



VEBKO ONLINE HELP

The “Transient” State Type:

Category	tester
Section	AMT Sequencer Module
Language	English
Generated	2026-10-18

As mentioned before, one of the features of Vebko device and software is relay testing in transient state. To easily access the windows needed for this "State Type", a "Layout" named "Default Layout for Transient" is designed specifically for this state which is located in the "Windows" menu. This layout includes "Detail View", "Signal View", "Measurement View", "Vector View" and "Impedance View" windows. Here, to have a better view of the "Detail View" window, all other windows is closed. When a fault occurs, the relay saves the fault information and moments before the fault as a "Comtrade" file and provides the user with this file. By using this information it is possible to view impedance or differential trajectory or by injecting the same transient signal, simulate the fault moment and test the relay performance again.

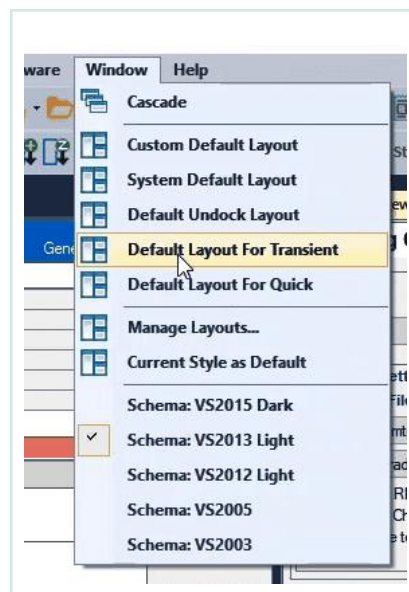


Figure 1

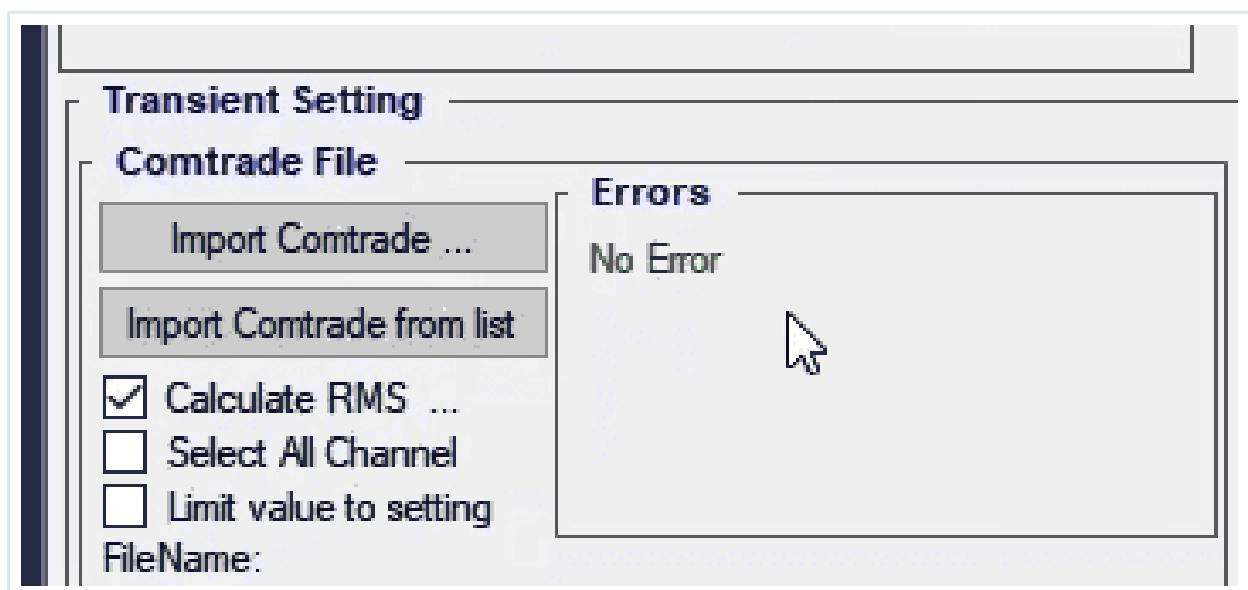


Figure 2

Other than "Comtrade" file with ".cfg" extension, there is another file with ".dat" extension. These two files have the same name and for the "comtrade" file to be loaded in the software, both files must be together.

In "Transient Setting" section, the settings related to "comtrade" file are adjusted. By selecting "Import Comtrade", the "comtrade" file exported from the relay is imported and loaded. Moreover, a list including several "comtrade" files is located in the software. By selecting "Import Comtrade from List" option this list opens and a file can be selected and loaded. After loading a transient file, the data related to that file is loaded in the table of this section. In "Signal" column, name of the output of the device is specified. To change the outputs of this section, "Analog Out" tab in the "Hardware Configuration" page can be used. In "Channel" column, current or voltage signals allocated to output of the device are displayed. By opening the drop down field, it is possible to change the allocated signal.

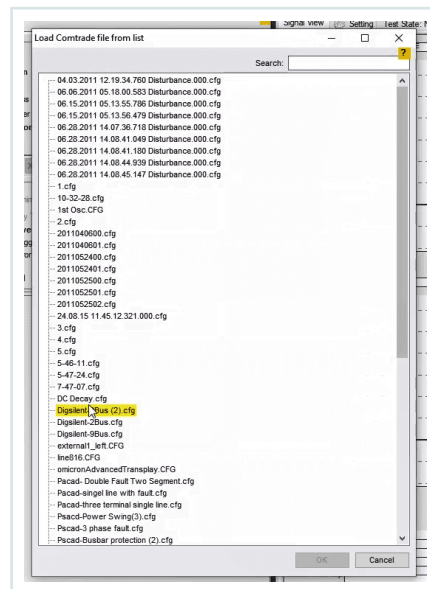


Figure 3

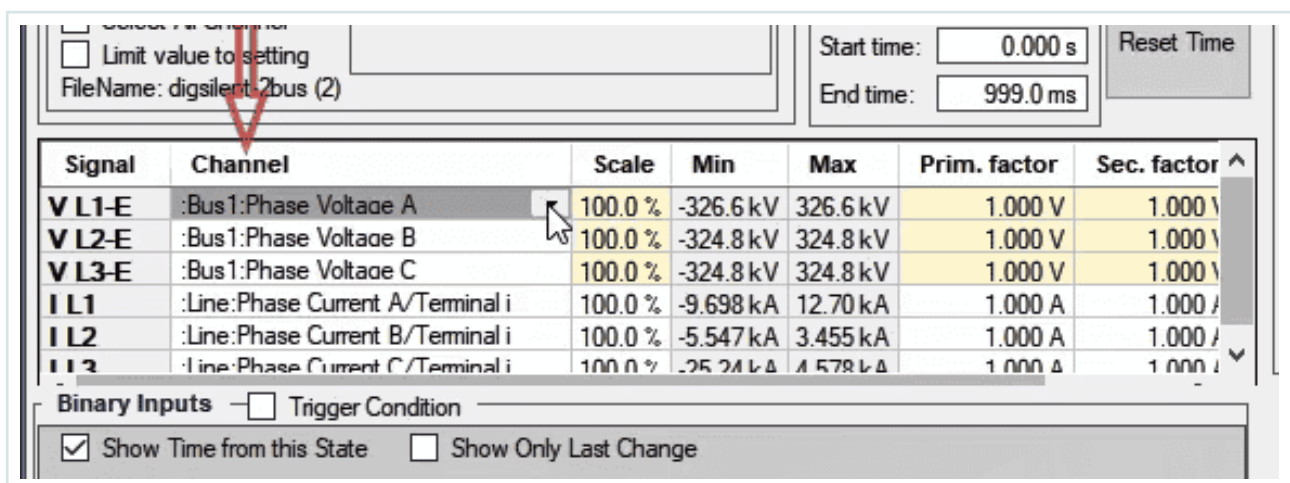


Figure 4

In "Scale" column, the user can determine a specific percentage of the Transient signal amplitude for injection. In "Min" and "Max" columns, positive and negative amplitudes of signals of "Comtrade" file are specified. In "Prim.factor" and "sec.factor" columns, the conversion ratio of "VT"s and "CT"s is specified in relation to the "Comtrade" file and it is possible that values of these coefficients are not the same in some files. In that case, the user needs to edit them. For example, here "Prim.factor" is set at 1 kilovolt and by right-clicking on this column and selecting "Apply to all Voltage", this value is set for other voltages as well.

Scale	Min	Max	Prim. factor	Sec. factor	PS
100.0 %	-326.6 kV	326.6 kV	1.000 V	1.000 V	Primarv
100.0 %	-324.8 kV	324.8 kV	1.000 V	1.000 V	Primarv
100.0 %	-324.8 kV	324.8 kV	1.000 V	1.000 V	Primarv
100.0 %	-9.698 kA	12.70 kA	1.000 A	1.000 A	Primarv
100.0 %	-5.547 kA	3.455 kA	1.000 A	1.000 A	Primarv
100.0 %	-25.24 kA	4.578 kA	1.000 A	1.000 A	Primarv

dition

☐ Show Only Last Channel

Figure 5

In "PS" column, it is specified that the information of "Comtrade" is primary or secondary side. If it is "Primary", in "Min" and "Max" columns the secondary values are placed in "Prim.factor" and "Sec.factor" in accordance with the given conversion ratio. If "Secondary" is selected, in "Min" and "Max" columns, the original values of the file are placed. To calculate the "RMS" value of the signals of "Comtrade" file and displaying it in "Signal View", first, "Calculate RMS, Phase and Other" option should be checked and then in "Setting" tab, in "Show Type" box, the "RMS" radio button is checked. After seeing signal's "RMS" value, "show type" is get back to the instantaneous state.

Transient Setting

Comtrade File

Import Comtrade ...
Import Comtrade from list

☒ Calculate RMS
☐ Select All Channel
☐ Limit value to setting

FileName: digsilent-2bus (2)

Errors

VA1_Value

Sampling Rate

Original : 1.000 kHz
Used : 1.000 kHz
Frequency: 50.00 Hz

Trim Time

Start time: 0.000 s
End time: 999.0 ms
Reset Time

Signal	Channel	Scale	Min	Max	Prim. factor	Sec. factor
✓ L1-E	:Bus1:Phase Voltage A	100.0 %	-326.6 V	326.6 V	1.000 kV	1.000 V
✓ L2-E	:Bus1:Phase Voltage B	100.0 %	-324.8 V	324.8 V	1.000 kV	1.000 V
✓ L3-E	:Bus1:Phase Voltage C	100.0 %	-324.8 V	324.8 V	1.000 kV	1.000 V
L1	:Line:Phase Current A/Terminal i	100.0 %	-9.698 kA	12.70 kA	1.000 A	1.000 A
L2	:Line:Phase Current B/Terminal i	100.0 %	-5.547 kA	3.455 kA	1.000 A	1.000 A
L3	:Line:Phase Current C/Terminal i	100.0 %	-25.24 kA	4.578 kA	1.000 A	1.000 A

Figure 6

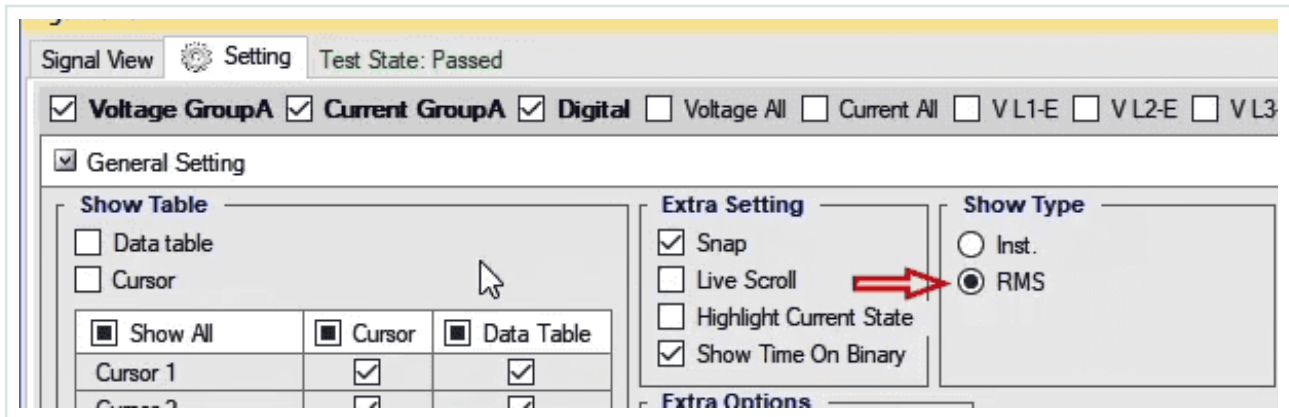


Figure 7

By checking "Select All Channel" in "Channel" column, it is possible to select all voltage and current signals existent in the "Comtrade" file for outputs of the device while if this option is unchecked, in the list of every output, it is possible to only select signals from the same type of output. For example, in "VL1-E" output, only voltage signals of the "Comtrade" file are visible. The reason for the existence of this option is that in some transient files, the unit of signals is not given in volt and ampere and the software is not able to differentiate between current and voltage and allocate it to the output of the device. So, it is necessary for the user to manually introduce the voltage and current signals to outputs of the device.

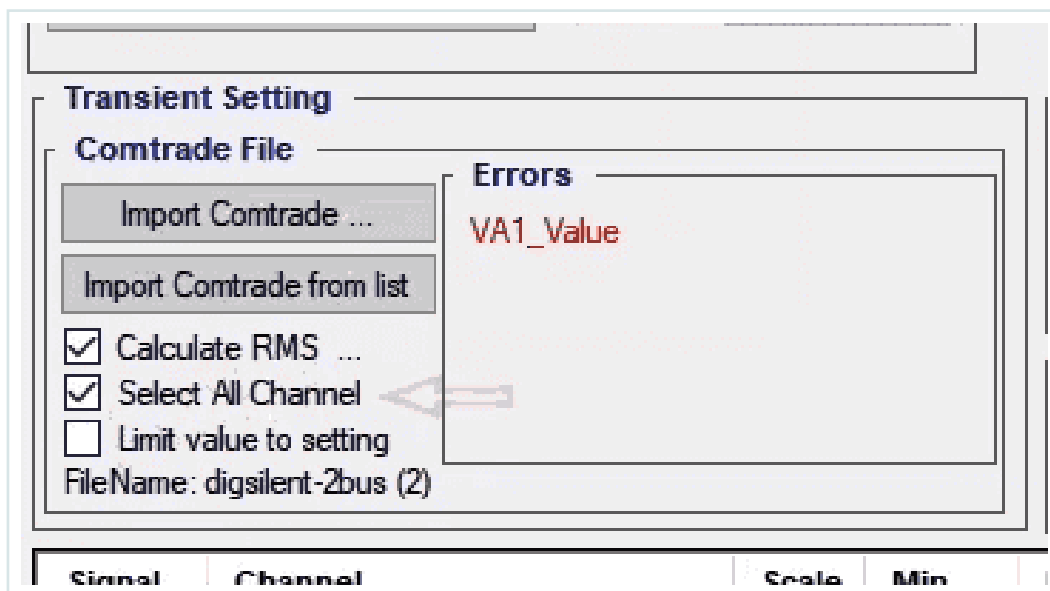


Figure 8

Signal	Channel	Scale	Min	Max	Prim. factor	Sec. factor
VL1-E	Bus1 Phase Voltage A	100.0 %	-326.6 V	326.6 V	1.000 kV	1.000 V
VL2-E	Bus2 Phase Voltage A	100.0 %	-324.8 V	324.8 V	1.000 kV	1.000 V
VL3-E	Bus3 Phase Voltage A	100.0 %	-324.8 V	324.8 V	1.000 kV	1.000 V
IL1	Line Phase Current A/Terminal I	100.0 %	-9.698 kA	12.70 kA	1.000 A	1.000 A
IL2	Line Phase Current C/Terminal I	100.0 %	-5.547 kA	3.455 kA	1.000 A	1.000 A
IL3	Bus1 Phase Voltage A	100.0 %	-25.24 kA	4.578 kA	1.000 A	1.000 A
Binary Int	Bus1 Phase Voltage B					

Figure 9

If the user wishes to view the waveform of all voltage, current and digital signals existent in the "Comtrade" file in "Signal View", he should select "Current State" from the toolbar. Then from the "Setting" tab in "Signal View", he should select the signals that he wishes to view. But in "All State" state, it is only possible to view the waveform of the outputs of the device in each "State" and not the waveform of all signals in "Single View". To better analyze the transient signals in "Vector View" window, it is possible to open up to 5 "Vector Views" and, view the vector of different signals in different times. Complementary description about "Vector View" window will be provided in the videos related to this window.

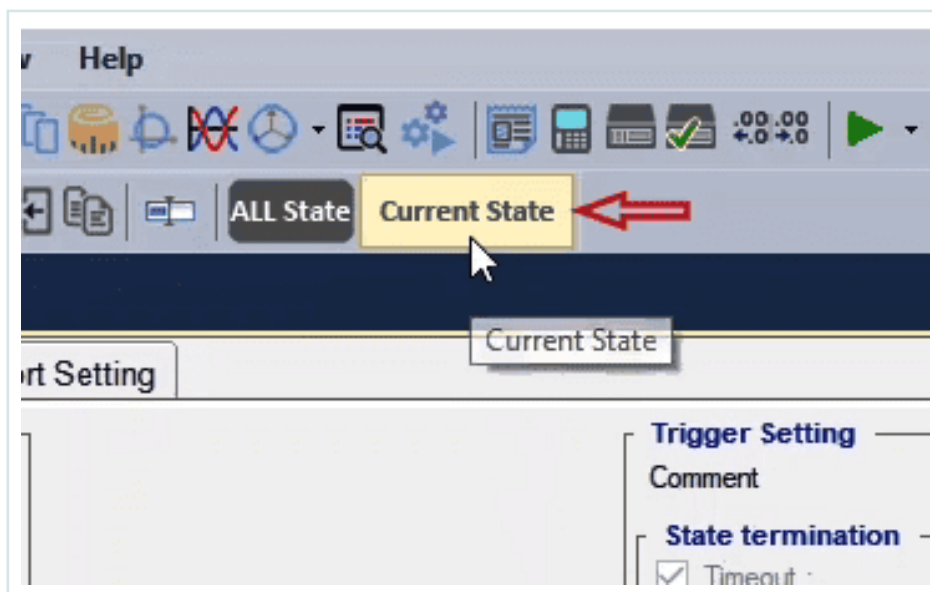


Figure 10

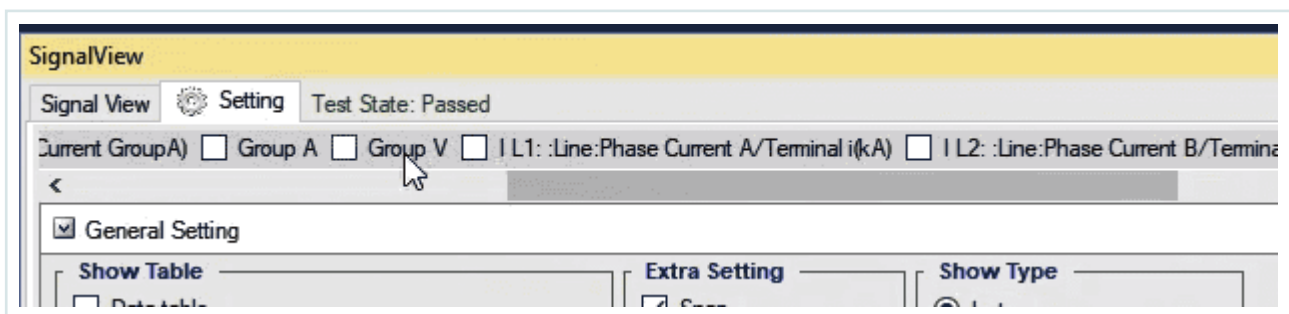


Figure 11

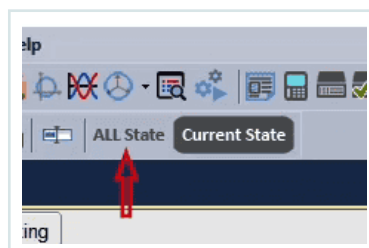


Figure 12

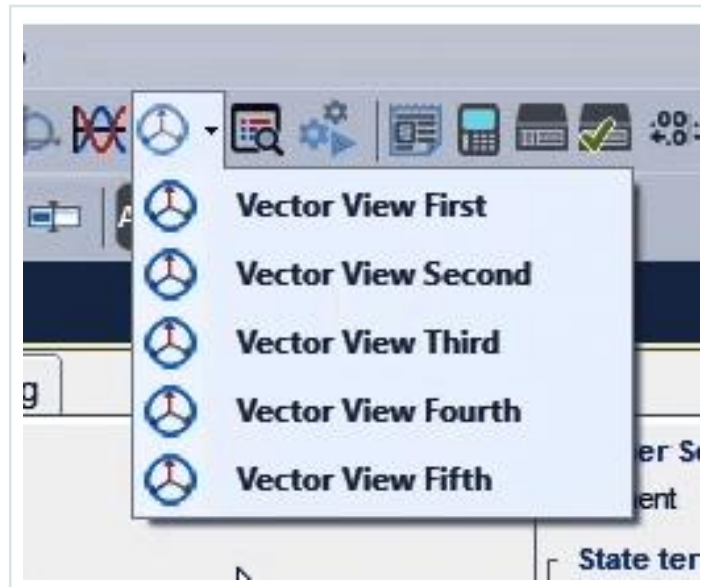


Figure 13

If the current and voltage values allocated to the output of the device which are specified in "Max" and "Min" columns exceed the allowed injection amount of the device, an error message is recorded in the "Errors" section. By selecting the "Limit Voltage and Current of Transient File to Setting", the amplitude of these signals is limited to the injectable amount by the device. The difference between this option and "Scale" is that by selecting this option, a part of the signal amplitude which is exceeding the allowed amount is cut but in "Scale", only a coefficient is multiplied by signal amplitude and no part of the signal is cut. The name of the "Comtrade" file is written in "File Name" section.

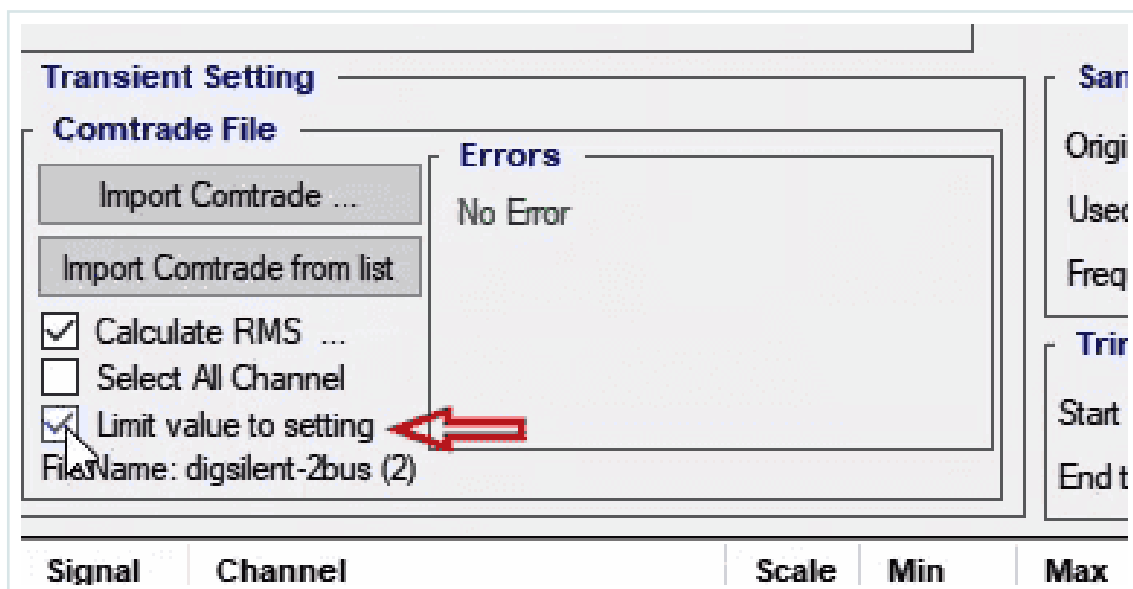


Figure 14

By right-clicking on "Prim. Factor" column or "Sec. Factor" and selecting "Fill Primary Secondary from Device" option, the "Prim. Factor" and "Sec.factor" values are entered in the "Test Object" page from "Device" block and if "Fill Primary Secondary from Comtrade File" is selected, the values of this column are entered from the "Comtrade" file. In "Sampling Rate" section, the information related to sampling frequency of the device and "Comtrade" file is specified. In "Original" field, the original value of the signal sampling frequency, in "Used" field, the value of used sampling frequency to be displayed in "Signal View" window and in "Frequency" section, the test signal frequency is specified.

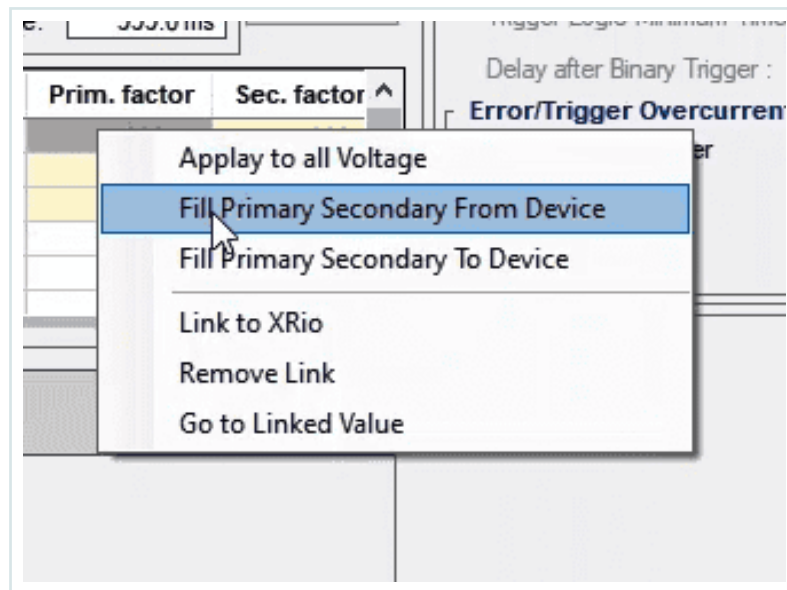


Figure 15

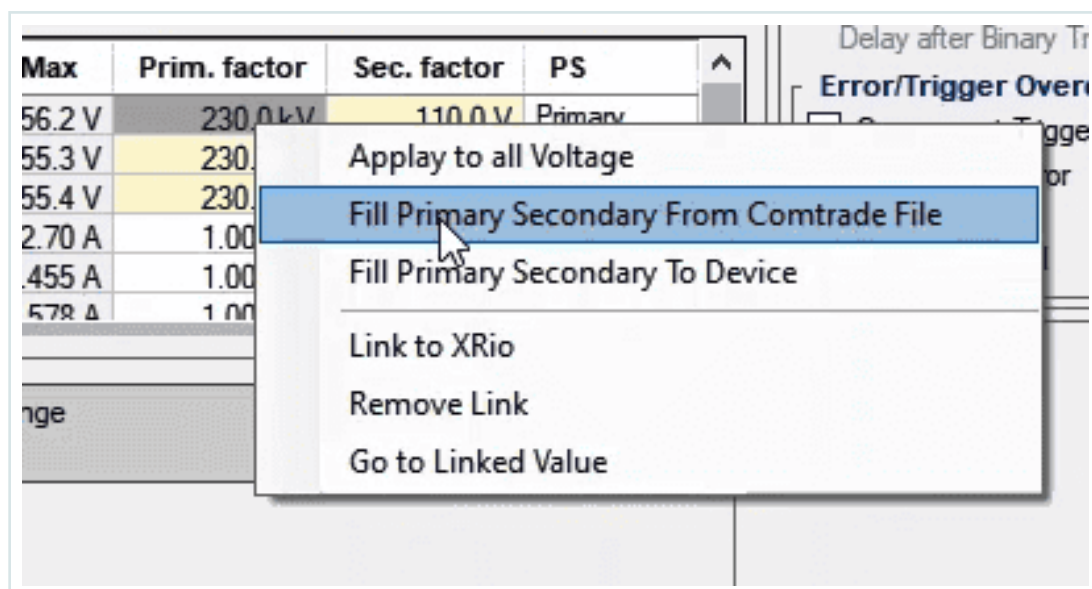


Figure 16

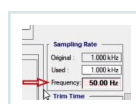


Figure 17

If the user wishes to apply a part of the transient waveform to the device, he can use the "Trim Time" section where its start time is specified in "Start Time" section and the end time is specified in "End Time" section. In this section, when the "Comtrade" file is loaded, the time value is extracted from the "Comtrade" file. To inject a part of the transient signal by device, first, the "Current State" option should be selected. Then, by activating "Cursor1" and "Cursor2" in "Setting" of the "Signal View" window, the beginning and end of the signal is specified. Finally by clicking on "Apply from trackbars" option, the values of "Cursors" are entered automatically. Also by selecting "Reset Time" option, these times reset.

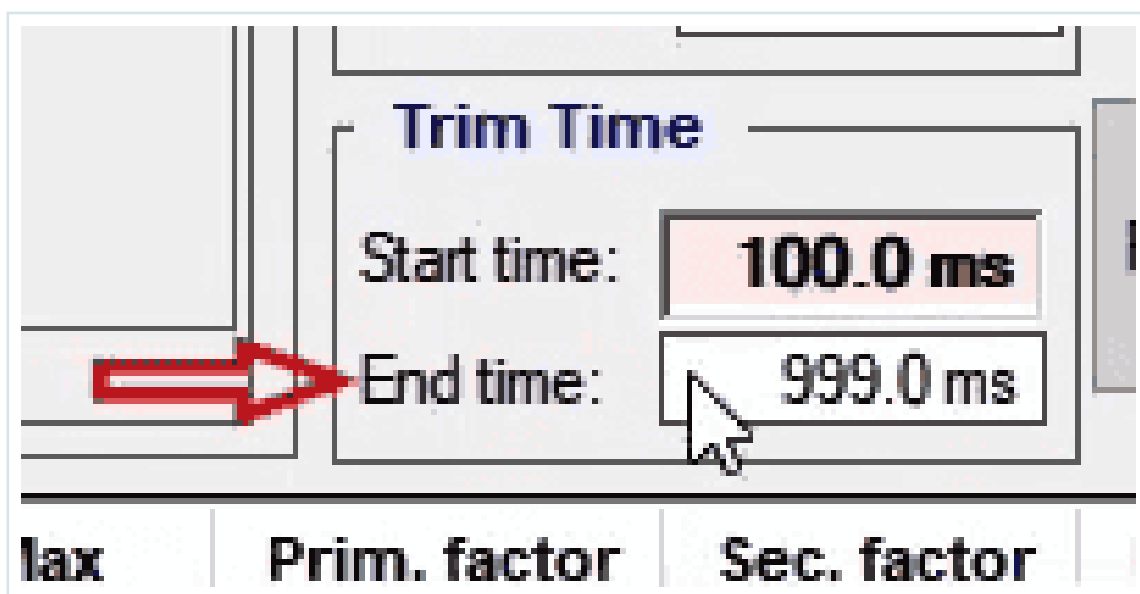


Figure 18

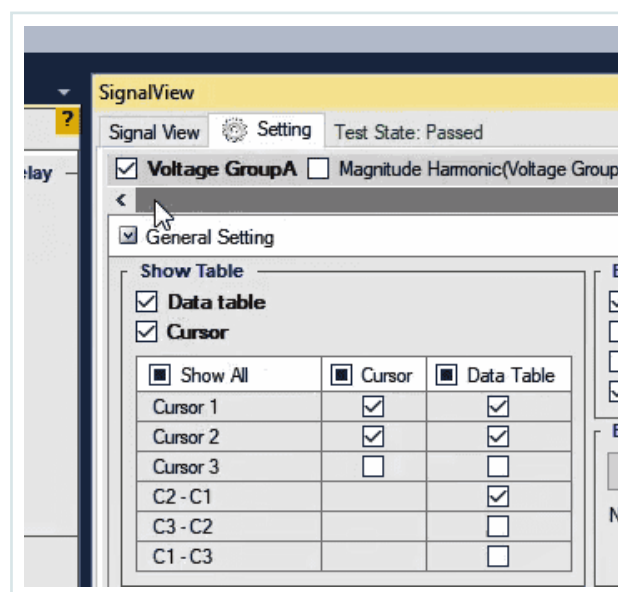


Figure 19



Figure 20

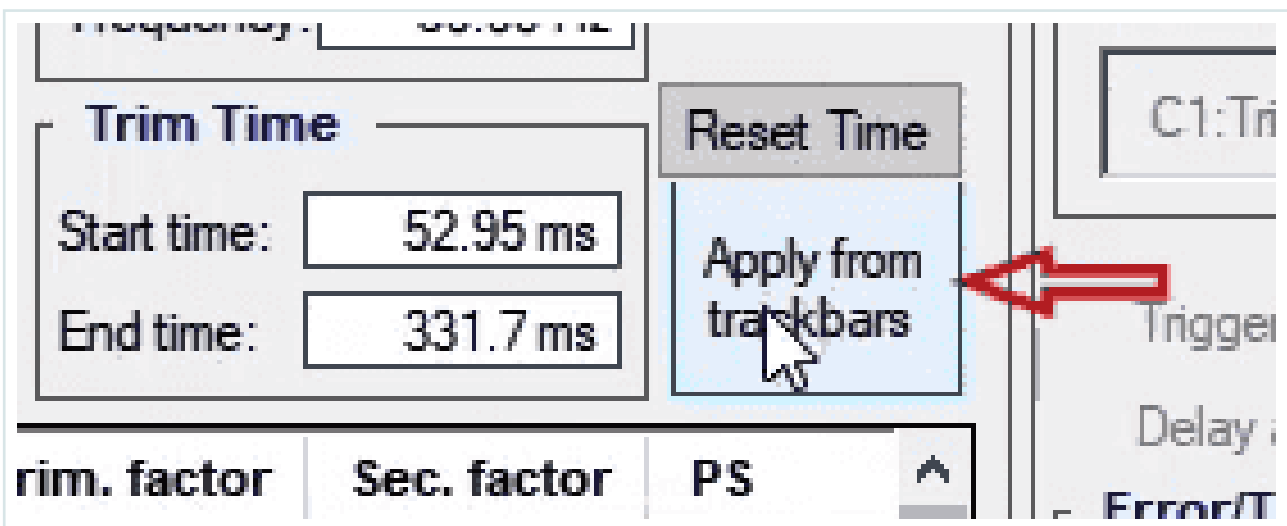


Figure 21

[jg1]Transient_state_type