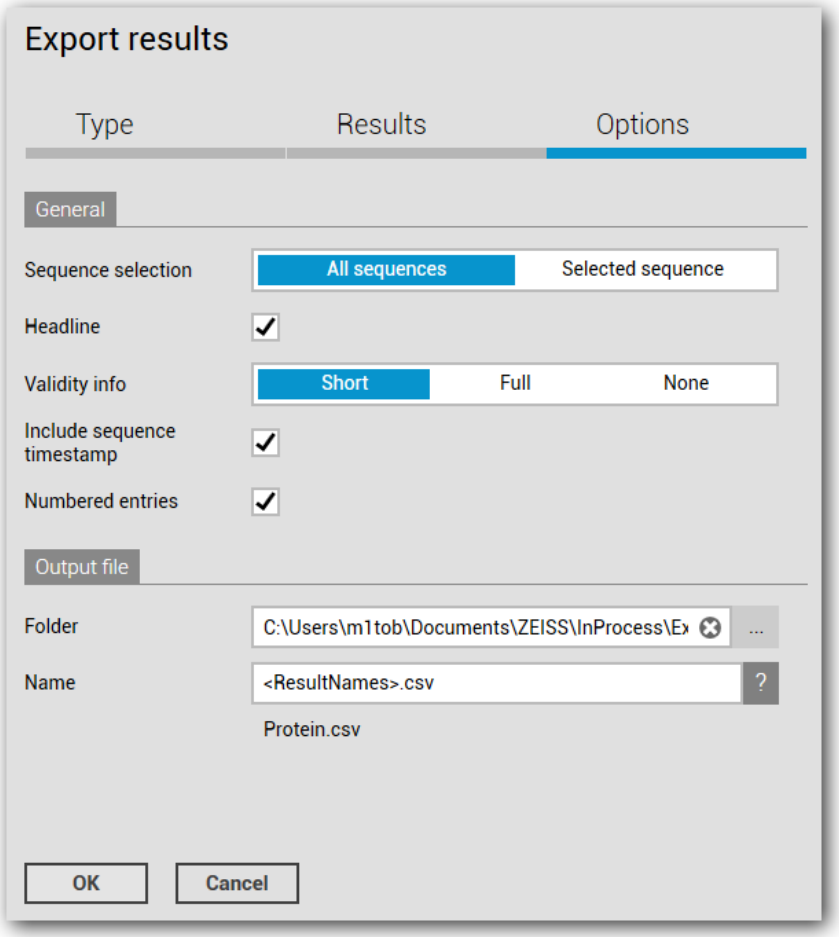
<Year>, <Month>, <Day>, <Hour>, <Minute>, <Second>, <Millisecond> - Parts of the sequence's timestamp.



8.4.2 Numerical data export

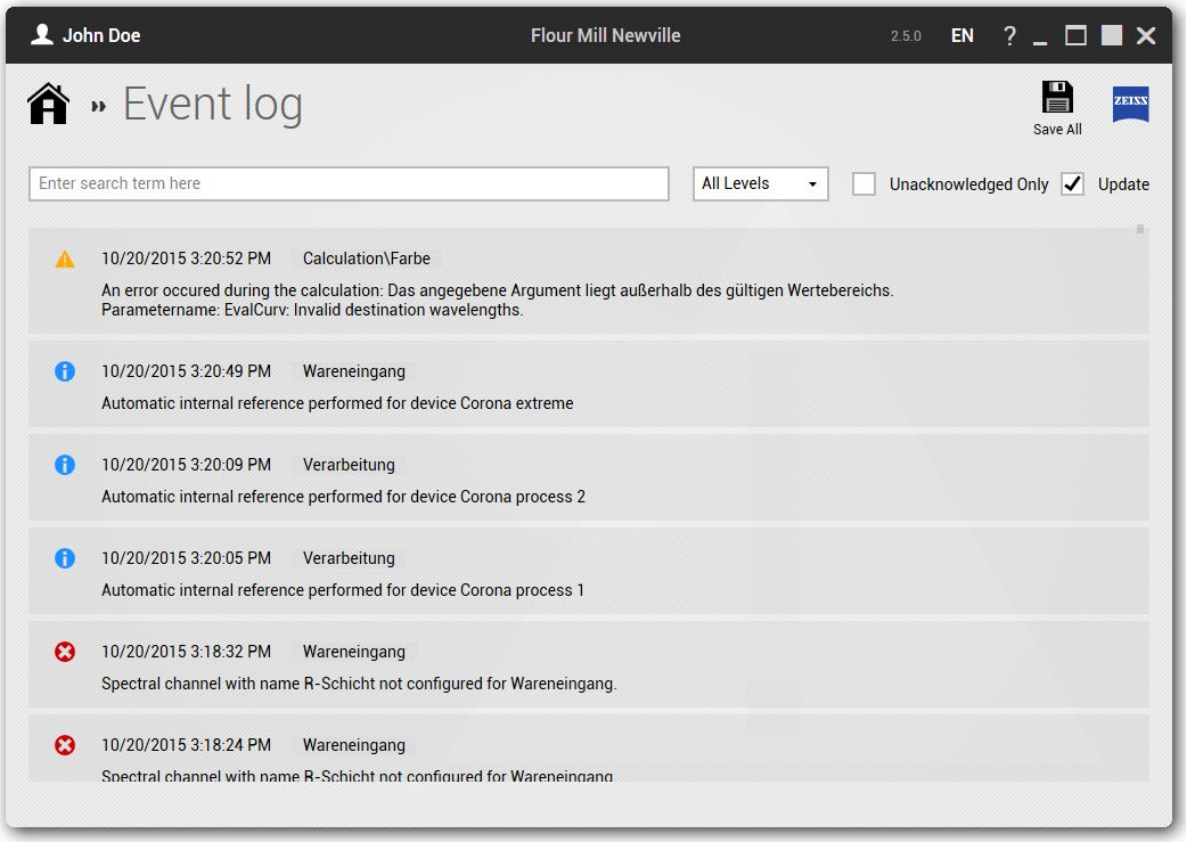
For CSV export, first select which results to include. Options are all sequences of the current list or only the current sequence. Furthermore, options to include the timestamp of the sequence and to add an index-number for the entries are available. The file name can be manually entered and contain the placeholder <ResultNames>.

Note: The format options of the exported file can be defined in the System settings (see chapter 4.1).



9 Event log

The Event log screen contains a list of events and information that have occurred during the usage of InProcess.

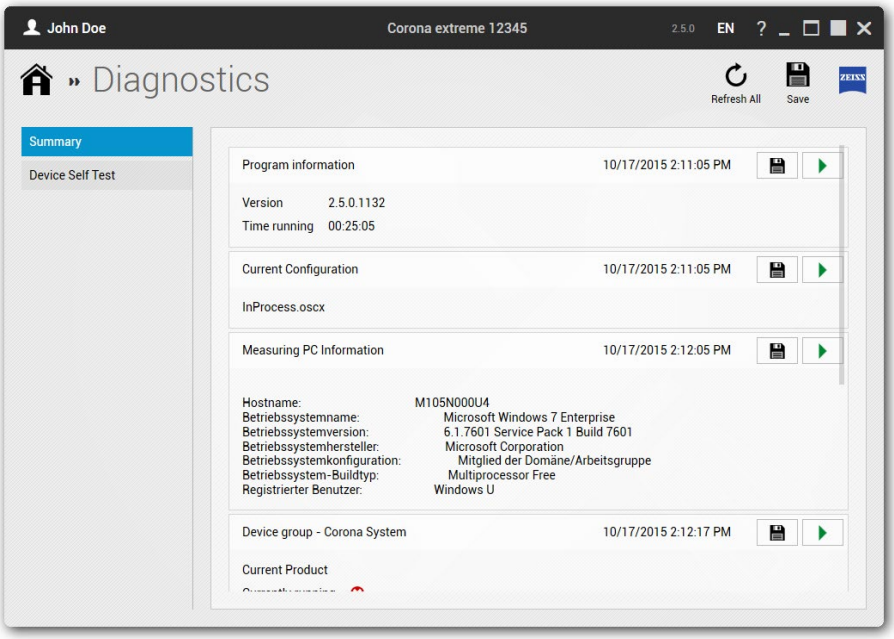


The list can be filtered by search-text, level and acknowledgement-state.

All entries can be exported to provide advanced error-information to the ZEISS service personnel.

10 Diagnostics

The diagnostics screen can be used to collect and export diagnostic information from the software and run diagnostic tests on the available hardware.



The following diagnostic cases are available:

Program information – Displays the version of the software.

Current Configuration – Retrieves the current system configuration for export.

Measurement PC information – Collects information about the computer and the operating system the software is running on.

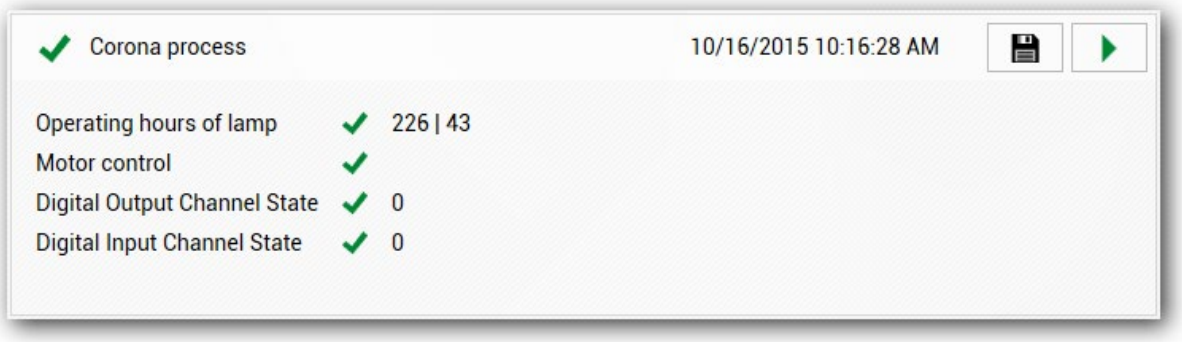
Device group – For every group of devices, the information of the currently selected product and whether the execution of the product is running is displayed.

Device – For every device, the IP-address, serial number and connection state is displayed.

Measurement history – The maximum allowed and currently used size of the measurement history is displayed.

Event log – The number of total and unacknowledged entries is displayed. For export, the whole event log is saved.

In the category Device Self Test, basic hardware tests can be performed for the Corona extreme and Corona process devices.

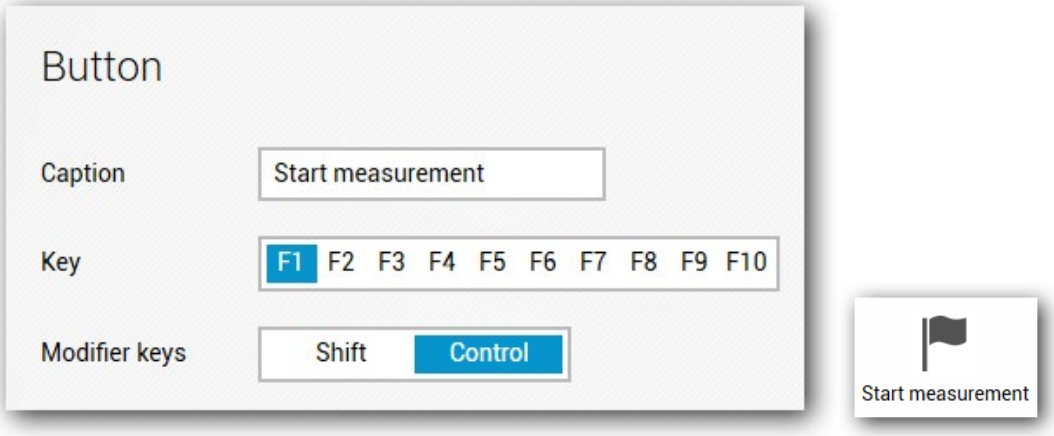


11 Appendix

11.1 Measurement sequence trigger conditions

Button

The sequence will be launched when a button with a custom caption is pressed.



Caption – The label the button will be shown with.

Key – The hotkey for the button

Modifier keys – Modifiers required to hold down when pressing the hotkey.

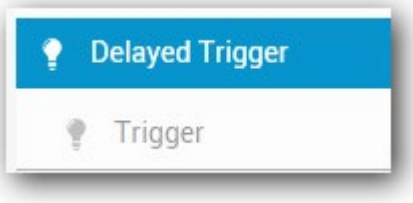
Button or digital in

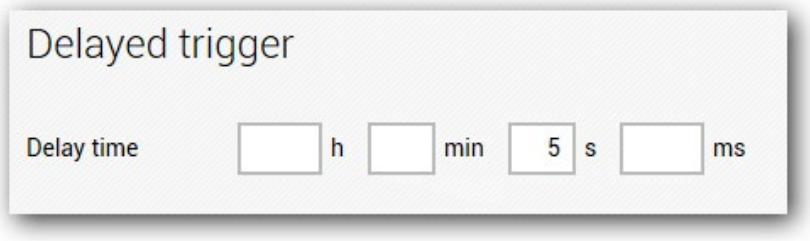
The sequence will be launched when a predefined state occurs on a digital input channel or when a button with a custom caption is pressed.

The configuration details of this step are a combination of the **Button** and the **Digital in** trigger step.

Delayed trigger

The sequence will be launched delayed after a predefined condition occurred. The effect of the configured sub-trigger is delayed by a defined time.





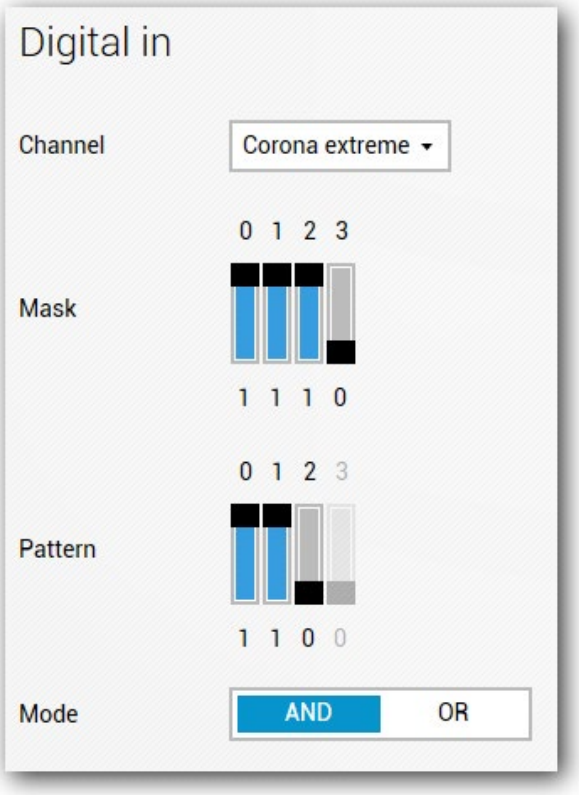
Delay – Time waited after the trigger condition occurred.

For example, a button trigger step could be configured with a delay of 10 seconds. In this case, the button could be pressed in the Measurement screen without anything happening immediately. The execution of the configured execution steps (i.e. a sample measurement) will start 10 seconds after the button is pressed.

In an automated process environment, a digital trigger from a programmable controller could always occur 5 seconds before the sample objects are ready for measurement. In this case, the occurance of the desired digital state can be delayed by 5 seconds to ensure that the sample measurement sequence is only executed when samples are available.

Digital in

The sequence will be launched when a predefined state occurs on a digital input channel.



Channel – Choose the digital input channel to use.

Mask – Choose the relevant bits for the comparison.

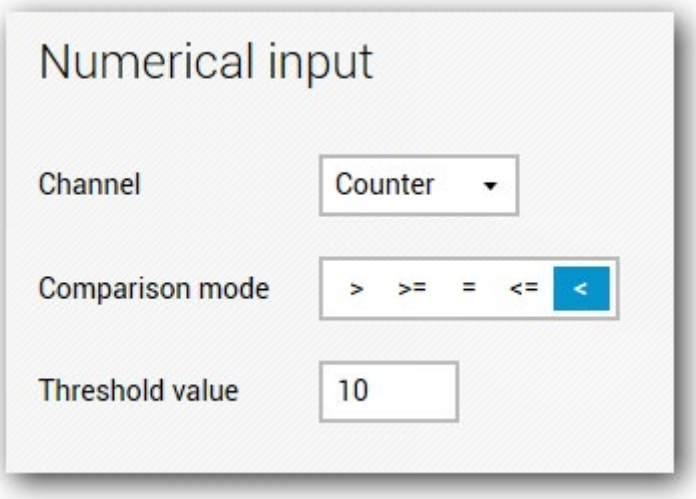
Pattern – Specify the necessary state (high/low) for each relevant bit.

Mode – Decide whether the pattern must match all relevant bits (AND) or only one bit (OR).

In the example above the statuses of bits 0, 1, and 2 are relevant to launch the sequence, while the status of bit 3 is of no importance. Bit 0 and 1 need to be 'high' and bit 2 needs to be 'low' in order to launch the sequence.

Numerical in

The sequence will be launched when the current value from a numerical input channel fulfills a configured condition.



Channel – Choose the numerical input channel to use.

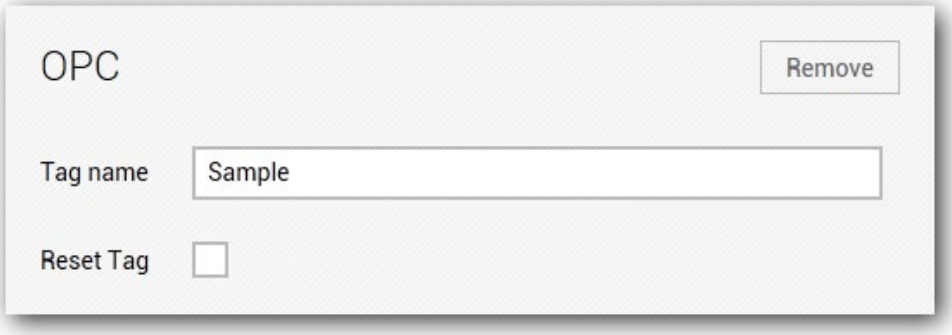
Comparison mode – Choose how to compare channel and threshold value.

Threshold value – Specify the threshold value for the comparison.

Example: The sequence will be launched when the current value of the numerical input channel is smaller than 10 when the 'Comparison mode' is set to '<' and 'Threshold value' is set to 10.

OPC

The sequence will be launched when a predefined state occurs on an OPC tag.

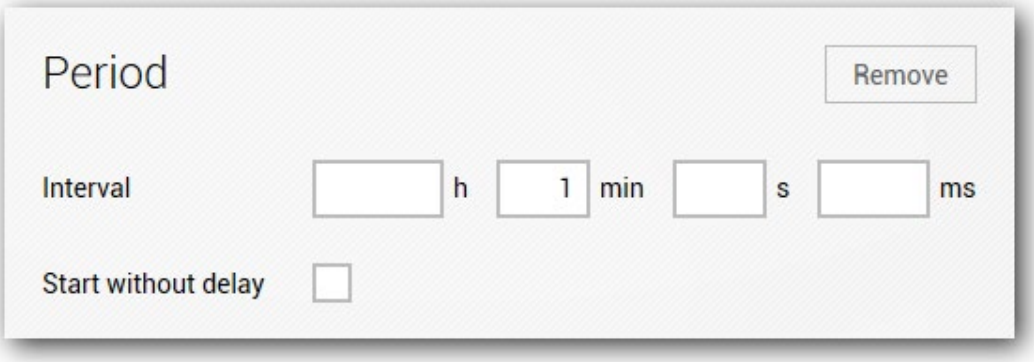


Tag name – Name of the OPC tag to be created on the OPC server.

Reset Tag – The OPC tag is set to 'false' after triggering the sequence.

Period

The sequence will be launched periodically when a predefined time period has elapsed.



Interval – The time between two executions of the sequence.

Start without delay – No interval before the first execution of the sequence.

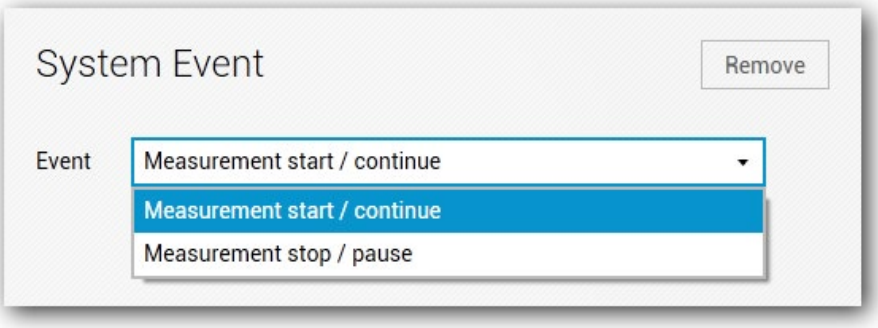
Period and digital in

The sequence will be launched periodically when a predefined time period has elapsed as long as a predefined state persists on a digital input channel.

The configuration details of this step are a combination of the **Period** and the **Digital In** trigger step.

System event

Triggers the execution of a sequence when a system event (i.e. product selection) occurs.
This feature is useful to bring the system variables in a defined state at the start or end of product execution. E.g., the spinning of the TURNSTEP accessory can be stopped when the execution of the product is stopped.



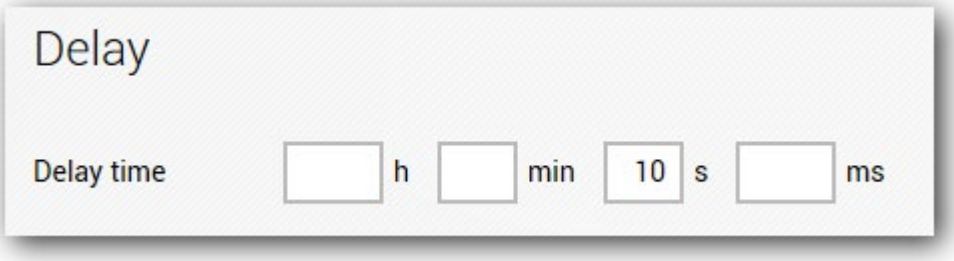
Event – The event that starts the sequence.

> **Measurement start / continue** – Occurs when a product is selected for usage in the Measurement screen or execution is continued.
>
> **Measurement stop / pause** – Occurs when the usage of a product is paused or stopped in the Measurement screen.

11.2 Measurement sequence actions

Delay

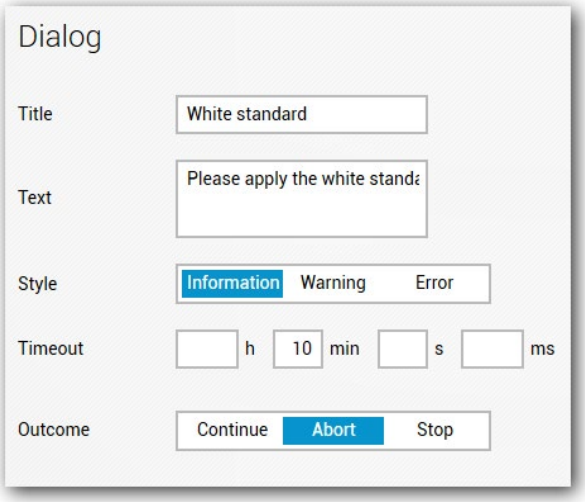
Delays the following actions for a defined time.

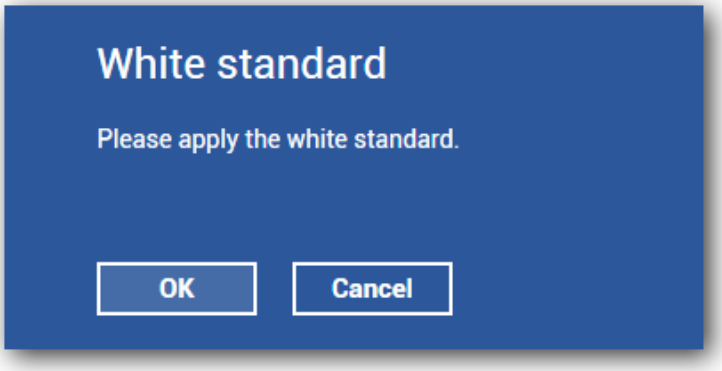


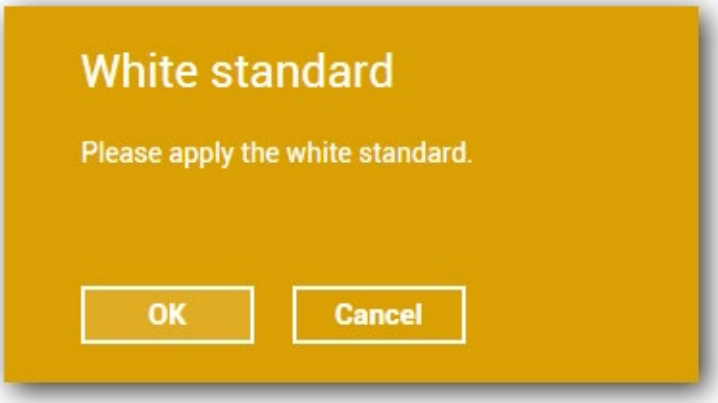
Delay – Introduces a pause in the sequence.

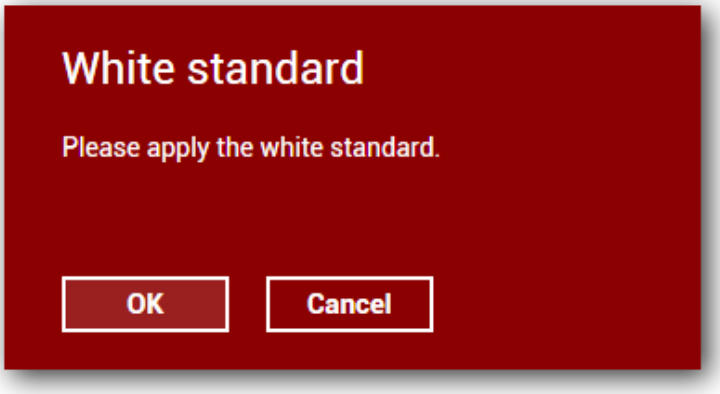
Dialog

Displays a dialog with a custom message.









Title – The dialog's title.

Text – The text to show inside the dialog.

Style – Select the color of the dialog (Information = blue; Warning = yellow; Error = red).

Timeout – Time to wait before the dialog is closed automatically.

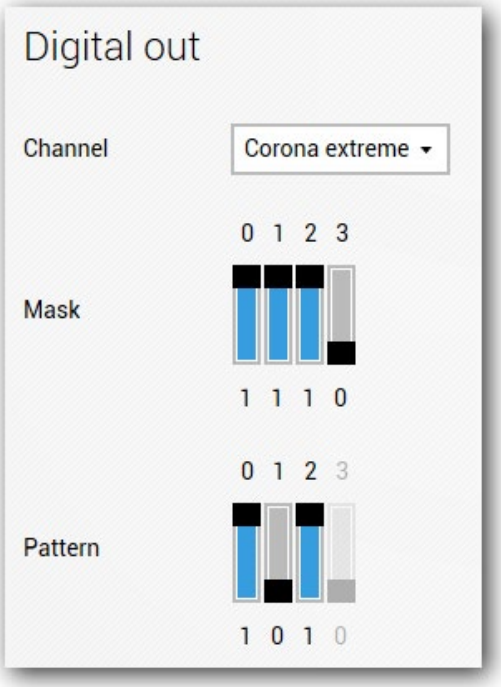
Outcome – The consequence of the timeout: Continue with next step of the sequence/Abort the current sequence/Stop execution of the product.

I.e., when the dialog is not confirmed after the defined time there are three possible scenarios:

Continuation with the next step of the current sequence.
Aborting the current sequence and return to the state 'Waiting for trigger'.
Stopping the execution of the product.

Digital out

Assigns a predefined state to a digital output channel.



Channel – Choose digital output channel to use.

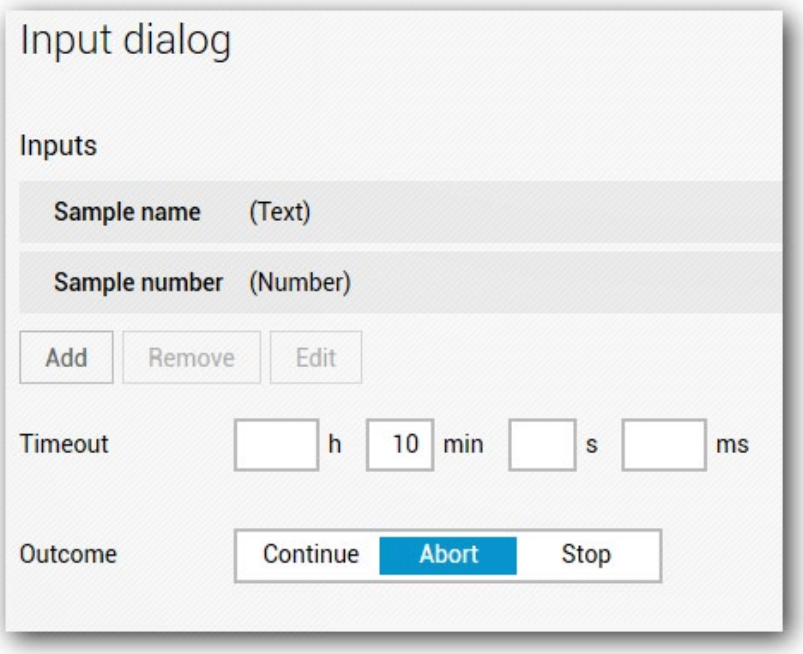
Mask – Choose the relevant bits for which the state can be changed.

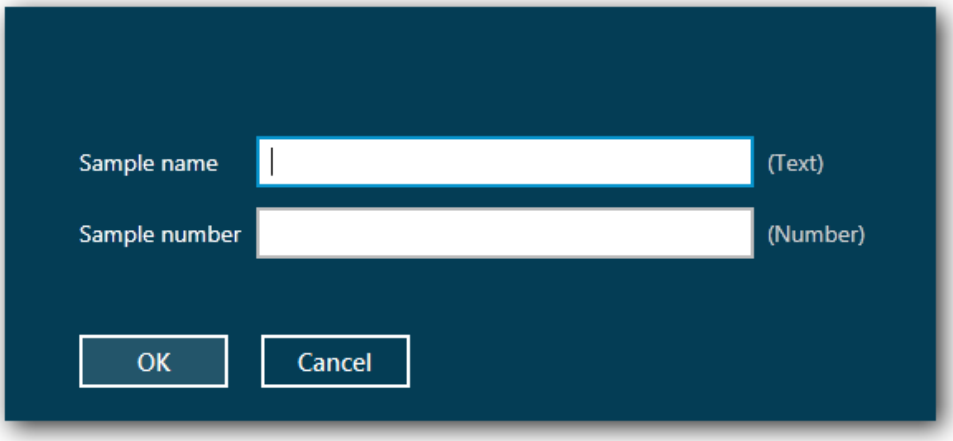
Pattern – Specify the desired state (high/low) for each relevant bit.

In the example above the status of the bits 0, 1 and 2 will be assigned anew, while the status of bit 3 will remain unchanged. Bit 0 and 2 will be assigned 'high' while bit 1 will be assigned 'low'.

Input dialog

Displays a dialog where information can be entered.





Inputs – Defines the names and types of the information that can be entered with the dialog.

Timeout - Time to wait before the dialog is closed automatically.

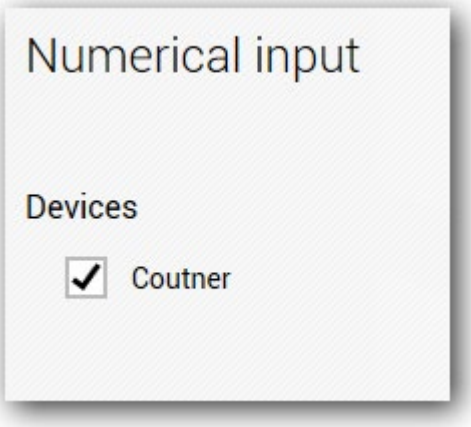
Outcome – The consequence of the timeout: Continue with next step of the sequence/Abort the current sequence/Stop execution of the product.

I.e., when the dialog is not confirmed after the defined time there are three possible scenarios:

Continuation with the next step of the current sequence.
Aborting the current sequence and return to the state 'Waiting for trigger'.
Stopping the execution of the product.

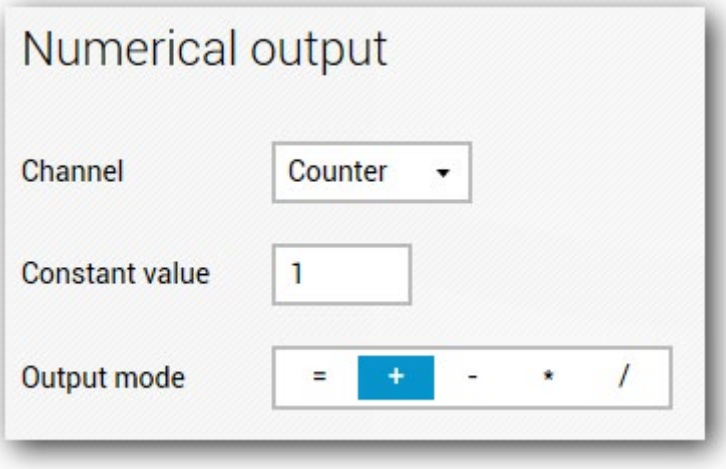
Numerical input

Reads the current values from numerical input channels. The available numerical input channels will be listed and can be selected. The values of the channels that are selected will be made available to the calculations.



Numerical output

Use a predefined value to modify a numerical output channel.



Channel – Choose numerical output channel to use.

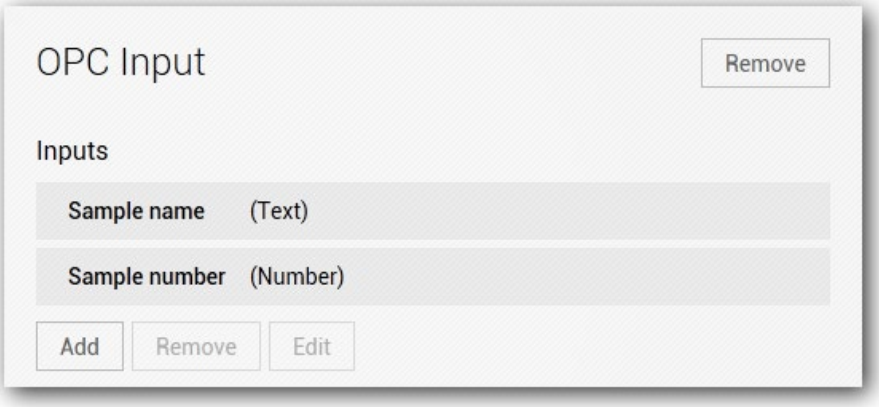
Constant value – The value that is used for the modification of the current value.

Output mode – The mathematical operation which will be used to modify the current value.

In the example above the value of the numerical channel will be increased by one each time the sequence step is passed. Therefore, this numerical channel serves as a counter.

OPC input

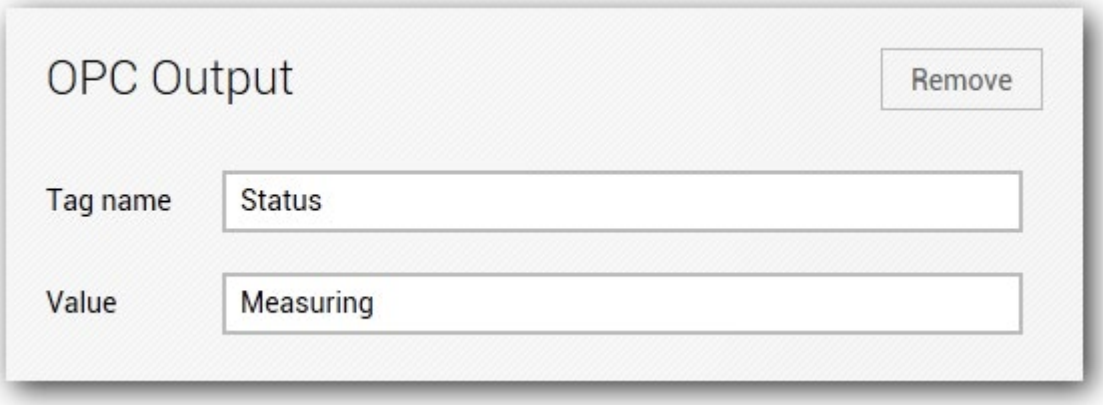
Receives the current values from OPC tags.



Inputs – Defines the names and types of the tags that will be received.

OPC output

Assigns a predefined value to an OPC tag.



Tag name – Name of the OPC tag to be created on the OPC server.

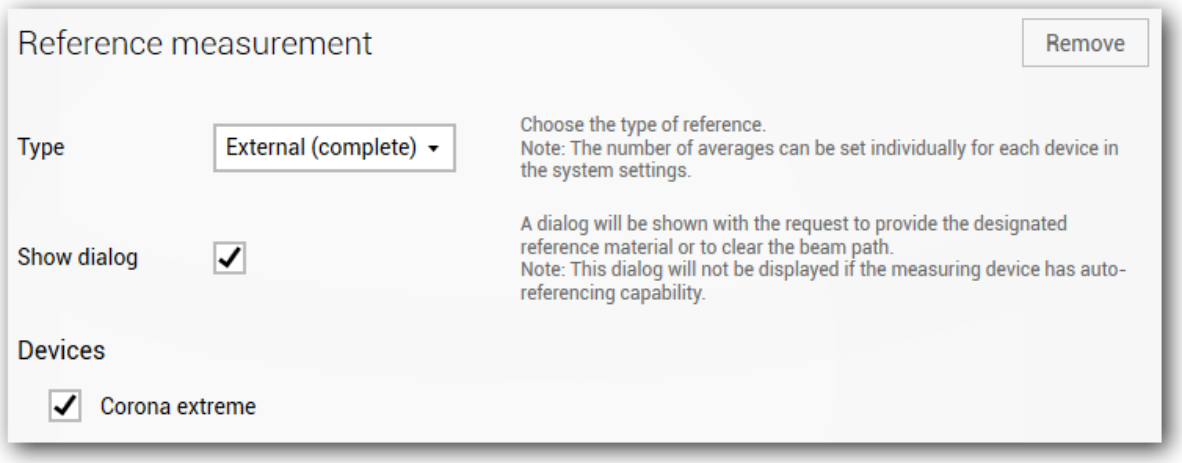
Value – Value the OPC tag is set to.

Pause

This executable step is equivalent to pressing the pause button in the Measurement screen. There are no additional options.

Reference measurement

Executes a reference measurement for the selected devices.



Type – Choose the type of reference.

Note: The number of averages can be set individually for each device in the system settings.

Internal – Performs the necessary internal reference measurements of the device. These internal reference measurements compensate drift and therefore increase the accuracy of the measurement results when the intervals between the external reference measurements are long. *Note:* There is the possibility of the 'Automatic update' (see chapter 4.3).

External (complete) – Performs all necessary reference measurements for the selected devices. Prior to the actual measurement, the integration times are determined by default. *Note:* This type is only available for some devices.

External White – Performs an external White reference measurement of the device. Please make sure that either a white standard is present in front of the measurement head or the beam path is clear for a transmission device while executing this step. Before the actual measurement, a determination of the optimal integration time will be executed.
Note: It is recommended to perform an External Black reference measurement after an External White reference measurement for reflection devices that require this reference type.

External Black - Performs an external Black measurement of the device. Please make sure that a black standard is present in front of the measurement head while executing this step.
Note: External Black reference measurements are not required for transmission devices.

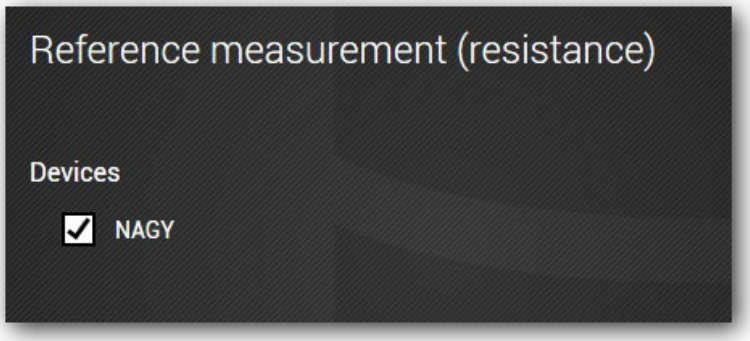
Show dialog – A dialog will be shown with the request to provide the designated reference material.

Devices – Choose for which device the reference measurement will be launched.

Note: The measurements will be performed sequentially.

Reference measurement (resistance)

Performs measurements of a resistance reference with the selected devices.



Devices – Choose for which device the reference measurement will be launched. *Note:* The measurements will be performed sequentially.

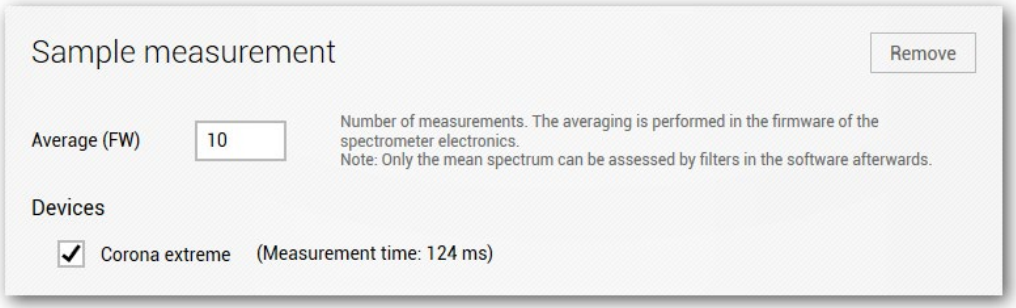
Reset batch cache

Resets the batch cache and triggers the statistic's calculation (if requested in that calculation).

There are no options for this sequence action.

Sample measurement

Executes a sample measurement for selected devices.

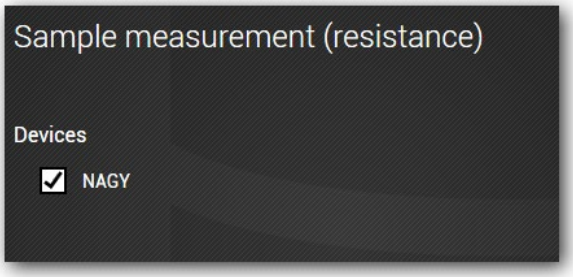


Average (FW) – Number of measurements. The averaging is performed in the firmware of the spectrometer electronics. *Note:* Only the mean spectrum of an averaging period can be assessed by filters.

Devices – Choose for which device the sample measurement will be launched. *Note:* The measurements will be performed simultaneously.

Sample measurement (resistance)

Performs resistance measurements with the selected devices.



Devices – Choose for which device the sample measurement will be launched. *Note:* The measurements will be performed sequentially.

Select view

This executable step allows to switch to a certain view. It is useful to show only the essential information at a given time on the measurement screen.
Example: The results of a batch statistic can be shown on the screen right after the batch cache was resetted.

Status output

There are 10 predefined status channels. The status of one or several channel can be set with this action.

Channel(s) – The channel for which the status wil be changed.

Text – The new status assigned to the channel(s).

Stop

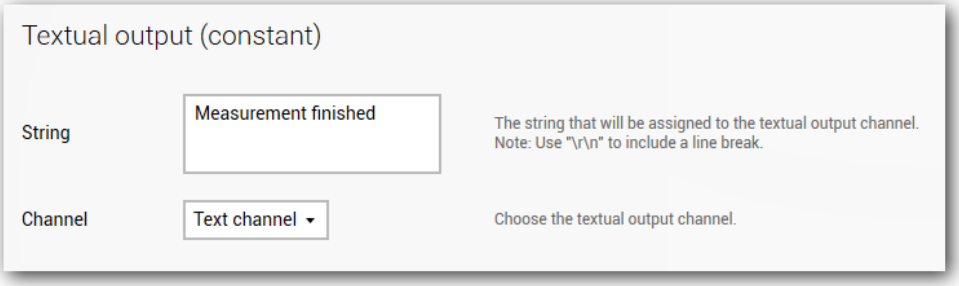
This executable step is equivalent to pressing the stop button in the Measurement screen. There are no additional options.

Textual input

Reads the current value from a textual input channel.

Textual output (constant)

Assigns a predefined string to a textual output channel.



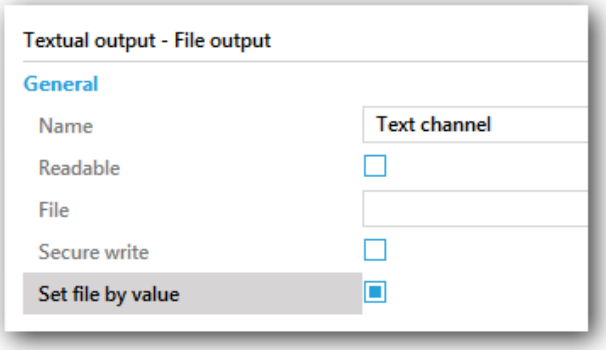
String – The string that will be assigned to the textual output channel. Use "\r\n" to include a line break.

Channel – Choose the textual output channel.

Example:

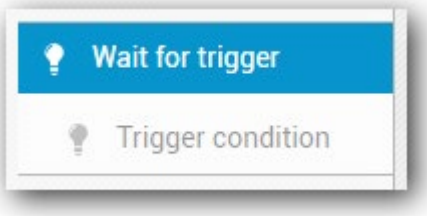
String: C:\\temp\\output_file.txt
next output in file: output_file.txt in folder C:\temp

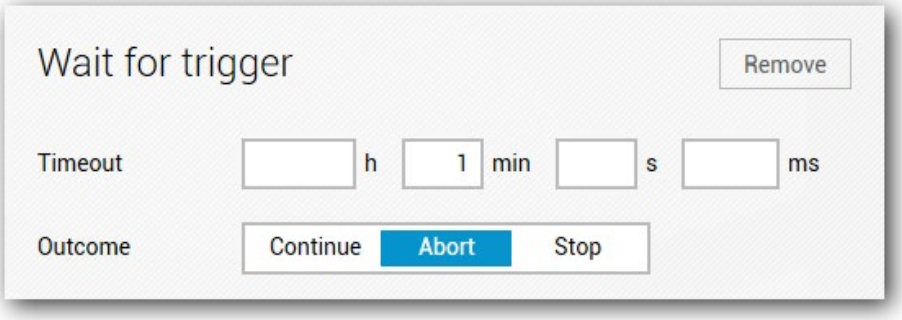
Note: The file name can only be set dynamically, if the option “Set file by value” is activated in the “OMC for InProcess” for this textual output channel.



Wait for Trigger

Delays the following actions until a definite event has occurred.





Timeout – The maximum time waited for the trigger.

Outcome – The consequence of the timeout: Continue with next step of the sequence/Abort the current sequence/Stop execution of the product.

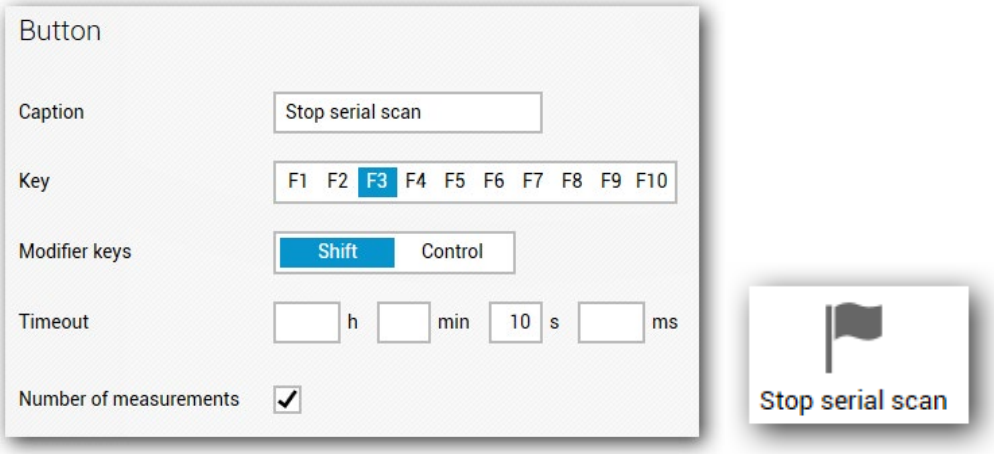
I.e., when the dialog is not confirmed after the defined time there are three possible scenarios:

Continuation with the next step of the current sequence.
Aborting the current sequence and return to the state 'Waiting for trigger'.
Stopping the execution of the product.

11.3 Stop definitions

Button

Stops the measurement when a button with a custom caption is pressed.



Caption – The label the button will be shown with.

Key – The hotkey for the button.

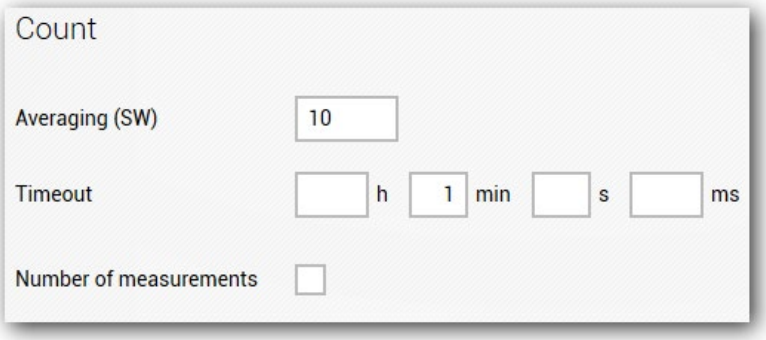
Modifier keys – Modifiers required to hold down when pressing the hotkey.

Timeout – Maximum time to wait for the button to be pressed.

Number of measurements – This result returns the number of measurements that were actually carried out.

Count

Stops the measurement when a defined measurement count is reached.



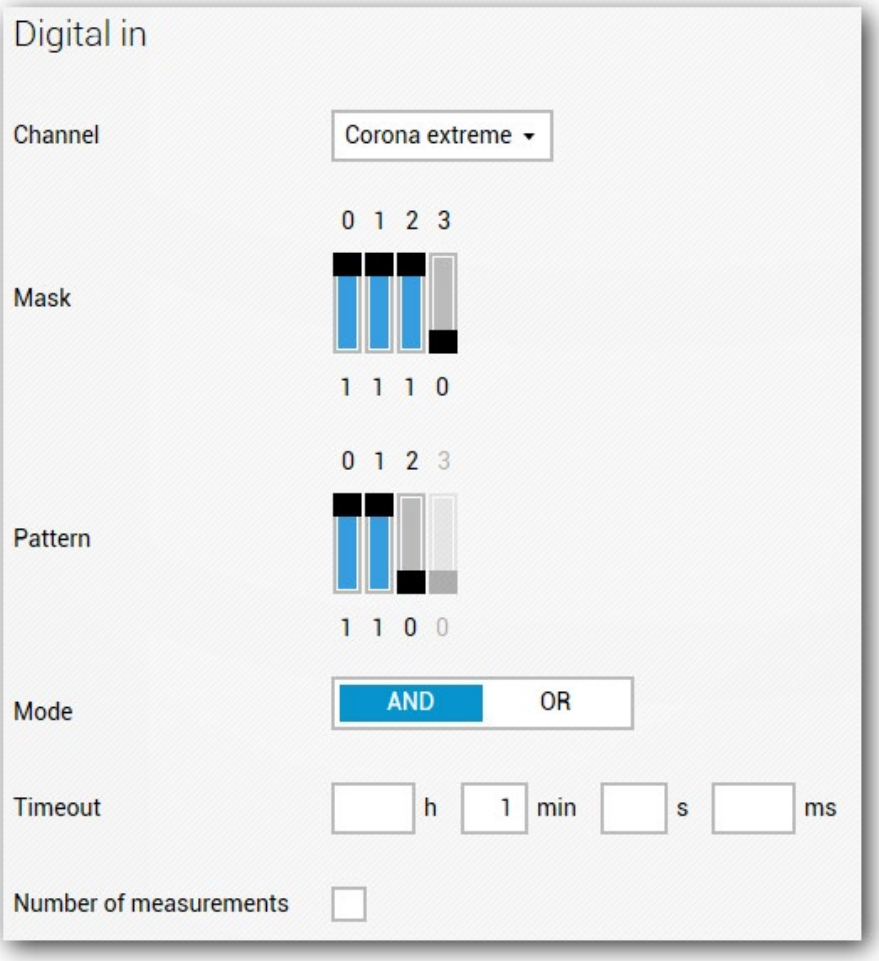
Average (SW) – The number of measurements to perform.

Timeout – Maximum time after which the measurement will be stopped.

Number of measurements – This result returns the number of measurements that were actually carried out.

Digital in

Stops the measurement when a defined state occurs on a digital input channel.



Channel – Choose the digital input channel to use.

Mask – Choose the relevant bits for the comparison.

Pattern – Specify the necessary state (high/low) for each relevant bit.

Mode – Decide whether the pattern must match all relevant bits (AND) or only one bit (OR).

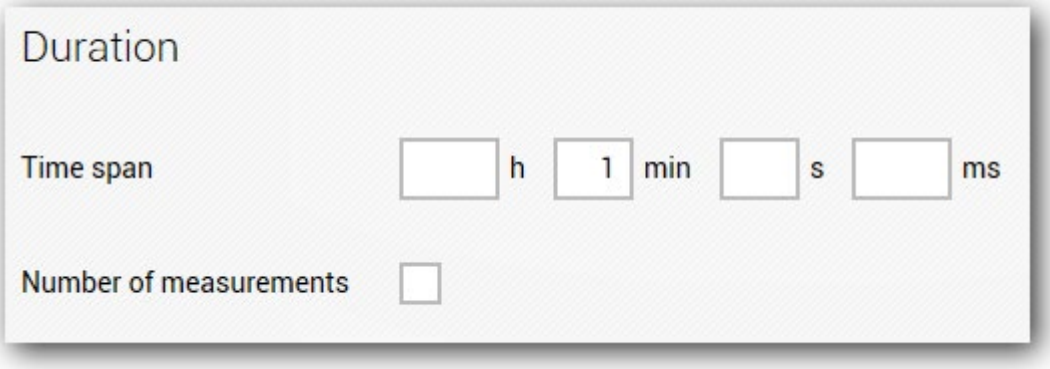
Timeout – Maximum time waited fro the specified pattern.

Number of measurements – This result returns the number of measurements that were actually carried out.

In the example above the statuses of bits 0, 1, and 2 are relevant to stop the measurement, while the status of bit 3 is of no importance. Bit 0 and 1 need to be 'high' and bit 2 needs to be 'low' in order to stop the measurement. The measurement will be stoped at the latest after one minute even if the specified pattern will have ever occurred.

Duration

Stops the measurement when a defined time period has elapsed.

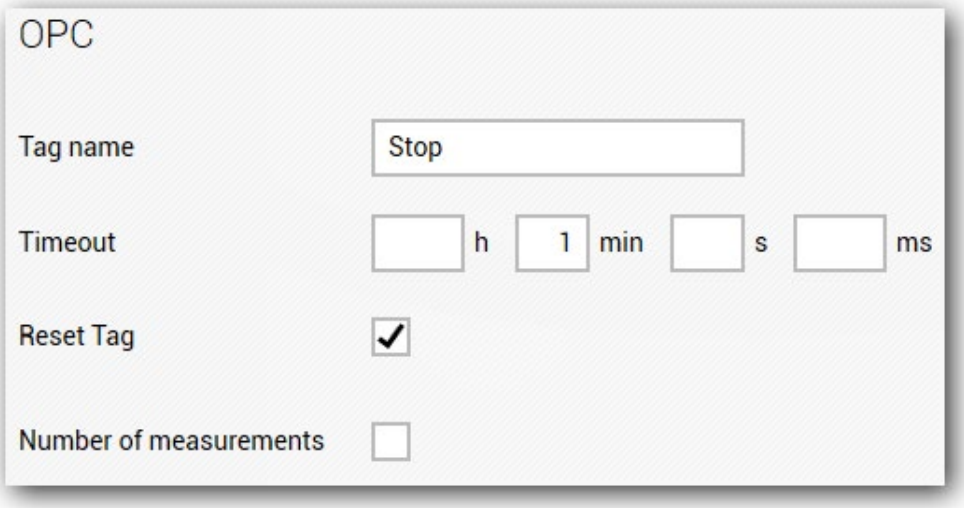


Time span – The time span to execute the action.

Number of measurements – This result returns the number of measurements that were actually carried out.

OPC

Stops the measurement when a defined state occurs on an OPC tag.



Tag name – Name of the OPC tag to be created on the OPC server.

Timeout – Maximum time wairted for the OPC tag to be 'true'.

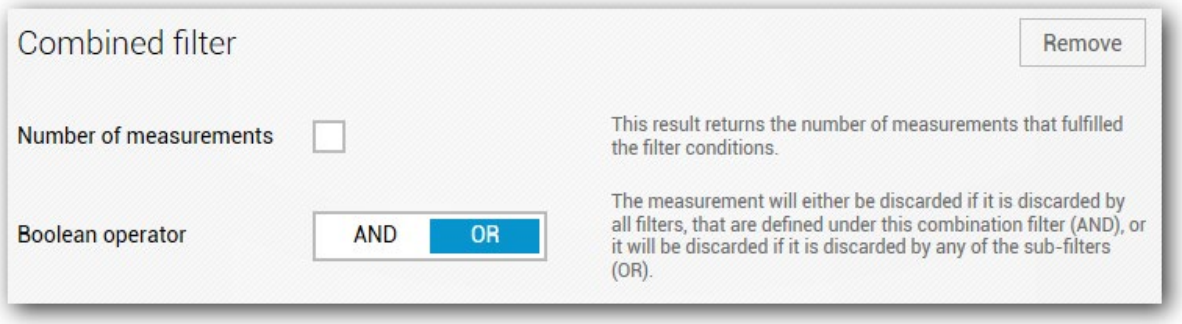
Reset Tag – The OPC tag is set to 'false' after stopping the measurement.

Number of measurements – This result returns the number of measurements that were actually carried out.

11.4 Filter definitions

A spectrum will be discarded if a filter criterion is transgressed. In this case, the spectrum will not be considered for the calculation of the mean spectrum for a series of measurements, when using a Stop definition (see chapter 11.3).

Combined Filter

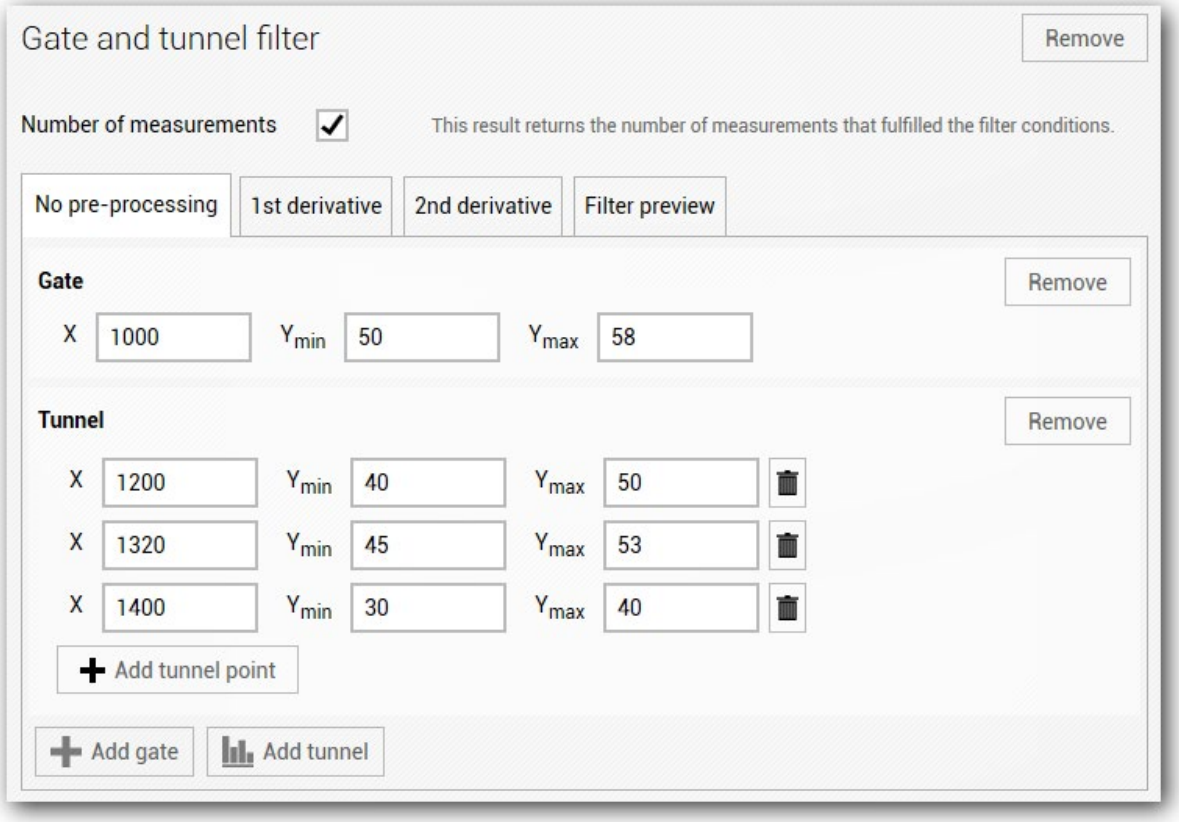


Number of measurements – This result returns the number of measurements that fulfilled the filter conditions.

Boolean operator – The measurement will either be discarded if it is discarded by all filters, that are defined under this combination filter (AND), or it will be discarded if it is discarded by any of the sub-filters (OR).

Gate and tunnel filter

Filtering of measured spectra based on configured maximum and minimum limits.



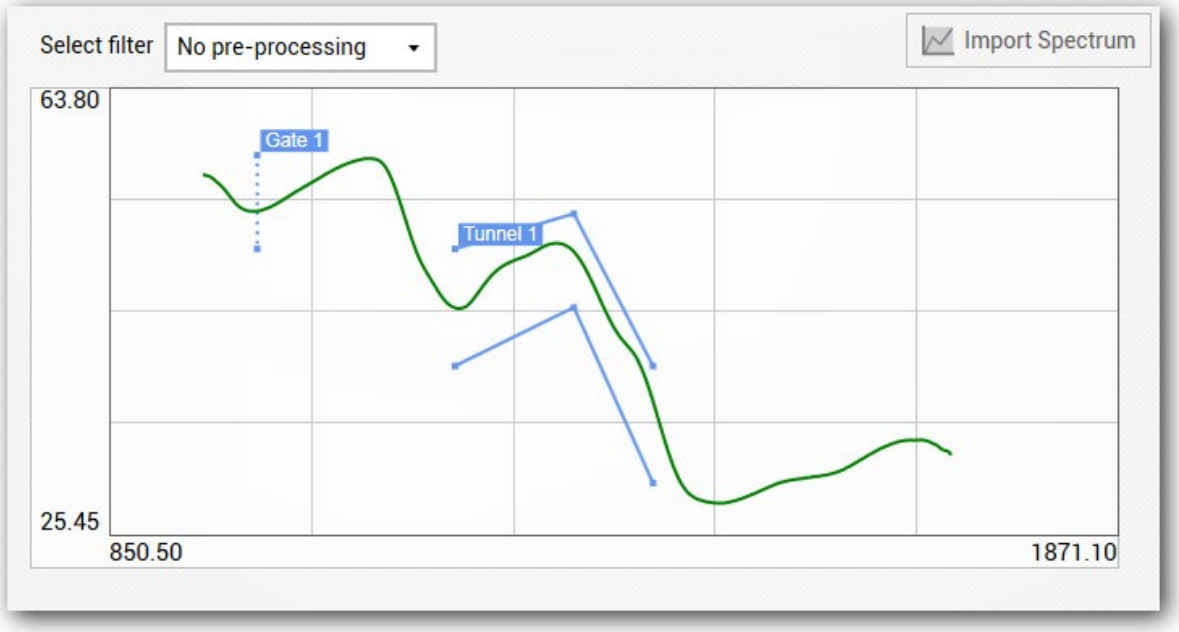
Number of measurements – This result returns the number of measurements that fulfilled the filter conditions.

Filters can be applied to the measured normalized %R / %T spectra (No pre-processing) as well as to the first and second derivatives of the normalized spectra.
Prior to calculating the first or second derivative, the spectrum is interpolated to a data interval of 1 nm. Afterwards, the calculation of the derivative is carried out according to Savitzky-Golay with 9 data points (4 left and 4 right) and a 2nd order polynomial.

Elements of a filter can be Walls and Gates.

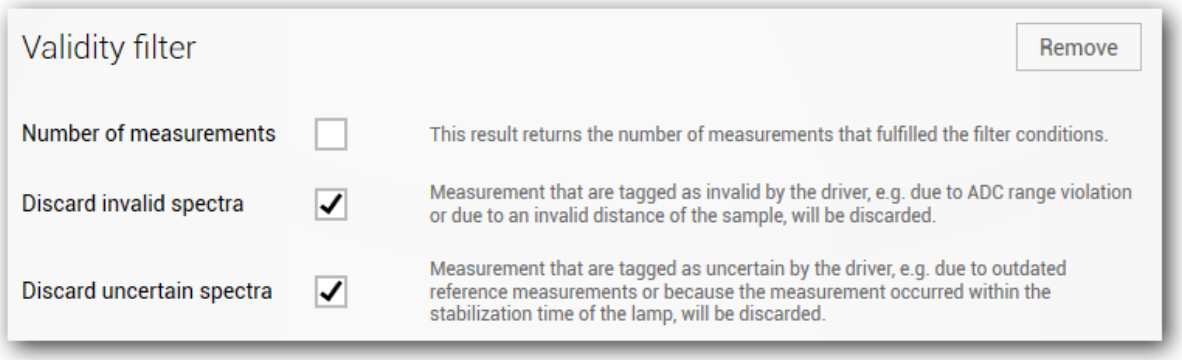
Gate – Defines a maximum (Y_{max}) and minimum (Y_{min}) value for a given wavelength (X). The spectrum is discarded, if a measured spectrum has a value higher than Y_{max} or lower than Y_{min} at X.

Tunnel – Defines a number of tunnel points. All Y_{max}/Y_{min} values that will be linearly connected to form an upper/lower tunnel limit. The spectrum is discarded, if one of the Y values for all X values of the measured spectrum is outside of the bounds set by the upper or lower tunnel limit.



Validity filter

Spectra can be filtered based on their validity.



Number of measurements – This result returns the number of measurements that fulfilled the filter conditions.

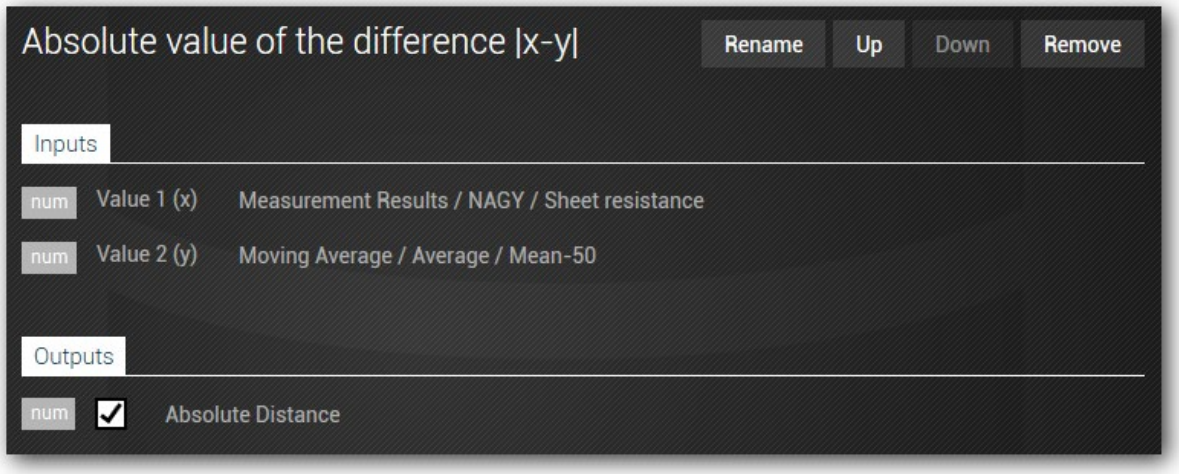
Discard invalid spectra – Measurement that are tagged as invalid by the driver, e.g. due to ADC range violation or due to an invalid distance of the sample, will be discarded.

Discard uncertain spectra – Measurement that are tagged as uncertain by the driver, e.g. due to outdated reference measurements or because the measurement occurred within the stabilization time of the lamp, will be discarded.

11.5 Calculations

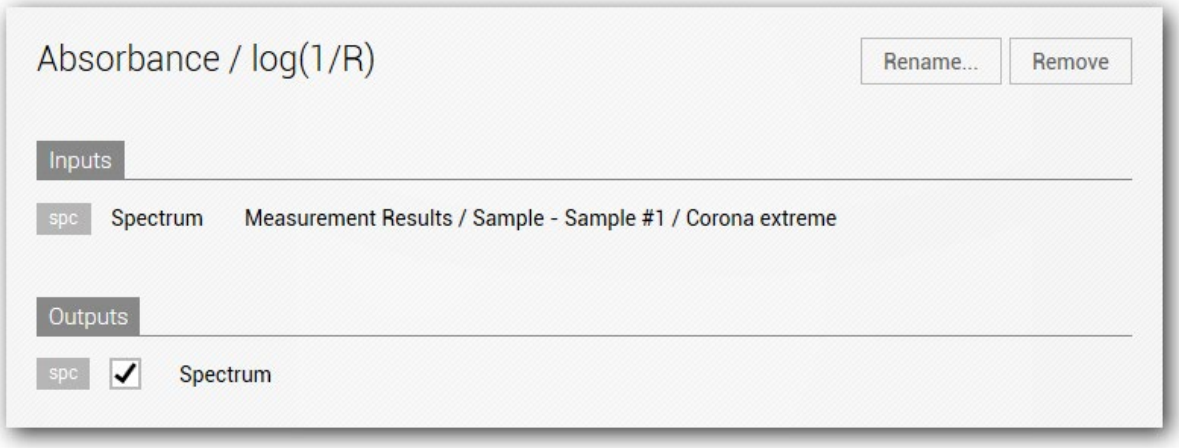
Absolute value of the difference |x-y|

Calculates the absolute difference between two given values.
(Only available with ThinFilm license)



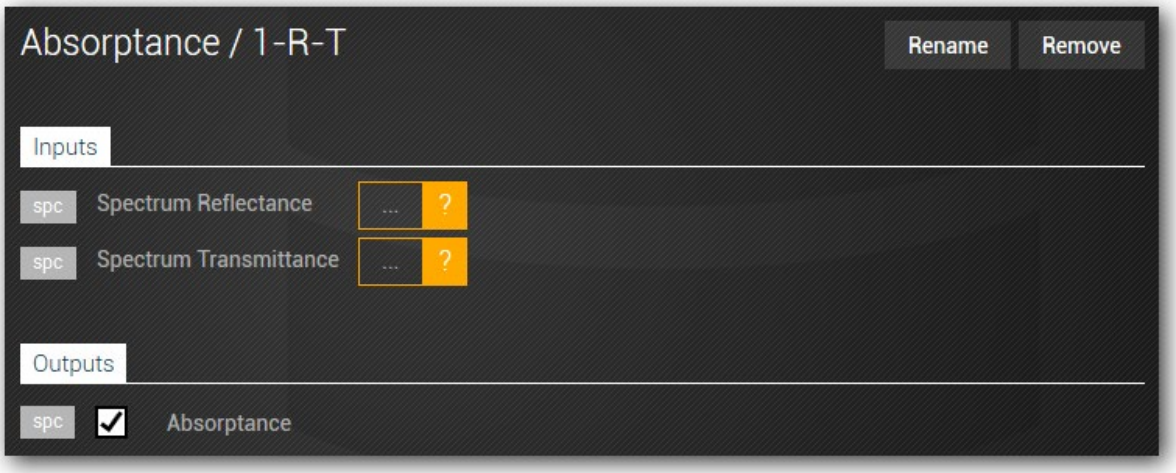
Absorbance / log(1/R)

Transforms a reflection/transmittance spectrum into a log(1/R)/absorbance spectrum. Transmission or reflection values below zero will be replaced by 0.000001% prior to the transformation; therefore, the log(1/R)/absorbance value will be set to 8.



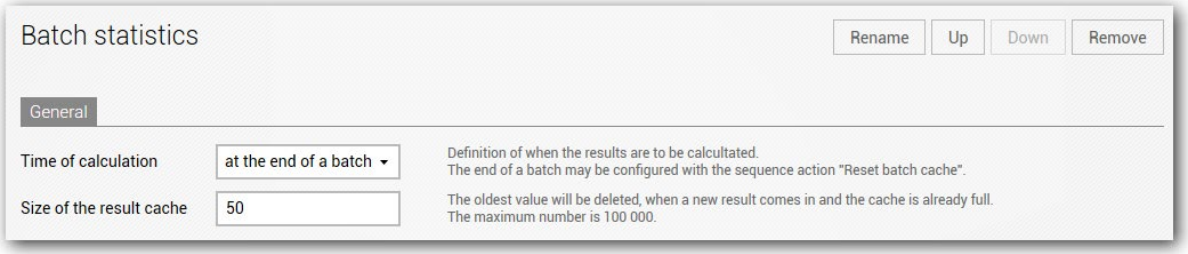
Absorptance / 1-R-T

Calculates a 1-R-T/absorptance spectrum from reflection and transmittance spectrum.
(Only available with ThinFilm license)



Batch statistics

Calculation of statistical key figures on the values of a resettable batch cache.

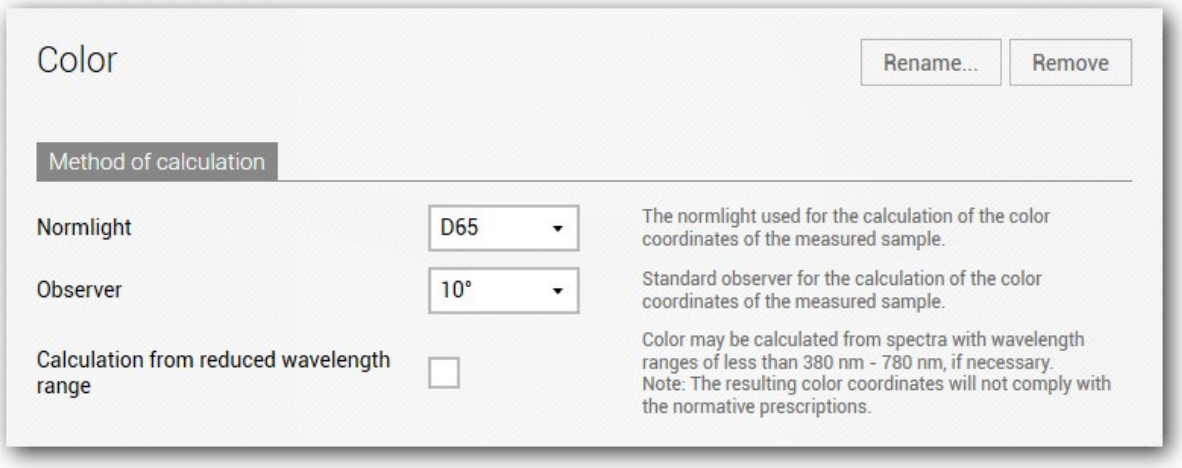


Time of calculation – The calculation of the statistical values will be carried out either at the end of the batch or every time a new result comes in.
Note: The end of a batch can be configured with the sequence action "Reset batch cache".

Size of the result cache – The result cache has a limited size, the maximum being 100,000. The size of the cache can be limited. The oldest value will be deleted when a new result comes in and the cache is already full.

Color

Calculates color values from a spectrum.



Normlight – The normlight used for the calculation of the color coordinates of the measured sample.

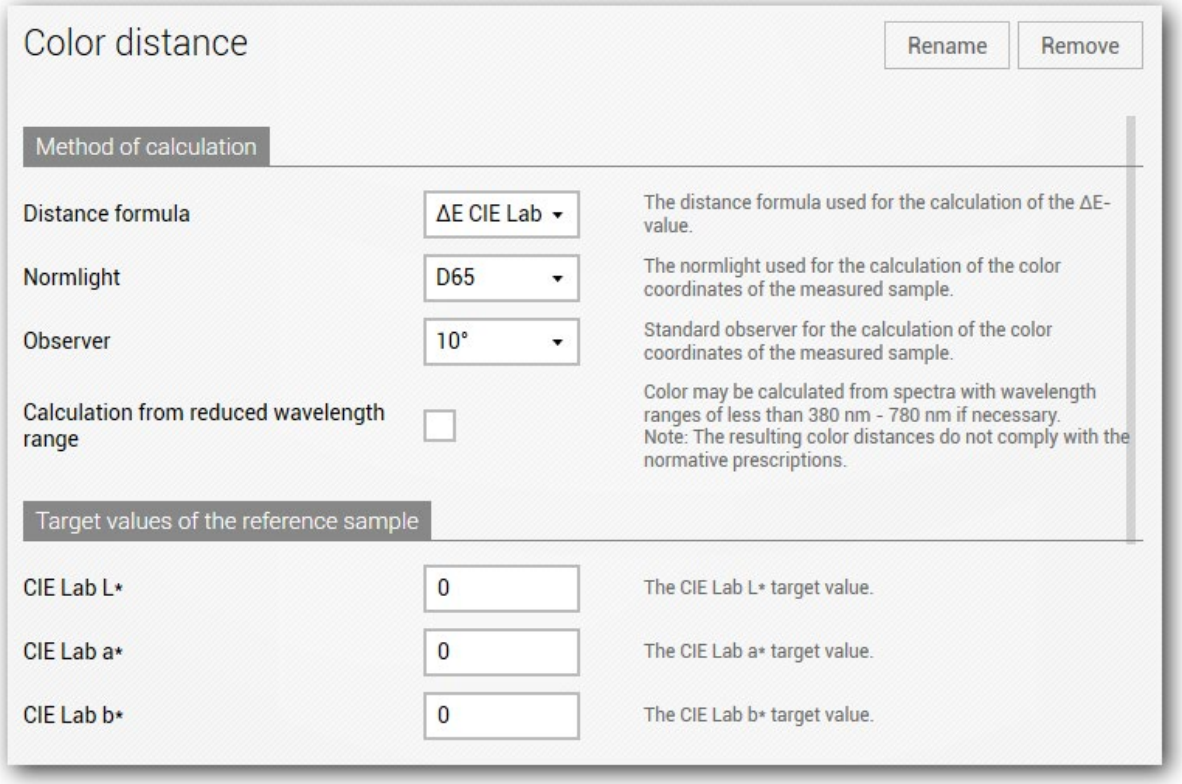
Observer – Standard observer for the calculation of the color coordinates of the measured sample.

Calculation from reduced wavelength range – Color may be calculated from spectra with wavelength ranges of less than 380 nm-780 nm, if necessary. *Note:* The resulting color coordinates will not comply with the normative prescriptions.

Note: For the calculation Hunter Lab values the procedure of ASTM D 2244 – 05 is followed.

Color Distance

Calculates the color distance to the color of a reference sample.



Distance formula – The distance formula used for the calculation of the ΔE-value.

Normlight – The normlight used for the calculation of the color coordinates of the measured sample.

Observer – Standard observer for the calculation of the color coordinates of the measured sample.

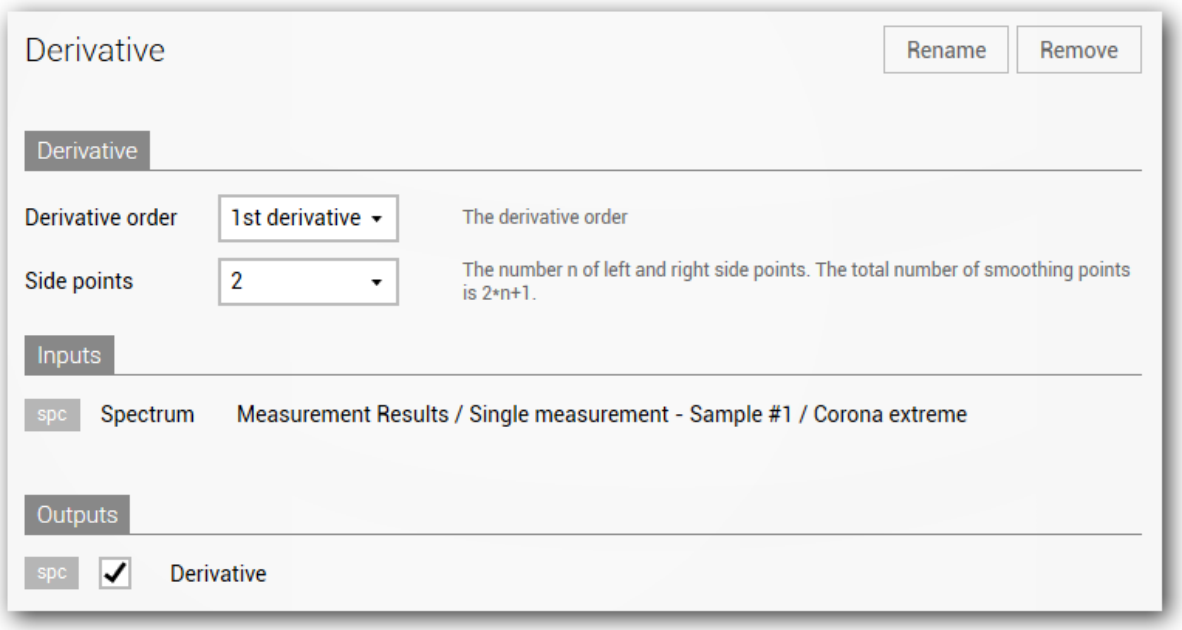
Calculation from reduced wavelength range – Color may be calculated from spectra with wavelength ranges of less than 380 nm-780 nm, if necessary. *Note:* The resulting color coordinates will not comply with the normative prescriptions.

Target values of the reference sample – In this category the reference sample's color values need to be specified. The type of the color coordinates depend on the selected distance formula.

Note: For the calculation of the ΔE CIE 94 value the procedure of CIE 116-1995 and the weighting factors for textiles (k_L = 2, K_1 = 0.048 and K_2 = 0.014) are used.
For the calculation of the ΔE CMC value the procedure of ASTM D 2244 - 05 and the weighting factors l=2 and c=1 are used.
For the calculation Hunter Lab values the procedure of ASTM D 2244 – 05 is followed.

Derivative

Calculates the derivative of a spectrum using the Savitzky-Golay algorithm. The data points of the incoming spectrum must be equidistant.



Derivative order – It is possible to calculate the first up to the fourth derivative.

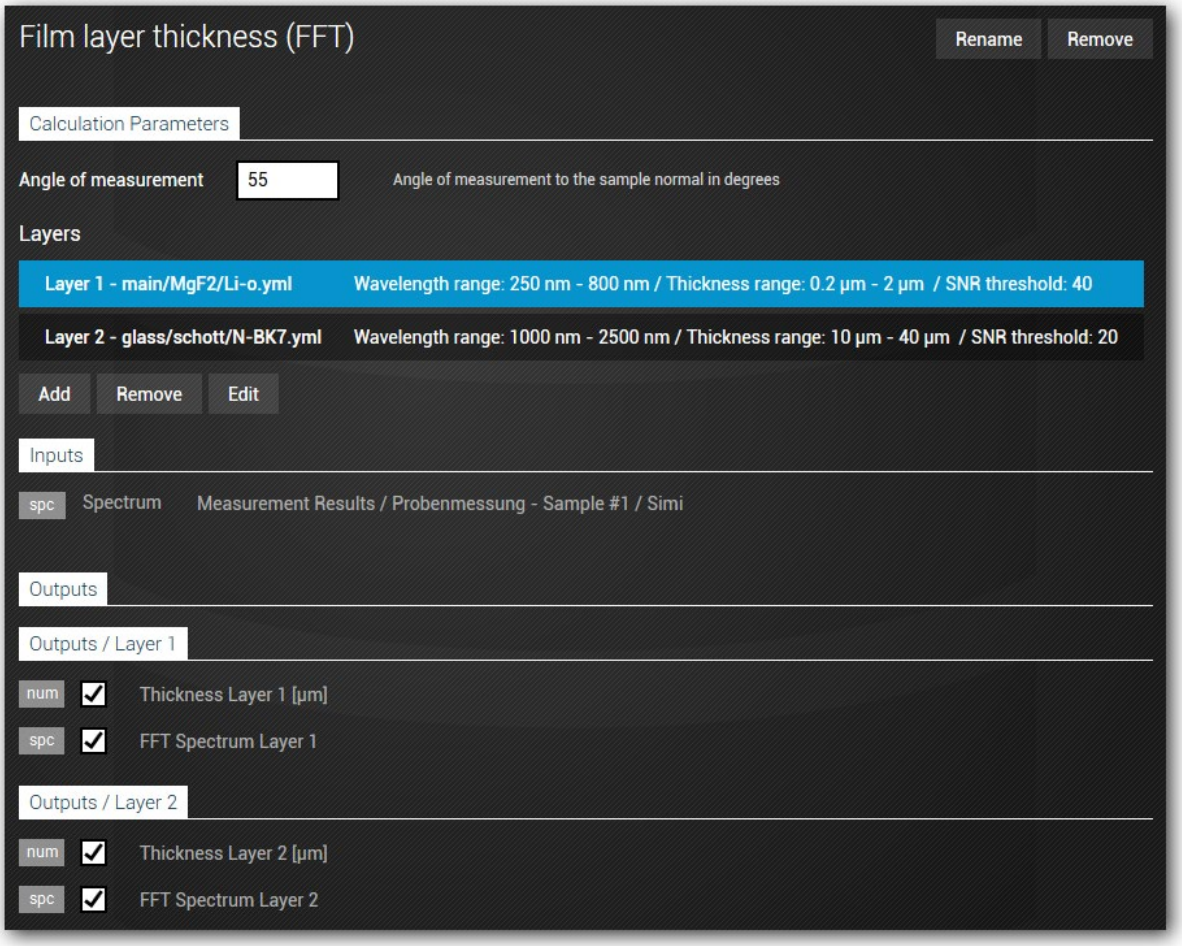
Side points – The number n of left and right side points. The total number of smoothing points is 2*n+1.

Note: In theory the derivative of the first n and the last n points cannot be calculated. In order to provide values nevertheless the algorithm decreases the number of derivative points gradually. The values of the first two and the last two data points will be assigned the value of its neighbor, i.e. the third data point.

Note: The polynomial order for the fist and second derivative is two, the order for the third derivative is three, and the order for the fourth derivative is four.

Film Layer Thickness (FFT)

Calculates film layer thickness with the Fast Fourier Transformation (FFT) algorithm.
(Only available with ThinFilm license)

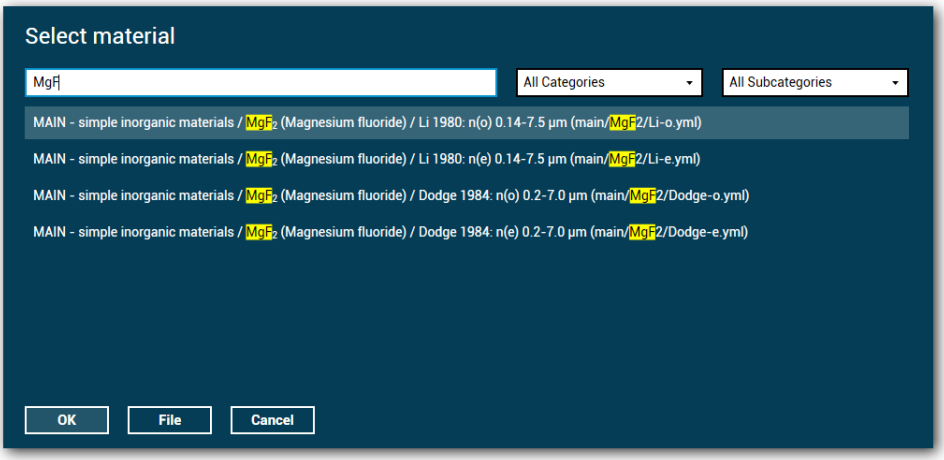


Angle of measurement – The angle to the sample normal that was used for the spectral measurement.

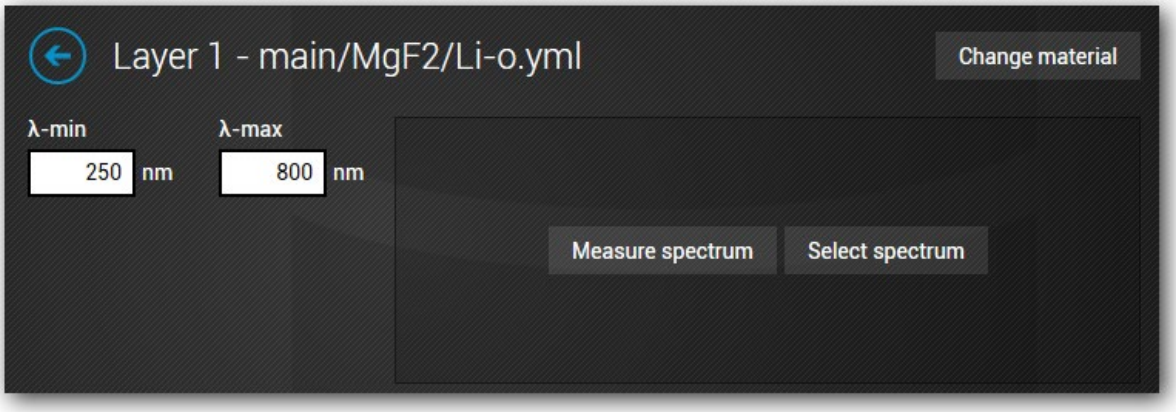
Layers – Manage the layers for which the calculation will be performed. Parameters for the thickness determination must be defined for each layer. These parameters are: the layer's material, the wavelength range with which the calculation will be carried out, the range of the FFT-spectrum, in which the signal of the layer will be searched, and a signal-to-noise threshold, which the signal must exceed in order to be classified valid. For the definition of these parameters double click the desired layer or select "Edit".

Definitions of the parameters for the layer thickness determination.

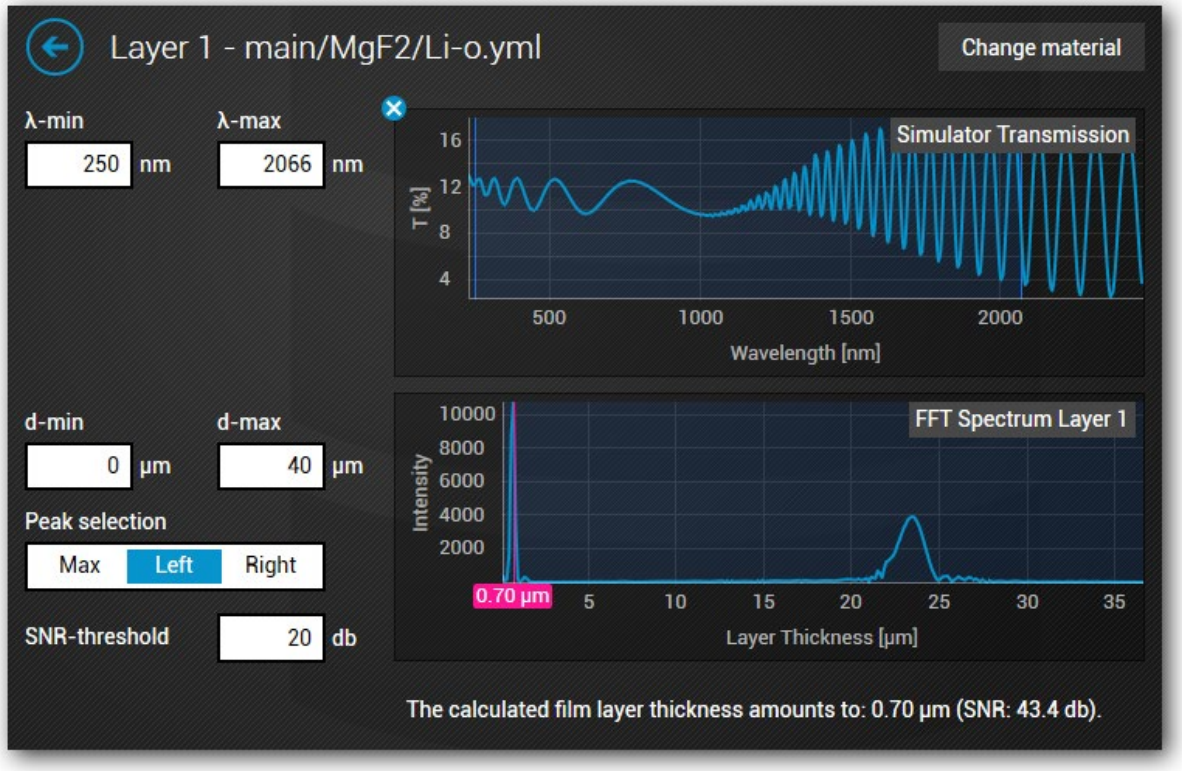
At first, the material of the layer needs to be defined. Load a new material file or choose the suitable entry in the list of materials. You can enter a search text or narrow down the list by selecting categories of materials. The individual entries contain the name of the material and if available reference, manufacturer, wavelength range, or details for birefringent substances. The materials are taken from the "Refractive index database". Comprehensive information can be found there. (http://refractiveindex.info/)



The wavelength range with which the calculation will be carried out, the range of the FFT-spectrum, in which the signal of the layer will be searched, and a signal-to-noise threshold, which the signal must exceed in order to be classified valid, are defined in the following section. It is very helpful to define these parameters with an example spectrum. Therefore, you can measue a spectrum or load a previously measured spectrum here.



You may narrow down the wavelength range in the upper part in order to optimize the calculation for the desired layer. In the given example, the interference structure of a thin MgF_2 layer can be seen in the short wavelength range, while the interference of a much thicker layer can be seen in the long wavelength range. To highlight the signal of the MgF_2 layer the parameters λ-min and λ-max were limited.
Note: λ-min and λ-max can only be given values covered by the material definition dataset.



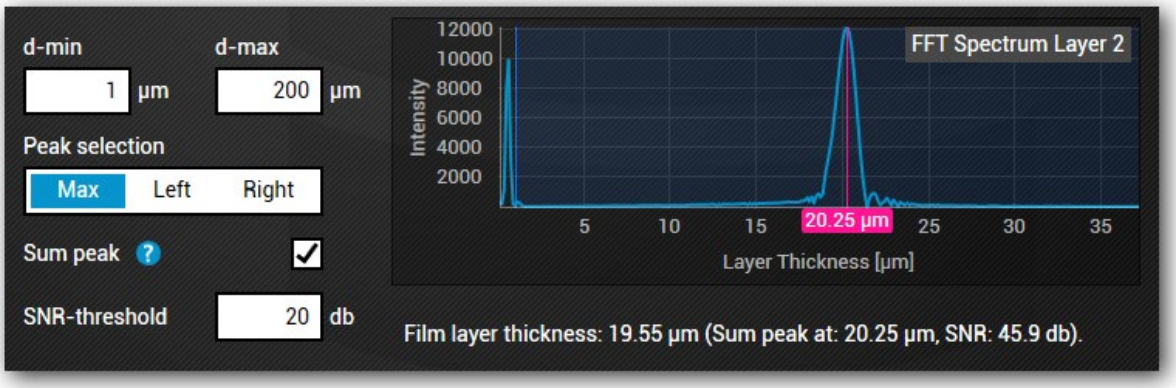
The FFT spectrum is displayed in the lower part. The highest signal will be marked. The layer thickness will be calculated from this signal. You may narrow down the range of the FFT spectrum by selecting values for d-min and d-max in order to obtain the desired result.

A signal-to-noise-ratio is calculated from the intensity of the highest signal within the d-range and the surrounding range. This SNR must be higher than the SNR threshold, otherwise, no result will be calculated when the product is running.

If it is not possible to catch the desired peak for various samples through the selection of λ-min and λ-max as well as d-min and d-max, the option Peak selection should be used. The options Left and Right enables the selection of the peak for the thinnest and for the thickest layer, respectively, in the range between d-min and d-max.

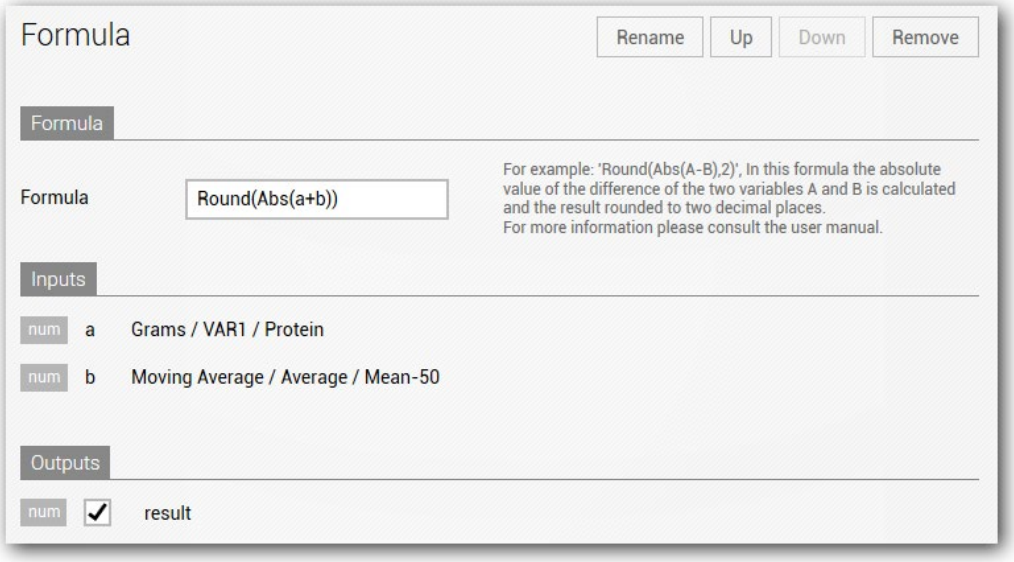
There is an additional option for the analyses of the thicknesses of layer 2 and higher:

Sum peak – Interpret this peak as sum peak. Hence, the thickness of layer n is calculated by subtracting the thicknesses of all preceding layers (1 to n-1) from the sum peak's position. Note: Consider using an effective refractive index of all involved layers in order to obtain the correct sum peak position.



Formula

Customizable calculation by entering a formula.



The formula entered must conform to the algebraic notation with parentheses. The number of inputs will be automatically determined depending on the variables used in the formula. The type of the available output depends on the types that are chosen for these inputs. Available types are spectral and numeric values.

Note: If several spectra are included in a formula, they must match in their wavelength range and sampling point spacing.

In addition to the basic arithmetic operations **+**, **-**, ***** and **/**, the following constants and functions can be used.

Constants:

PI (π = 3,141…), E (Euler's number e = 2,718…), Random (a random number between zero and one; zero is a possible random number, while one is excluded)

Basic functions:

Abs(x), Ceiling(x), Floor(x), Round(x), Max(x,y), Min(x,y)

Exponential functions:

Exp(x), Log(x), Log(x, base), Log10(x), Pow(x,y), Sqrt(x)

Trigonometric functions:

Sin(x), Cos(x), Tan(x), Asin(x), Acos(x), Atan(x), Sinh(x), Cosh(x), Tanh(x)

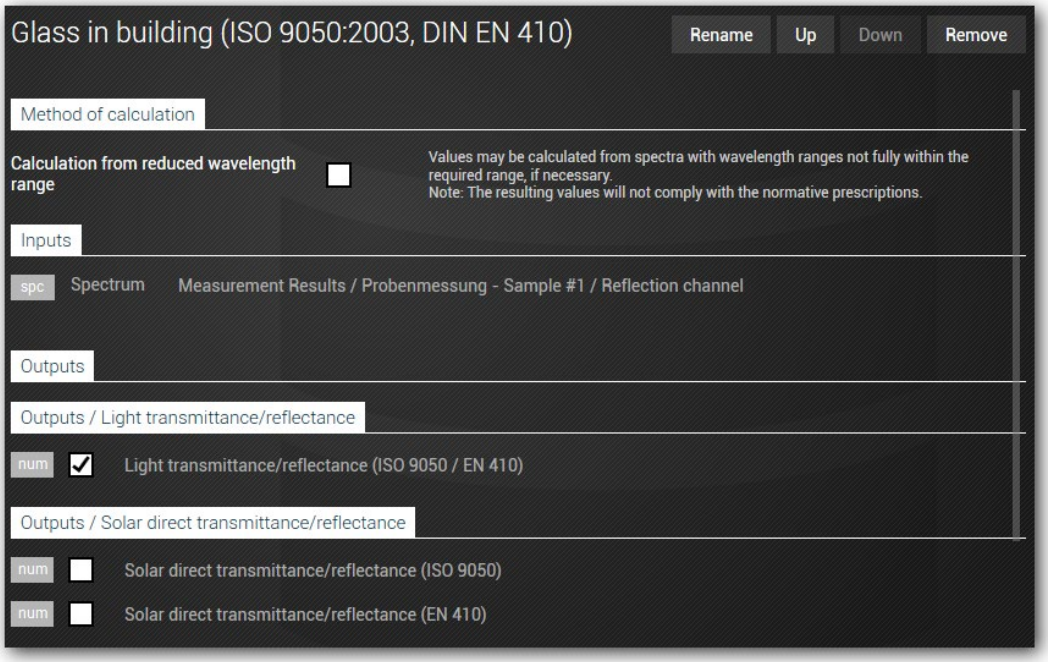
For further information about these functions, please refer to the Microsoft Developer Network (MSDN) documentation of the Math Class at the following link:

http://msdn.microsoft.com/en-us/library/system.math.aspx

Glass in building (ISO 9050:2003, DIN EN 410:2011)

Calculates solar characteristics according to ISO 9050:2003 and DIN EN 410:2011 based on a reflection/transmittance/absorbance spectrum.
(Only available with ThinFilm license)

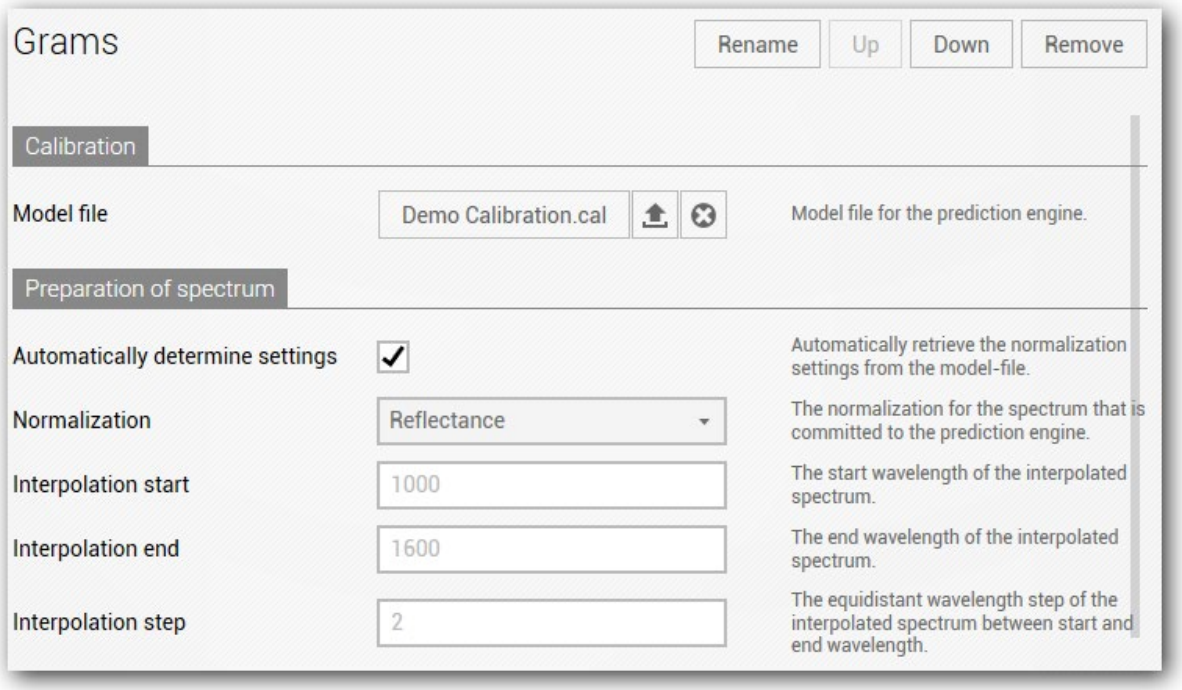
The value will not be calculated if the input spectrum does not contain the full wavelength range required of this value. (see further down how to force the calculation)
Exeption are the calculations of the solar direct transmittance/reflectance according to ISO 950 and EN 410. If the input spectrum contains the wavelength range of 380 – 2150 nm, estimations for the missing ranges are made from the available spectral edges. The errors remain under 1 %, typically even less, because the energy of the sun in these missing ranges is very low compared to the overall energy.



Calculation from reduced wavelength range – Values may be calculated from spectra with wavelength ranges not fully within the required range, if necessary.\r\nNote: The resulting values will not comply with the normative prescriptions.

Grams

Predicts sample properties from a spectrum.
(Only available with Agri license)



Model file – GRAMS-model file (.cal) to be used for prediction.
Note: The model file will be added as local copies to the product definition. The sum of the size of all files must not exceed 100 MB.

Automatically determine settings – Automatically retrieve the normalization settings from the model-file.

Normalization – The normalization for the spectrum that is committed to the prediction engine.

Interpolation start – The start wavelength of the interpolated spectrum.

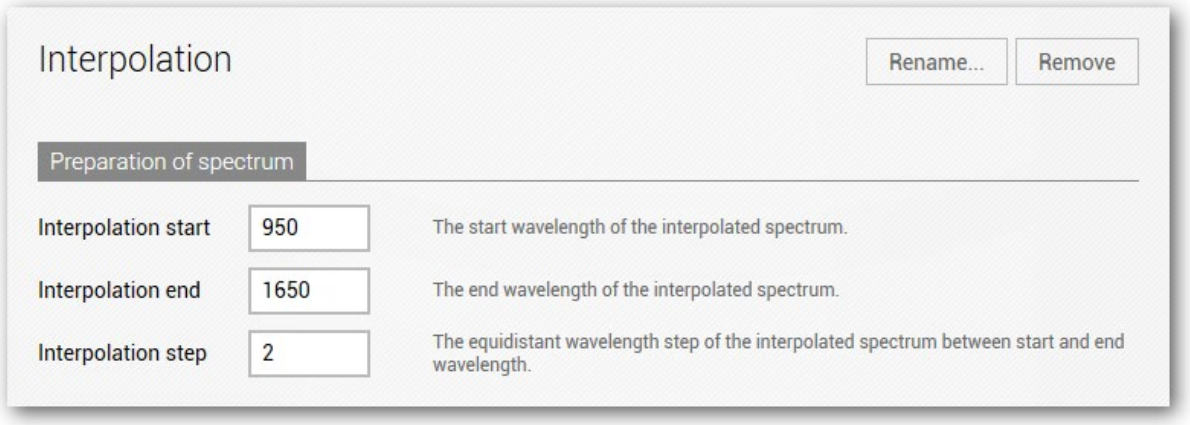
Interpolation end – The end wavelength of the interpolated spectrum.

Interpolation step – The equidistant wavelength step of the interpolated spectrum between start and end wavelength.

Note: The transformation to the necessary ordinate value is performed before the interpolation. The results of your prediction might differ slightly if this order is reversed, i.e. if the interpolation is performed separately prior to the prediction.

Interpolation

Interpolates a given spectrum to defined wavelengths.



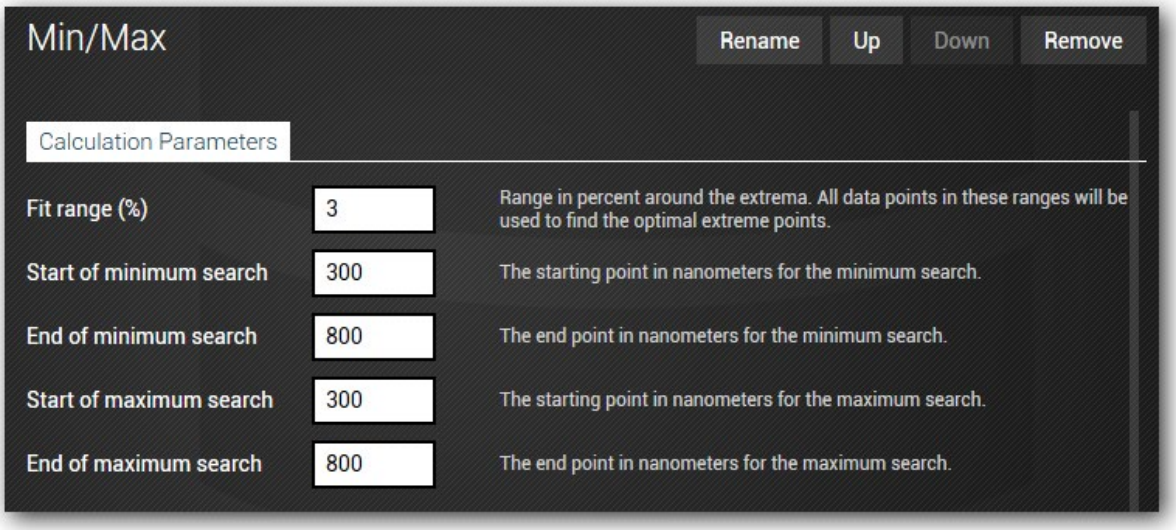
Interpolation start – The start wavelength of the interpolated spectrum.

Interpolation end – The end wavelength of the interpolated spectrum.

Interpolation step – The equidistant wavelength step of the interpolated spectrum between start and end wavelength.

Min/Max

Determines the minimum and the maximum of a spectrum.
(Only available with ThinFilm license)



Fit range (%) – Range in percent around the extrema. All data points in these ranges will be used to find the optimal extreme points.

Start of minimum search – The starting point in nanometers for the minimum search.

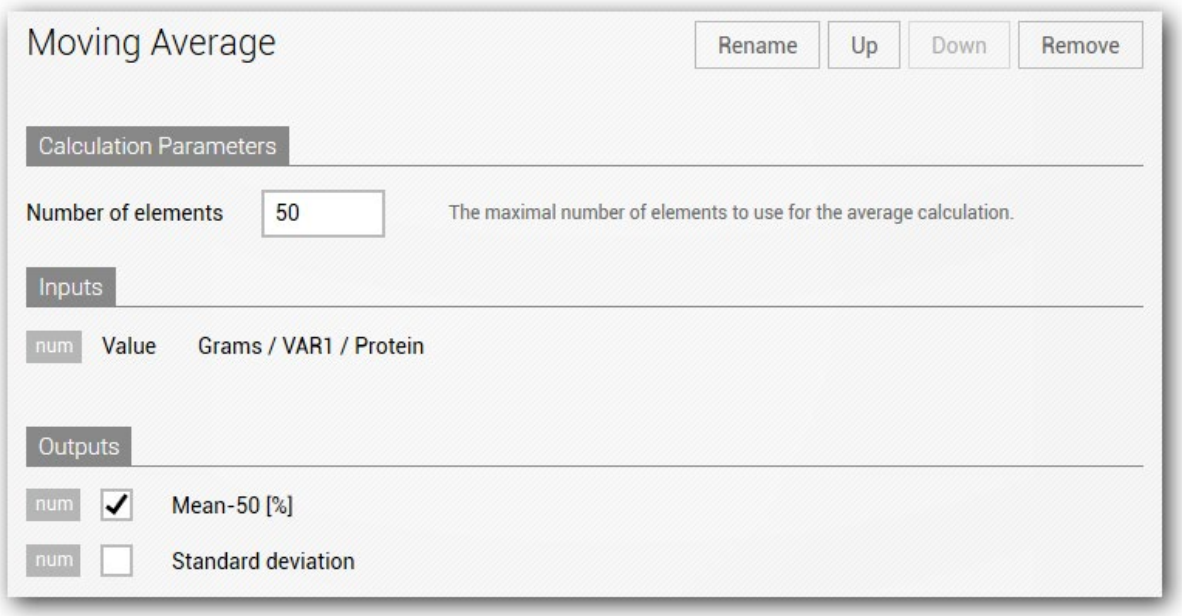
End of minimum search – The end point in nanometers for the minimum search.

Start of maximum search – The starting point in nanometers for the maximum search.

End of maximum search – The end point in nanometers for the maximum search.

Moving Average

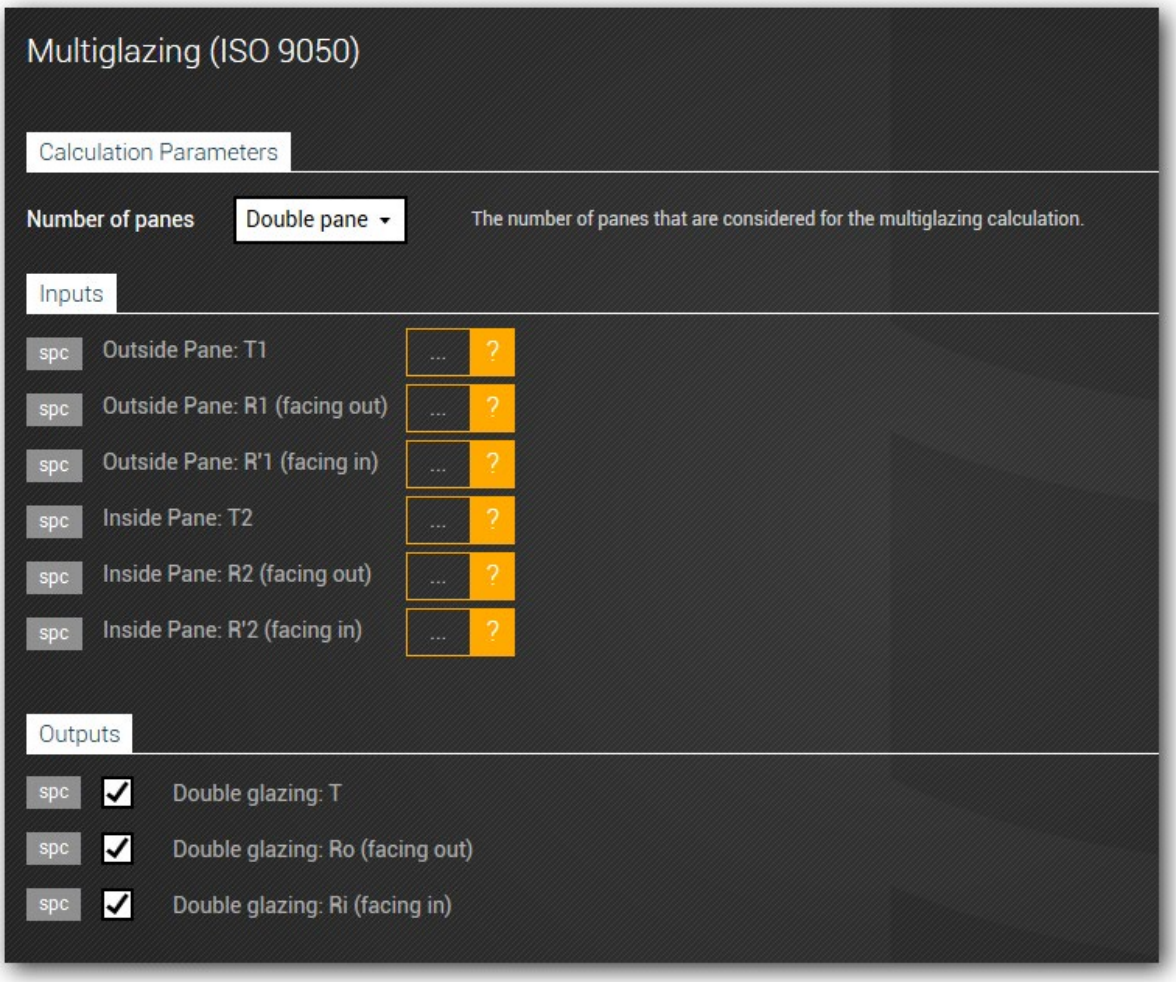
Calculates the moving average as well as the standard deviation for a sequence of scalar values. (Only available with Agri license)



Number of elements – The maximum number of elements to use for the calculation.

Multiglazing (ISO 9050)

Calculates the reflection and transmission spectra that can be expected for a double or triple glazing based on the ISO 9050 norm.
(Only available with ThinFilm license)



Number of panes – Whether to use two or three panes as necessary input values.

Note: The spectral range and the sample points of all incoming spectra must match. The result spectra have the same spectral range and the same interpolation points as the incoming spectra.

Note: The incoming spectra can be provided in %T, T or Absorbance or in %R, R or log(1/R).

OLUC v9.8

Calculates classification criteria from a spectrum.
(Only available with Agri license)
Note for installation: OLUC can be installed in any desired directory (e.g. "C:/Program Files (x86)/OLUP"). However, a restart of the computer is necessary after the installation.

Model file – OLUC-model file (.__D/.__M) to be used for prediction.
Note: The model file will be added as local copies to the product definition. The sum of the size of all files must not exceed 100 MB.

Normalization – The normalization for the spectrum that is committed to the prediction engine.

Interpolation start – The start wavelength of the interpolated spectrum.

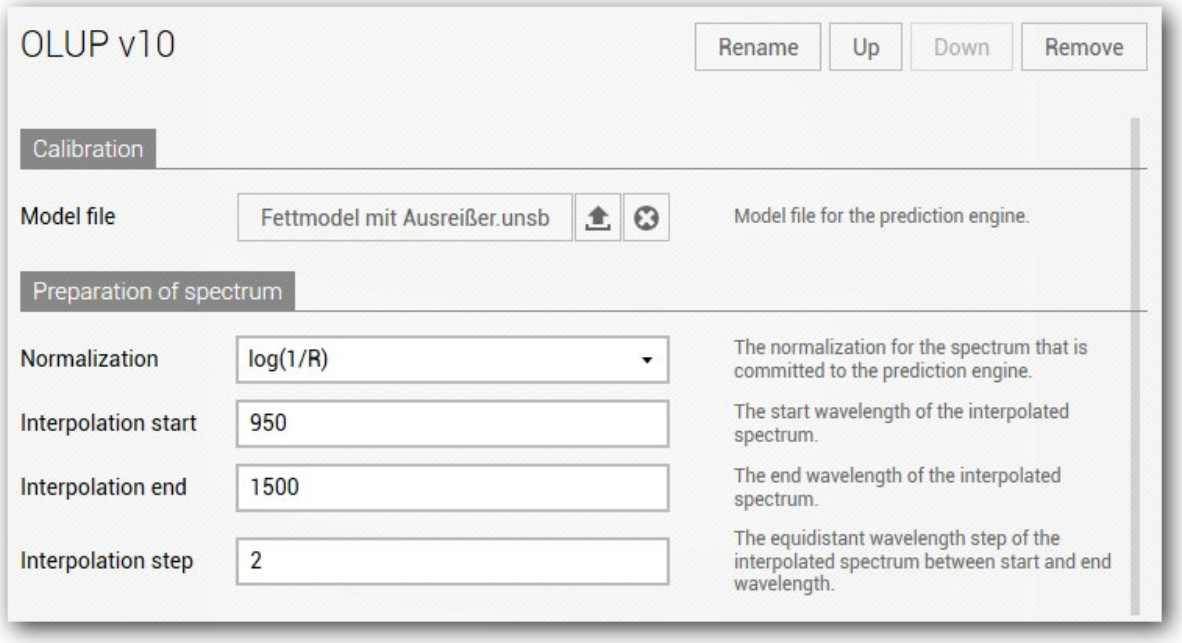
Interpolation end – The end wavelength of the interpolated spectrum.

Interpolation step – The equidistant wavelength step of the interpolated spectrum between start and end wavelength.

Note: The transformation to the desired ordinate value is performed before the interpolation. The results of your prediction might differ slightly if this order is reversed, i.e. if the interpolation is performed separately prior to the prediction.

OLUP v10

Predicts sample properties from a spectrum with the Unscrambler X Prediction Engine.
(Only available with Agri license)
Note for installation: InProcess only supports the 32-bit version of the Unscrambler Engine. It can be installed in any desired directory (e.g. "C:/Program Files (x86)/UnscXPredEngineRedist10.4").
However, a restart of the computer is necessary after the installation.



Model file – Unscrambler X model file (.unsb) to be used for prediction.
Note: The model file will be added as local copies to the product definition. The sum of the size of all files must not exceed 100 MB.

Model – In case a project file is used, defines the model of the project to use.

Password – In case the file is password protected, the password needs to be provided here.

Normalization – The normalization for the spectrum that is committed to the prediction engine.

Interpolation start – The start wavelength of the interpolated spectrum.

Interpolation end – The end wavelength of the interpolated spectrum.

Interpolation step – The equidistant wavelength step of the interpolated spectrum between start and end wavelength.

Note: The transformation to the desired ordinate value is performed before the interpolation. The results of your prediction might differ slightly if this order is reversed, i.e. if the interpolation is performed separately prior to the prediction.

OLUP v9.8

Predicts sample properties from a spectrum.
(Only available with Agri license)
Note for installation: OLUP can be installed in any desired directory (e.g. "C:/Program Files (x86)/OLUP"). However, a restart of the computer is necessary after the installation.

Model file – OLUP-model file (.__D/.__M) to be used for prediction.
Note: The model file will be added as local copies to the product definition. The sum of the size of all files must not exceed 100 MB.

Normalization – The normalization for the spectrum that is committed to the prediction engine.

Interpolation start – The start wavelength of the interpolated spectrum.

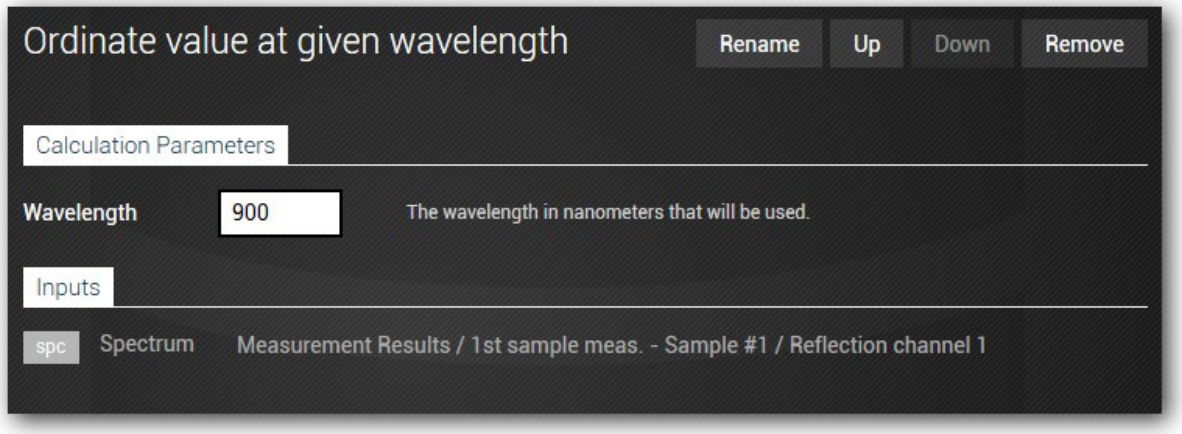
Interpolation end – The end wavelength of the interpolated spectrum.

Interpolation step – The equidistant wavelength step of the interpolated spectrum between start and end wavelength.

Note: The transformation to the desired ordinate value is performed before the interpolation. The results of your prediction might differ slightly if this order is reversed, i.e. if the interpolation is performed separately prior to the prediction.

Ordinate value at given wavelength

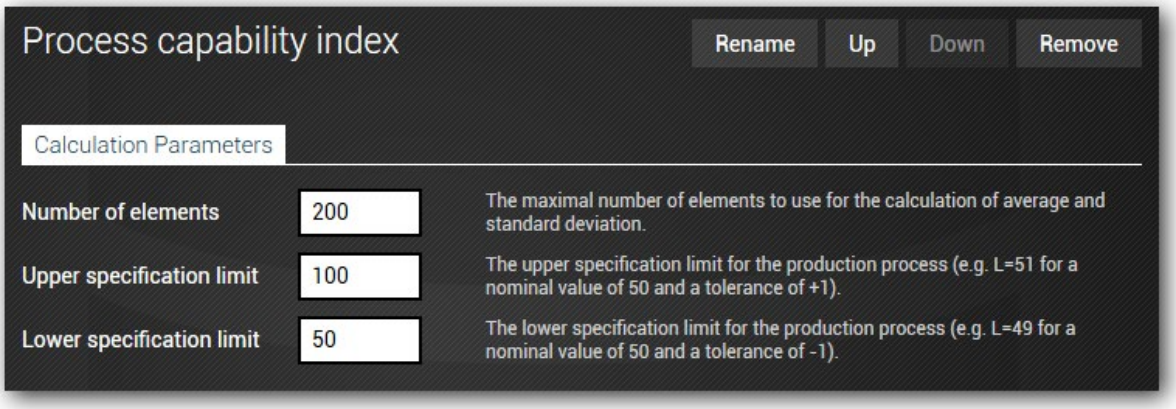
Returns the existing or interpolates the discrete ordinate value for a specific wavelength.
(Only available with ThinFilm license)



Wavelength – The wavelength in nanometers that will be used.

Process Capability Index

Calculates the process capability indizes Cp and Cpk for a selected value.
(Only available with ThinFilm license)



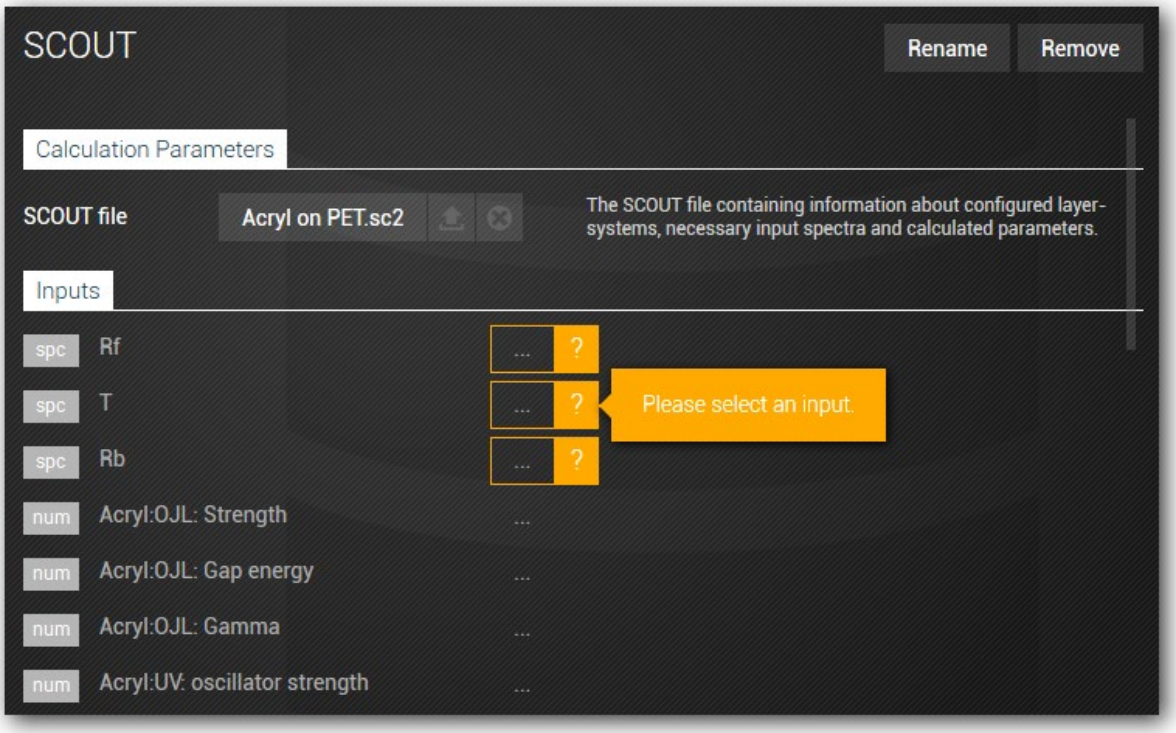
Number of elements – The maximal number of elements to use for the calculation of average and standard deviation.

Upper specification limit – The upper specification limit for the production process (e.g. L=51 for a nominal value of 50 and a tolerance of +1).

Lower specification limit – The lower specification limit of the production process (e.g. L=49 for a nominal value of 50 and a tolerance of -1).

SCOUT

Calculates layer parameters using the SCOUT software.
(Only available with ThinFilm license)
Note for installation: Install the "SCOUT Runtime for ZEISS" available from the Carl Zeiss Spectroscopy GmbH. Only this installer ensures the flawless interaction of InProcess and SCOUT.



SCOUT file – The SCOUT file containing information about configured layer-systems, necessary input spectra and calculated parameters.
Note: The model file will be added as local copies to the product definition. The sum of the size of all files must not exceed 100 MB.

Note: Depending on the selected SCOUT model, some input parameters may be optional. These inputs will not be highlighted with the warning "Please select an input".

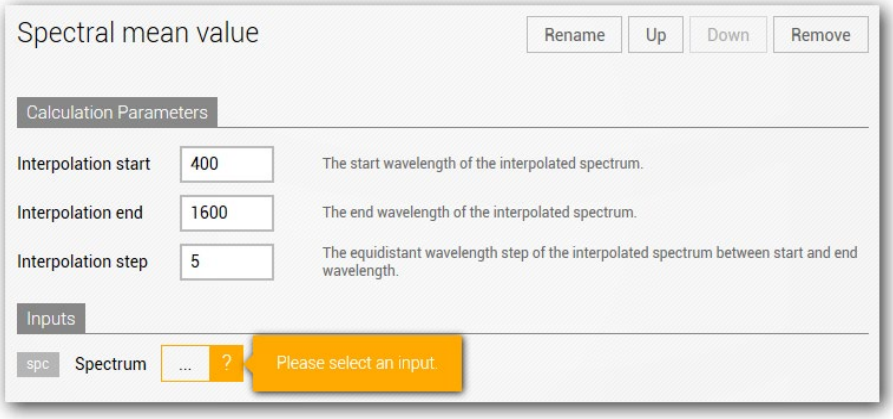
SensoLogic

Predicts sample properties from a spectrum.
(Only available with Agri license)
Note for installation: "SensoLogic Application Development Kit" can be installed in any desired directory (e.g. "C:\Program Files (x86)\SensoLogic\ADK").

Model file – SensoLogic-model file (.cpf) to be used for prediction.
Note: The model file will be added as local copies to the product definition. The sum of the size of all files must not exceed 100 MB.

Spectral mean value

Calculation of the mean value of the spectral values in a given wavelength range.



Prior to the calculation of the mean value, the spectrum is interpolated to equidistant wavelength steps. Furthermore, the spectrum is clipped to the desired wavelength range.

Interpolation start – The start wavelength of the interpolated spectrum.

Interpolation end – The end wavelength of the interpolated spectrum.

Interpolation step – The equidistant wavelength step of the interpolated spectrum between start and end wavelength.

Text formatting

Generates a string from inputs via a user-defined formatting pattern.

The number of necessary inputs is automatically determined from the variables, which are specified in parentheses. Possible input types are text and numeric values.

The function can be used, for example, to combine several identification features and use them in the transfer for naming exported measurement result files.

Example 1:

Plot:	Barley 47b13
Subplot:	1 to n
Formatting string:	{Plot}_{Subplot:D2}
Result:	Barley 47b13_01
Export setting:	<ID> <TimeStamp> <ResultName>
File name:	Barley 47b13_01 2021-05-05 16-12-01.542 Corona extreme.spc

Example 2:

Pane ID 478	
Repetition	1 to n
Formatting string:	{Pane ID}\{Repetition:D4} {Pane ID}
Result:	478\0001 478
Export setting:	<ID> <TimeStamp> front side
File name:	0001 478 2021-05-05 16-12-01.254 front side.csv
in folder:	478

UCal

Predicts sample properties from a spectrum.
(Only available with Agri license)
Note for installation: Install the "UCal Runtime for ZEISS" available from the Carl Zeiss Spectroscopy GmbH. Only this installer ensures the flawless interaction of InProcess and UCal.

Model file – UCal-model file (.prd) to be used for prediction.
Note: The model file will be added as local copies to the product definition. The sum of the size of all files must not exceed 100 MB.

Normalization – The normalization for the spectrum that is committed to the prediction engine.

Interpolation start – The start wavelength of the interpolated spectrum.

Interpolation end – The end wavelength of the interpolated spectrum.

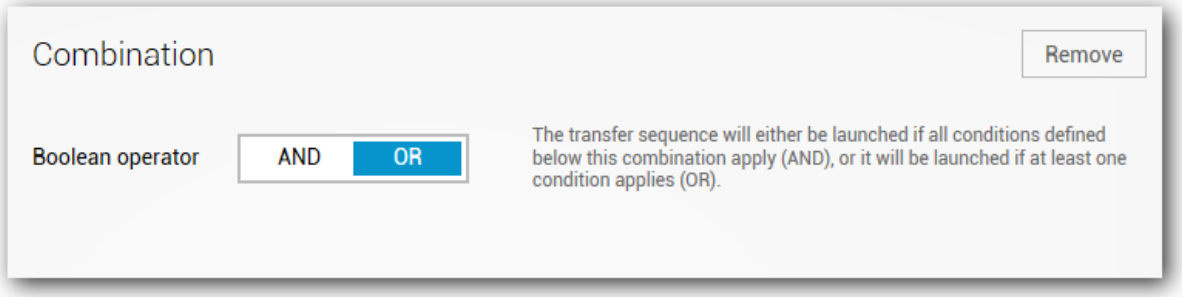
Interpolation step – The equidistant wavelength step of the interpolated spectrum between start and end wavelength.

Note: The transformation to the desired ordinate value is performed before the interpolation. The results of your prediction might differ slightly if this order is reversed, i.e. if the interpolation is performed separately prior to the prediction.

11.6 Transfer sequence trigger conditions

Combination

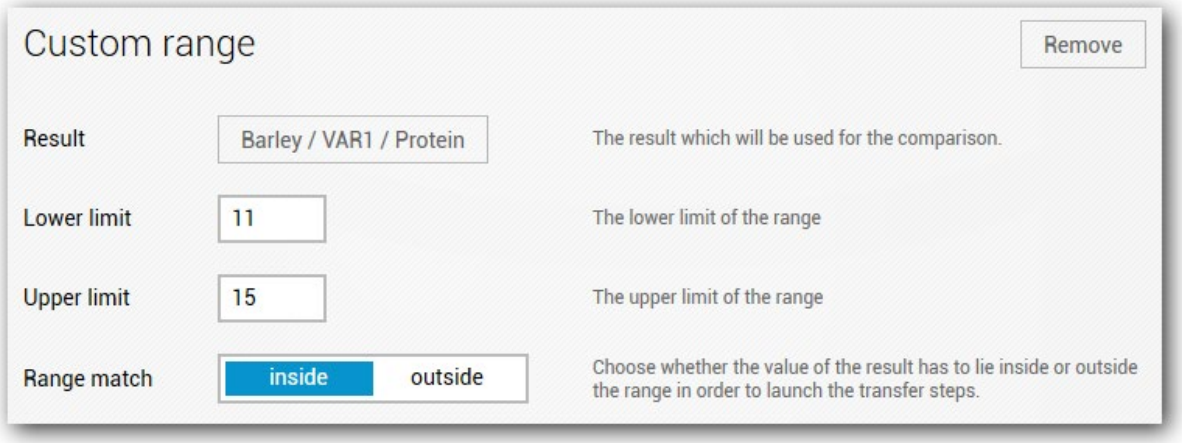
Combines multiple triggers with a Boolean operator.



Boolean operator – The transfer sequence will either be launched if all conditions defined below this combination apply (AND), or it will be launched if at least one condition applies (OR).

Custom range

The transfer sequence will be launched when a result lies within or outside a pre-defined value range.



Result – The result which will be used for the comparison.

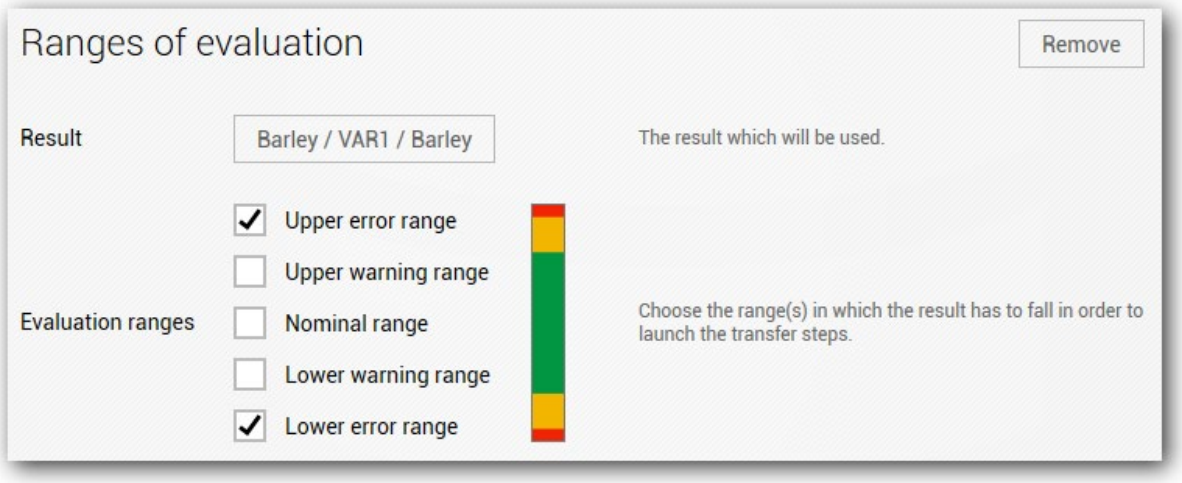
Lower limit – The lower limit of the range.

Upper limit – The upper limit of the range.

Range match – Choose whether the value of the result has to lie inside or outside the range in order to launch the transfer sequence.

Ranges of evaluation

The transfer sequence will be launched when a result lies within a certain evaluation range (e.g. in the range above the upper control limit)



Result – The result which will be used.

Evaluation ranges – Choose the range(s) in which the result has to fall in order to launch the transfer sequence.

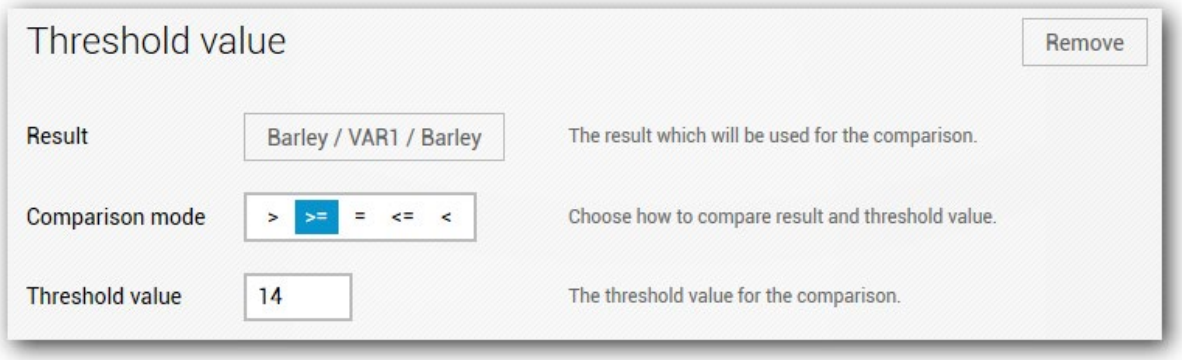
Result available

The transfer sequence will be launched as soon as a result is available.

Result – The result which will be used.

Threshold value

The transfer sequence will be launched when a result lies above or below a pre-defined threshold value.



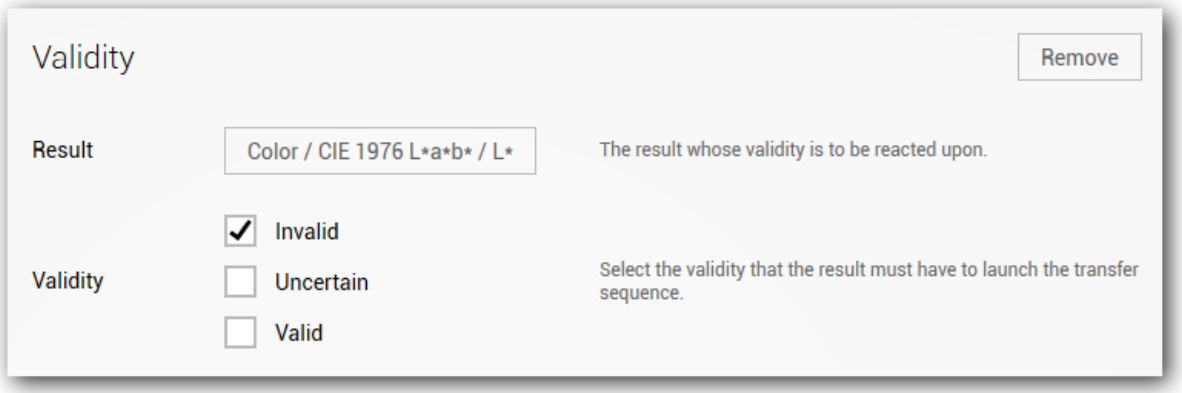
Result – The result which will be used for the comparison.

Comparison mode – Choose whether the value of the result has to lie above or below the threshold in order to launch the transfer sequence.

Threshold value – The threshold value for the comparison.

Validity

The transfer sequence will be launched when a result has a specified validity.



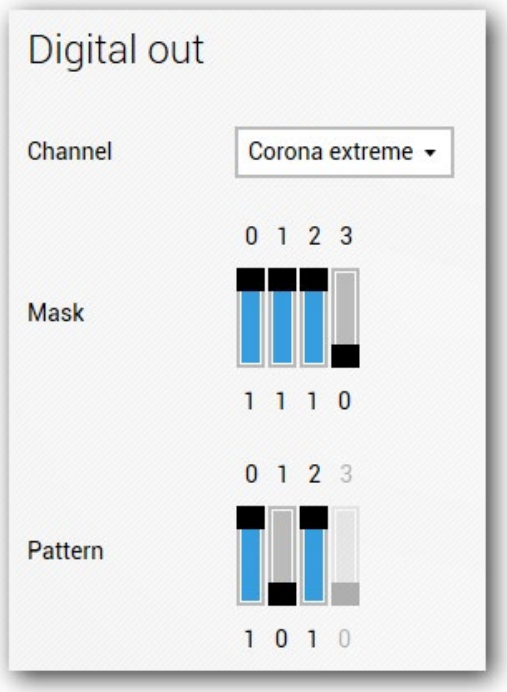
Result – The result whose validity is to be reacted upon.

Validity – Select the validity that the result must have to launch the transfer sequence. (Multiple selection possible)

11.7 Transfer sequence actions

Digital Out

Assigns a predefined state to a digital output channel.



Channel – Choose digital output channel to use.

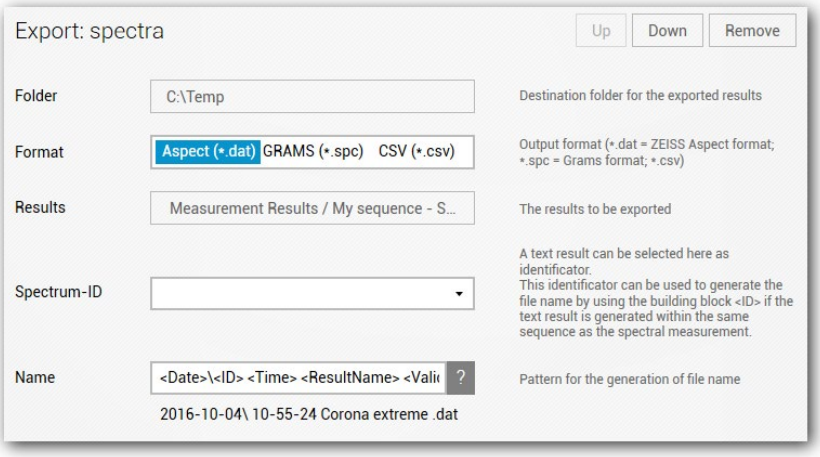
Mask – Choose the relevant bits for which the state can be changed.

Pattern – Specify the desired state (high/low) for each relevant bit.

In the example above the status of the bits 0, 1 and 2 will be assigned anew, while the status of bit 3 will remain unchanged. 'High' will be assigned to bits 0 and 2, 'while low' will be assigned to bit 1.

Export: spectra

Exports spectra as dat, spc, or csv file.



Folder – Choose a folder for the exported file. The folder will be created if necessary.
Note: When configuring products of a network service or an embedded controller the storage folder of the remote computer must be entered here. Storage does not take place at the computer that is used for the product configuration. In the case of working with the local service, an Explorer window will open and the local folder can be selected.

Format – Choose a file format. There are three formats available:

*.dat – ZEISS Aspect format
*.spc – Grams format
*.csv – Text file with semicolon as column separator

Results – Choose the result which will be exported. For each result a separate file will be created.

Spectrum-ID – A text result of an 'Input dialog' can be chosen here. The text can be used to generate the file name, if the building block <ID> is used to generate the file name.
Note: This field is only available, if text results are available.

Name – Choose a name for the file.
For the generation of the filename the following predefined placeholders can be used:

<ID> - The value of the text result selected under 'Spectrum-ID'.

<ResultName> - The name of the result.

<ValidityInfo> - 'invalid' or 'uncertain' will be added to the file name, if applicable.

<TimeStamp> - The timestamp of the sequence including date, time and milliseconds.

<Date> - The date of the sequence including year, month and day.

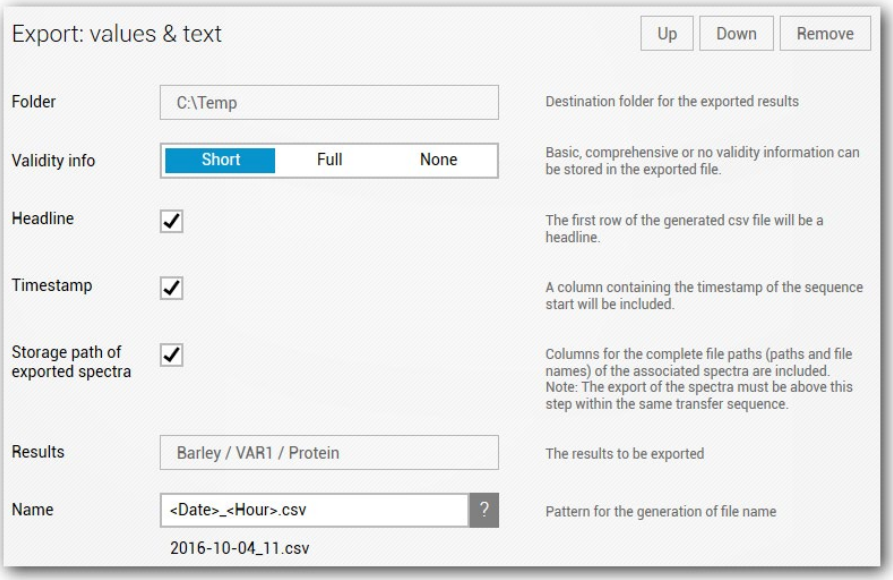
<Time> - The time of the sequence including hours, minutes and seconds.

<Year>, <Month>, <Day>, <Hour>, <Minute>, <Second>, <Millisecond> - Parts of the sequence's timestamp.

Note: When a '\' (backslash) is used, the preceding characters will be interpreted as directory names. This directory will be created if necessary. This can be used to create daily or hourly folders.

Export: values & text

Exports numeric or text results to a csv file.
Note: The format options of the exported file can be defined in the System settings (see chapter 4.1).



Folder – Choose a folder for the exported file. The folder will be created if necessary.
Note: When configuring products of a network service or an embedded controller the storage folder of the remote computer must be entered here. Storage does not take place at the computer that is used for the product configuration. In the case of working with the local service, an Explorer window will open and the local folder can be selected.

Validity info – Information about the validity of the result will be included for each result.

Headline – The first row of the generated csv file contains the names of the results.

Timestamp – The timestamp of the sequence is included.

Spectra paths – Column containing the complete path, i.e. path and file name, of the associated exported spectra are included.

Results – Choose the result to be exported. For each result a column within the csv file will be used.

Name – Choose a name for the csv file.
For the generation of the filename the following predefined placeholders can be used:

<ResultNames> - The names of the results.

<TimeStamp> - The timestamp of the sequence including date, time and milliseconds.

<Date> - The date of the sequence including year, month and day.

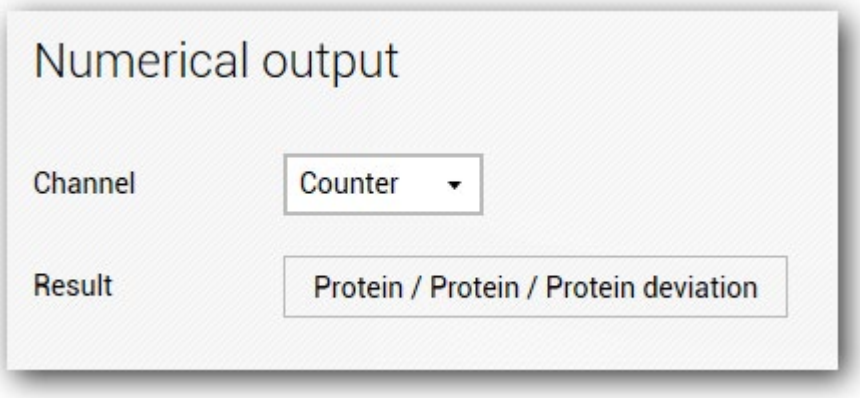
<Time> - The time of the sequence including hours, minutes and seconds.

<Year>, <Month>, <Day>, <Hour>, <Minute>, <Second>, <Millisecond> - Parts of the sequence's timestamp.

Note: When a '\' (backslash) is used, the preceding characters will be interpreted as directory names. This directory will be created if necessary. This can be used to create daily or hourly folders.

Numerical output

Assigns a result to a numerical output channel.

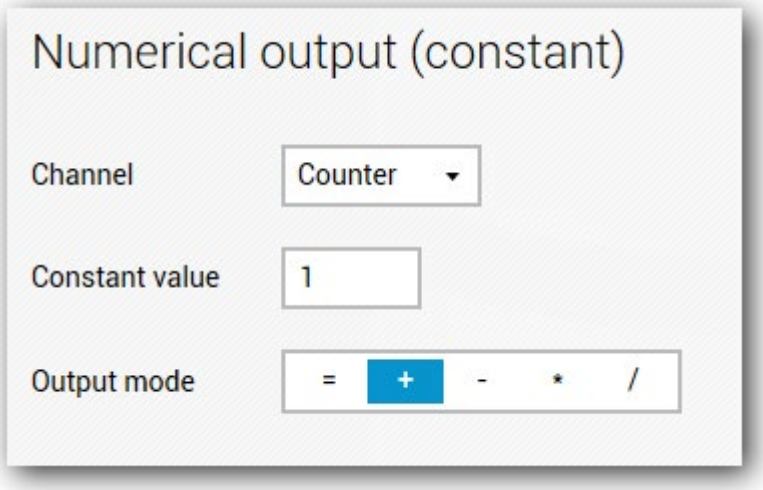


Channel – Choose the numerical output channel to use.

Result – Choose the result which will be assigned to the the numerical output channel.

Numerical output (constant)

Use a predefined value to modify a numerical output channel.



Channel – Choose numerical output channel to use.

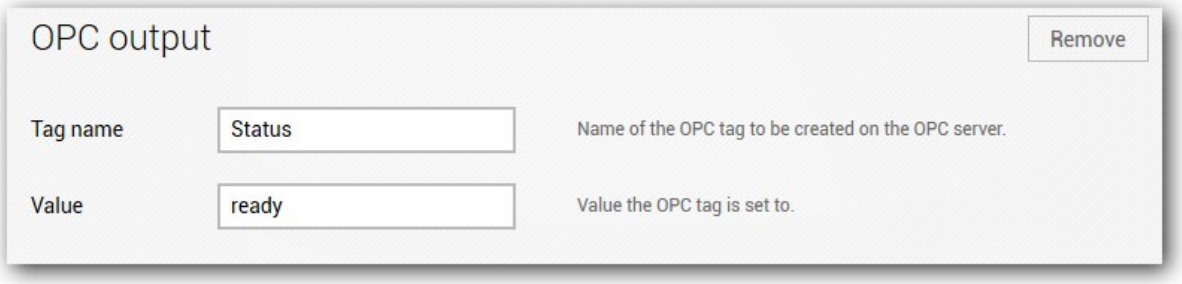
Constant value – The value that is used for the modification of the current value.

Output mode – The mathematical operation which will be used to modify the current value.

In the example above value of the numerical channel (Counter) will be increased by one.

OPC Output

Assigns a predefined value to an OPC tag.



Tag name – Name of the OPC tag to be created on the OPC server.

Value – Value the OPC tag is set to.

Select view

Swiches to the desired view.

Status output

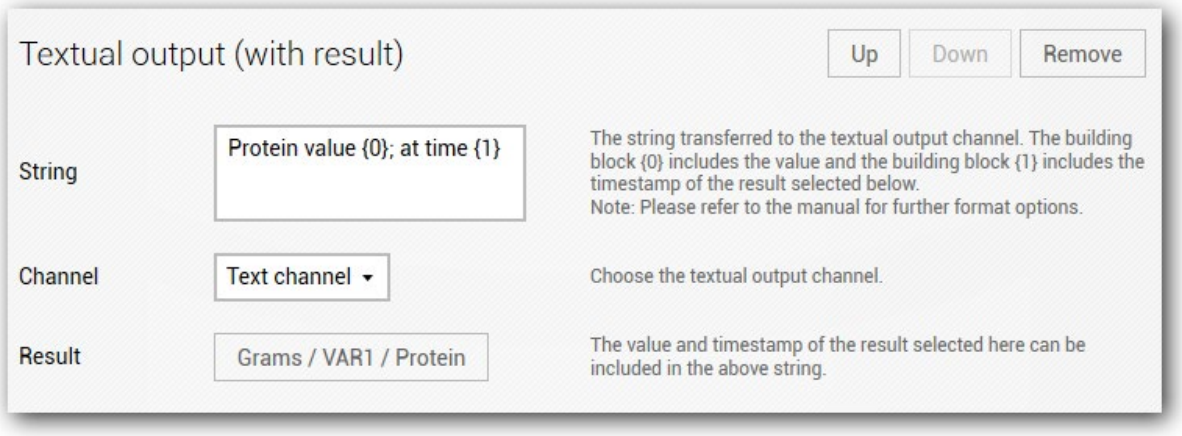
There are 10 predefined status channels. The status of one or several channel can be set with this action.

Channel(s) – The channel for which the status wil be changed.

Text – The new status assigned to the channel(s).

Textual output (with result)

Assigns to a textual output channel a combination of a predifined string, the value of a result, and the timestamp of a result.
The string is transferred to a file or to an Ethernet socket. The channel needs to be configured with the "OMC for InProcess". Please contact the ZEISS support.



String – The string transferred to the textual output channel. The building block {0} includes the value and the building block {1} includes the timestamp of the result selected below.

Channel – Choose trextual output channel to use.

Result – The value and the timestamp of the result selected here can be included in the above string.

For more information concerning the formats for the value and the timestampe see here:
https://msdn.microsoft.com/en-us/en-en/library/dwhawy9k(v=vs.110).aspx
https://msdn.microsoft.com/en-us/en-en/library/8kb3ddd4(v=vs.110).aspx

Example 1:

String : protein value {0:f4}
Output in file or to Ethernet socket: protein value 13.3245

Example 2:

String : protein value {0:e3}
Output in file or to Ethernet socket: protein value 1.332+001

Example 3:

String: C:\\temp\\Test_{1:yyyy}{1:MM}{1:dd}_{1:HH}{1:mm}{1:ss}.txt
next output in file: Test_20161207_143650.txt in folder C:\temp

Note: The file name can only be set dynamically, if the option “Set file by value” is activated in the “OMC for InProcess” for this textual output channel.