syncAXIS control Viewer

syncAXIS control V1.8.0

Contents

1 About this Manual

This manual describes the software
SCANLAB syncAXIS control Viewer.

Notice!

Carefully read the document *"syncAXIS* control
Software License Agreement" before installing
and using *syncAXIS* control. This agreement
defines matters such as terms of usage,
warranty information and liability disclaimers. If
you have questions, simply contact SCANLAB.

⚠ Caution!

Read and observe all safety instructions in this
manual!

SCANLAB accepts no liability for damages or
consequential losses resulting from non-
observance of this manual, in particular the
safety instructions contained herein.

1.1 Related Documents

- RTC6 Manual
- "syncAXIS control-DLL – Application
  Programming Interface" Manual
- "Installation of SCANLAB XL *SCAN* Components
  and Initial Operation of the
  XL *SCAN* System" Manual
- "syncAXIS control Viewer" Manual
- "syncAXIS control Configurator" Manual
- *"syncAXIS* control Master-Slave-
  Synchronizer" Manual

1.2 Manufacturer

SCANLAB GmbH
Siemensstr. 2a
82178 Puchheim
Germany
Tel. +49 (89) 800 746-0
Fax +49 (89) 800 746-199
info@scanlab.de
www.scanlab.de

1.3 Glossary

GUI	Graphical User Interface.
syncAXIS control instance	A software object which is created in the PC-RAM when a valid `syncAXISConfig.xml` is called by a sync*AXIS* control-based user program.
`syncAXISConfig.xml`	XML configuration file. Although the file name can be freely chosen, it is denominated as "`syncAXISConfig.xml`" throughout this document. The complete tag descriptions can be found in "syncAXIS control-DLL – Application Programming Interface" Manual, Chapter 13 "Appendix F: Reference of syncAXISConfig.xml Tags", page 357.
Simulation File	See "syncAXIS control-DLL – Application Programming Interface" Manual, Chapter 2.5 "About Simulation Mode and Simulation Files", page 33.

XML configuration file	`syncAXISConfig.xml`. Text file in XML format. Contains the parameter values ("configuration") with which a syncAXIScontrol-DLL-based user program initializes the syncAXIS control instance, see "syncAXIS control-DLL – Application Programming Interface" Manual, Chapter 2.4 "About Initializing syncAXIS control-based User Programs", page 26.
	It consist of several sections, for example, `RTCConfig` and `LaserConfig`.
	Example for `RTCConfig`:
	
	`<cfg:RTCConfig>`
	  `<cfg:BoardIdentificationMethod>UseFirstFound`
	  `</cfg:BoardIdentificationMethod>`
	  `<cfg:ProgramFileDirectory />`
	  `<cfg:Boards>`
	    `<cfg:RTC6>`
	      `<cfg:SerialNumberSerialNumber>0</cfg:SerialNumber>`
	      `<cfg:HeadA>ScanDevice1</cfg:HeadA>`
	      `<cfg:HeadB>Stage1</cfg:HeadB>`
	    `</cfg:RTC6>`
	  `</cfg:Boards>`
	`</cfg:RTCConfig>`
	
	For further information refer to "syncAXIS control-DLL – Application Programming Interface" Manual,
	
	• Chapter 2.2.3 "Configuring Safe syncAXIS control Instances", page 20
	• Chapter 13 "Appendix F: Reference of syncAXISConfig.xml Tags", page 357

2   syncAXIS control Viewer

2.1 Intended Use

syncAXIS control Viewer is a software[1] (with GUI, Figure 1, page 9) for visualizing unmodified Simulation Files which have been generated by a syncAXIScontrol-DLL-based user program.

One or even several Simulation Files at once can be imported. Several plots are available. Depending on the plot, some of the data displayed originate directly (unprocessed) from the specified Simulation File, others are derived from calculations in syncAXIS control Viewer.

syncAXIS control Viewer is able to indicate positioning stage and scan head limit value exceedances in the plots, see Chapter 2.5.2 "Limit Value Exceedances ("Limits Breached")", page 10.

Notice!

syncAXIS control Viewer *does not* provide any support for interpreting the content of the plots. This requires exclusively the expertise of the user and is his sole responsibility.

2.2 System Requirements

As with syncAXIScontrol-DLL.

---

(1) `syncAXIScontrol_Viewer.exe` is designed to be executed as 32-bit application on MS Windows 32-bit variants and as
64-bit application on MS Windows 64-bit variants.

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

6

2.3 Installing and Starting syncAXIS control Viewer

(1) Copy all delivered files to an target folder on your system.

(2) Do one of the following:

- Start `syncAXIScontrol_Viewer.exe` in Explorer.
- Carry out a command line call, see Command line call syntax.
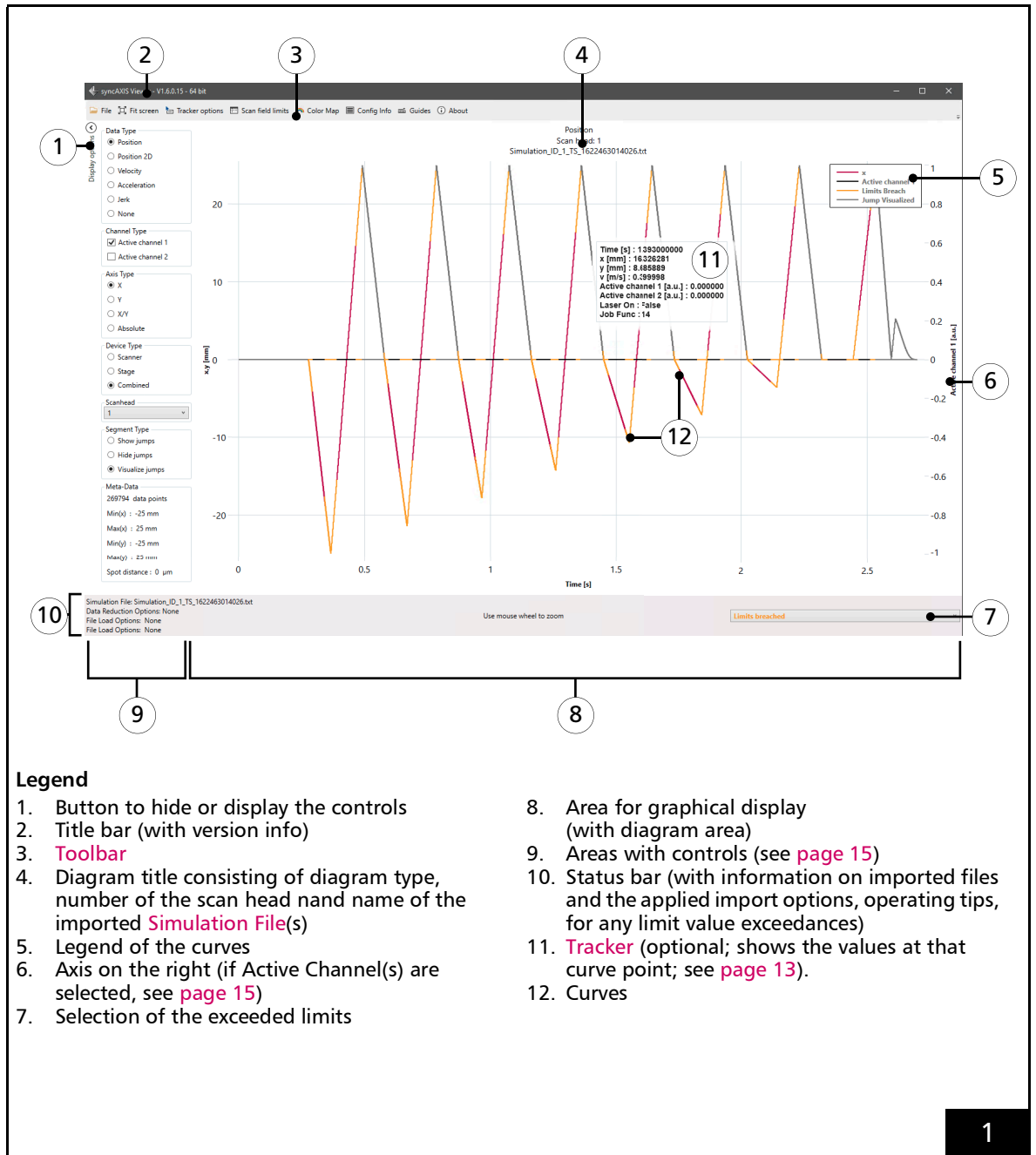 syncAXIS control Viewer GUI opens.

Command line call syntax

`syncAXIScontrol_Viewer.exe [OPTION] , , , [FILE] , , ,`

Arguments			
[OPTION]	Not mandatory.		
	/?	Opens a dialog which shows help information.	
	-a	Read in positions are displayed more accurately. Files are read in slower.	
	--accurate-limits	For files which are not read in completely due to '-r': Improves the limits. Example: -r 5 -l.	
	--accurate-position	Like -a.	
	-h	Like /?.	
	--help	Like /?.	
	-l	Like --accurate-limits.	
	-r	Lines are skipped at the specified interval. Files are read in faster. Example: -r 5 only reads every 5th line.	
	--read-each	Like -r.	
[FILE]	Not mandatory.		
		Multiple files can be read in at the start. Example: syncAXIScontrol_Viewer.exe file1.txt file2.txt file3.txt. Files after the first are appended.	
		The command line argument is applied to all files. Example: -r 10 file1.txt file2.txt file2.txt causes all 3 files read in with instruction 'every 10th line only'.	

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

7

2.4 Loading a Simulation File

- Click **File > Open** and choose your desired Simulation File.
  See Dialog "Loading Options".

  Alternatively you can drag a Simulation File in the program window.

  Note:

  Before loading, syncAXIS control Viewer checks how much space is available in the working memory. If this is not sufficient for the complete Simulation File, the program loads only up to a certain time index. A corresponding message appears in the main window.

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

8

2.5 GUI – Main Window

Legend

1. Button to hide or display the controls
2. Title bar (with version info)
3. Toolbar
4. Diagram title consisting of diagram type, number of the scan head nand name of the imported Simulation File(s)
5. Legend of the curves
6. Axis on the right (if Active Channel(s) are selected, see page 15)
7. Selection of the exceeded limits

8. Area for graphical display (with diagram area)
9. Areas with controls (see page 15)
10. Status bar (with information on imported files and the applied import options, operating tips, for any limit value exceedances)
11. Tracker (optional; shows the values at that curve point; see page 13).
12. Curves

syncAXIS control Viewer main window: areas.

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

9

2.5.1 Zooming and Scaling

- To zoom in a whole diagram:
  Use mouse wheel.

- To zoom specific areas:
  Click and hold left mouse button and mark the specific area. syncAXIS control Viewer zooms in the selected area.
  Note: If necessary, the scale division is changed (not in Data type Position 2D).

- To reset the zoom:
  Click **Fit screen**

2.5.2 Limit Value Exceedances ("Limits Breached")

From the currently loaded Simulation File, syncAXIS control Viewer reads out:

- working field size, max. velocity, max. acceleration and max. jerk of the positioning stage[1]

If the working field size is not specified in the configuration:

- the value is taken from the correction file specified in `DefaultCorrectionFile`
  - If this is not successful, 54 mm × 54 mm is used[2].

syncAXIS control Viewer uses the currently loaded Simulation File to indicate exceedances of positioning stage working field boundaries and dynamic limits as well as scan head working field boundaries in the plots. Affected curve sections are drawn in *orange* and corresponding information is shown in the status bar. Figure 2, page 11 shows an example of limit value exceedances.

With limit value exceedances, the list **Limits breached** appears on the right hand side of the status bar.

- Click **Limits breached**. All matching limit value exceedances are shown:.
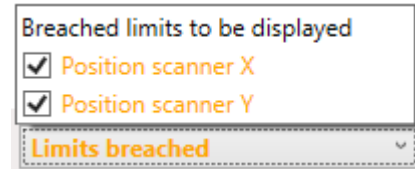
In this example, the x and y position values are exceeded. In general, following options are available, depending of the exceeded limits:
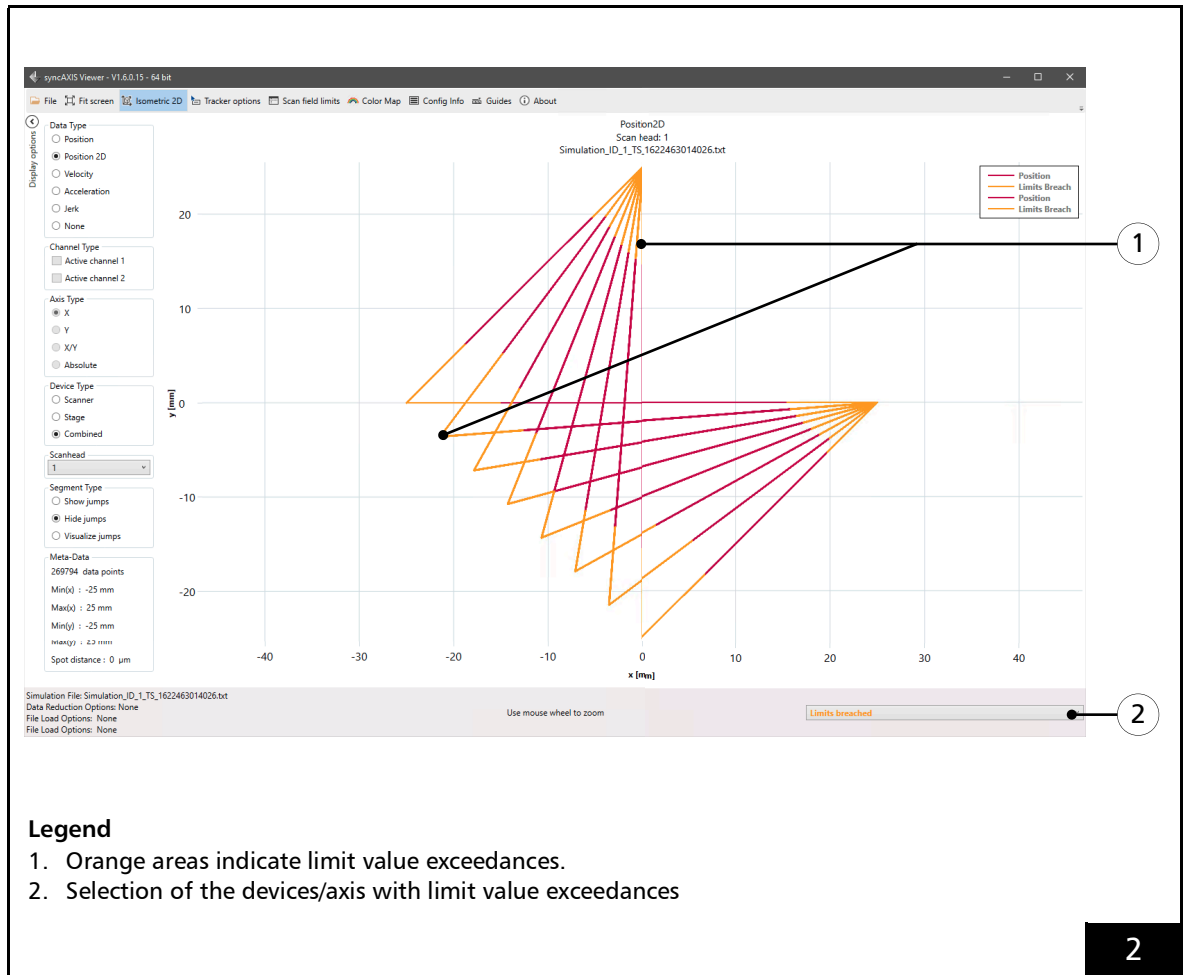
– Position scanner X
– Position scanner Y
– Position stage X
– Position stage Y

If no limits are exceeded, the box **Limits breached** is not shown.

- Tip: To determine "where" in the marking result the problem would occur, set:
  – **Data type: Position 2D**
  – **Device type: Combined** and then click
  – **Isometric 2D**

---

(1) See "syncAXIS control-DLL – Application Programming Interface" Manual.

(2) A corresponding message opens.
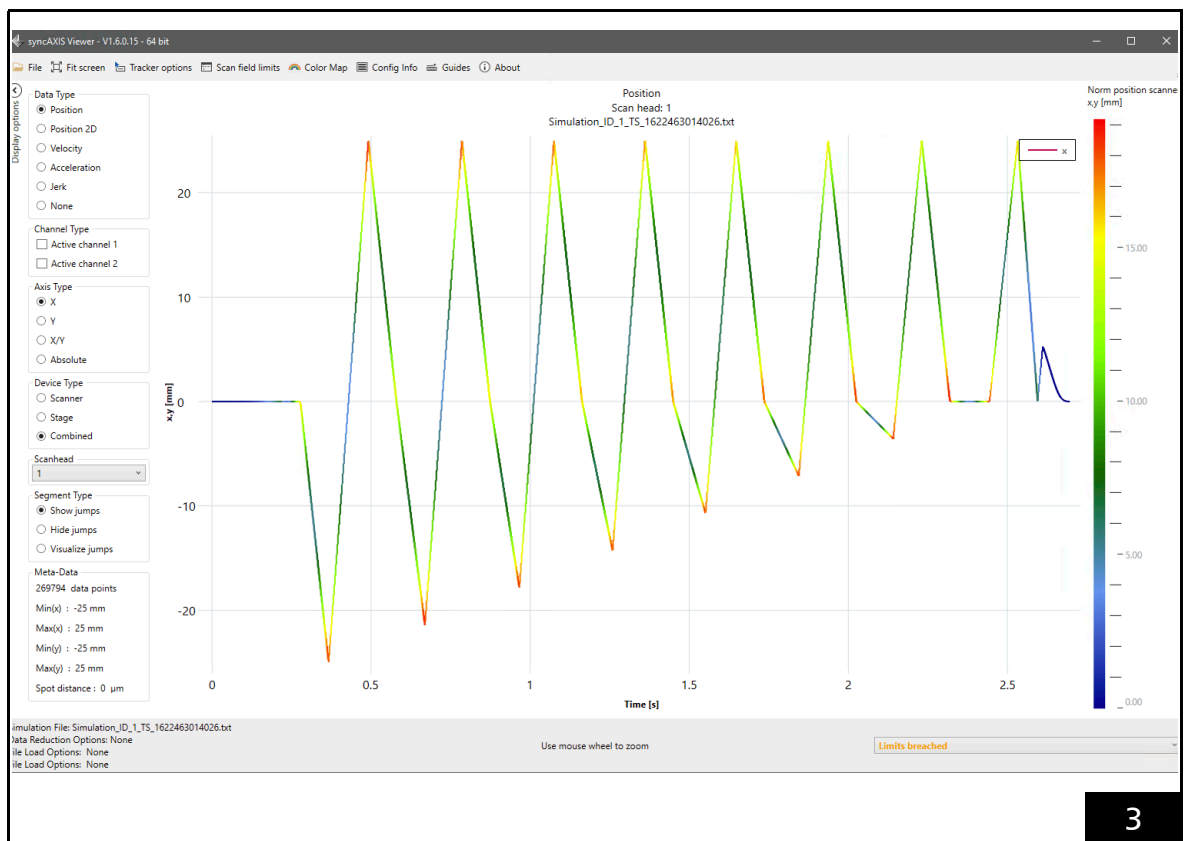Furthermore, subsequently the status bar shows "Correction File: Not found - using default limits".

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

10

Legend
1. Orange areas indicate limit value exceedances.
2. Selection of the devices/axis with limit value exceedances

syncAXIS control Viewer: Display of limit value exceedances.

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
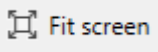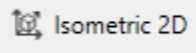2 syncAXIS control Viewer

11
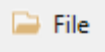
2.5.3 Color Map

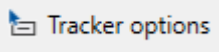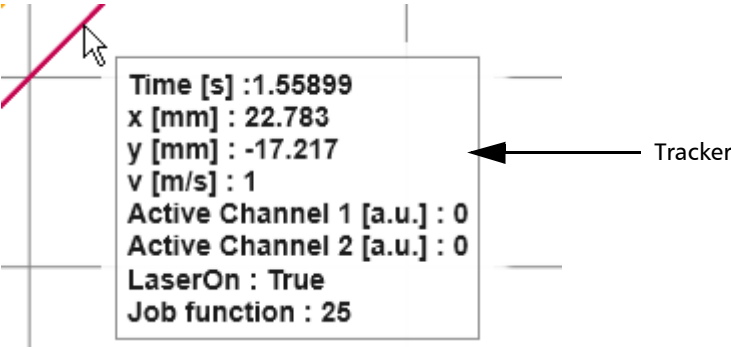It is possible to overlay the displayed curves with a color map. This color map shows selected values colored, see Figure 3, page 12. Depending on the height of the value, another color is displayed. Note the color scale on the right.

- Click **Color Map** in the Toolbar and choose the value to be displayed in color. For each selection, the norm is displayed. It can be shown (each for scanner and stage):
  - position
  - velocity
  - acceleration
  - jerk

  and the Job Function.
- Click the color scale on the right, hold the mouse button and drag the mouse to adjust the scale.
- Choose **Limits breached** to end the colored display.

Display of a color map of the scanner (Norm position scanner).

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

12

2.5.4 Toolbar

📁 File	**File** • To open a Simulation File (`*.txt`). For more details, see Chapter 2.5.6 "Dialog "Loading Options"", page 18. • To export header(s) of the currently loaded Simulation File(s) in XML format.
⊐ Fit screen	**Fit screen** To reset the zoom factor or the scaling and to adjust the size of the diagram to the screen.
ⓘ Isometric 2D	**Isometric 2D** Only appears, when diagram type **Position 2D** is selected (for example, if circles are not represented as circles, but as ellipses due to different scale divisions): Fits the entire diagram into the diagram area. Thereby, the same scale division is applied to the X-axis and Y-axis.
🗁 Tracker options	**Tracker options** To open the Tracker settings. • Choose the information to show in the Tracker when moving the cursor over a curve or • clear **Enable Tracker**. The Tracker is not shown anymore. Items to display on tracker ☑ Path Velocity ☑ Active Channel 1 ☑ Active Channel 2 ☑ Laser On ☑ Job function ☑ Enable Tracker With options chosen as shown above, the Tracker shows following information when moving over a curve: Time [s] :1.55899 x [mm] : 22.783 y [mm] : -17.217 ← Tracker v [m/s] : 1 Active Channel 1 [a.u.] : 0 Active Channel 2 [a.u.] : 0 LaserOn : True Job function : 25

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

13

⊞ Scan field limits	**Scan field limits** To set the limits of the working field. The default values are the limits indicated in the Simulation File (`*.txt`). • Type in the desired values and click **Apply**. X Axis Minimum: -15 mm X Axis Maximum: 15 mm Y Axis Minimum: -15 mm Y Axis Maximum: 15 mm Apply
🌈 Color Map	**Color Map** To display of color maps of several values, see "Color Map", page 12. • Select the norm to display.
☰ Config Info	**Config Info** To display configuration information.
⊞ Guides	**Guides** To show/delete (not: hide) guides. • Click **Guides**. The configuration panel appears in the status bar. ☑ Horz guide1: -14.88 guide2: 13.59 diff: 28.47 mm ☑ Vert guide1: 0.09 guide2: 0.29 diff: 0.20 s • Choose, if horizontal or vertical guides (or both) should appear. • Click the guide, hold the left mouse button and drag it to the desired position. Alternatively you can enter exact values for each guide in the configuration panel. The distance between both guides is shown on the right hand side.
ⓘ About	**About** To show the version number and manufacturer information.

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

14

2.5.5 Controls

Data Type ● Position ○ Position 2D ○ Velocity ○ Acceleration ○ Jerk ○ None	**Group 'Data type'** For selecting the diagram type (plot) to be shown in the diagram area. The selected option is used as diagram title (4 in Figure 1).
	Position x,y [mm] vs. Time [s]
	Position 2D y [mm] vs. x [mm]
	Velocity vx, vy [m/s] vs. Time [s] (laser spot speed; square root of (vx^2+vy^2))
	Acceleration ax, ay [m/s^2] vs. Time [s]
	Jerk jx, jy [m/s^2] vs. Time [s]
	None None of the above diagram types. Nevertheless, Active Channel curves are shown, if these are selected.
Channel type ☑ Active channel 1 (*) ☑ Active channel 2 (*) (*) Actual Active channel names are shown here after the Simulation File has been loaded.	**Group 'Channel type'** To select which Active Channel curves are to be shown in the diagram area. • Disabled, if **Position 2D** is selected. • Even available, if **None** is selected. • The screenshot on the left shows the check box labels immediately after `syncAXIScontrol_Viewer.exe` start. After the Simulation File has been loaded, the labels are changed according to the Active Channels entered there. That is, for example, "Active Channel 1" is changed to "Analog out 2" and "Active Channel 2" is changed to "Spot distance".
	Active channel 1 (for example, Analog out 2) If the check box is selected, the corresponding curve is shown in the diagram. The curve is shown in addition to other curves.
	Active channel 2 (for example, Spot distance) See **Active channel 1**.

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

15

Axis Type ● X ○ Y ○ X/Y ○ Absolute	**Group 'Axis type'** To select which axes are to be shown as curves.
	X Shows curve of x values.
	Y Shows curve of y values.
	X/Y Shows curves of both axes.
	Absolute Shows the absolute value of the X/Y vector.
Device type ● Scanner ○ Stage ○ Combined	**Group 'Device type'** To select which motion portions (scan head and/or positioning stage) are to be included in the shown curves.
	Scanner Shown curves shall include scan head portions only.
	Stage Shown curves shall include positioning stage portions only.
	Combined Shown curves shall include scan head portions and positioning stage portions.
Scan head 1 ⌄	**Group 'Scan head'** To select from which scan head the data to be shown as curves (on multi head systems).
	Click the drop down list and select your desired scan head number. The number of entries can vary here. For default, data of scan head 1 is shown after loading a Simulation File.
Segment type ● Show jumps ○ Hide jumps ○ Visualize jumps	**Group 'Segment type'** To select which vectors (mark vectors, jump vectors) are to be included in the shown curves.
	Show jumps Shown curves shall include mark vectors and jump vectors. Each curve is uniformly colored.
	Hide jumps Shown curves shall include mark vectors only (no jump vectors). Each curve is uniformly colored.
	Visualize jumps Jump vectors in all curves are highlighted (grey).

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

16

Meta data	
173859 data points	
Min(x) : -34.7 mm	
Max(x) : 40.9 mm	
Min(y) : -34 mm	
Max(y) : 40.6 mm	
Spot distance : 5 µm	

Group 'Met data'

Shows read-only information on imported data records, extrema and laser spot distance.

Important: all data shown here base on the selected import options, see Chapter 2.5.6 "Dialog "Loading Options"", page 18 *as well as* **Cancel***. Actual values may therefore differ (for example, the number of data points does not necessarily have to be the total number of lines in the* Simulation File*)!*

<n> data points: number of Simulation File lines that has been imported to syncAXIS control Viewer.

Extrema (always 4 lines): depending on the current diagram type, up to 4 values (including unit) are shown.

| Extrema	Available with diagram type
Min(x)	**Position, Position 2D**
Max(x)	**Position, Position 2D**
Min(y)	**Position, Position 2D**
Max(y)	**Position, Position 2D**
Min(v)	**Laser spot speed**
Max(v)	**Laser spot speed**
Min(vx)	**Velocity**
Max(vx)	**Velocity**
Min(vy)	**Velocity**
Max(vy)	**Velocity**
Min(ax)	**Acceleration**
Max(ax)	**Acceleration**
Min(ay)	**Acceleration**
Max(ay)	**Acceleration**
Min(jx)	**Jerk**
Max(jx)	**Jerk**
Min(jy)	**Jerk**
Max(jy)	**Jerk**

Spot distance: NaN ("not a number") indicates that the Simulation File does not contain such data (prerequisite: in the Simulation File, SpotDistance must have been defined as Active Channel).

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

17

2.5.6 Dialog "Loading Options"

The Dialog "Loading Options" opens, when you have selected a Simulation File, see Chapter 2.4 "Loading a Simulation File", page 8.
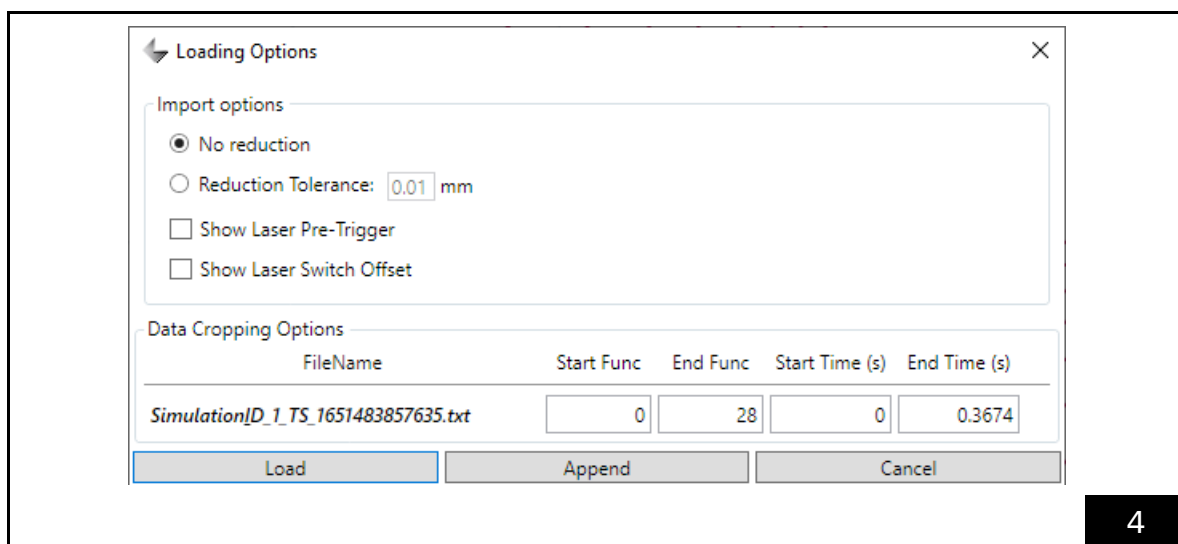
Dialog "Loading Options".

No reduction
Import option for the Simulation File: To load all Simulation File lines.

Reduction Tolerance
Performs data reduction during loading. The advantage is, that fewer position points are loaded and the display of the curve in the syncAXIS control Viewer is significantly faster when scrolling or zooming. The shape of the curve is preserved. In particular, all laser switching times and all sections in which a dynamic violation is present are not reduced.
Enter the reduction tolerance in mm (default is 0.01).

Show Laser Pre-Trigger
Shows the time shift of the laser signals by the argument `LaserPreTriggerTime`.

Show Laser Switch Offset
Shows the time shift of the laser signals by the argument `LaserSwitchOffsetTime`.

Data Cropping Options
Allows only certain sections to be imported. Select the section you want to import by entering the start and end values.

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

18

Load

Starts the import of the Simulation File according to the settings in the "Import Options" section.

Note: after the import process is completed, the status bar (see Figure 1, No. 10) shows the settings most recently made in the "Import Options" dialog.

Append

This button is disabled immediately after starting the program. It is enabled after a Simulation File has been imported. Usage is as with **Load**. Difference: the selected Simulation File(s) are imported and shown *in addition* to the already imported ones.

Notes:

* The limits of the last loaded file are valid.

* If you use **Append** and select import options (see above) different to the already imported Simulation File, then the status bar (see Figure 1, No. 10) even *only* displays the settings that has been most recently made in the "Import Options" section after the import process has been completed.

Cancel

To cancel a file import (starting from **Load**). Data loaded by then can still be displayed.

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

19

2.6 syncAXIS control Viewer Basic Procedure (Principle of Use)

Step		
(1)	To start syncAXIS control Viewer.	• Double-click `syncAXIScontrol_Viewer.exe`. syncAXIS control Viewer opens, see Figure 1.
(2)	To set the import option and specify the desired simulation file(s).	**(1)** In the main window, click **File > Open**. **(2)** Navigate to the desired Simulation File and click **Open**. **(3)** In the Dialog "Loading Options", set the desired option with which the Simulation File is to be imported. Then, click **Load**.
(3)	To choose a diagram type (plot).	• Click the desired diagram type (see page 15, for example, **Position 2D**).
(4)	Optional: to show curve(s) of Active Channel in diagram (if applicable, these are shown in addition to other curves).	• Select the desired check boxes (see page 15).
(5)	To set which axes curves are to be shown in the diagram.	• Click the desired option (see page 16, for example, **X/Y**).

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

20

Step (cont'd)		
(6)	To set which motion portion(s) the curves shall show in the diagram.	• Click the desired option (see page 16, for example, **Combined**).
(7)	To choose a scan head (available on multi head systems).	• Click the desired scan head number from the drop down list. (see page 16, for example, **scan head 1**).
(8)	To set which vectors the curves shall show in the diagram.	• Click the desired option (see page 16, for example, **Show jumps** for mark vectors and jump vectors; here, even color details are marked).
(9)	Visual inspection of individual points in curves (in the diagram area).	**(1)** Setup the Tracker according to your needs, see page 13. **(2)** Position the mouse pointer onto a curve in order to see details of this data point.
(10)	Visual inspection of extrema.	• ⚠ Caution! The accuracy of the shown values depend on the options you have selected for import. For exact results, you must use **No reduction** in step (2). Then, the status bar indicates "Selected import options: No Data Reduction". • Check the values in the group for information display (see page 17) in regards to limit value exceedances of the utilized XL *SCAN* systems.
(11)	Optional: Export of suitable settings.	• Click **File > Export Header(s)** and choose the directory to save the XML file.

syncAXIS control Viewer
Doc. Rev. 1.5.0 en-US
2 syncAXIS control Viewer

21

3   Change Index

The following are changes in this manual due to the
technical evolution of the product as well as
significant editorial changes.

Changes to document revision 1.5.0 en-US from document revision 1.4.0 en-US

Where	What
Global	Document Revision • 1.5.0 en-US applies to *syncAXIS* control-software package • V1.8.0
	Change Index, page 22