



VEBKO ONLINE HELP

The “Transient” State (Observing the Impedance Trajectory)

Category	tester
Section	AMT Sequencer Module
Language	English
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One of the applications of "State Type" Transient" is that the impedance and differential trajectories of distance and differential relays could be observed. The meaning of trajectory is the route of the change of differential or impedance characteristic of differential and distance relays in their characteristic curves based on the injected waves to the relay. For this purpose, at first, from the "window" menu, the "Default Layout for Transient" option will be selected so the arrangement of the windows would change. In this arrangement, the "Detail View", "Signal View", "Vector View" and "Impedance View" windows are positioned that is used for observing the trajectory.

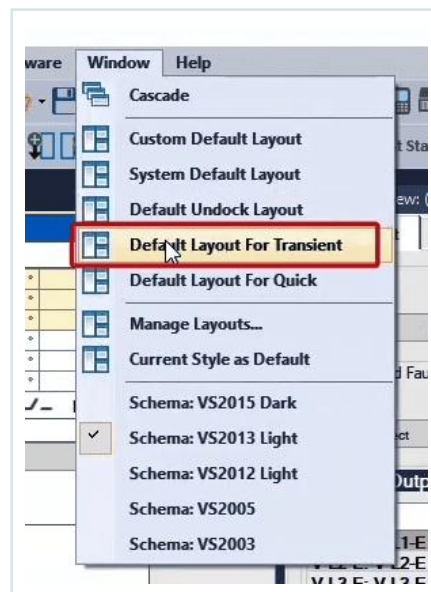


Figure 1

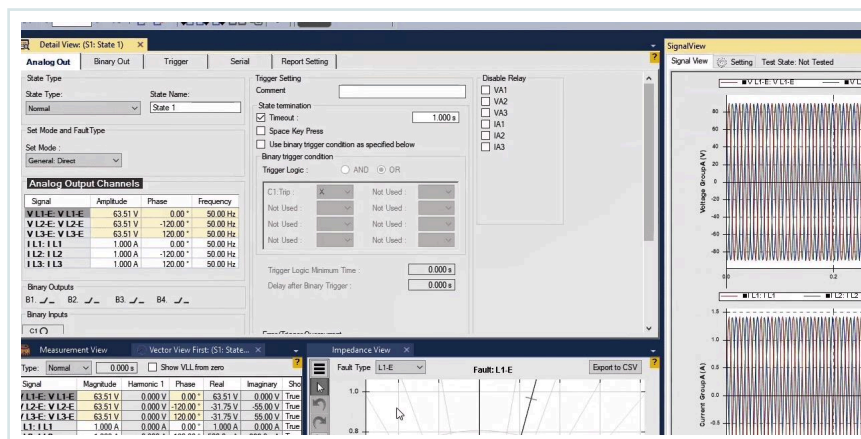


Figure 2

In the following, the "Detail View" window will be selected from the "State Type" drop down field of the "Transient" state. Then, the "current State" option will be selected from the toolbar on the upper part of the page. By doing this, the signals related to "State Type" in the "Signal View" and "Vector View" will be displayed after entering the "Comtrade" file.

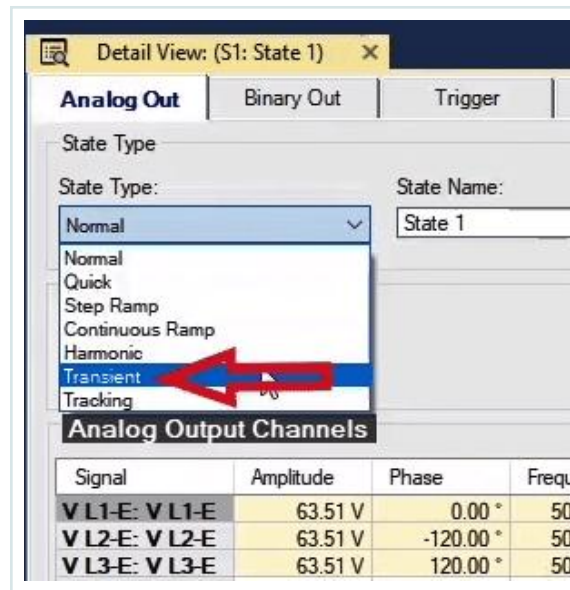


Figure 3

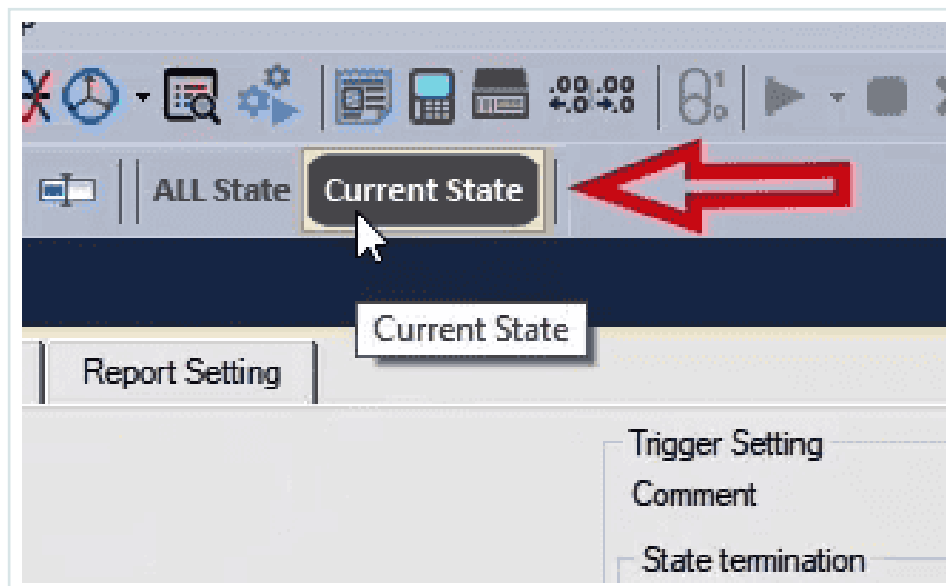


Figure 4

1 Entering the relay data

For observing the differential or impedance trajectory, the data related to relay must be loaded in the software so the characteristic curve of the relay would be displayed in the "Impedance View". In this video, the objective is to show the impedance trajectory of a distance relay.

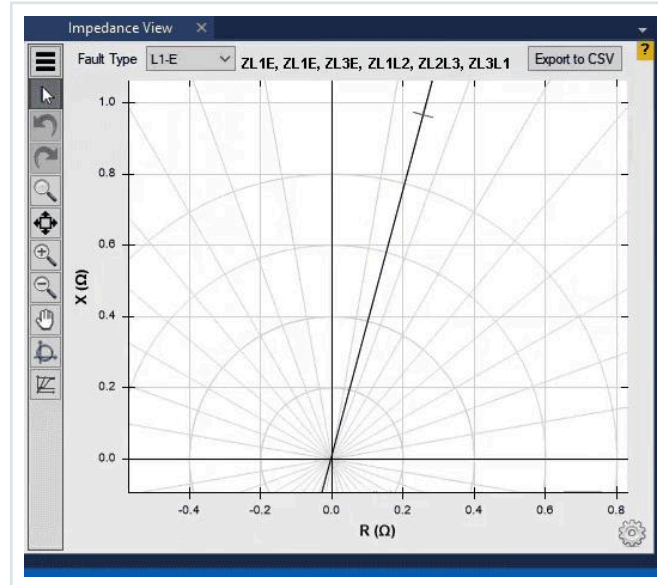


Figure 5

To do so, the "Test Object" icon will be clicked so the "General Test Object" would be opened. On this page, by having "XRio" and "Rio" files of the relay, the data of the relay would be entered in two ways. In this video, the data are loaded using the "Rio". To do so, we will click on the "Import from File" option, the file of "Rio" of the distance relay will be selected and loaded, and the OK option will be clicked. After loading the relay data, the impedance characteristic relay will be displayed in the "Impedance View".

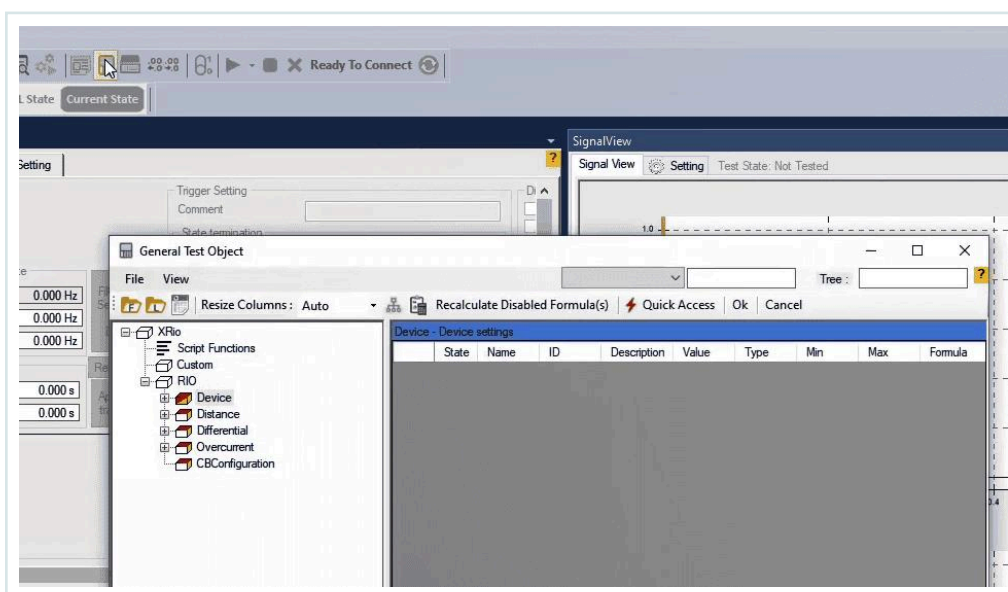


Figure 6

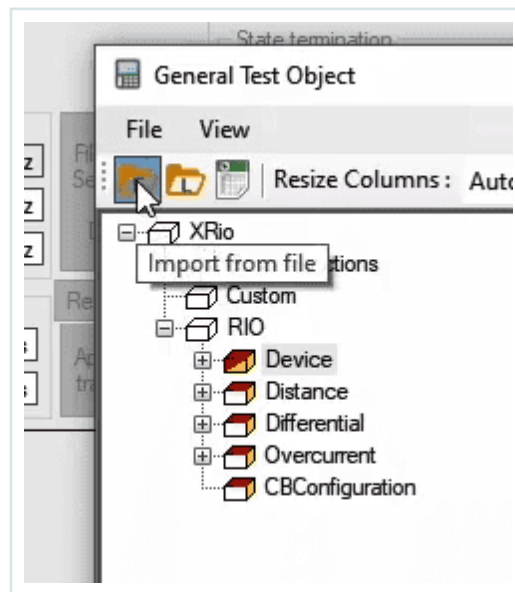


Figure 7

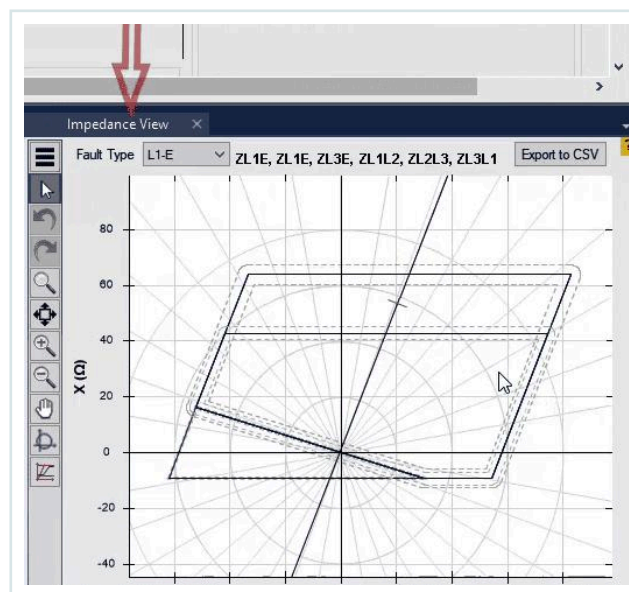


Figure 8

2 Entering the "Comtrade" file

After entering the relay information, the transient state file that is extracted from the relay should be loaded in the software. As you know, the "Comtrade" output is two files with the format of "CFG" and "DAT". If these two files are not located in a folder, then, this file will not be loaded in the software. To do this, click on the "Import Comtrade" option and then the intended file will be selected and loaded. Note that if the "Rio" has the same name as the "Comtrade" file and is located in a folder, by loading the "Comtrade" file, the data of the "Rio" file will be loaded automatically. After loading the "Comtrade"

file, the voltage and current signals will be displayed in "Signal View" and the information of voltage and the current signal will be displayed in the "Detail View" window. "Calculate RMS..." should be checked to the software calculates the RMS and phase of the voltage and current signals to trajectory display. After this, in the "Signal View" window, the "Setting" tab, the "cursor" option will be checked. After activating the "Cursor", the impedance trajectory could be observed online in the "Impedance View" by moving the "Cursor 1" in the time axis of "signal View" window. Note that for the differential relays "Comtrade" files, six current phases and for distance relays "Comtrade" files, three current phases and three voltage phases should active. Also, you have to check that the assigned signals to each output to be exactly according to the state that exists in the real state and in case of difference, it should be manually modified.

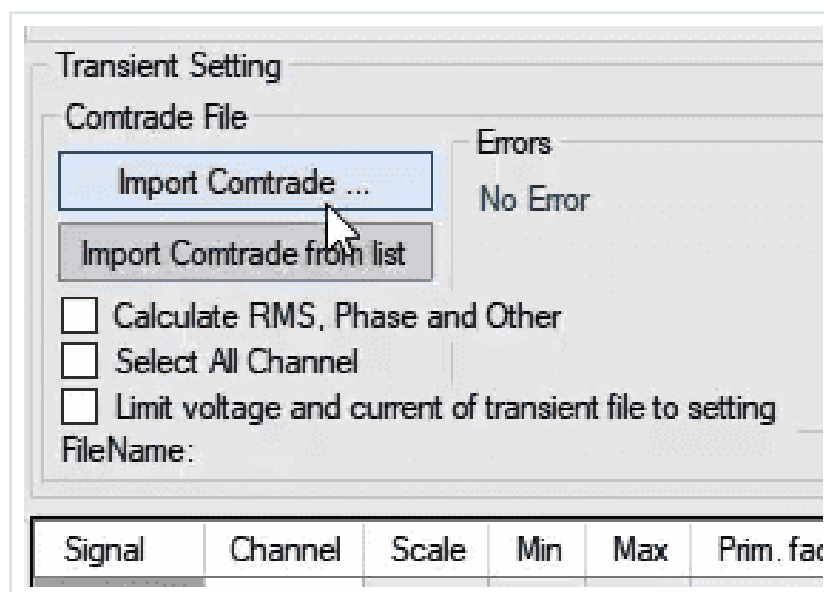


Figure 9

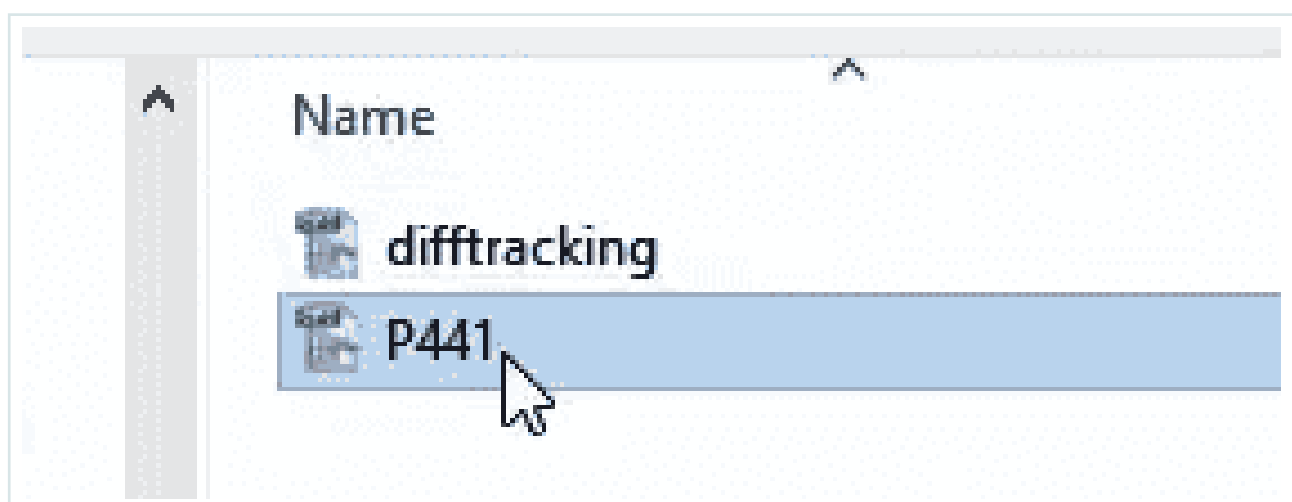


Figure 10



Figure 11

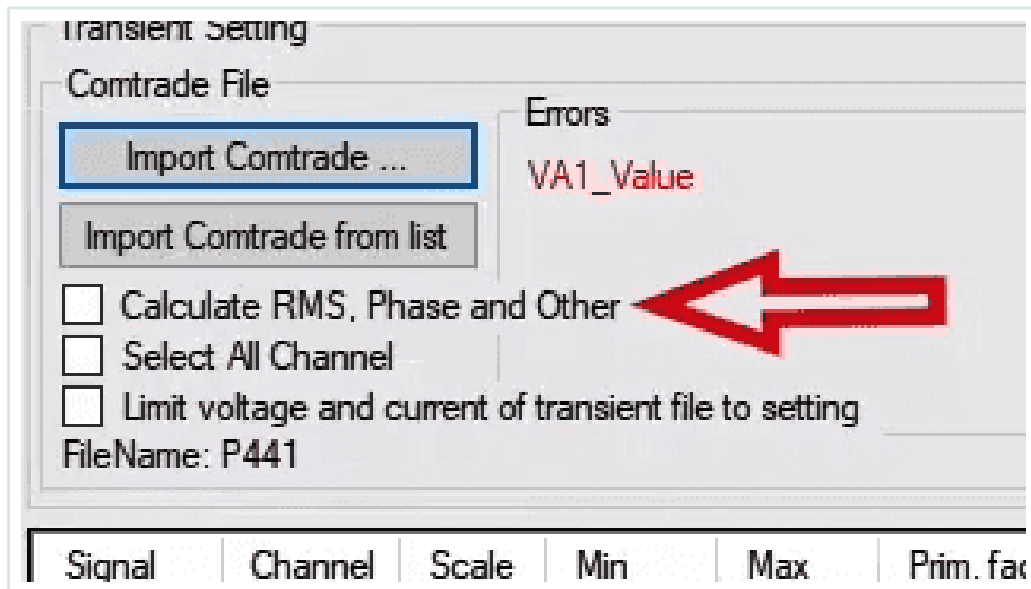


Figure 12

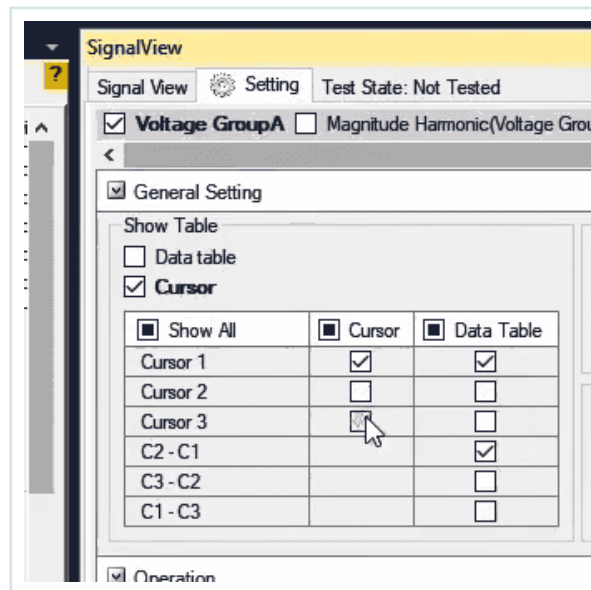


Figure 13

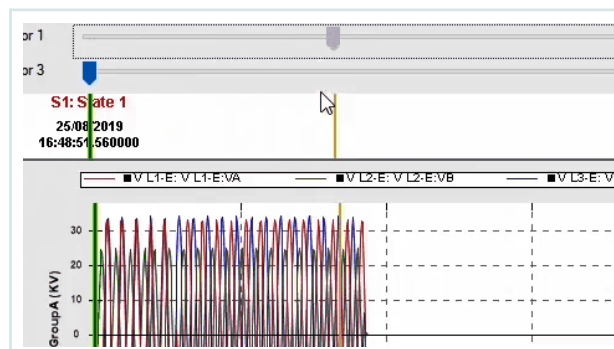


Figure 14

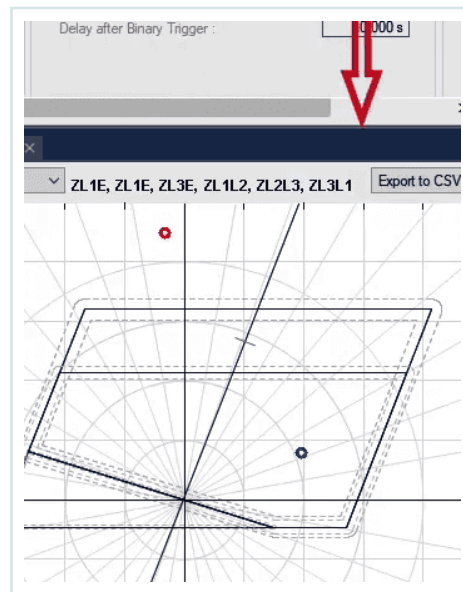


Figure 15

3 The "Impedance View" window

As mentioned in the "Impedance View" window, the impedance or differential characteristic curve of the relays is displayed. By opening this window, the impedance characteristic curve is displayed by default. This curve displays the line impedance in terms of "R" and "X". In the "Impedance View", select the "Differential" icon from the left-side icons for displaying the differential characteristic curve, so the differential characteristic curve of the differential relay would be displayed. This curve will be explained more in the differential trajectory video.

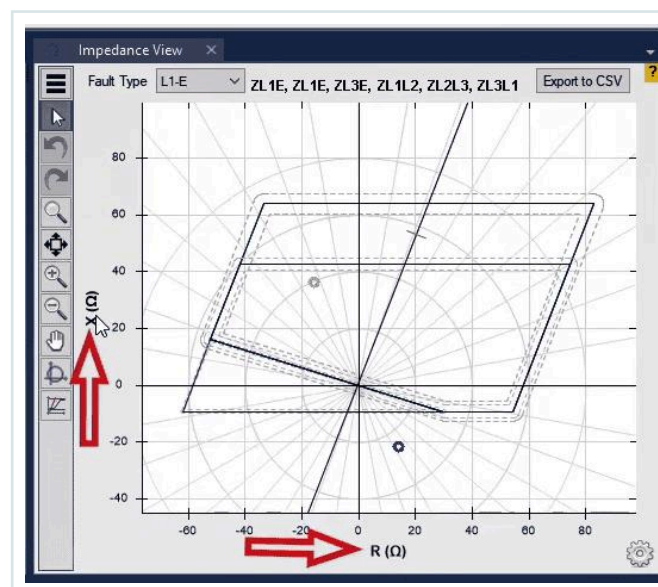


Figure 16



Figure 17

In the "Impedance View" window, by clicking on the "Undo" or "Redo" icons, we can return to the previous or next changes that are done on the characteristic curve. The "Zoom Model" icon places the mouse cursor in the zoomed condition for magnifying a part of the characteristic curve. The "Optimize all" icon will show the characteristic curve shape as a complete curve. The "Zoom In" and "Zoom Out" icons are used for magnifying and zoom out the characteristic curve. Using the "Pan Mode" icon, the characteristic curve could be displaced. By clicking on the "Hide/ Show Toolbox" the existing icons in the "Toolbox" could become hidden and shown again. Using the "Fault Type" icon the fault display can be specified. By clicking on the "Export CSV" from the settings of the relay zones that are checked, a "CSV" format output could be saved. Please pay attention that one CSV file will be given for each zone.

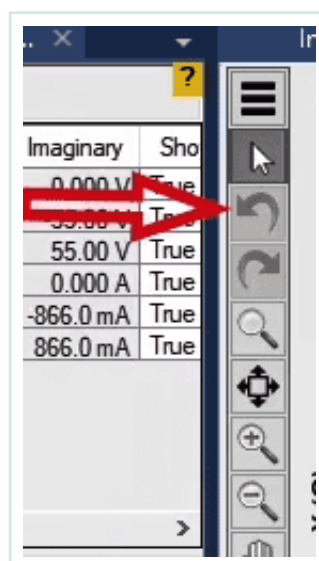


Figure 18

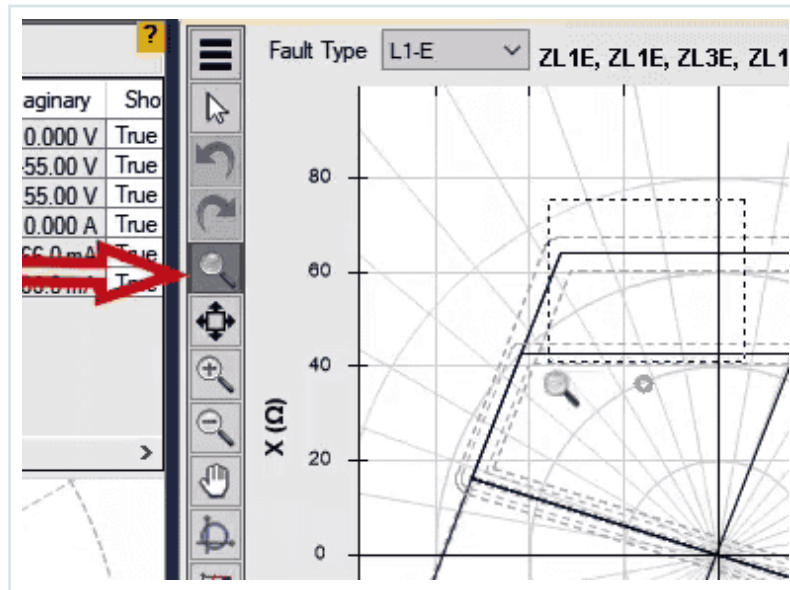


Figure 19

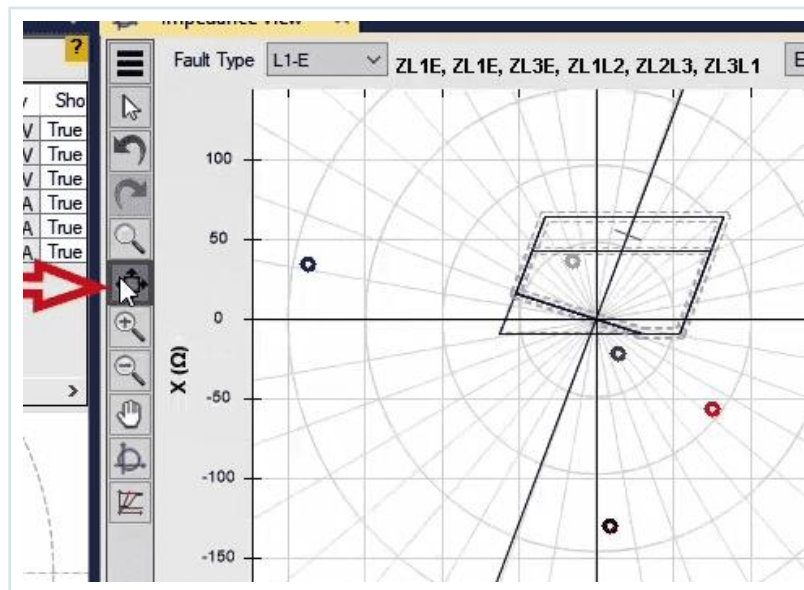


Figure 20

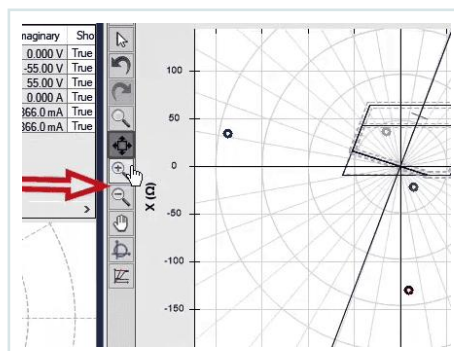


Figure 21

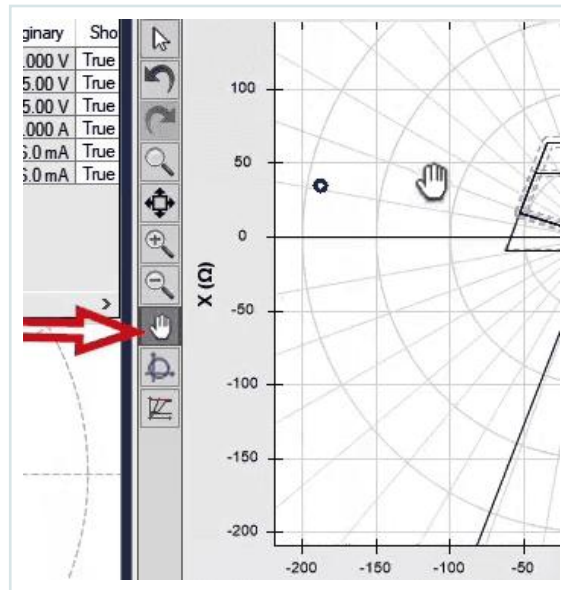


Figure 22

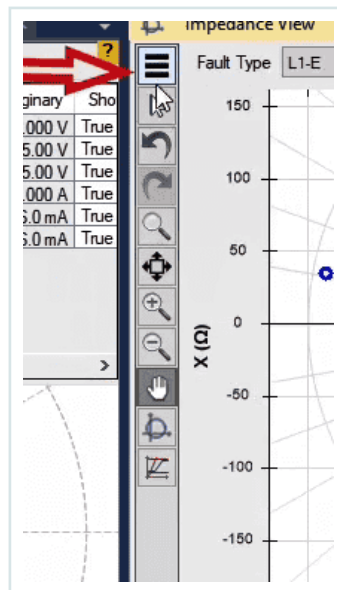


Figure 23

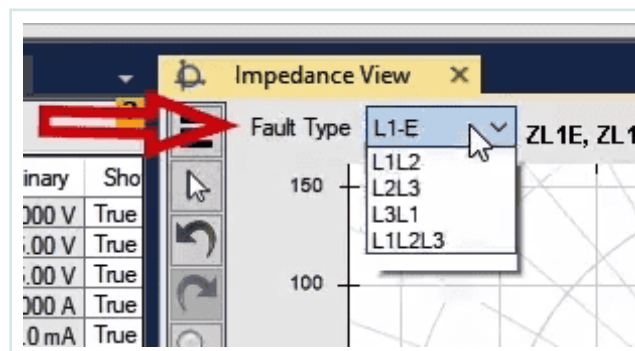


Figure 24

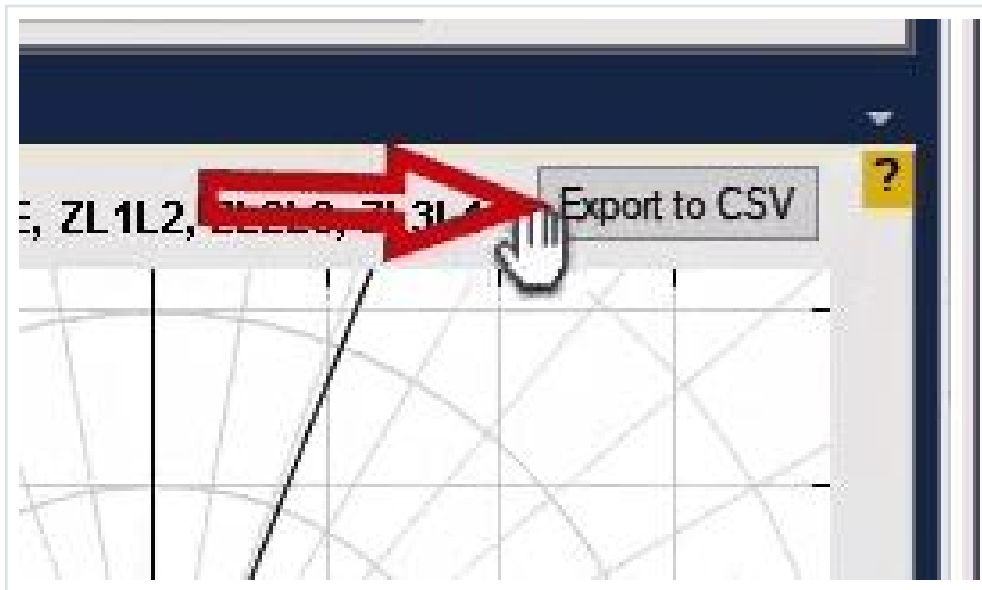


Figure 25

By clicking on the existing gear wheel in the below of this window, some options will be displayed for a better trajectory. By checking the "Between Orange, Green" option, the trajectory will be displayed as a line that its waves are between the orange and green colors in the "signal View". As a result, the trajectory will be displayed between these two "cursors". By checking the "all Points" option, the trajectory will be displayed in all the points and at all the times of the "Comtrade" file. In the "Circle.Ref" field, it will be specified that the trajectory will be simultaneously displayed by displacing which cursor on the "Signal View". Here, by changing the "Cursor" to orange the trajectory changes could be observed. The "ZL1E", "ZL2E", "ZL3E", "ZL1L2", "ZL2L3" and "ZL3L1" options show the impedance trajectory in different faults. The display of the trajectory of that fault can be deleted from the characteristic curve by unchecking each of them. In the below of each of these options, the coordinates of the impedance point is displayed as the "R" and "X" as online by moving the "Cursor 1" in "Signal View".

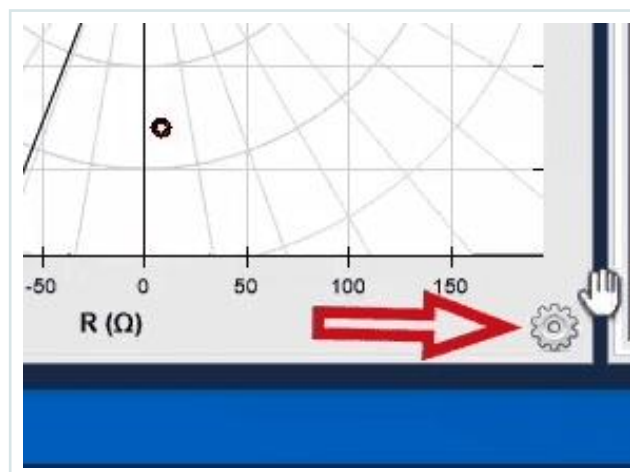


Figure 26

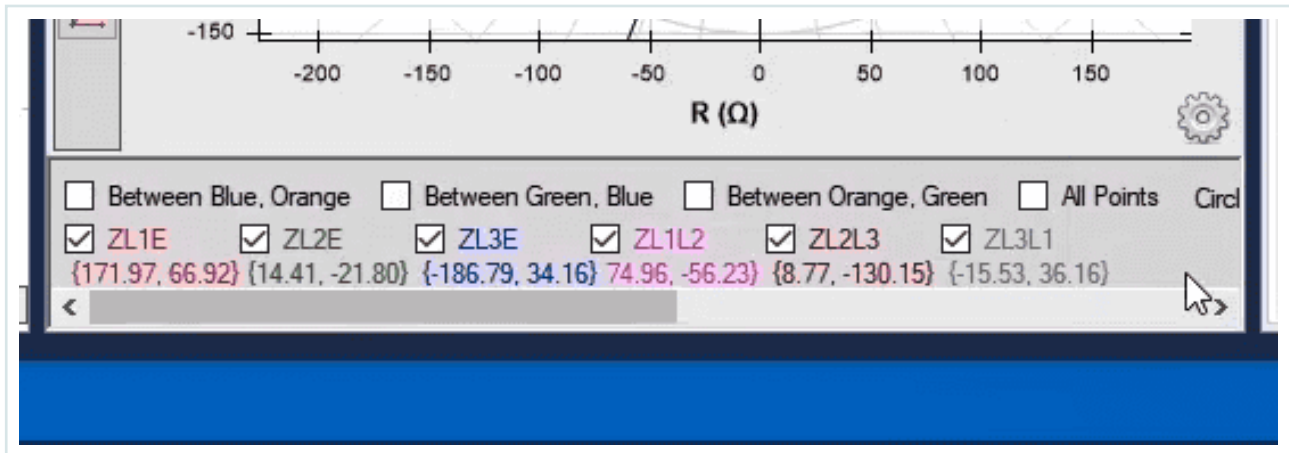


Figure 27

For observing the amounts of voltage and current at each moment, in the "Vector View" window of the "Type" field, the "Orange" option should be checked that is related to orange-colored "Cursor". Then, the voltage and current values and also the trajectory variations could be observed online by changing this "cursor".

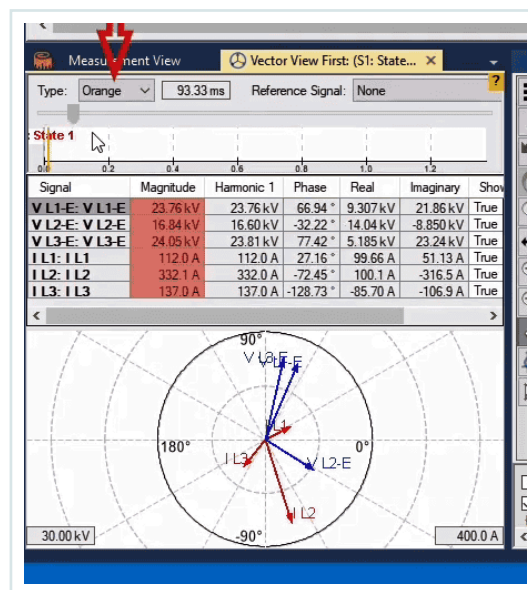


Figure 28

[jg1]The_Transient_State_observing_the_impedance_trajectory