# ibaPDA-Snapshot

## Interval-controlled Online Analytics

Manual

Issue 1.1

Measurement Systems for Industry and Energy

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| Version | Date | Revision | Author | Version SW |
|---|---|---|---|---|
| 1.1 | 09/2025 | Condition calculation example | rm | 8.7.0 |

# Contents

# 1 About this documentation

This documentation describes the application of the function *ibaPDA-Snapshot*.

**Other documentation**

This documentation is a supplement to the *ibaPDA* manual. Information about all the other characteristics and functions of *ibaPDA* can be found in the *ibaPDA* manual or in the online help.

## 1.1 Target group and previous knowledge

This documentation is intended for trained personnel engaged in the analysis of measurement and process data using the iba system.

Knowledge of the following is required, or would be helpful, for working with*ibaPDA-Snapshot*:

- Windows operating system
- *ibaPDA* (creation and structure of data files)

## 1.2 Notations

In this manual, the following notations are used:

| Action | Notation |
|---|---|
| Menu command | Menu *Logic diagram* |
| Calling the menu command | *Step 1 – Step 2 – Step 3 – Step x*<br>Example:<br>Select the menu *Logic diagram – Add – New function block*. |
| Keys | <Key name><br>Example: <Alt>; <F1> |
| Press the keys simultaneously | <Key name> + <Key name><br>Example: <Alt> + <Ctrl> |
| Buttons | <Key name><br>Example: <OK>; <Cancel> |
| Filenames, paths | `Filename`, `Path`<br>Example: `Test.docx` |

## 1.3 Used symbols

If safety instructions or other notes are used in this manual, they mean:

**Danger!**

**The non-observance of this safety information may result in an imminent risk of death or severe injury:**

- Observe the specified measures.

**Warning!**

**The non-observance of this safety information may result in a potential risk of death or severe injury!**

- Observe the specified measures.

**Caution!**

**The non-observance of this safety information may result in a potential risk of injury or material damage!**

- Observe the specified measures

**Note**

A note specifies special requirements or actions to be observed.

**Tip**

Tip or example as a helpful note or insider tip to make the work a little bit easier.

**Other documentation**

Reference to additional documentation or further reading.

# 2 System requirements

The following are the system requirements for use of the Snapshot function:

- *ibaPDA* v8.7 or higher
- License for *ibaPDA Snapshot*
- License for *ibaInSpectra*, if you are intending to use the InSpectra Expert module with snapshots

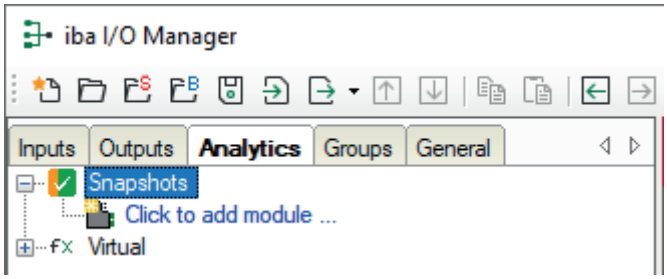
**License information**

| Order no. | Product name | Description |
|---|---|---|
| 30.770026 | ibaPDA-Snapshot | Extension license for ibaPDA in order to use the Snapshot function; unlimited number of Snapshot modules; unlimited number of Snapshot Computation modules; an additional ibaInSpectra license is required to use InSpectra Expert modules in conjunction with the Snapshot function. |

# 3 About Snapshots

*Snapshots* is a feature for buffering signal data over a limited period of time in the order of seconds/minutes. The term "snapshot" refers to this limited period of time. A snapshot can be repeated multiple times within a freely definable interval. The size of an interval ranges from minutes to hours.

For the Snapshot function to be visible and usable, you need an *ibaPDA-Snapshot* license. Provided the system requirements are met, *ibaPDA* displays the *Snapshots* node on the *Analytics* tab of the I/O Manager.




You can configure any number of different snapshots under the main *Snapshots* node.

The buffered signal data for each snapshot is then available for subsequent computations in suitable modules. The results – and, if desired, the buffered signal data – are only written to a data file once the computations have been completed.

The computations and write operations to the data file are asynchronous, meaning the recording of other signal data is not hindered by lengthy computations in the Snapshot modules. Up to four data files are generated per snapshot, depending on the submodule types and computations being used.

The following modules can be used with the Snapshot function:

- Snapshot Computation module
- Snapshot InSpectra Expert module

**Possible applications**
You can use the computation module to perform any computations for the data collected in a snapshot, such as to determine statistical values or other characteristic values for defined time periods at regular intervals.

The InSpectra Expert module allows you to perform customized vibration analyses over long periods of time during condition monitoring without having to continuously record the high-resolution vibration signals.

# 4 Snapshot module

The function of this module type is to buffer signal data over a defined period of time and make it available for further computations by secondary modules. A Snapshot module is used to define the duration of a snapshot, the signals involved, and the data storage.

The key properties, such as the interval, duration and condition, are configured in the form of profiles. This allows you to define different snapshot profiles and assign them to any Snapshot modules. Multiple modules can use the same profile.

To change a profile property, all you have to do is edit the relevant profile and the change will take immediate effect wherever the profile is in use.

The profile-based concept also offers the option of know-how protection and license-controlled use.

For example, if your settings or computations contain technological knowledge that merits protection, you can prevent it from being viewed or modified, as the profiles are supported by the know-how protection feature in *ibaPDA*'s I/O Manager. You can also link the execution of a computation to specific license numbers (dongle, soft license) based on the profile property.

On protecting profiles, see also ↗ *Protecting profiles*, page 27.

You can then add any number of Computation modules under each Snapshot module. The Computation modules (Snapshot Computation module or InSpectra Expert module) are configured in practically the same way as their standard versions. The computation results of the modules are then available in the Snapshot module, and can be recorded.

In addition to the calculated values – or if you want to use a Snapshot module without computations – you can select any input signals from the signal tree for snapshot recording.

With the Snapshot modules you can also implement any number of recording operations to data files.

# 5 Configure Snapshot module

Find out the best way to configure the Snapshot module here.

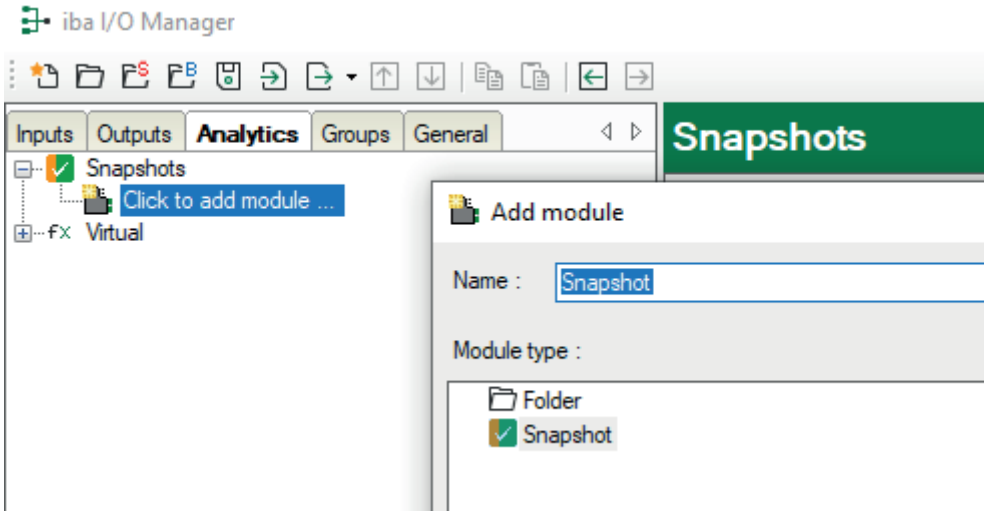
**Procedure**

1. Think about the intervals at which you want to take a snapshot, and how long you want each snapshot to take.
2. Specify conditions for the validity of a snapshot that determine when the data buffered with a snapshot is to be used for further computation.
3. Think about which computations you want to apply to the data collected in the snapshot, and which modules you need to do so.
4. Specify which signals (computation results and/or input signals) you want to record in the snapshot data files.
5. Think about where you want to save the data file with the snapshot data, and what names to give the files.

## 5.1 Add Snapshot module

You must first add a Snapshot module for each snapshot.

In the I/O Manager, select the *Analytics* tab and click under the main *Snapshots* node to add a module. Select the *Snapshot* module type and click <OK>.



## 5.2 Snapshot module – General tab

**Basic settings**

**Module Type (information only)**
Indicates the type of the current module.

**Locked**
You can lock a module to avoid unintentional or unauthorized changing of the module settings.

**Enabled**
Enable the module to record signals.

**Name**
You can enter a name for the module here.

**Comment**
You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

**Module No.**
This internal reference number of the module determines the order of the modules in the signal tree of *ibaPDA* client and *ibaAnalyzer*.

**Timebase**
All signals of the module are sampled on this timebase.

**Use module name as prefix**
This option puts the module name in front of the signal names.

**Profile**

Here you select the profile containing the settings and conditions for this module. If a profile is not yet available, you must first create one.

See ↗ *Add and configure profiles*, page 13 for details.

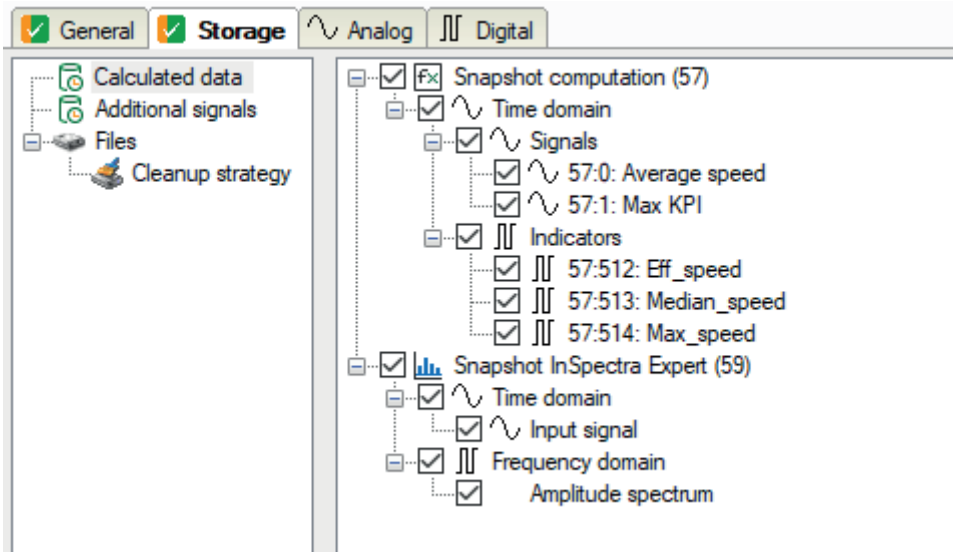
When you have selected the profile, additional lines showing the input parameters for the conditions appear directly below.

Assign the relevant signal to the input parameters. When you click in a field, the signal tree opens up and you can select the relevant signal.

## 5.3 Snapshot module – Storage tab

On the *Storage* tab you configure how the snapshot data is to be recorded and stored.

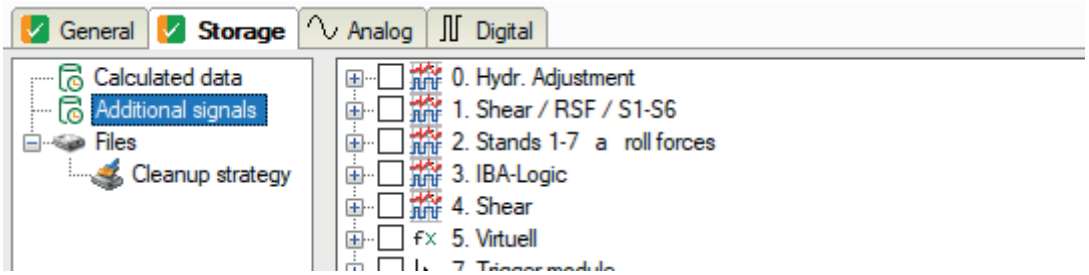
**"Calculated data" node**
Here you select the signals from the computations of the submodules that you want to record.




The signal groups *Time domain* and *Frequency domain* (where available) are created for each snapshot submodule. This is because up to four files are written for each snapshot:

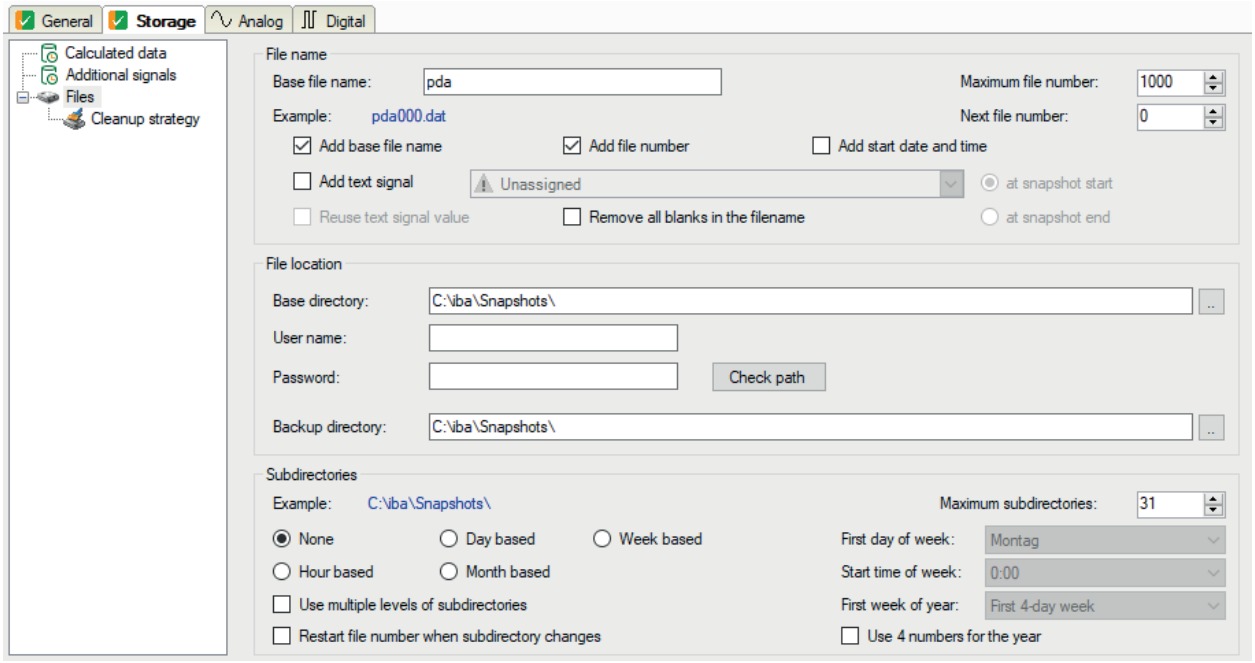
- Time domain data: A data file with the extension _trs, containing all time domain signals.
- Spectra: A data file with the extension _fft, containing all frequency domain data.
- Envelope spectra: A data file with the extension _fht, containing all frequency domain signals from InSpectra modules that compute an envelope spectrum.
- Indicator data: A data file with the extension _trd, containing all computed indicators.

**"Additional signals" node**
Here you can select additional input signals or virtual signals that you also want to save to the Snapshot data file.



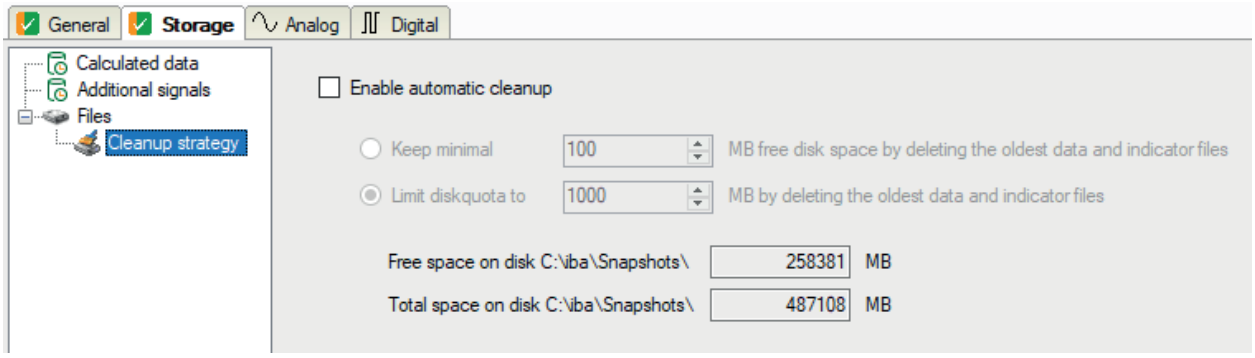

Signals that you select here are saved to the time domain data file.

**"Files" node**
On this node you can set the data file names and their storage locations. The setting options are essentially the same as for *ibaPDA*'s standard time-based data storage.




**"Cleanup strategy" sub-node**

On this node you can configure the criteria according to which old data files can be deleted or overwritten. This dialog is likewise very similar to *ibaPDA*'s standard data storage procedure. The only features missing here are the options to keep a maximum or minimum number of files.



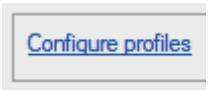

## 5.4 Snapshot – Analog and Digital tabs

On the *Analog* and *Digital* tabs you see the signals that the Snapshot module itself produces. These are diagnostic signals indicating how many snapshots have been taken, how many of them have failed, and the average time taken to process a snapshot. A digital signal indicates when buffering is in progress (true).

# 6 Add and configure profiles

Find out here how to add and configure profiles for Snapshot modules.

To add a profile to a module, click the blue *Configure profiles* link at the bottom in the *General* tab.




Alternatively, on the *Profile* line, open the dropdown list and click on *<New profile...>*.


Both actions open the *Configure profiles* dialog.

Below the left-hand window in the dialog you will find a row of buttons with the following functions:

| | |
|---|---|
|  | Add profile |
|  | Copy selected profile |
|  | Delete selected profile |
|  | Import profile(s) from a **.xxxProfile* file [1] |
|  | Export selected profile to a **.xxxProfile* file [1] |

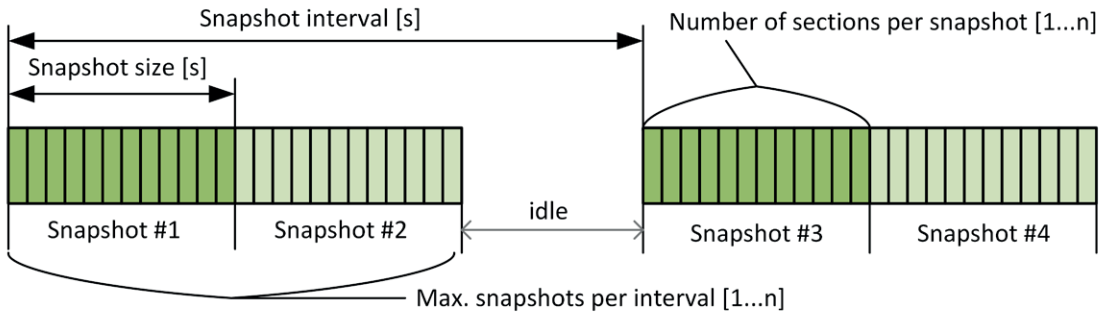
[1] File name extension xxx = snapshot

Add a profile and name it so that the function of the computation is identifiable.

## 6.1 Snapshot profile – General tab

On the *General* tab you make the basic settings for taking snapshots for this module.

To provide a better understanding, the individual parameters are illustrated in the following graphic.




**Interval**
The interval is the duration of a snapshot cycle in minutes. One or more snapshots can be taken within an interval. You can set the maximum number of snapshots to be taken in an interval below. When the set maximum number of snapshots has been reached, *ibaPDA* waits for the next interval to start before taking new snapshots.

**Snapshot size**
This is the duration of a snapshot, i.e. the time for which data is buffered. It is given in seconds.

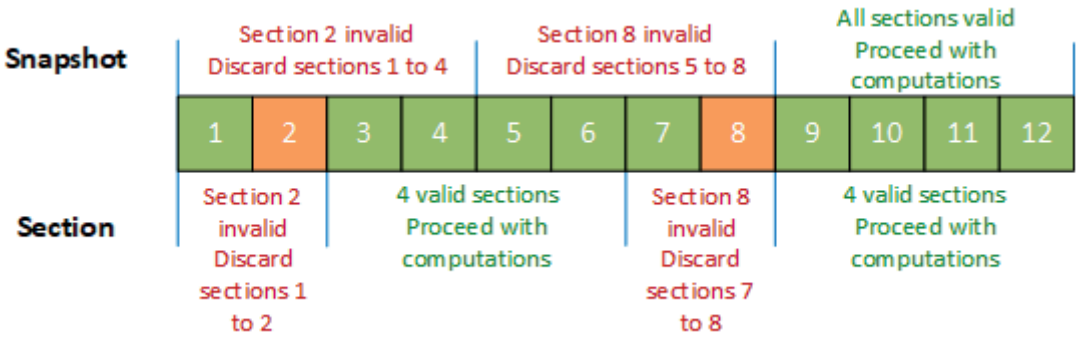
**Number of sections**
A snapshot can be divided into multiple sections of equal length. The conditions are then checked individually for each section.

**Condition validation**
This setting defines how the conditions for a valid snapshot are validated. Only a positive validation of the conditions allows the subsequent computations to be performed.

The following validation methods are available:

- Snapshot: As soon as the conditions are not met in a section of a snapshot, the entire snapshot is discarded as invalid.
- Section: As soon as the conditions are not met in a section of a snapshot, the data of the current and previous sections of the snapshot is classed as invalid and ignored. A new snapshot is started directly at the start of the next section.

The following graphic illustrates the differences between the two validation methods. In the example, four sections have been configured per snapshot.



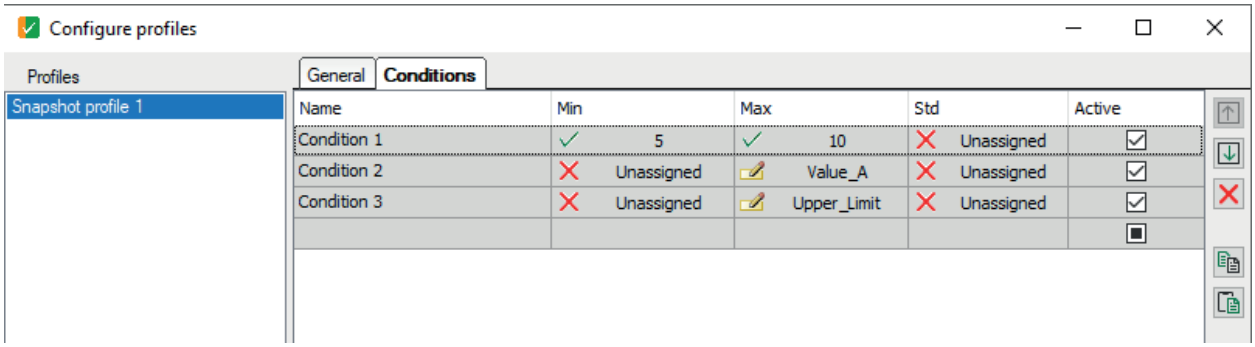

For more information about the calculation of the conditions, see ↗ *Snapshot profile – Conditions tab*, page 15

**Maximum snapshots per interval**
This allows you to specify the maximum number of snapshots to be taken in an interval. When the maximum number has been reached, the Snapshot module stops creating further snapshots, even if the conditions are met. Snapshots are only created again when the next interval starts.

The setting determines the maximum number – also meaning fewer snapshots might be taken in an interval, such as if the conditions are not met often enough.

## 6.2 Snapshot profile – Conditions tab

On the *Conditions* tab you define the conditions that must be met for a Snapshot module to buffer data and for a snapshot to be valid. If multiple sections have been configured for a snapshot, each section is checked individually to ensure that the conditions are met.

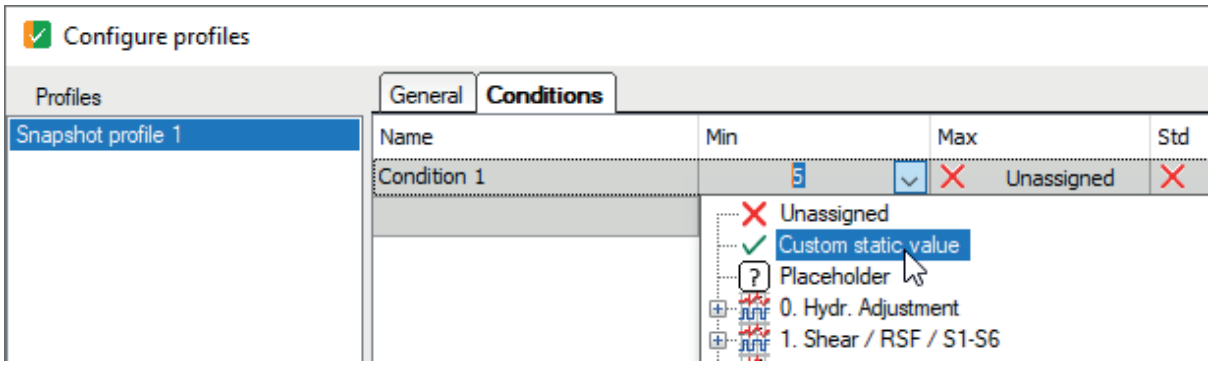



On this tab you can define multiple conditions, which are then displayed in table form.

A condition is basically a signal that is checked for the three values Minimum (Min), Maximum (Max) and Standard deviation (Std). You can define these values with a static value or with a signal.

To define the conditions:

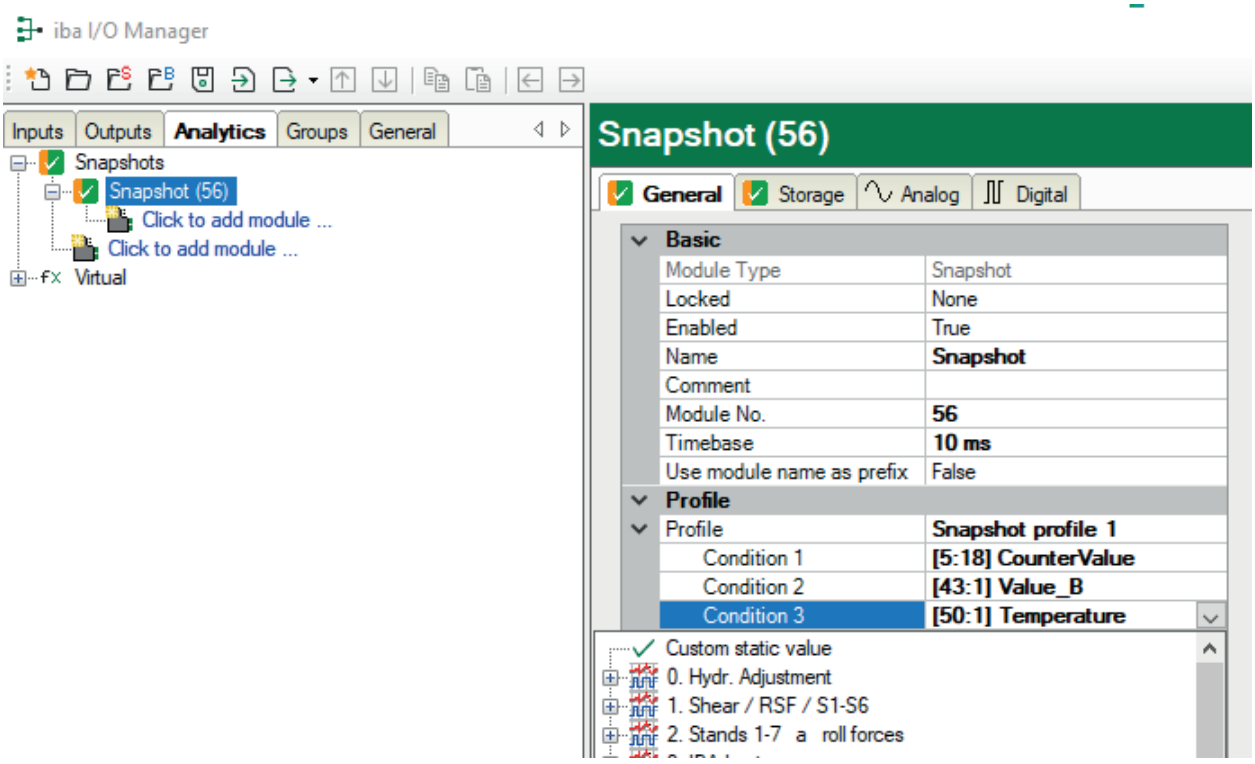
1. Click in the first field in the *Name* column and enter a name. Default entries are then made in the other fields.
2. In the Min, Max and Std columns, you can then choose from a dropdown list whether to specify those values with a static value, a signal or a placeholder.




3. If you want to set a fixed value, for example, select "Custom static value" and then enter a value.
4. If don't want to check one of the values for a condition, select "Unassigned" in the relevant field in the table.
5. To define more conditions, simply click in the empty area below the last row of the table. A new line will then automatically be created.

Note that the signals are not selected directly as conditions. Rather, placeholders are created with names derived from the *Name* column. In the example here, they are "Condition 1", "Condition 2" and "Condition 3".

You make the final assignment of definitions and condition signals on the *General* tab of the Snapshot module.




Once you have selected a profile, the previously defined conditions appear here in the *Profile* section. In the right-hand column, select the signal(s) you want to check for the values specified in the definition and so apply them as conditions.

A condition is considered as fulfilled, when the min value is not undercut, and both the max value and the standard deviation are not exceeded. The calculation of the reference values for min, max and standard deviation occurs section-wise. All samples of a section are taken into account for the calculation.

**Calculation example**

- Acquisition timebase = 0.05 ms (20 kHz)
- Snapshot size = 5 s
- Number of sections = 10

Duration of a section = 500 ms

Number of samples per section = 10.000

Min, max, and standard deviation values are calculated based on 10,000 samples.

If you define multiple conditions, then all conditions must be fulfilled at the same time in order to buffer data (AND-operator).

By configuring the profile and conditions, you have now defined when the Snapshot module is to buffer data. You determine what data that will be in each instance, and what to do with the data (use it for computation, for example) in various sub-modules that you create under each Snapshot module.

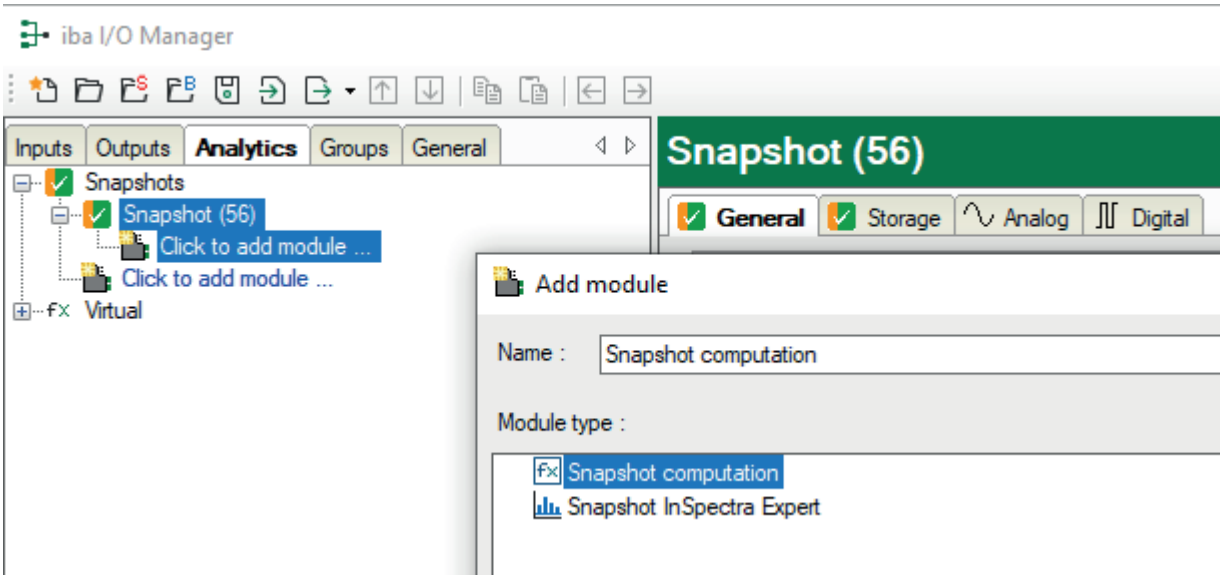
# 7 Snapshot submodules

The following module types are available for processing the data buffered in the snapshot:

- Snapshot Computation module
- Snapshot InSpectra Expert module

In principle, both module types work in exactly the same way as the *Computation Module* and the *InSpectra Expert module* of the interfaces *Virtual* resp. *ibaInSpectra*. The difference is, that the Snapshot variants work with buffered data instead of live data.

Add one or more modules of the desired type under the Snapshot module.



## 7.1 Snapshot Computation module

The Snapshot Computation module is essentially configured in the same way as the Computation module under the *Virtual* interface.

For the Snapshot Computation module, too, you must first define a profile. With the profile, you configure the computations that you want the module to perform.

As opposed to the standard Computation module, the profile for the Snapshot variant has an *Indicators* tab.

### 7.1.1 Computation module (Snapshot) – General tab

**Basic settings**

**Module Type (information only)**
Indicates the type of the current module.

**Locked**
You can lock a module to avoid unintentional or unauthorized changing of the module settings.

**Enabled**
Enable the module to record signals.

**Name**
You can enter a name for the module here.

**Comment**
You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

**Module No.**
This internal reference number of the module determines the order of the modules in the signal tree of *ibaPDA* client and *ibaAnalyzer*.

**Timebase**
All signals of the module are sampled on this timebase.

**Use module name as prefix**
This option puts the module name in front of the signal names.

**Advanced**

**High accuracy**
If you enable this option (True), then the calculation results are saved as 64-bit floating point values. If you do not enable "High accuracy", then 32-bit floating point values are used.

**Profile**

Here you select the profile containing the computation formula(s) for this module. If a profile is not yet available, you must first create one.

See ↗ *Add and configure profiles*, page 22 for details.

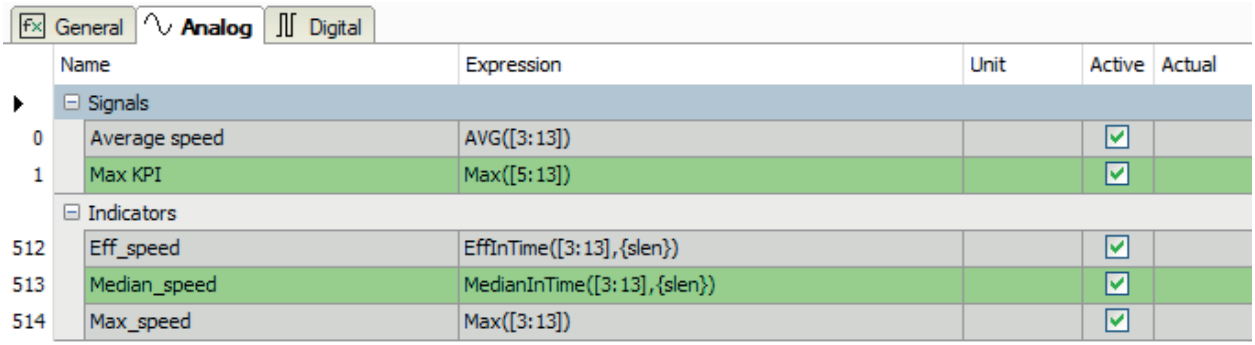
When you have selected the profile, additional lines showing the input parameters for the computation appear directly below.

Assign the relevant signal to the input parameters. When you click in a field, the signal tree opens up and you can select the relevant signal.

### 7.1.2 Computation module (Snapshot) – Analog/Digital tab

The results of the module's computations are available as signals on the *Analog* and/or *Digital* tab(s).

On the *Analog* tab, the computed signals and indicators are listed separately in two groups.




The indicators start from signal number 512, meaning the number of computed signals is limited to 512 (numbers 0 to 511). Note that the indicators are only refreshed once per snapshot, as they represent just a single value.

## 7.2 InSpectra Expert module (Snapshot)

The Snapshot InSpectra Expert module is configured in the same way as the standard InSpectra Expert module. The only difference here is that there is no *Snapshots* section in the profile configuration, as the snapshot is defined by the Snapshot module.

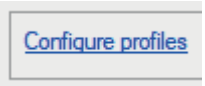
**Note**

Details on configuring the InSpectra Expert module can be found in the *ibaInSpectra* product manual.

# 8 Add and configure profiles

Find out here how to add and configure profiles for Computation modules.

To add a profile to a module, click the blue *Configure profiles* link at the bottom in the *General* tab.




Alternatively, on the *Profile* line, open the dropdown list and click on *<New profile...>*.


Both actions open the *Configure profiles* dialog.

Below the left-hand window in the dialog you will find a row of buttons with the following functions:

| | |
|---|---|
|  | Add profile |
|  | Copy selected profile |
|  | Delete selected profile |
|  | Import profile(s) from a **.xxxProfile* file [1] |
|  | Export selected profile to a **.xxxProfile* file [1] |

[1] File name extension xxx = snapshotComputation

Add a profile and name it so that the function of the computation is identifiable.

## 8.1 Configure profiles – placeholders

To formulate your calculation, you must first define the placeholders for the input and output variables of the calculation.

In the *Placeholders* tab, enter the placeholders in order. Each time you complete a line, the next free line is automatically created.

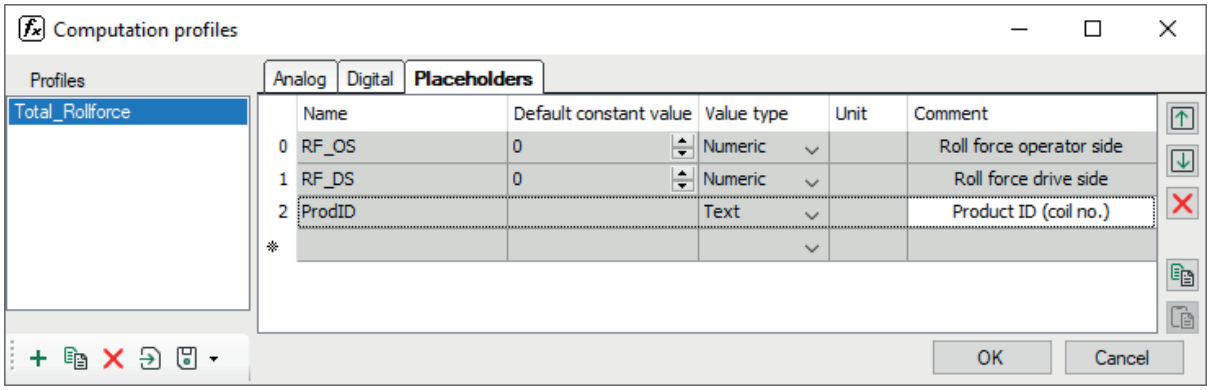
- Name: Name of the placeholder as it will subsequently be used in the calculation function.
- Default constant value: Enter a value here that the placeholder should have if no signal is linked or the signal is invalid. Note that this value must match the value type.
- Value type: Select the value type from the drop-down list here. Choose the type that matches the signal or constant. The following types are available for selection:
  - Numeric... for a numerical value
  - Digital... for a purely digital signal (True/False, 0/1)
  - Text... for a text signal
  - Any (numeric default)... The value type is detected automatically
  - Any (digital default)... The value type is detected automatically
  - Any (text default)... The value type is detected automatically
- Comment: You can enter a short description of the placeholder here. This text will then be displayed later in the *General* tab of the computation module that you use to link the placeholders to the signals.

In the next step, you can formulate the expressions in the *Analog* and/or *Digital* tabs.

**Example**

Calculation of total and differential rolling force with limit-value monitoring

1. Add computation module and then configure profiles.
2. Define placeholders for the two measured input values "rolling force, operating side" and "rolling force, drive side", as well as the product ID.



## 8.2 Configure profiles – analog and digital expressions

In the *Analog* and *Digital* tabs you can now formulate the desired calculations.

As with the "Virtual" module, all the functions in the expression builder are available when you click the <fx> button in the *Expression* column.

In the formulas you can use the placeholders as well as the results of other expressions in the same profile, or constant values.

If you want to use the result of one line in another expression, use the predefined placeholders {analog:*X*} or {digital:*Y*}, where *X* and *Y* stand for the name of the expression in the *Analog* or *Digital* tab of the same profile.

If you populate several lines, you can manipulate the lines with the buttons on the right margin. The order of the lines is not relevant for the calculation of the expressions.

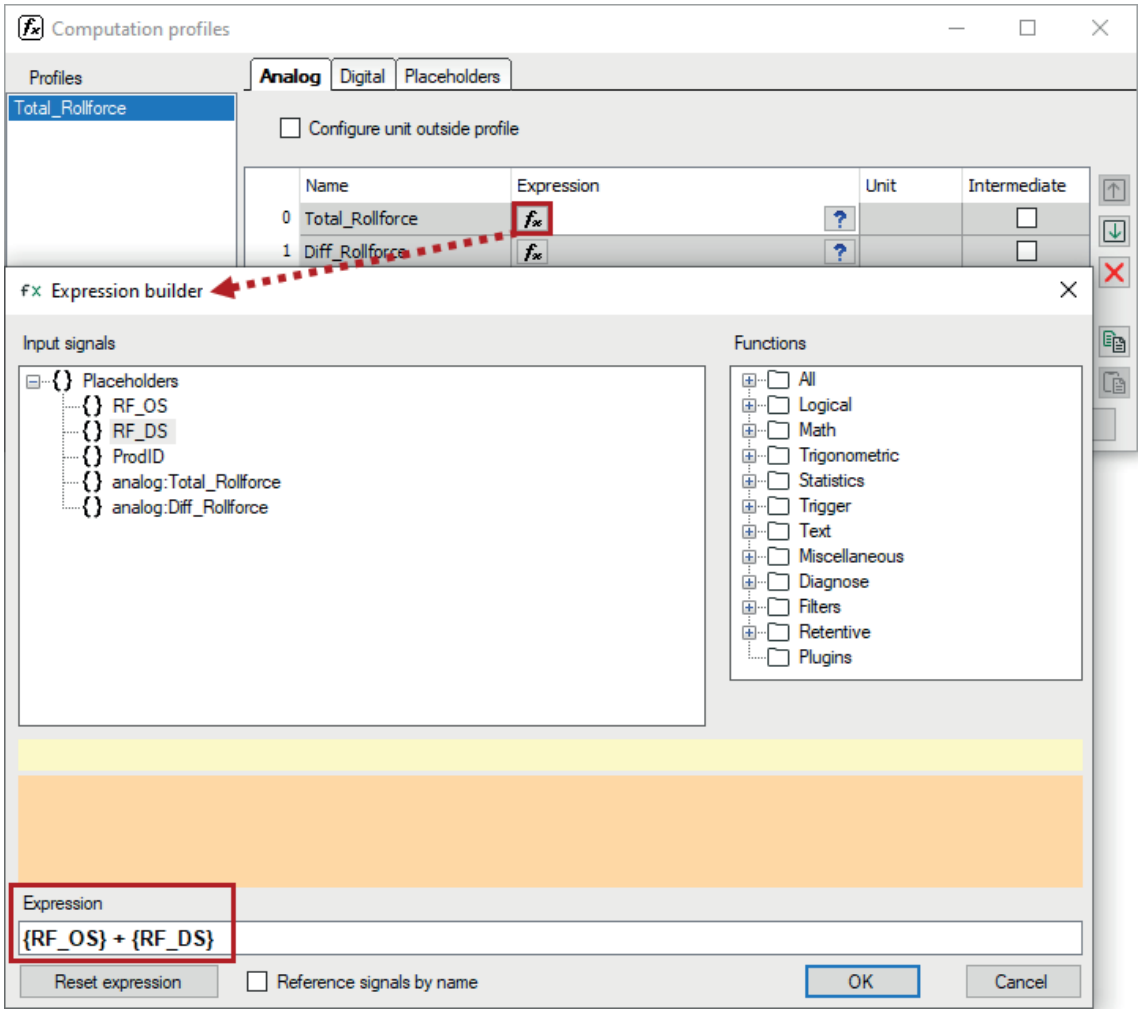
| | |
|---|---|
|  | Move selected rows up |
|  | Move selected rows down |
|  | Delete selected rows |
|  | Copy all rows |
|  | Paste from clipboard, starting from the selected row |

In the *Intermediate* column, you have the option to classify each expression as an internal intermediate value. These expressions or signals are then not displayed in the signal table and are not available to be displayed in the *ibaPDA* client.

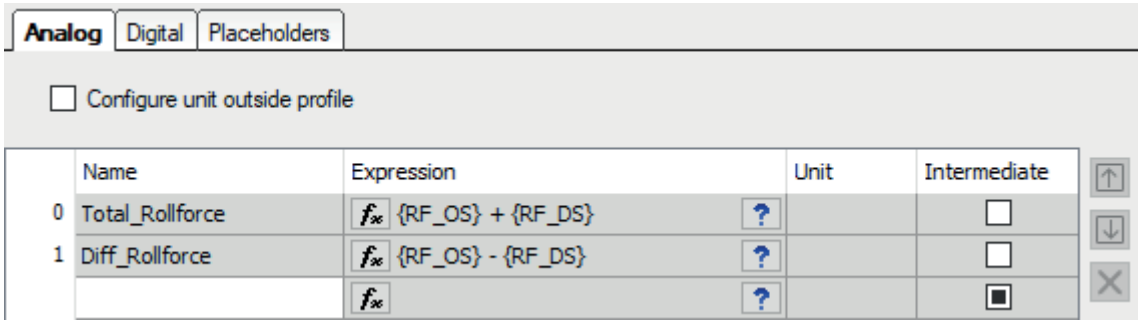
### Example

#### Analog

Calculation of the total rolling force as the sum of the rolling force on the operating side and the rolling force on the drive side. Calculation of the differential rolling force as the difference between the two rolling forces.



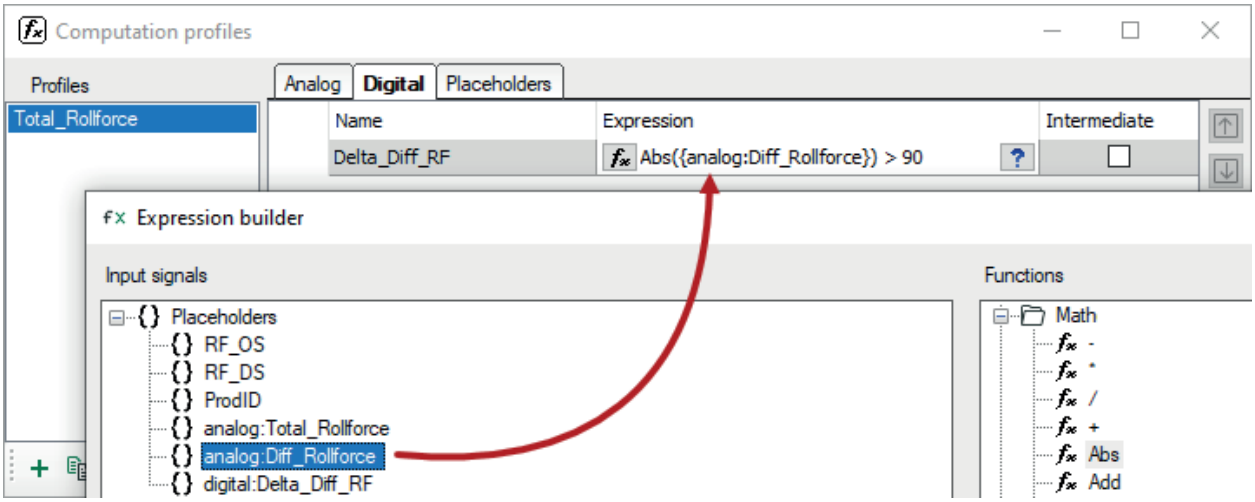

In the expression builder, only the defined placeholders and placeholders for the internal calculation results are available for the calculation. I/O signals cannot be used here.




#### Digital

A digital signal should indicate when the absolute value of the differential rolling force exceeds a certain level (90 t).

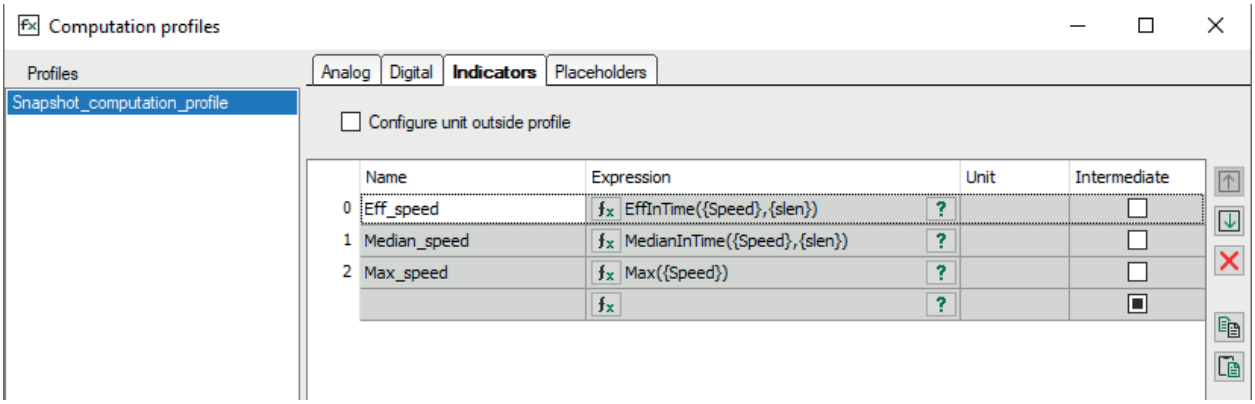
In the following figure an internal calculation result is used for another expression.



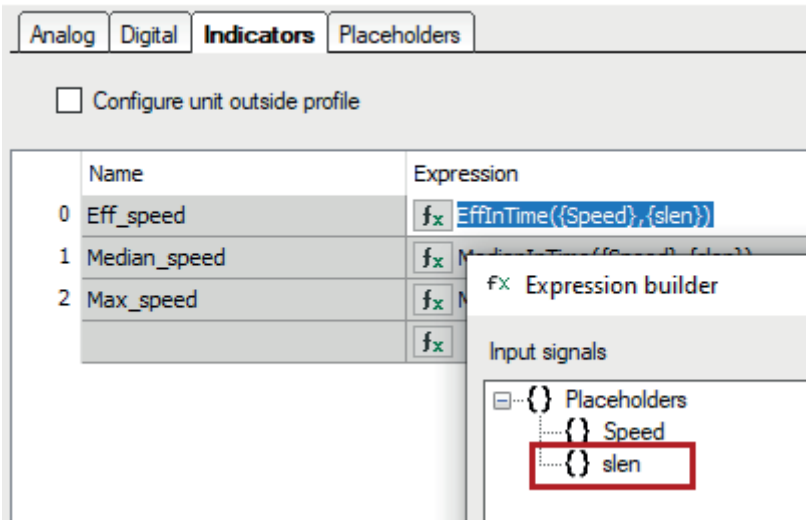

The limit value of 90 t is permanently entered here. If this value were variable or process-dependent, then a placeholder would also have to be defined for it, which would then be linked to a corresponding signal.

## 8.3 Configure profiles – Indicators

On the *Indicators* tab you configure individual values – so-called indicators – that are computed across the entire snapshot. The standard mathematical and statistical functions are provided in the Expression Builder. This gives you one value across all the buffered samples of a snapshot, such as the effective (RMS) value, the average, the maximum, etc.




To make computations easier, there is a placeholder *{slen}* that is provided by default but is not visible in the placeholder table. The placeholder stands for the length of the snapshot. You can use it for computations on the *Indicators* tab, as well as on the *Analog* and *Digital* tabs.

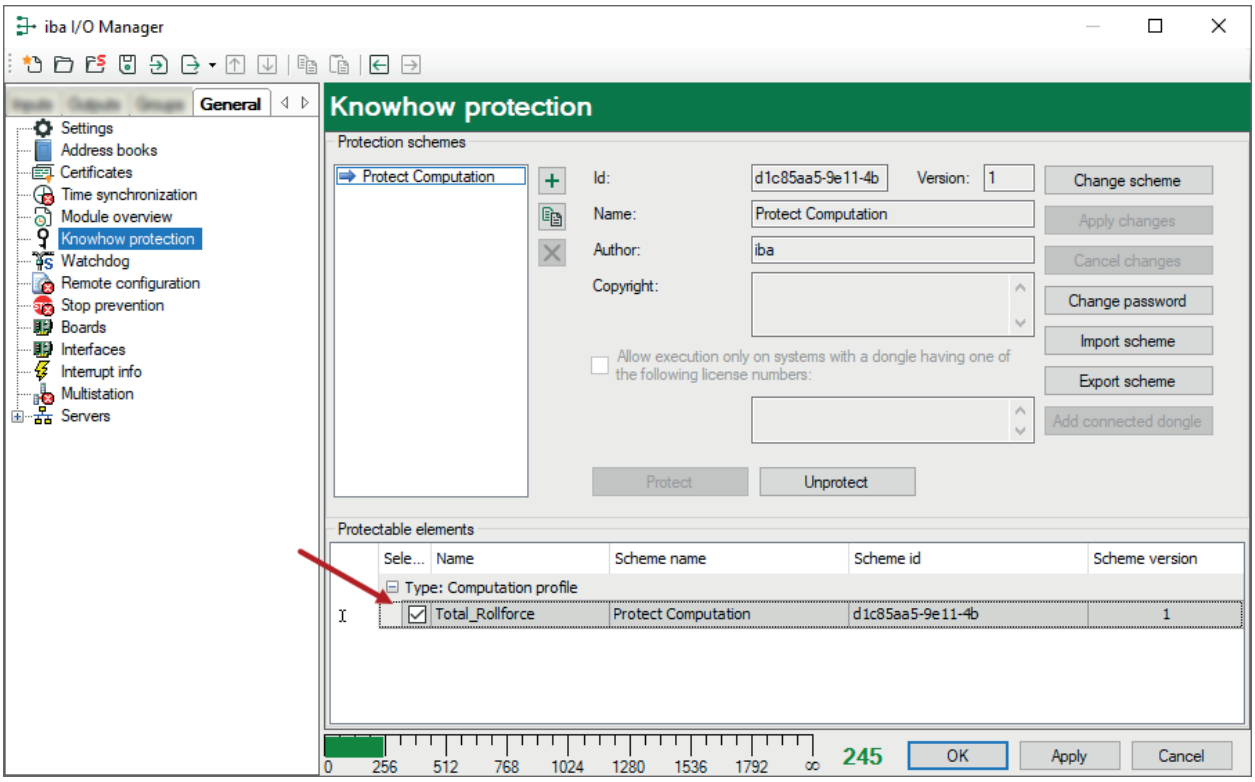



## 8.4 Protecting profiles

You can prevent all profiles that provide the calculation basis for certain modules from being viewed or modified via the know-how protection feature. The profiles can be part of the following modules:

- ibaInSpectra
- ibaInCycle
- Computation module
- Lookup table
- Process condition
- Parameter set

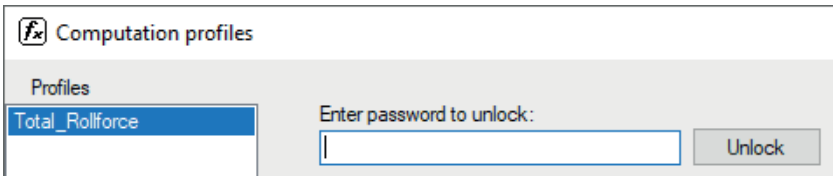
All defined profiles are listed in the know-how protection dialog. The following figure shows the example for a profile of a computation module.




**Protecting a profile**

1. If you have not already done so, define a protection scheme and select it in the "Protection schemes" list.
2. Then select the desired profile (add a checkmark).
3. Click <Protect> and enter the password for the protection scheme.
4. Confirm your choice by clicking on <OK>.

If you then click *Configure profiles* in the module where this profile is used, you must first enter the protection scheme password to see the calculation.




**Other documentation**

More information about the topic of know-how protection can be found in the *ibaPDA* manual, part 2, *Know-how protection*.

# 9 Support and contact

**Support**

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Email: support@iba-ag.com

**Note**

If you need support for software products, please state the number of the license container. For hardware products, please have the serial number of the device ready.

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