sync*AXIS* Viewer V1.6

sync*AXIS* control

Document info:
Doc. Rev. 1.1 e

June 21, 2021

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

(Doc. Rev. 1.1 e - June 21, 2021)

SCANLAB
innovators for industry

Contents

1 sync*AXIS* Viewer V1.6

This manual describes the tool sync*AXIS* Viewer V1.6 from SCANLAB.

1.1 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

1.2 Scope of Delivery

- sync*AXIS* Viewer
- This manual

1.3 System Requirements

- As with sync*AXIS* control.

1.4 Related Documents

- Manual “syncAXIS-DLL – Application Programming Interface“

1.5 Intended Use

sync*AXIS* Viewer V1.6 is a tool (with GUI) for visualizing unmodified simulation files (see Manual “syncAXIS-DLL – Application Programming Interface“ and Chapter 1.8 “Content of a Simulation File“, page 5) generated by sync*AXIS* control V1.6.

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 sync*AXIS* Viewer.

sync*AXIS* Viewer V1.6 is able to indicate exceedances of positioning stage and scan head in the plots (affected curve sections are then drawn in orange and a corresponding information is shown in the status bar, see “Exceedance of Limits“, page 7).

Notice: sync*AXIS* 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.

1.6 Program Start

- Start **syncAXIS_Viewer.exe**.
  The program opens.

Alternatively, you can start the program via command line arguments. Here you also can configure the graphical user interface and the simulation files to be loaded. You have the following possibilities:

- Argument in commando line:
  syncAXIS_Viewer.exe [OPTION]… [FILE]…
  Options:
  – With no [FILE] syncAXIS Viewer opens in default screen and ignore options (multiple files are allowed).
  – **-h --help**: Opens a help window with descriptions of the command arguments.
  – **-r N, --read-each N**: Reads only each N-th line.
  – **-a, --accurate-position**: Calculates positions of marks and jumps with a higher precision due to laser delays.
  – **-l, --accurate-limits**: Only allowed if --read-each N is also set, values exceeding the limit are displayed in orange, see “Exceedance of Limits”, page 7.

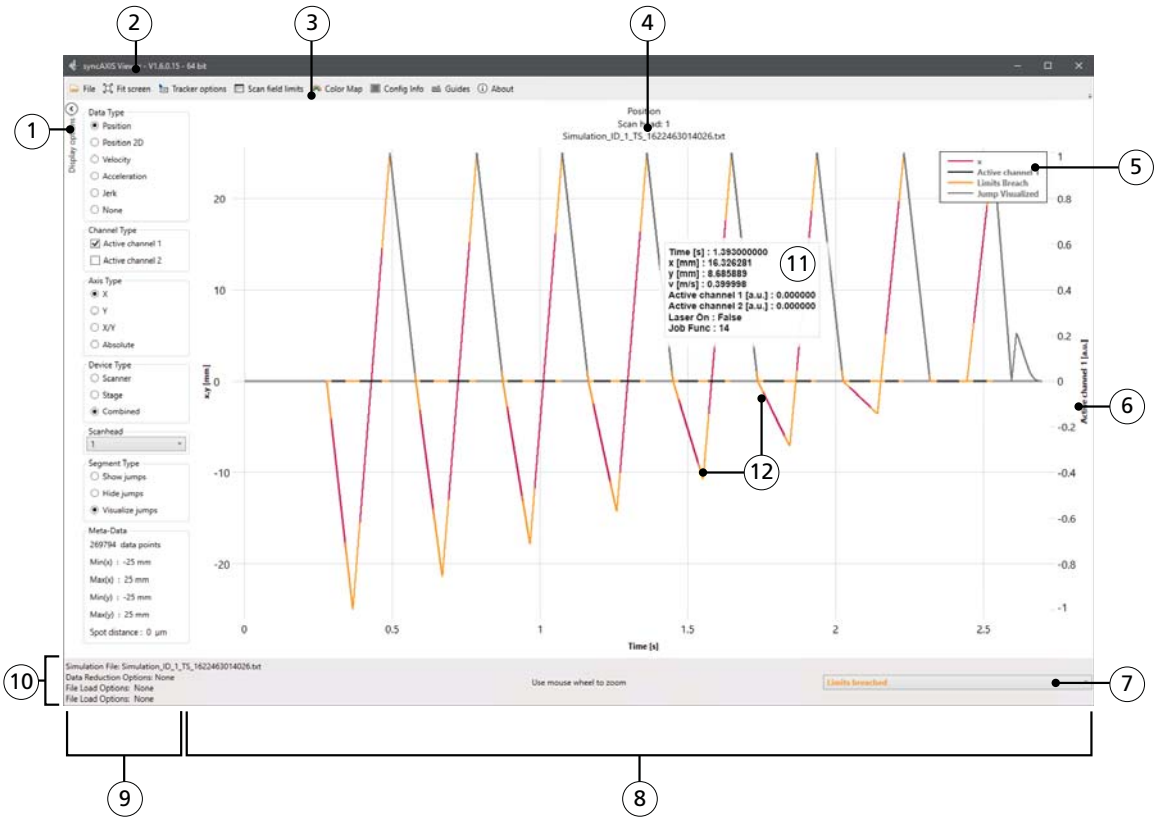
1.7 Loading a Simulation File

- Click **File > Open** and choose your desired simulation file. For a description of the loading options, see “Dialog Loading Options”, page 17.
  Alternatively you can drag a simulation file in the program window.
  Note: Before loading, sync*AXIS* 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.

1.8 Content of a Simulation File

For the content of a simulation file, see Manual “syncAXIS-DLL – Application Programming Interface“.

1.9 Graphical User Interface (GUI)



Legend

1. Button to hide or display the controls
2. Title bar (with version info)
3. Toolbar (see page 10)
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 14)
7. Selection of the exceeded limits
8. Area for graphical display (with diagram area)
9. Areas with controls (see page 14)
10. Status bar (with information on imported files and the applied import options, operating tips, for any exceeding of limit values)
11. Tracker (optional; shows the values at that curve point; see page 11).
12. Curves

1

sync*AXIS* Viewer V1.6: main window (overview).

1.9.1 Zoom 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. sync*AXIS* 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**

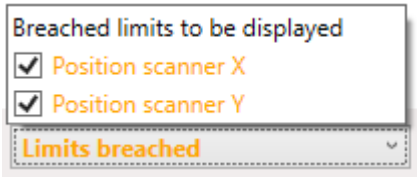
1.9.2 Exceedance of Limits

From the currently loaded simulation file, sync*AXIS* Viewer V1.6 reads out the working field size, max. velocity, max. acceleration and max. jerk of the positioning stage(1). These limits are read out from the configuration in the simulation file. If the working field size is not determined in the configuration, it will taken from the correction file specified via the `DefaultCorrectionFile`(1) tag. If this is also not successful, 54 mm × 54 mm are used(2).

sync*AXIS* Viewer V1.6 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 8 shows an example of exceeded limits.

When limits are exceeded, the drop down list **Limits breached** appears on the right hand side of the status bar.

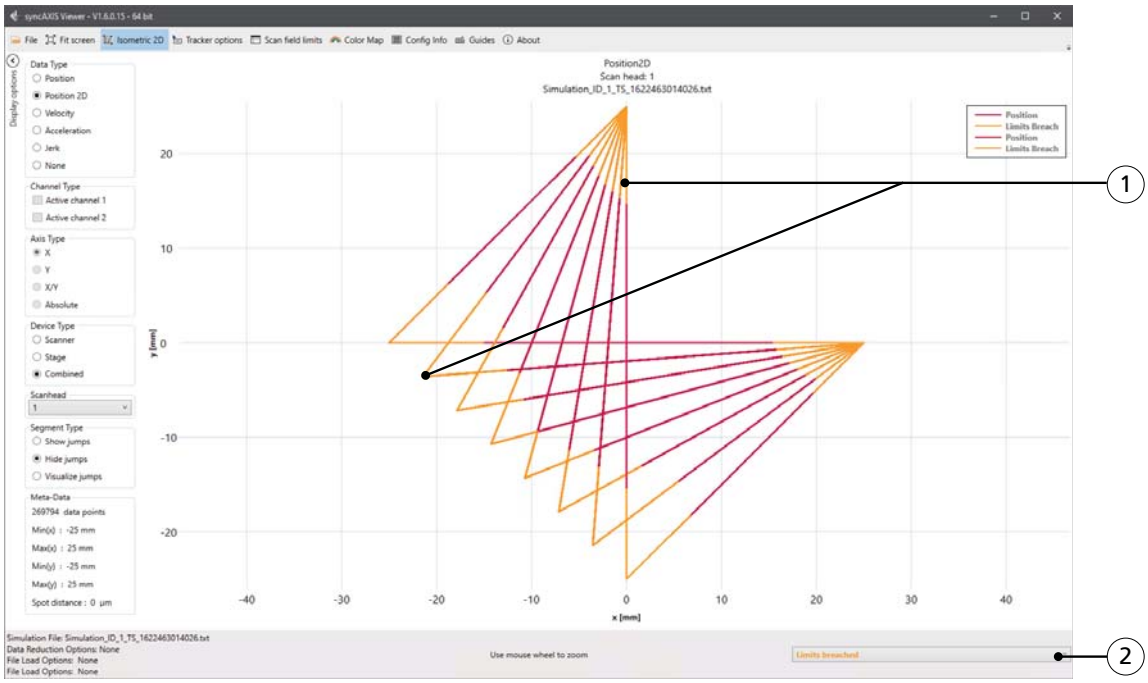
- Click **Limits breached**. The selection of the exceeded limits to be displayed is shown.



  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 drop down 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 also Manual “syncAXIS-DLL – Application Programming Interface“.

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



Legende

1. Limits breached in the orange areas
2. Selection of the devices/axis with exceeded limits

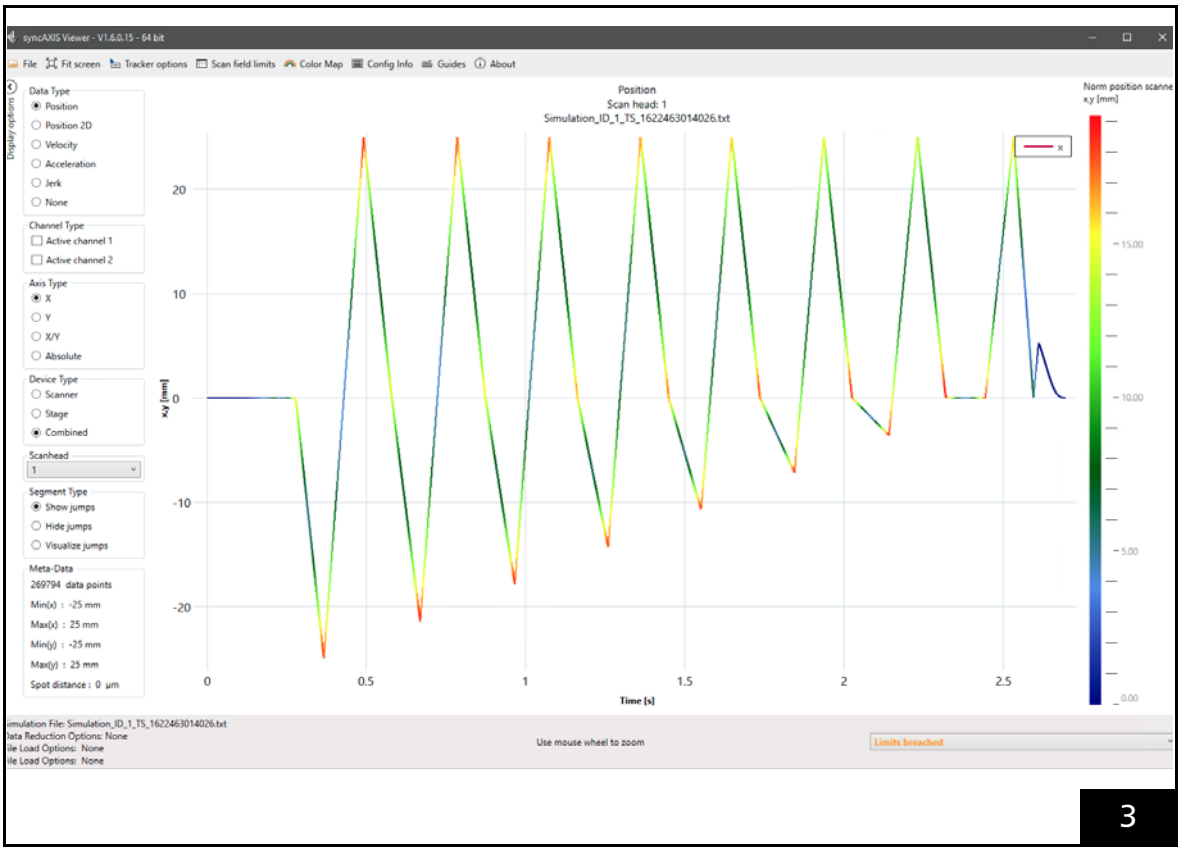
2

sync*AXIS* Viewer V1.6: Display of exceeded limits

1.9.3 Color Map

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

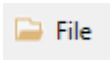
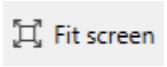
- Click **Color Map** in the toolbar and choose the value to be displayed in color. For each selection, the norm is displayed. It can be shown (each for scanner and stage):
  – position
  – velocity
  – acceleration
  – jerk
  and the job function.
- Click the color scale on the right, hold the mouse button and drag the mouse to adjust the scale.
- Choose **Limits breached** to end the colored display.

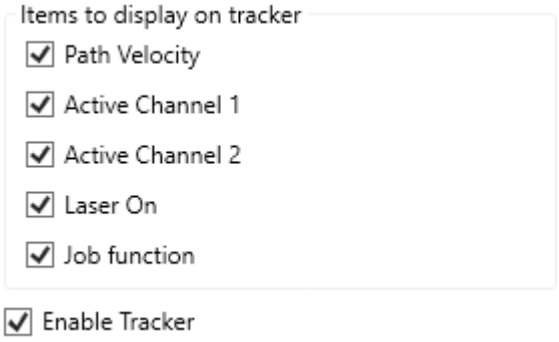
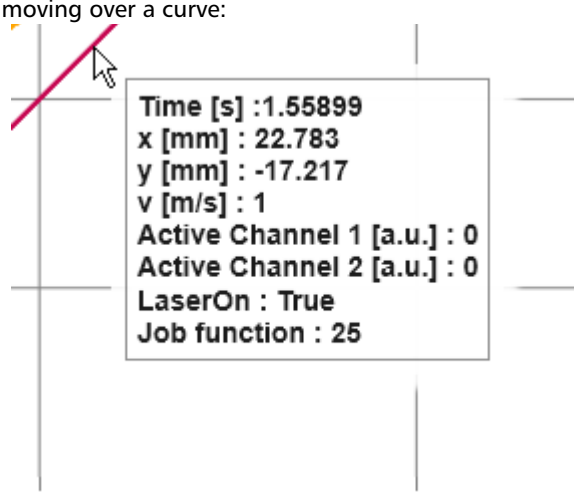
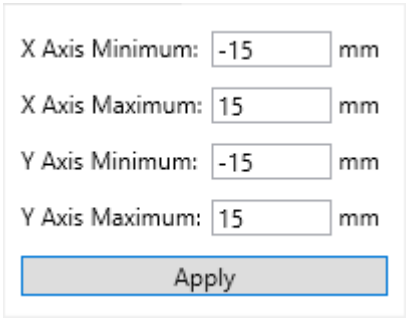


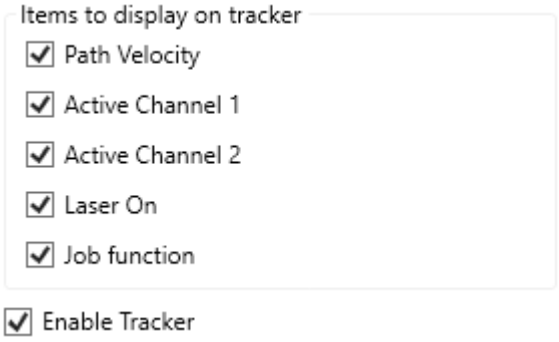
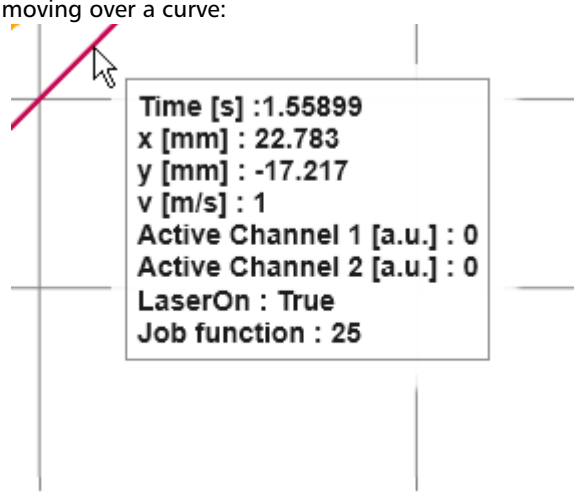
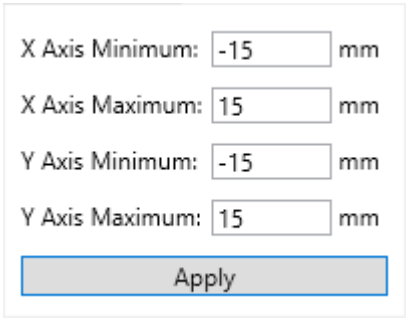
3

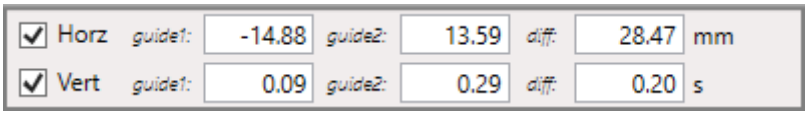
Display of a color map of the scanner (Norm position scanner)

1.9.4 Functions of the Toolbar

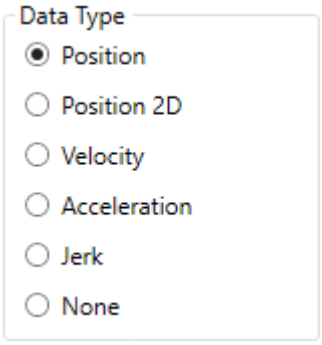
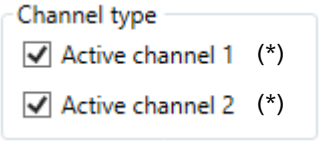
	**File** • To open a simulation file (`*.txt`). For more details, see Chapter 1.9.6 "Dialog Loading Options", page 17. • To export header(s) of the currently loaded simulation file(s) in XML format.
	**Fit screen** To reset the zoom factor or the scaling and to adjust the size of the diagram to the screen.
	**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.

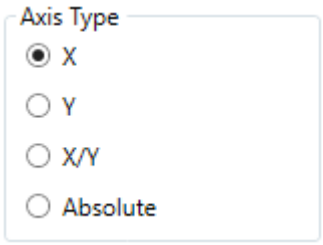
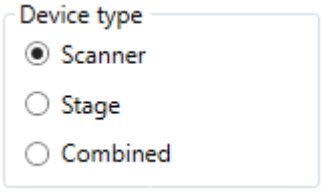
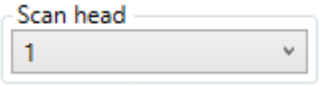
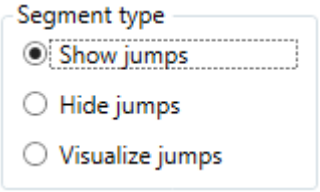
Tracker options	**Tracker options** To open the tracker settings. • Choose the information to show in the tracker when moving the cursor over a curve or • clear **Enable Tracker**. The tracker is not shown anymore.  With options chosen as shown above, the tracker shows following information when moving over a curve: 
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**. 

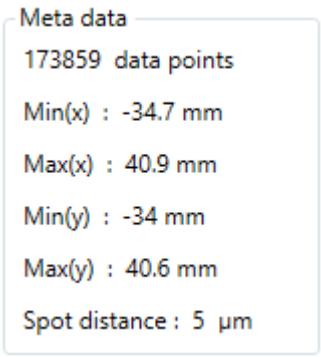
Tracker options	**Tracker options** To open the tracker settings. • Choose the information to show in the tracker when moving the cursor over a curve or • clear **Enable Tracker**. The tracker is not shown anymore.  With options chosen as shown above, the tracker shows following information when moving over a curve: 
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**. 

Color Map	**Color Map** To display of color maps of several values, see “Color Map”, page 9. • Select the norm to display.
Config Info	**Config Info** To display configuration information.
Guides	**Guides** To show/delete (not: hide) of two guides. • Click **Guides**. The configuration panel appears in the status bar.  • 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 information about the programmer.

1.9.5 Functions of the Controls

	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, page 6).
	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/s²] vs. Time [s]
	Jerk jx, jy [m/s²] vs. Time [s]
	None None of the above diagram types. Nevertheless, Active Channel curves are shown, if these are selected.
 (*) 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 `syncAXIS 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**.

	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.
	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.
	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.
	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).



Group that 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 1.9.6 "Dialog Loading Options", page 17 *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 sync*AXIS* Viewer.

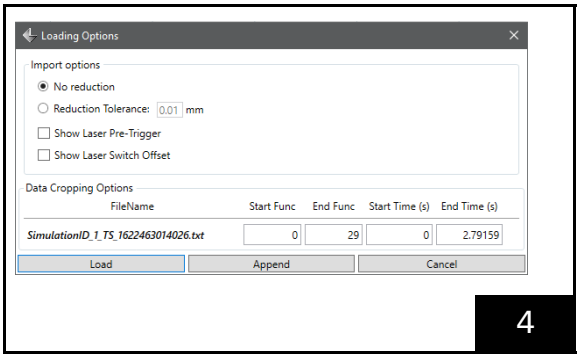
Extrema (always 4 lines): depending on the current diagram type, up to 4 values (including unit) are shown.

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).

1.9.6 Dialog Loading Options

The dialog “Loding Options” opens, when you have selected a simulation file, see “Loading a Simulation File”, page 5.



Dialog Loading Options

No reduction Import option for the simulation file: To load all simulation file lines.
Reduction Tolerance This function performs data reduction during loading. The advantage is, that fewer position points are loaded and the display of the curve in the sync*AXIS* 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 This function shows the time shift of the laser signals by the argument `LaserPreTriggerTime`.
Show Laser Switch Offset This function shows the time shift of the laser signals by the argument `LaserSwitchOffsetTime`.
Data Cropping Options This function allows only certain sections to be imported. Select the section you want to import by entering the start and end values.

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, page 6, 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, page 6, 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.

1.10 sync*AXIS* Viewer Basic Procedure (Principle of Use)

Step		
(1)	To start sync*AXIS* Viewer.	• Double-click `syncAXIS Viewer.exe`. sync*AXIS* Viewer opens[(a)], see figure 1, page 6.
(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 "Loading Options" dialog (see page 17), 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 14, 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 14).
(5)	To set which axes curves are to be shown in the diagram.	• Click the desired option (see page 15, for example, **X/Y**).

(a) `syncAXIS 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.

Step (cont'd)		
(6)	To set which motion portion(s) the curves shall show in the diagram.	• Click the desired option (see page 15, 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 15, for example, **scan head 1**).
(8)	To set which vectors the curves shall show in the diagram.	• Click the desired option (see page 15, 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 11. **(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 16) in regards to limit 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.