

Data Visualizer

Evaluation Tool for Disturbance Records

Manual DATVIS-5.0-EN-MAN



Data Visualizer

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1 Important Definitions


The types of messages shown below serve the safety of life and limb as well as for the appropriate operating life of the device.

DANGER!




DANGER indicates an immediately dangerous situation that will result in death or serious injury if it is not avoided.

WARNING!




WARNING indicates a hazardous situation that can result in death or serious injury if it is not avoided.

CAUTION!




CAUTION indicates a possibly hazardous situation that can result in minor or moderate injuries if it is not avoided.

NOTICE!




NOTICE is used to address practices not related to personal injury.



This symbol indicates useful tips and recommendations as well as information for efficient and trouble-free operation.

Proper Use of the Device and of This Manual

WARNING!



FOLLOW INSTRUCTIONS

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

WARNING!**PROPER USE**

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (1) constitute “misuse” and/or “negligence” within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (2) invalidate product certifications or listings.

The programmable devices subject to this manual are designed for protection and also control of power installations and operational devices that are fed by voltage sources with a fixed frequency, i.e. fixed at 50 or 60 Hertz. They are not intended for use with Variable Frequency Drives. The devices are further designed for installation in low-voltage (LV) compartments of medium voltage (MV) switchgear panels or in de-centralized protection panels. The programming and parameterization has to meet all requirements of the protection concept (of the equipment that is to be protected). You must ensure that the device will properly recognize and manage (e. g. switch off the circuit breaker) on the basis of your programming and parameterization all operational conditions (failures). The proper use requires a backup protection by an additional protective device. Before starting any operation and after any modification of the programming (parameterization) test make a documentary proof that your programming and parameterization meets the requirements of your protection concept.

The Self-Supervision Contact (Life-Contact) has to be wired with the substation automation system in order to supervise and monitor the state of health of the programmable protective device. It is very important that an alarm annunciation is driven from the programmable protective device self-supervision contact (Life-Contact) that requires immediate attention when tripped. The alarm indicates that the protective device is no longer protecting the circuit and the system should be serviced.

Typical applications for this product family/device line are for instance:

- Feeder protection
- Mains protection
- Machine protection
- Transformer Protection
- Generator Protection

Any usage beyond these applications the devices are not designed for. This applies also to the use as a partly completed machinery. The manufacturer cannot be held liable for any resulting damage, the user alone bears the risk for this. As to the appropriate use of the device: The technical data and tolerances specified by *Woodward* have to be met.



Out-of-date documentation?

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, please visit the download section of our website.

Please check the web site of Woodward for the latest revision of this Technical Manual and if there is an Errata Sheet with updated information.

- Visit the company website (=> www.woodward.com) and search for the documents you are interested in. (The ID of every document is printed on its cover page.)
- Alternatively, every HighPROTEC device has a QR code printed on it. Scan this code, and you are taken to an online directory that contains all relevant documents in the most recent version.

Important Information

WARNING!



In line with the customer's requirement the devices are combined in a modular way (in compliance with the order code). The terminal assignment of the device can be found on the top of the device (wiring diagram).

CAUTION!**Electrostatic Discharge Awareness**

All electronic equipment is electro static-sensitive, some components more than others. To protect these components from electro static damage, you must take special precautions to minimize or eliminate electrostatic discharges. Follow these precautions when working with or near the control.

1. Before doing maintenance on the electronic control, discharge the static electricity on your body to ground by touching and holding a grounded metal object (pipes, cabinets, equipment, etc.).
2. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
3. Keep plastic, vinyl, and Styrofoam materials (such as plastic or Styrofoam cups, cup holders, cigarette packages, cellophane wrappers, vinyl books or folders, plastic bottles, and plastic ash trays) away from the control, the modules, and the work area as much as possible.
4. Do not remove any printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
 - Verify the safe isolation from supply. All connectors have to be unplugged.
 - Do not touch any part of the PCB except the edges.
 - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
 - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

To prevent damage to electronic components caused by improper handling, read and observe the precautions in the *Woodward* manual 82715, "Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules".

Woodward reserves the right to update any portion of this publication at any time. Information provided by *Woodward* is believed to be correct and reliable. However, no responsibility is assumed by *Woodward* unless otherwise expressly undertaken.

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2 Introduction to the DataVisualizer

The *DataVisualizer* is a universal tool for evaluation of disturbance records, i. e. currents and voltages in case of a fault or at other times stipulated by the user. The *DataVisualizer* evaluates the disturbance records stored in the individual control devices. With this program it is possible to visually display, process, store and print disturbance records in their chronological progress (as oscillographic curves) with the appertaining events (such as tripping, alarm, etc.).

The *DataVisualizer* offers:

- Analysis of the fault
- detection of the faulty consumer
- the reaction of the grid and
- the switch-off behavior of the circuit breaker

This information provides the user with the basis for the analysis of faults and weak points of his electrical equipment.

On this basis the following is possible, for example:

- to adjust or revise circuit breakers
- to limit short circuit powers
- to optimise transformers (capacity / u_K)
- to adjust converters (saturation behaviour)

Installation of the DataVisualizer

System requirements:

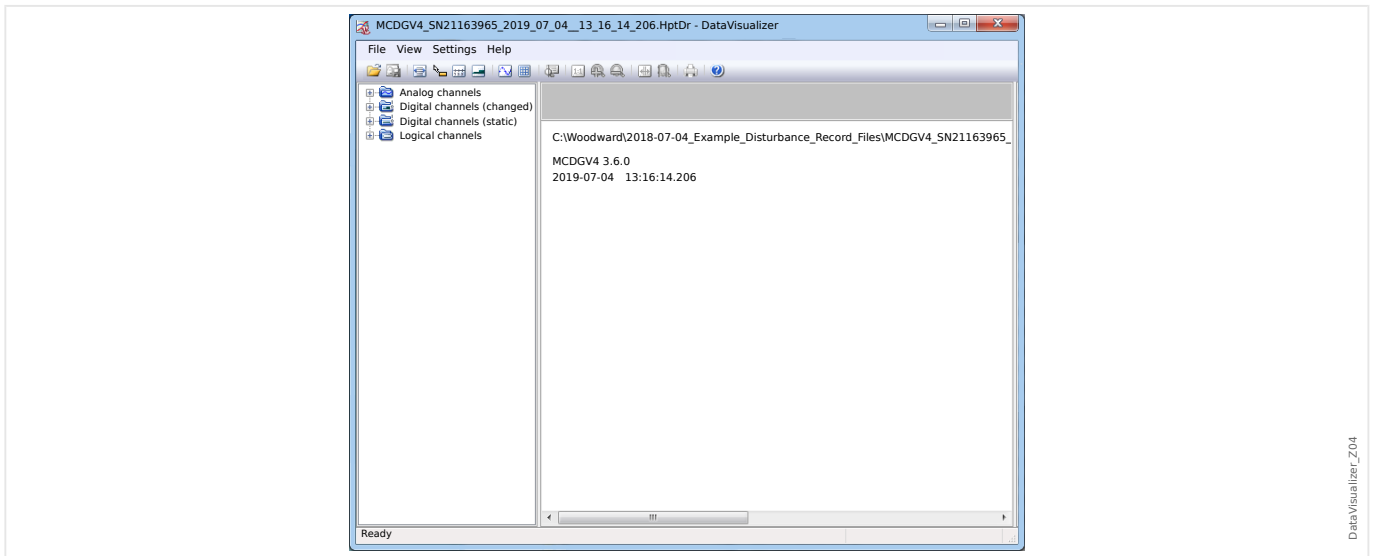
Windows 7, Windows 8.x or Windows 10

The *DataVisualizer* does not need a separate installation process, because it is always installed along with *Smart view*.

Uninstalling DataVisualizer

The *DataVisualizer* does not need a separate uninstall process, because it is always removed together with *Smart view*.

DataVisualizer Start



A file is imported via the menu item [File / Open Existing Disturbance File] (see [“3 File Menu”](#)), or via the corresponding button [1] (see [“3 Button Bar”](#)).

The supported files can have the following suffixes:

- HighPROTEC file formats:
 - *.HptDr — disturbance records
 - *.HptSr — start records
 - *.HptTr — trend records
- HighTechLine file formats:
 - *.dsb
 - *.cfg

The *DataVisualizer* selects the appropriate input filter, and after the file has been loaded successfully, the channels are shown on the Tree Structure Panel, sorted into categories such as Analog Channels, Digital Channels, and so on.

3 DataVisualizer's Main Window

The *DataVisualizer* is a universally applicable tool for displaying fault and system records.

Structure of the Main Window

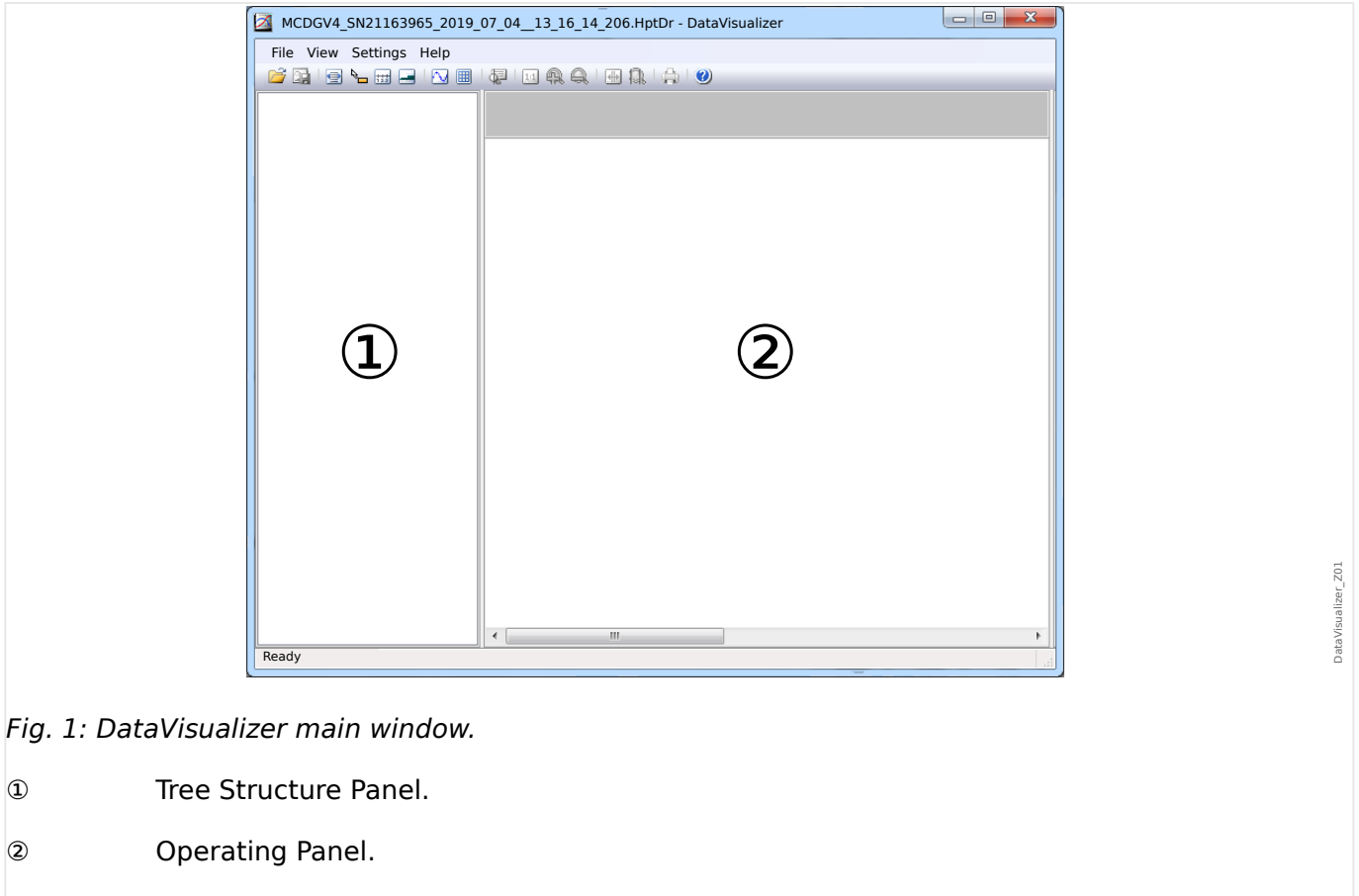
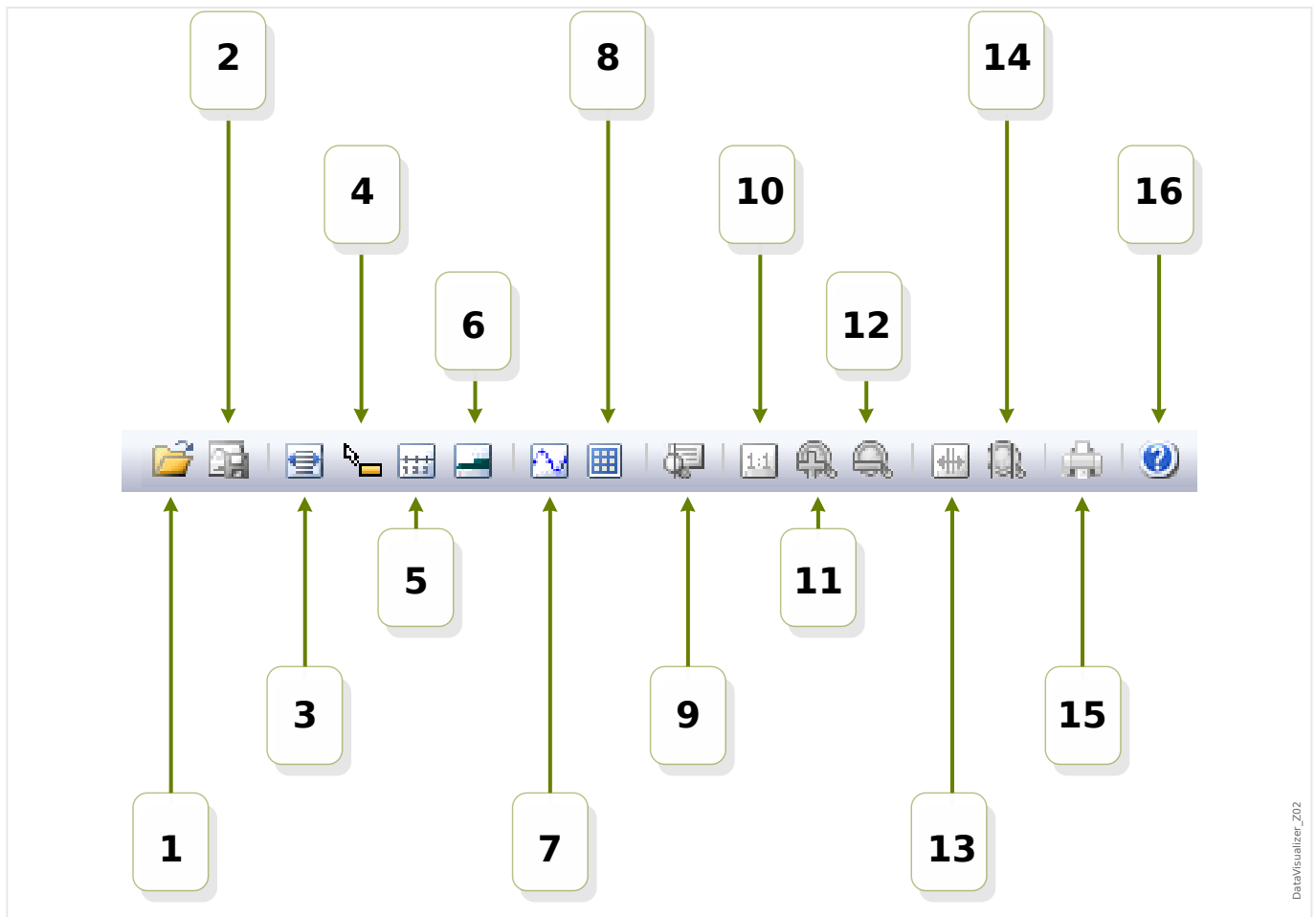



Fig. 1: DataVisualizer main window.


- ① Tree Structure Panel.
- ② Operating Panel.

The buttons on the toolbar are described here:  "3 Button Bar"

Button Bar

- **[1]** Open a disturbance record.
- **[2]** Freeze view: Store the current view settings of the loaded disturbance file. (A new file with the extension *.snp - *snapshot* - is created.) Depending on the preferences (↳ **“3 Preferences Menu”**) these settings are automatically adopted again when the file is loaded.
- **[3]** The width of the time axis depends on the window size and gets automatically adjusted if the window dimensions are changed. (If this option has not been chosen, this resolution can be set in the preferences in addition to others, see ↳ **“3 Preferences Menu”**). This is deactivated automatically during zooming.
- **[4]** If the mouse is located within the working panel and this option has been activated, a small panel is displayed with the »measured values« at the mouse position (if the mouse is not moved for about 1 second). (See also ↳ **“5 Show Measured Data”**.)
- **[5]** Switch the labelling of the time axis on or off.
- **[6]** Modify the low offset of the digital channels.
- **[7]** Switch the marking of the sample points on or off. (See also ↳ **“5 Show Sampled Data”**.)
- **[8]** Display the analog channels with or without grid.
- **[9]** Time slider: A cursor (green vertical line) is shown. Press and hold down the left hand mouse key over the green line. Keep holding down the left hand mouse key

and move the mouse pointer along the time line. All measured values of the displayed channels are indicated in a window for the respective cursor position. (See also  "5 Momentary Values".)

- **[10]** Switch back to display without zoom (original size).
- **[11]** This option zooms the display of all channels.
- **[12]** Switch back to the next lower (previous) zoom stage.
- **[13]** Two cursor lines are shown. Press and hold down the left hand mouse key above these lines and move them according to the interval you want to zoom in. By means of the blue line you can define the start and by means of the red line you can define the end of the time interval. By pressing button [14] the *DataVisualizer* zooms into the interval that you have set. (See also  "5 Zoom".)
- **[14]** Stretch the time axis onto the time range between the two cursors [13].
- **[15]** Print the currently displayed channels.
- **[16]** Open the online help.

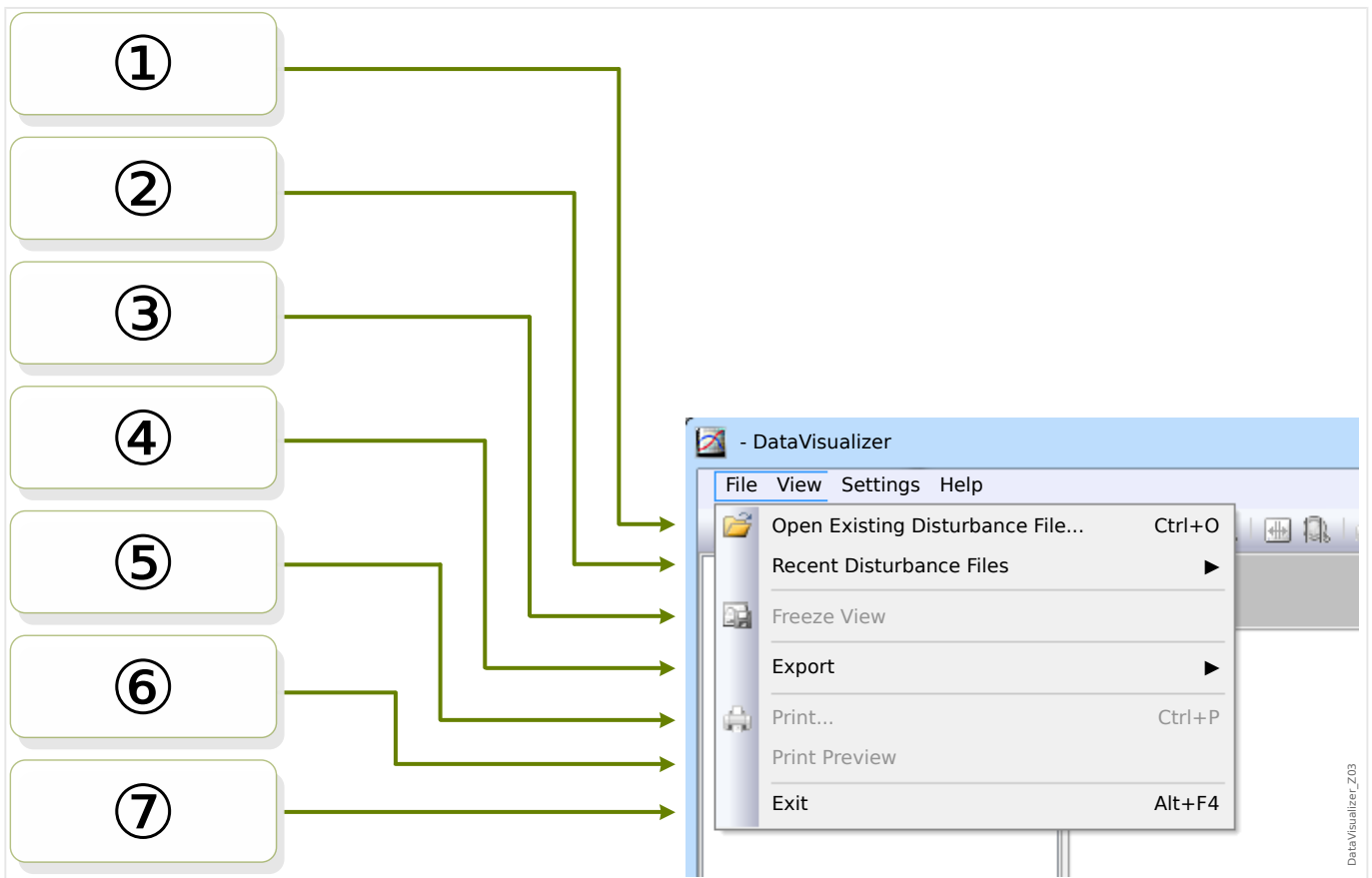
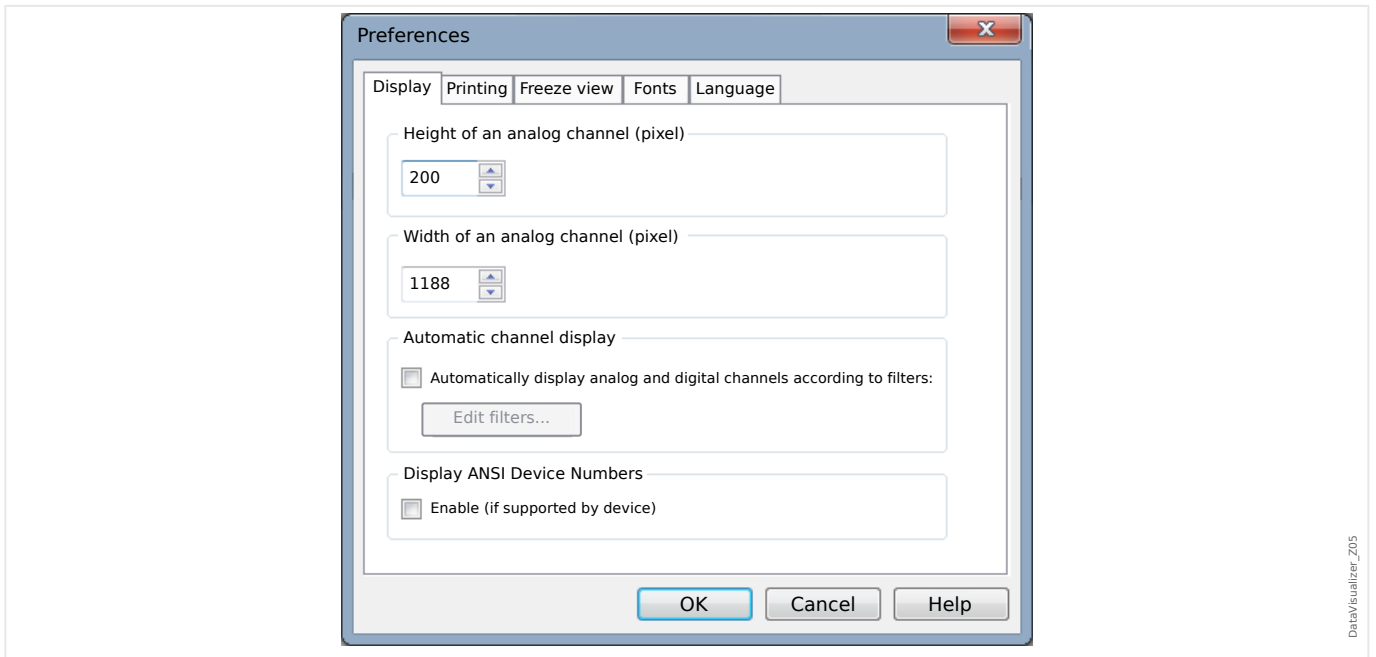
[File] Menu

Fig. 2: Menu items in the [File] menu.

- ① Open or import an existing disturbance record file. See [“2 DataVisualizer Start”](#) for supported file types.
- ② Select to re-open a previously opened file.
- ③ Freeze view, see [button \[2\]](#).
- ④ Export the currently loaded file to ASCII, Look or COMTRADE file format.
- ⑤ Print.
- ⑥ Print preview.
- ⑦ Quit the *DataVisualizer*.

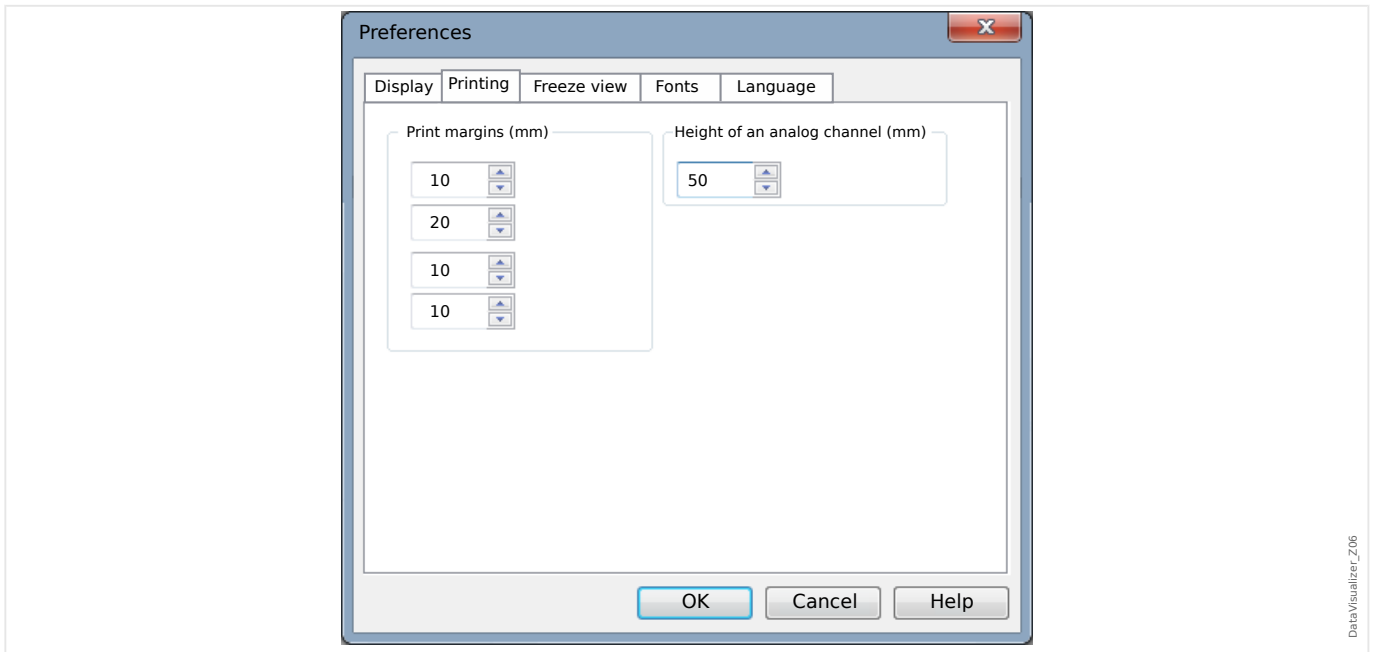
[Preferences] **Menu**



Some settings can be changed permanently. For this purpose select the menu item [Preferences / Edit]. These settings are stored so that they become effective again with a subsequent (re-)start of the *DataVisualizer*.

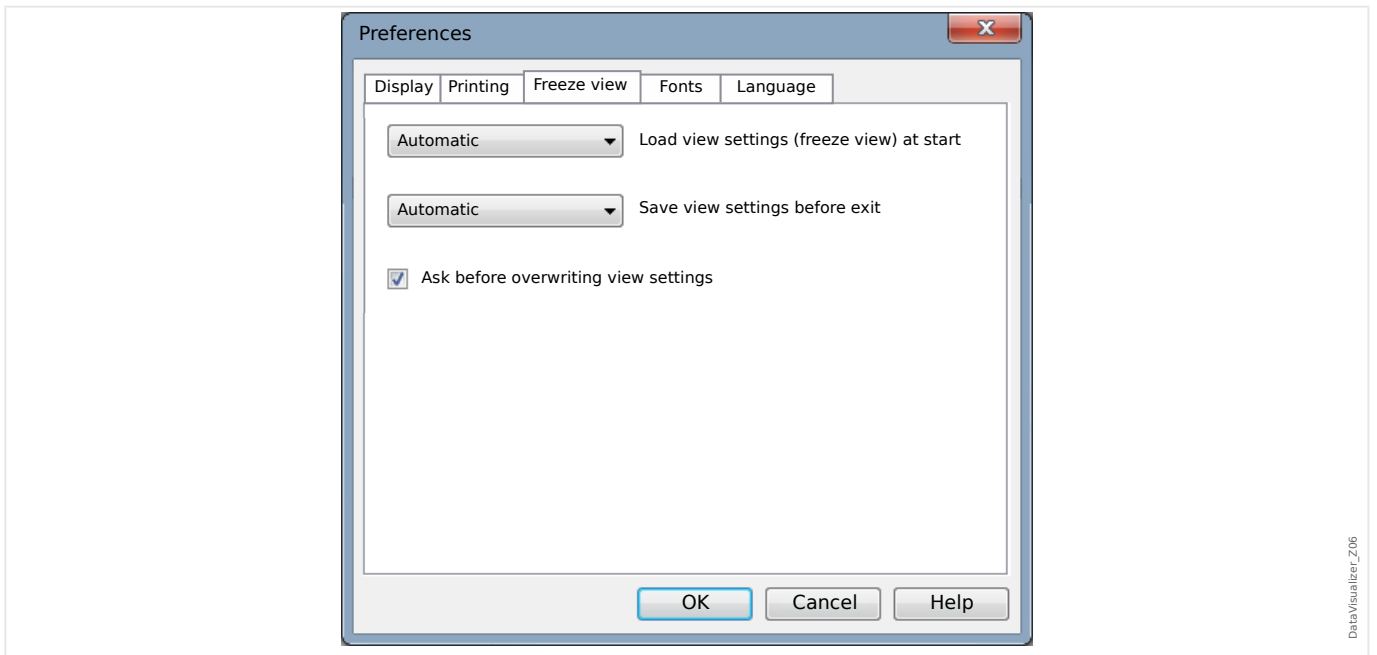
Display

- The screen resolution (width and height of the analog channels) can be adjusted. The size of digital and logical channels depends on the font chosen for the display.
- An automatic filter can be added and defined for the analog and digital channels (↳ **“4 Automatic Channel Display”**).
- The display of the ANSI Device Numbers can be enabled. This setting works only if the device supports it. If this setting is changed when channels are already displayed, the change becomes effective only if the file is reloaded.



Printing

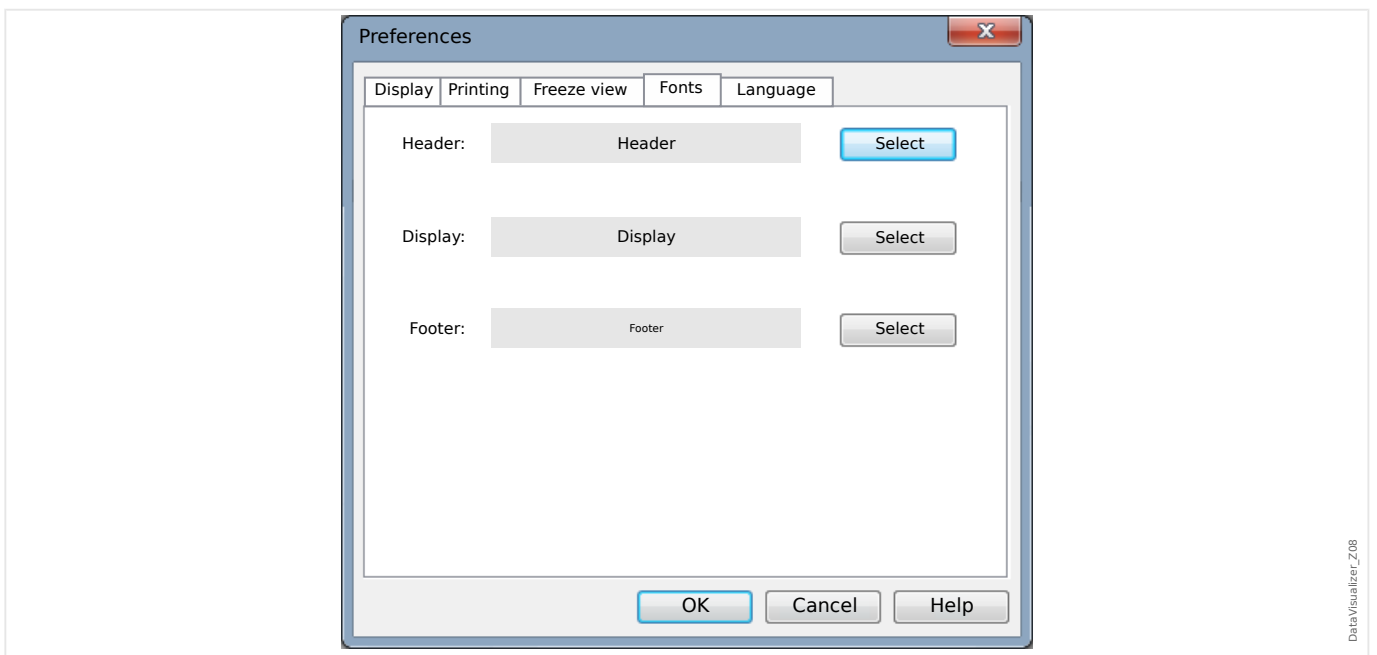
- The paper margins can be adjusted for printouts.
- Furthermore, the height of the analog channels can be specified in millimeters.



Freeze View

- These settings define the storage of the currently selected display parameters.

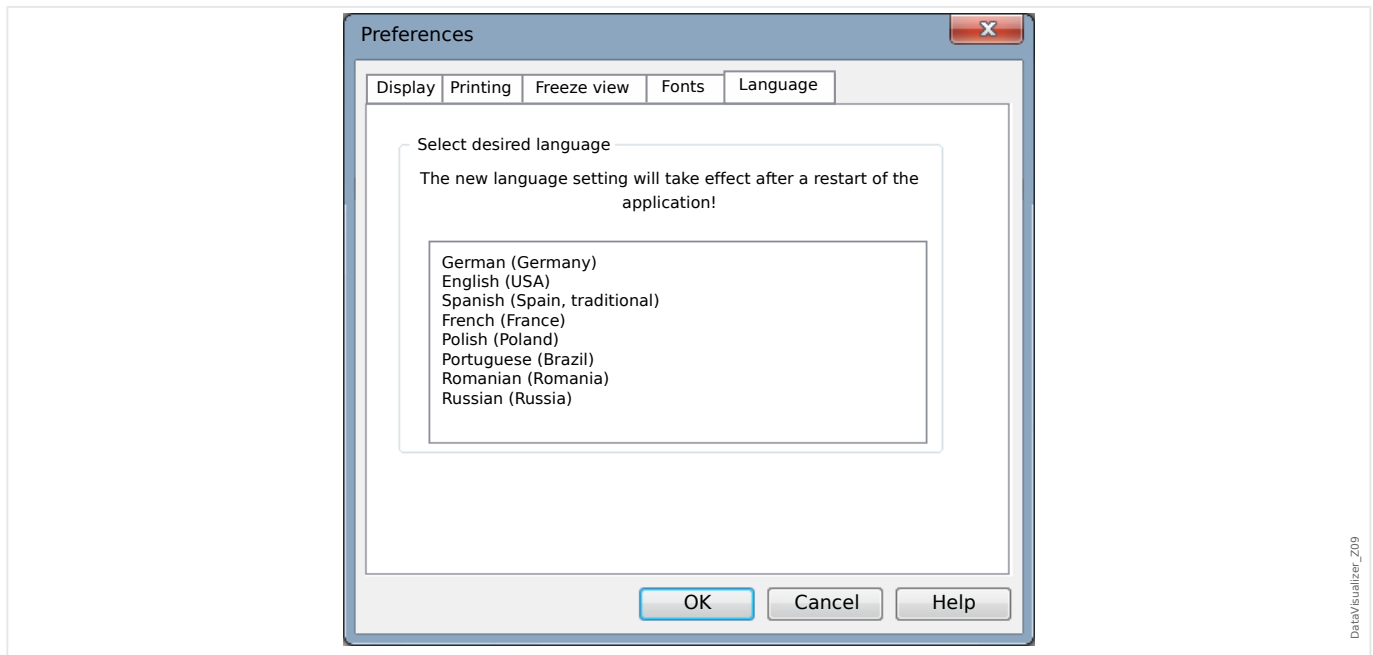
A snapshot stores all displayed channels as well as their order. These are then available when the file is loaded again.



Fonts

- The fonts for display and printing are adjusted.

The displayed height of the digital and logical channels is adjusted as a function of the chosen fonts.



Language

- The language that *DataVisualizer* uses can be selected.


A change, however, becomes effective only after a restart of the *DataVisualizer*.

[Help] **Menu**

The [Help / Help] menu item launches the *DataVisualizer* online-help.

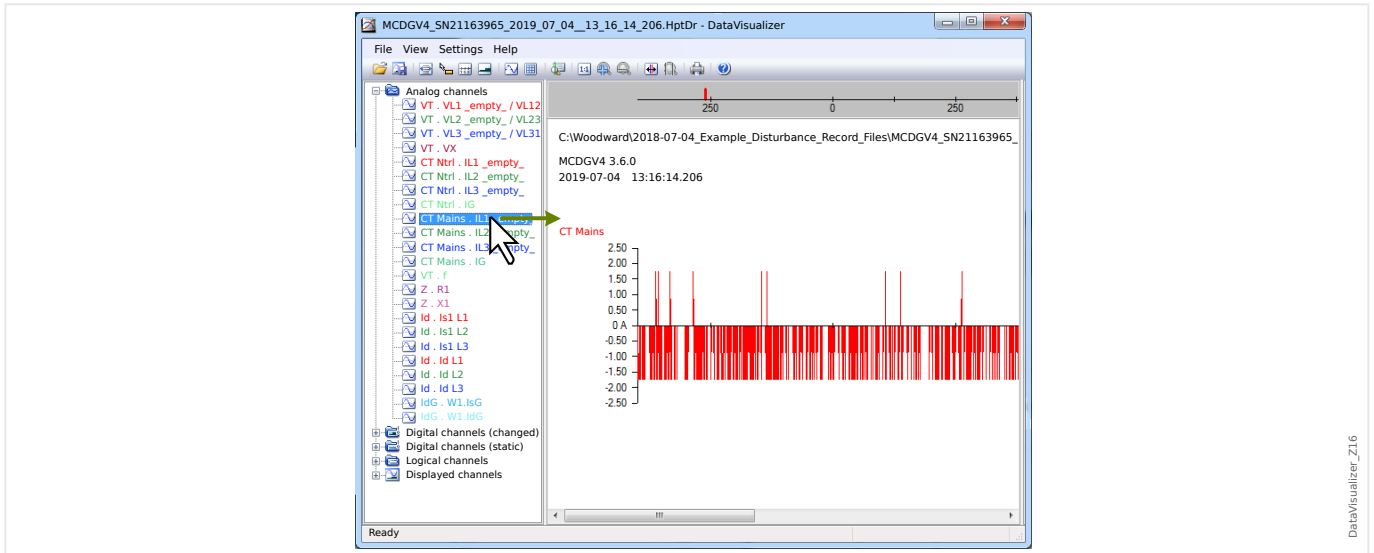
The [Help / Program Information] menu item launches a window that displays *DataVisualizer*-related version and copyright information.

Function of the Mouse Pointer

- If the mouse is not moved inside the operating window, the appertaining sample number and time are shown. If the respective button is active, the measured values of the channel underneath the mouse will be displayed.
- If the mouse position gets near the cursors (Button bar [9] or [13],  "3 Button Bar") the pointer changes and these cursor lines can be shifted by keeping the left mouse button suppressed.
- If the left mouse button is pressed on a display, a section can be zoomed. If the mouse is moved while the left mouse button is being pressed, it is possible to fix the section to be zoomed. There are two cursors which indicate during marking whether this zoom rate is permissible. (Zoom OK, Zooming not possible as this would exceed the maximum resolution of 32000 × 32000 pixels.) Zooming can be aborted with the »ESC« key.
- If the right hand mouse key is pressed and the display is larger than the screen section, the mouse pointer changes into a hand symbol. If the mouse key is held down the shown section can be moved.




4 The Tree Structure — Handling Displayed Channels

Add Channels to the Operating Panel



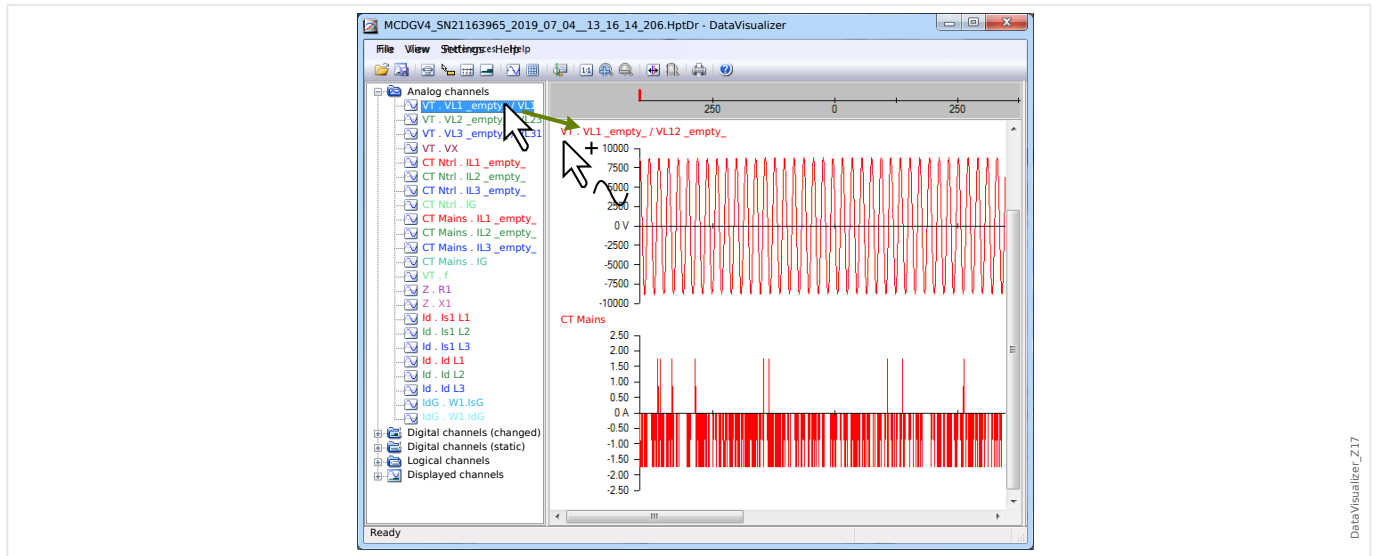
Additional channels can be dragged from the Tree Structure Panel onto Operating Panel (with the left-hand mouse button pressed).

During this procedure the mouse pointer changes and indicates how this channel is going to be displayed:

- 1st possibility:  — A new graph is added in this place.
- 2nd possibility:  — The curve is added to the existing graph. (Note that only analog channels can be combined).
- 3rd possibility:  — It is not possible to add the channel to this position.

Further channels can be added the same way.

It is also possible to select several channels at a time (with the »Ctrl« key being pressed), then drag and drop them all at once.



Remove Channels from the Operating Panel

If you want to remove channels from the display, select and do a right-mouse-button click on the channel to be removed in the tree structure (displayed channels). (It is possible to select several curves the usual way, by keeping the »CTRL« key pressed.)

Then press the »Delete« key.

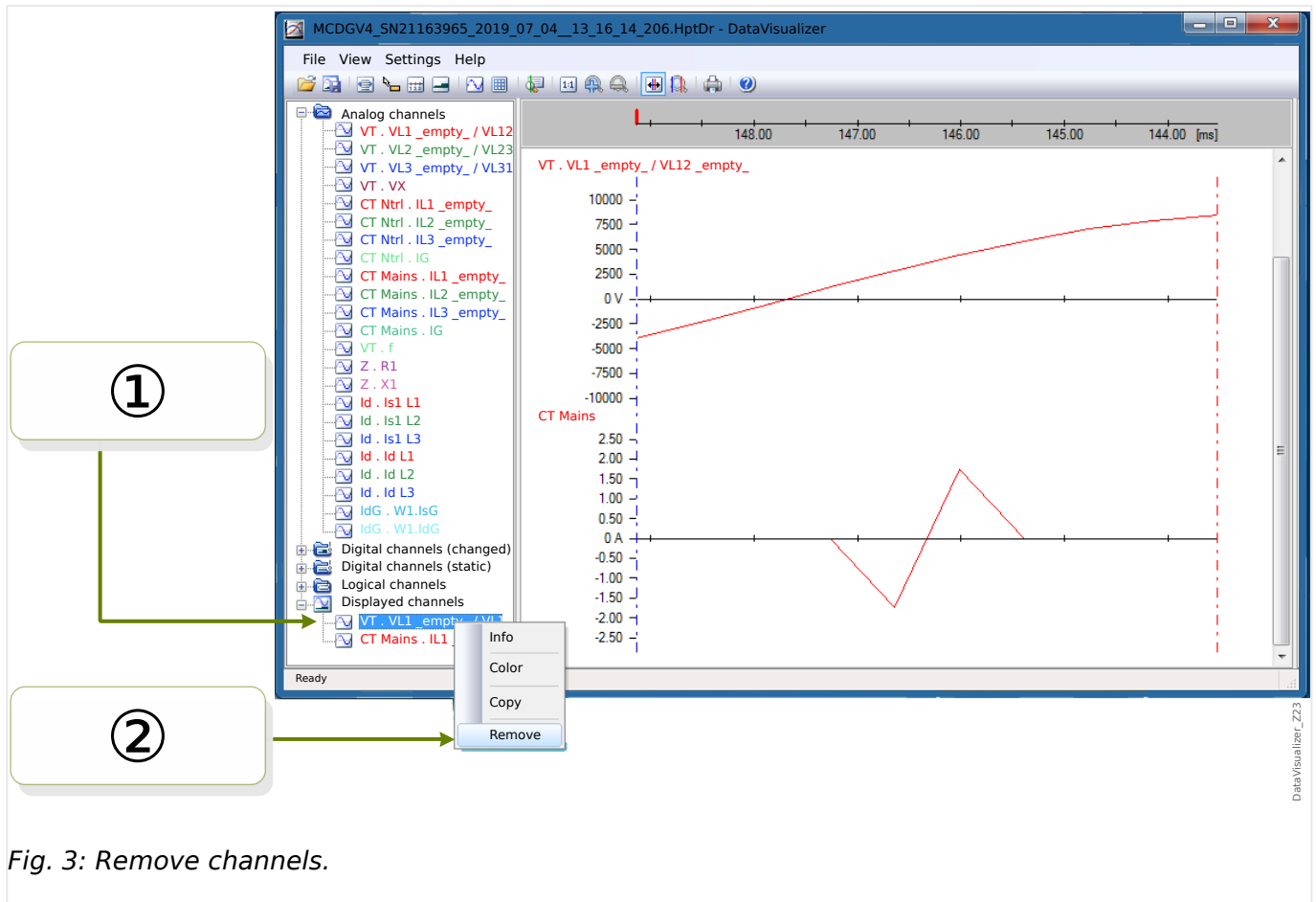


Fig. 3: Remove channels.


Alternatively, the channels can be removed with the following procedure:

- ① First select the channels with the left mouse key (multiple choices by means of the pressed and hold down »CTRL« key respectively »Shift« key are possible).

② Then do a right-mouse-button click on any selected channel and select the option »Remove« from the context-menu.

The context-menu of the parent-branch in the Tree Structure also offers the option »Remove all« or »Remove group«. These remove all subordinated channels at once.

Automatic Channel Display

It is possible to enable option to automatically display certain channels after opening a new file (see: [Preferences / Edit] → Display → Automatically display analog and digital channels according to filters,  "3 Preferences Menu").

Channels to be added are defined by filters, that are set in a separate dialog. There are separate filters for analog channels and changed digital channels (see: [Preferences / Edit] → Display → »Edit filters«).

It is possible to either a default filter set or a user-defined filter set.

Note: If a "snap shot file" exists for a recently opened file (see [Preferences / Edit] → Freeze view), then the stored view from this "snap shot file" is used for the channel display. In this case the automatic channel display is ignored.

Defining filters: A filter definition consists of several channel names that are entered, each on a separate line, into the text field of the dialog. Each line entry will generate a new diagram. (Exception: The comma character, see "*Analog channels*" below.) The matching mechanism is case-sensitive, and also space (blank) characters do count. It is possible to use wildcards in filter definitions to match several channel names to be added. An asterisk character "*" represents any number of any characters in the filter definition. (See some examples below.)

Analog channels: Usually channels matched by a filter are added one underneath the other. In case of analog channels it is possible to have some channels being displayed overlapping on one graph. To achieve this, a "," (comma) character must be used. If several channel filters appear in one line, each separated one from another by a comma, then all matching channels will be displayed in one graph. But if some of these channel(s) shall be forced onto a new graph (underneath the previous one) then this can be achieved by starting this part of the filter definition on a new line (see Example 3 below).

Digital channels: In case of digital channels it is not possible to have multiple overlapping channels on one graph. Therefore all digital channels are always added one underneath the other no matter which character (comma or »new-line«) is used to separate the filter definitions.

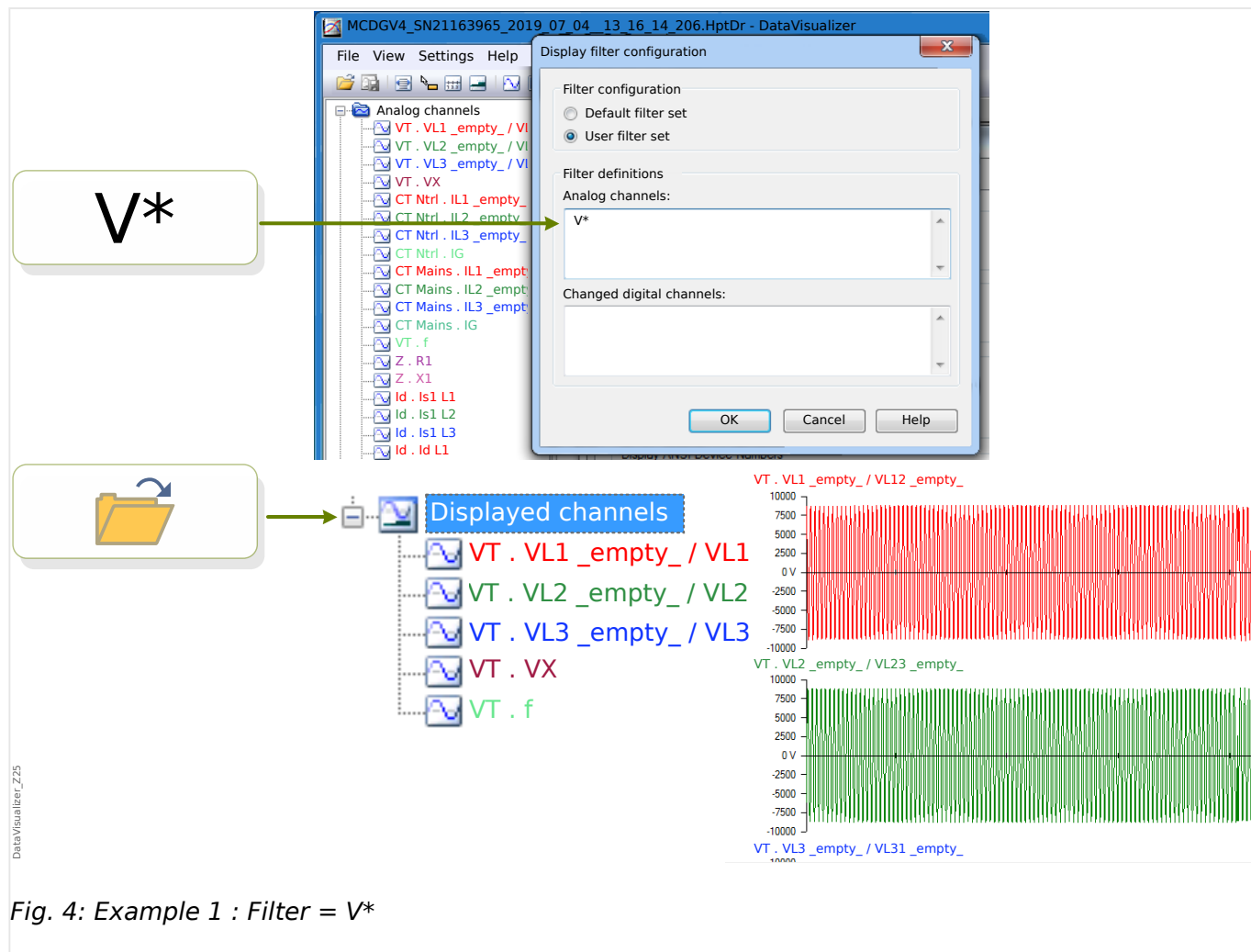


Fig. 4: Example 1 : Filter = V^*

Example 1 : Filter = V^* — When the file is re-opened the matching channels are displayed (all separately, one graph below the other).

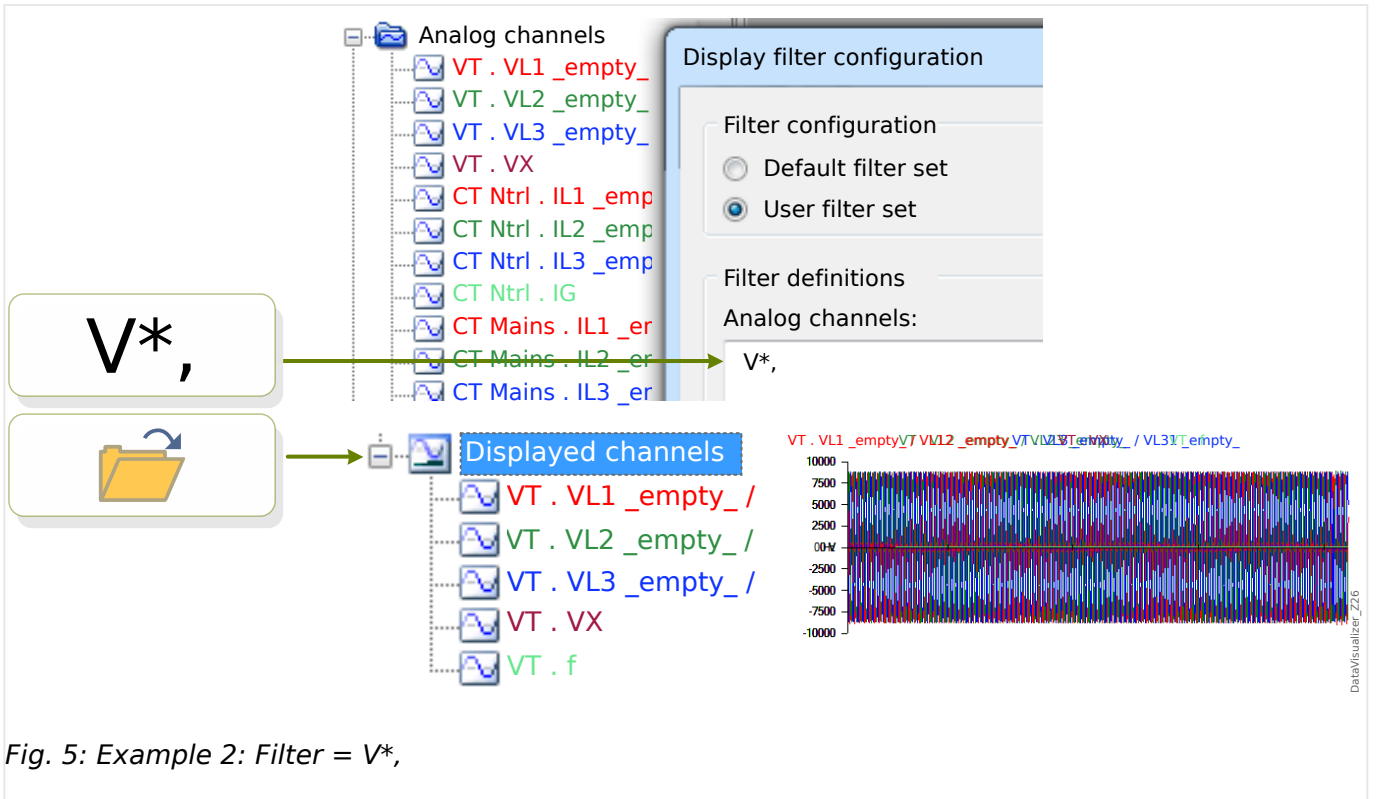


Fig. 5: Example 2: Filter = V*,

Example 2: Filter = V*, — When the file is re-opened the matching channels are displayed (all combined in one graph).

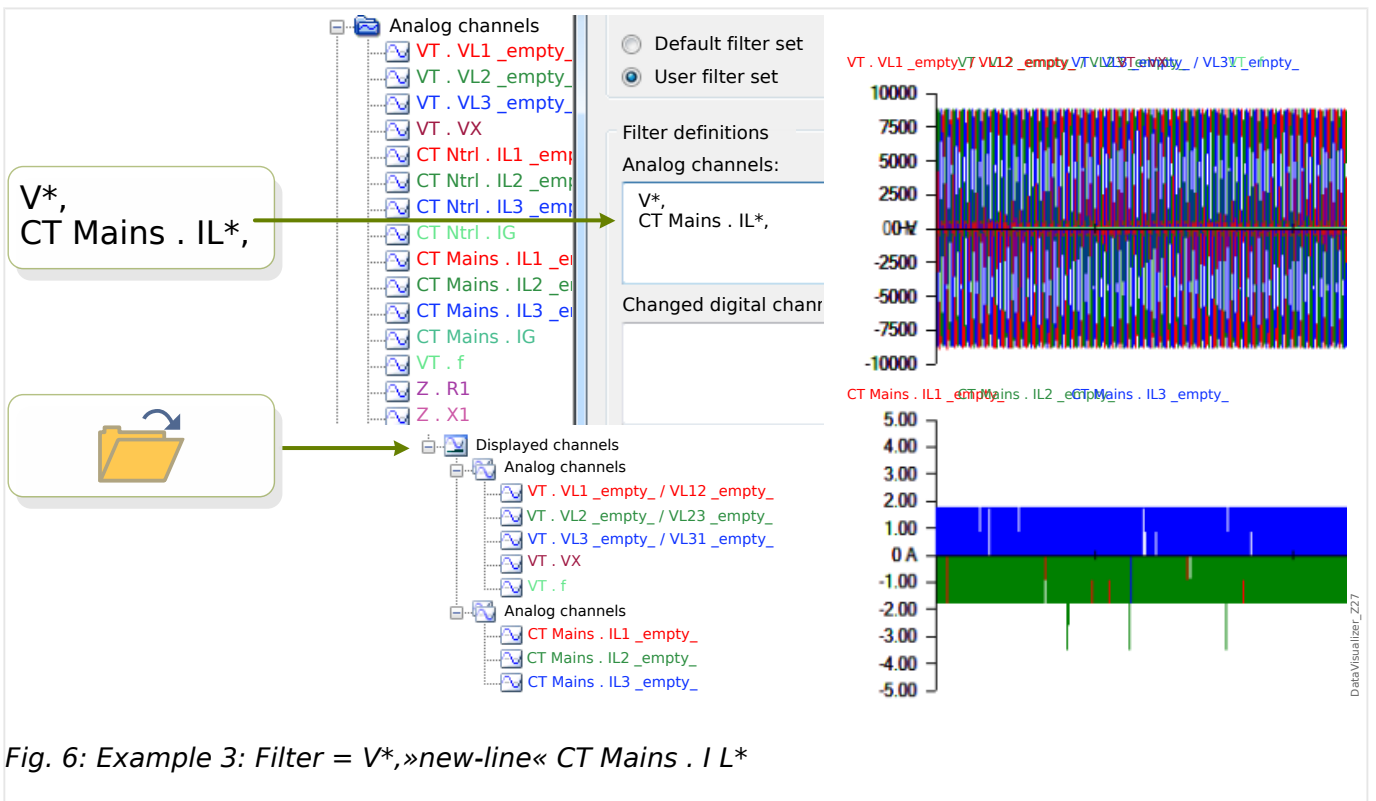


Fig. 6: Example 3: Filter = V*,»new-line« CT Mains . I L*

Example 3: Filter = V*,»new-line« CT Mains . I L* — When the file is re-opened the matching channels are displayed, with the voltage curves being combined in one graph, and the current curves being combined in a second graph that is placed underneath the voltage graph.

5 Display of Channels and Measured Values

Show Channel Information

Click on the required channel in the Tree Structure Panel.

Clicking »Info« opens a list that shows all measured data as a table.

Change the Color of the Channel Display

Click on the required channel in the Tree Structure Panel.

Clicking »Color« opens a palette where you can select the color to be used for displaying the curve.

Zoom

The displayed curves can be zoomed so that more details can be seen.



First, there are buttons [11] and [12] (see  "3 Button Bar") that enlarge (or shrink, respectively) all curves horizontally and vertically by some fixed magnifying factor. Buttons [10] resets this magnification to the original size.



Fig. 7: Stretch time axis, steps 1 and 2.

There is, however, also another useful feature that allows to increase the resolution of the time axis:

- ① First, select the »Two cursor lines« button [13] (see  "3 Button Bar").
- ② Move the time sliders with the mouse to adjust the left and right borders of the area to be shown.
- ③ Finally click the »Stretch time axis« button [14] to enlarge this area.
- ④ The two time sliders move to the left-most and right-most positions, respectively.

This way it is possible, for example, to enlarge a small time interval to the greatest possible resolution and find the point in time where the curve crosses the time axis.



Fig. 8: Stretch time axis, step 3.

Show Sampled Data

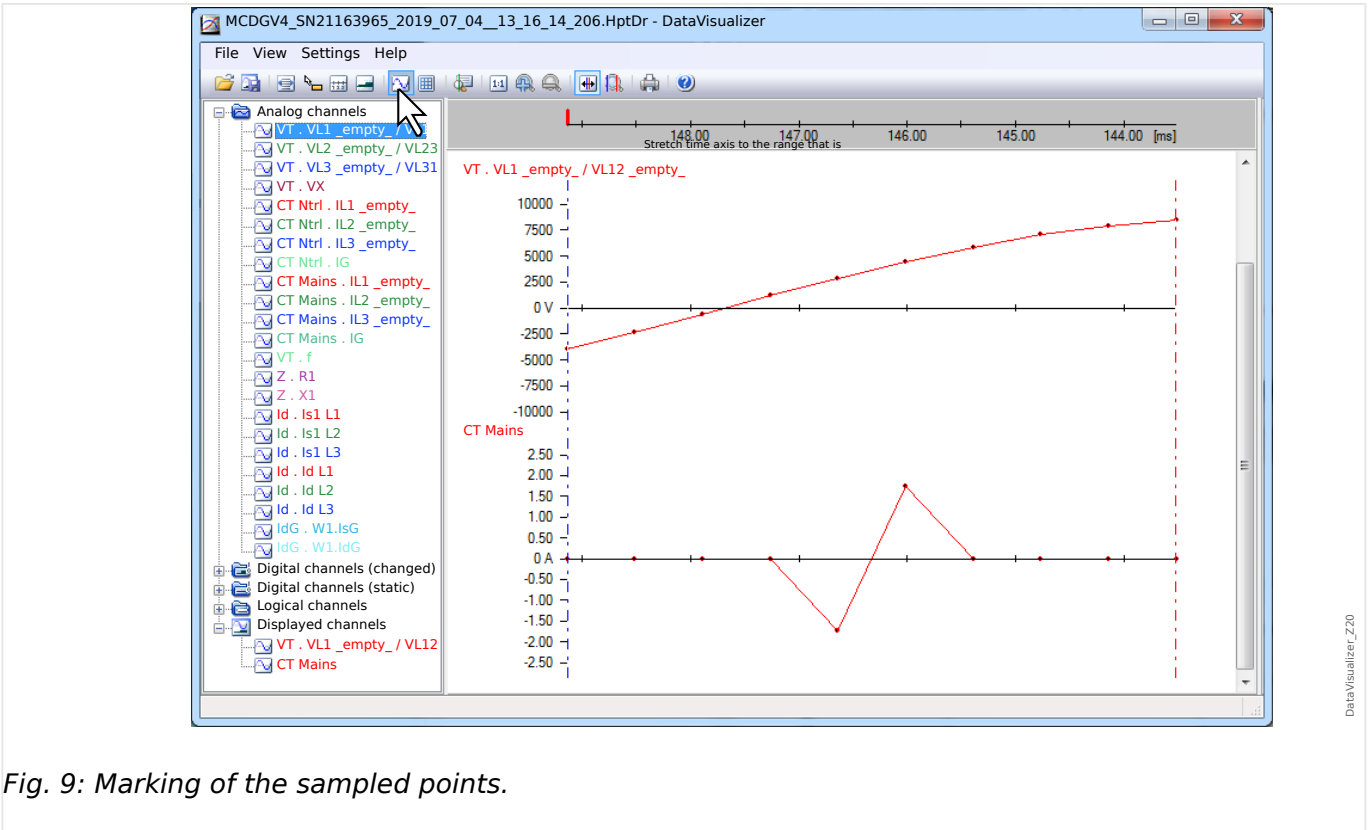
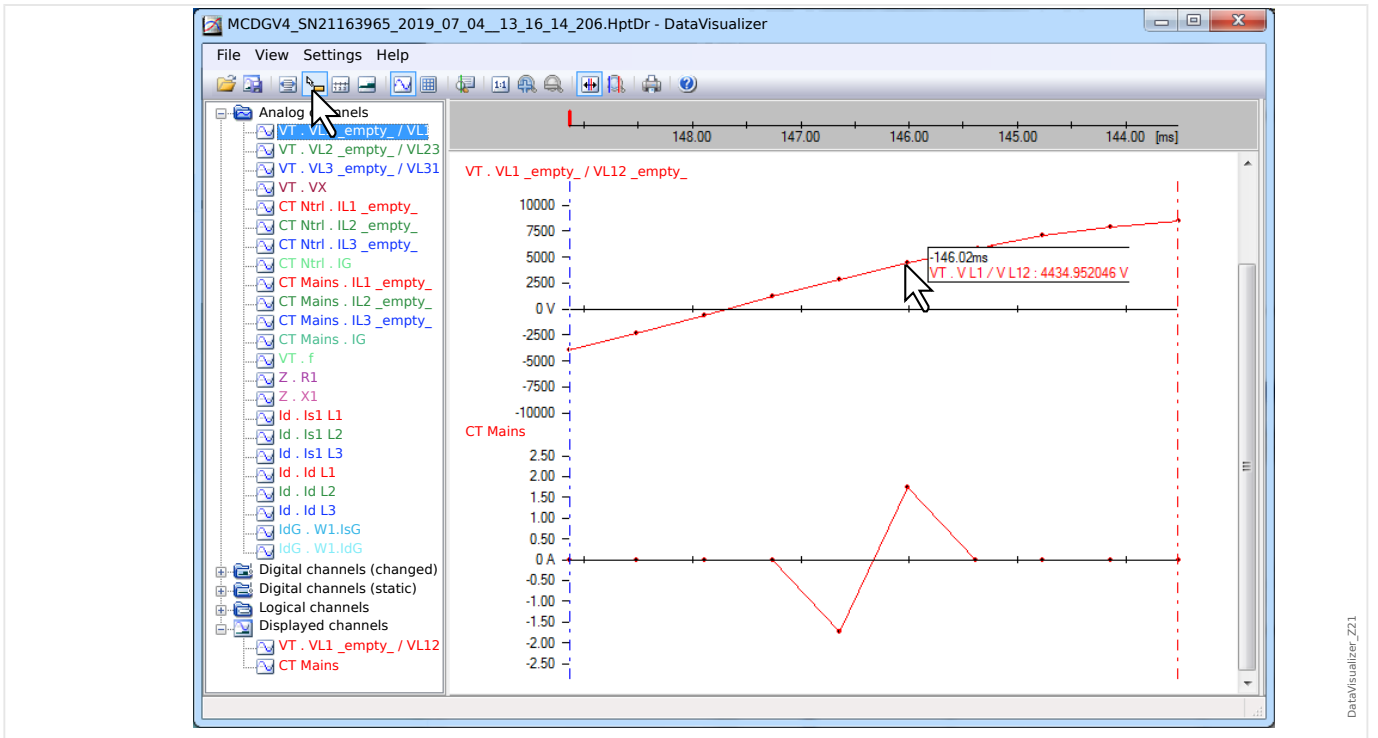


Fig. 9: Marking of the sampled points.

The »Marking of the sample points« button [7] toggles the visibility of the sample points. Note that this does **not** enable you to edit the sample points, this button only controls the visibility.

Show Measured Data

Independent of the visibility of sample points you can also activate the »Measured Values« button [4]. Then the sampled data is shown when the mouse pointer hovers over some point of a curve.



Momentary Values

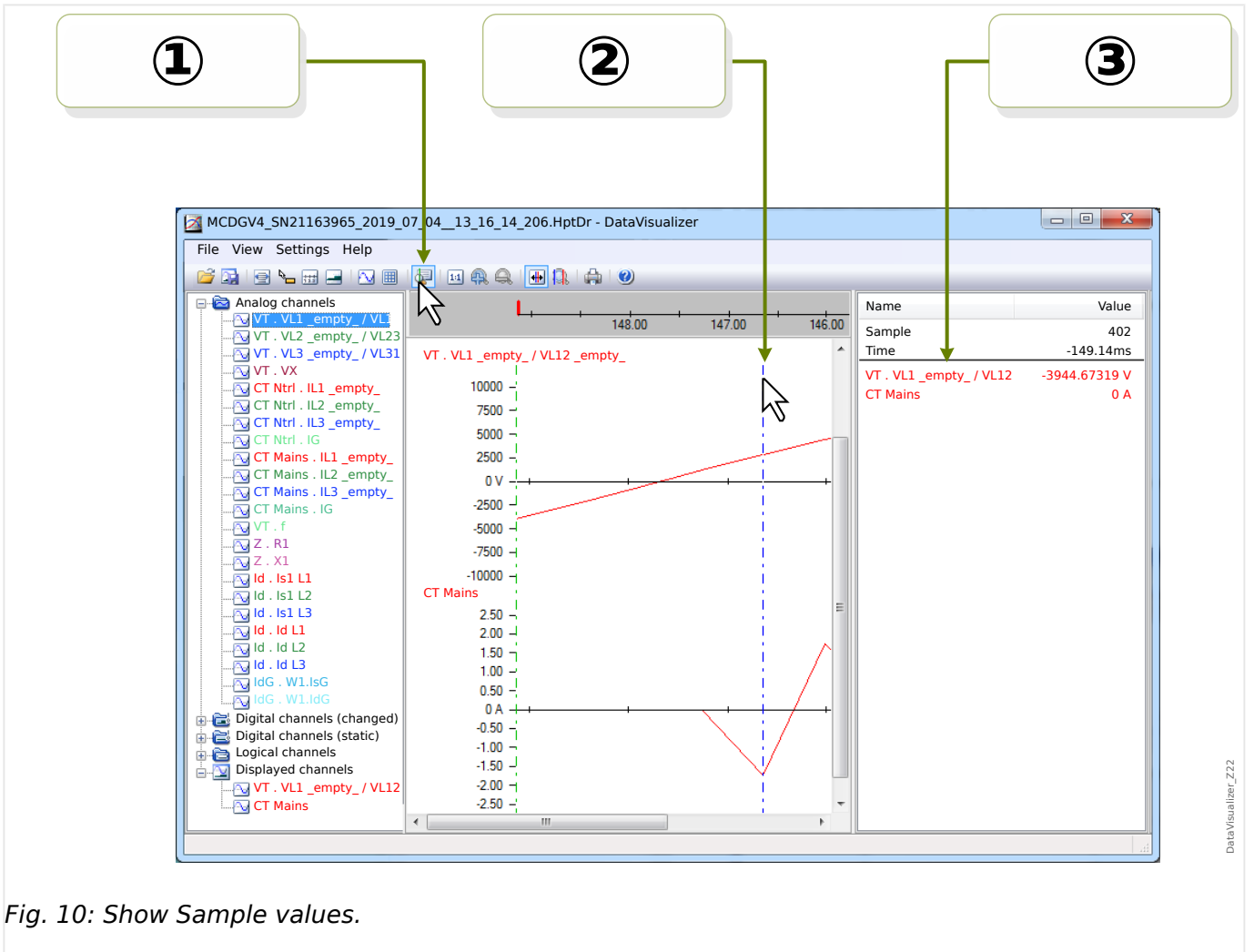



Fig. 10: Show Sample values.

- ① You can use the »Time slider« button [9] (see  "3 Button Bar") to activate/deactivate the momentary-value/time-slider mode.
- ② If this mode is active, a green vertical line pops up within the Operating Panel.
- ③ If this line is moved along the time-axis (with the left-hand mouse key being pressed) all measured values according to the current position of the time slider are displayed in a separate window.

Copy and Paste Channels

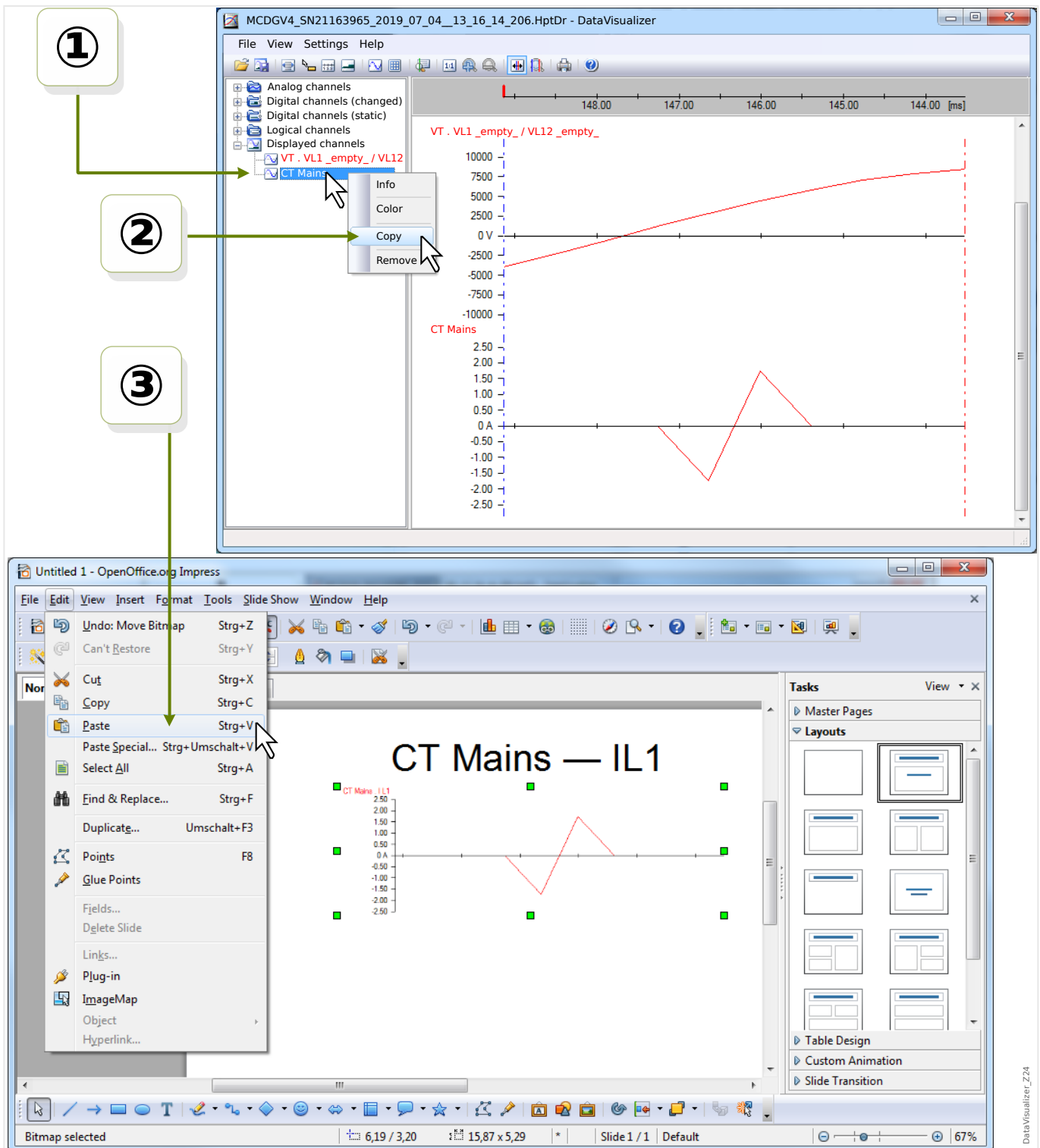


Fig. 11: Copy/paste a curve (as a bitmap).

- ① Select and do a right-mouse-button click on the required channel in the tree structure (category »Displayed channels«).
- ② A context-menu opens that offers the option »Copy«.

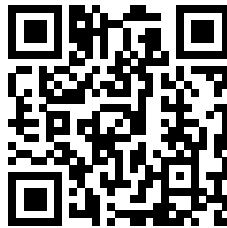
③ This option copies the curves as an image to the clipboard, so that they can be pasted (the usually way, e. g. with »Ctrl«+»v«) into some document.

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Please reference publication DATVIS-5.0-EN-MAN

http://wwdmanuals.com/smart_view



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