EPSON

Vibration Data Viewer 1.0
User Guide

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2022.08

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Revision History

Rev. No.	Date	Page	Description
20230830	2023/8/30	ALL	New release
20240226	2024/2/26	P2	Corrected compatible OS

1. Introduction

1.1. Overview

The "Vibration Data Viewer" is an analysis software that allows you to drag and drop waveform data output from Seiko Epson's Vibration Logger software and immediately check waveforms, RMS values, and Fourier transform graphs. This software is provided free of charge to customers to evaluate such sensors.

1.2. Key Functions

This software allows you to perform the following actions.

- Import waveform data (CSV file)
- Display a waveform graph or a Fourier transform graph and export as a CSV file
- Apply filtering and/or integral processing to raw waveform data

By checking the waveform graphs, RMS values, and Fourier transform results from the measurement data in the Vibration Logger, you can identify peak frequencies which helps to identify the source of the vibration.

2. Introduction

2.1. Operating Environment

The following are the recommended system specifications for this software. Other operating environments have not been tested.

Operating System	Windows 11, Windows 10 (64 bit)
CPU	Intel multi-core processor (Intel Core i3 or higher)
RAM	4 GB or more (8 GB or more recommended)
Free Hard Disk Space	1 GB or more

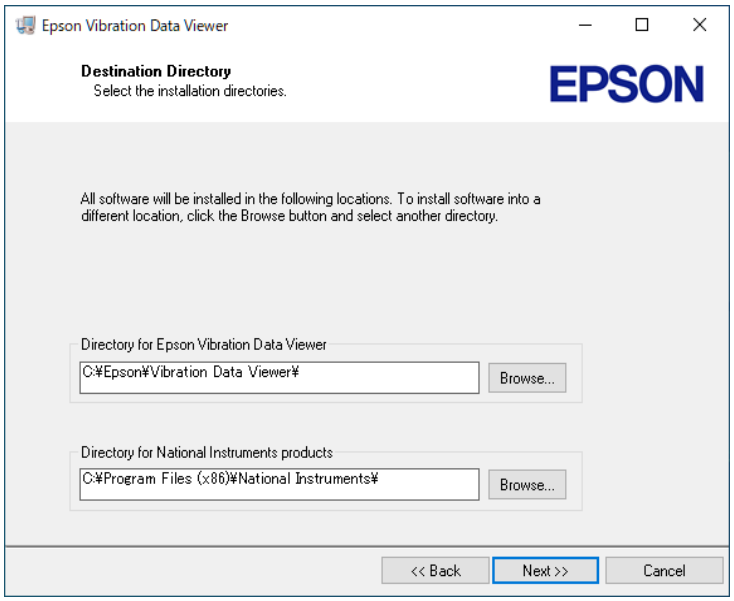
- If you use a computer with lower specifications and experience operational abnormalities such as delays in updating graphs, try using a computer with higher specifications.
- You must also install the "Vibration Logger" software from Epson to use this software.

2.2. Installing the Software

1) Close all other running software applications.

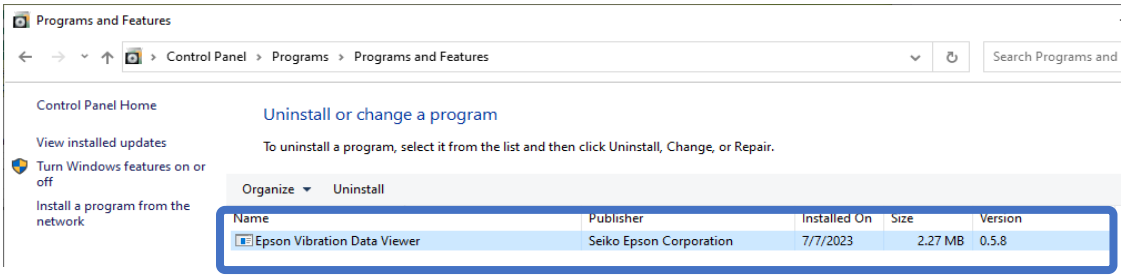
2) Execute "setup.exe" in the "Installer\Volume" folder.

3) Select the destination directory and click "Next". Then, follow the on-screen instructions to install the software.



2.3. Uninstalling the Software

To uninstall this software, go to "Programs and Features" in Control Panel, select "Vibration Data Viewer", and execute the uninstallation.



3. Operating Procedures

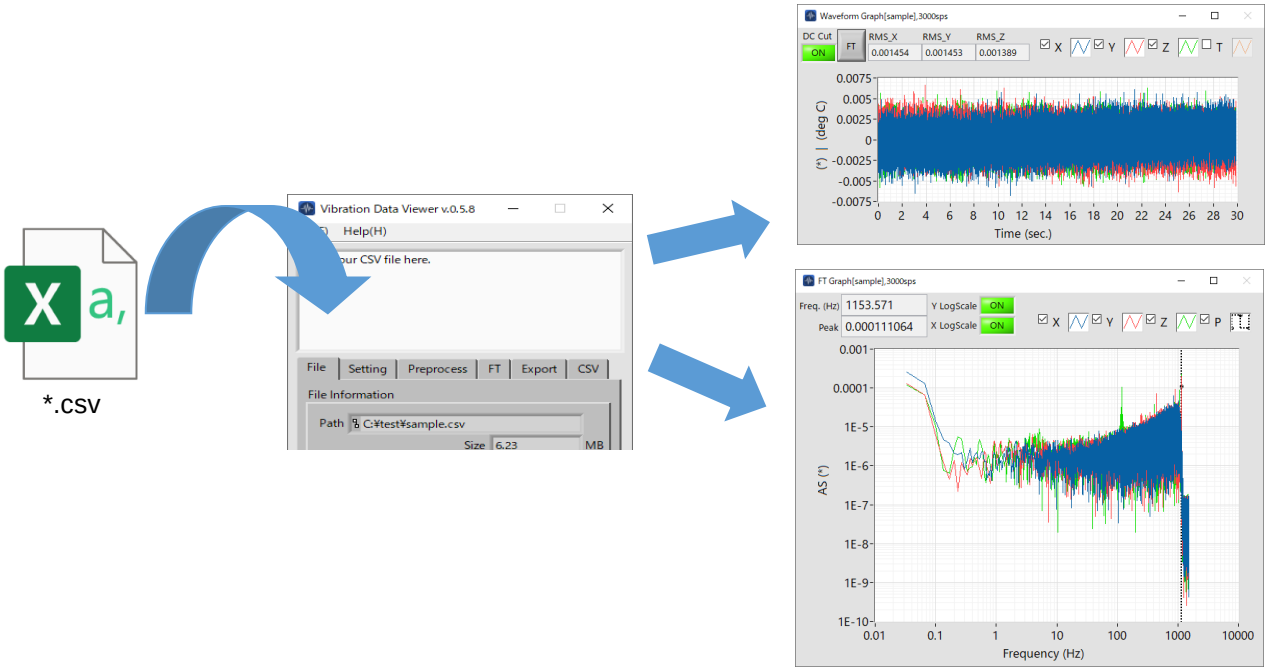
3.1. Starting and Exiting the Software

Double-click the following icon (Vibration Data Viewer.exe) on your computer's desktop to start this software.

To exit this software, click "Exit" in the "File" menu or click the X button at the top-right corner of the window.

3.2. Operation Workflow

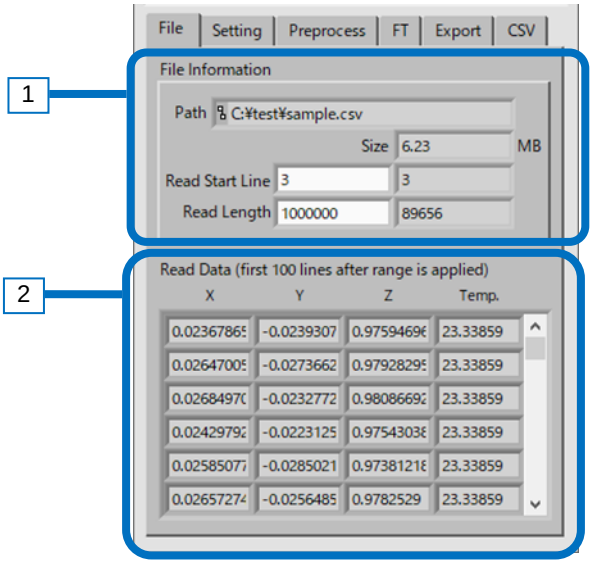
Drag and drop a CSV file (waveform data) onto the software's main window to apply pre-processing to the waveform data, and display waveform graphs and Fourier transform graphs on the graph area. You can export the displayed graphs to a CSV file.



3.3. Using the Windows and Settings

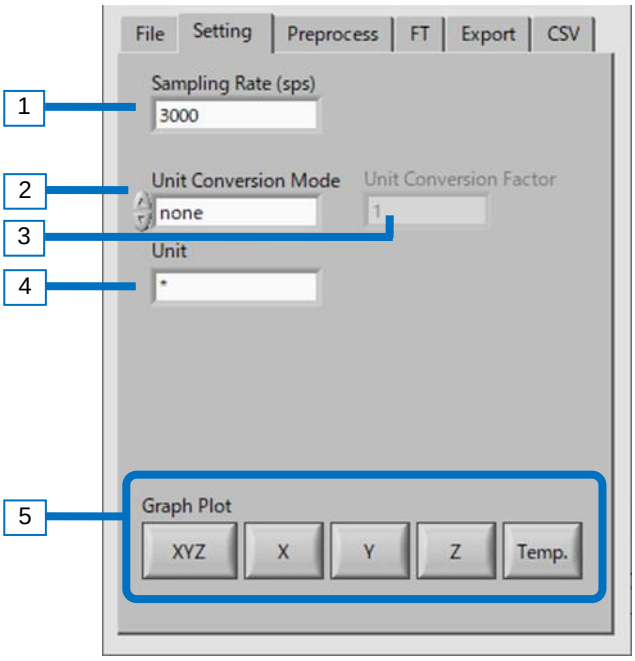
3.3.1. Main Window

[File] tab



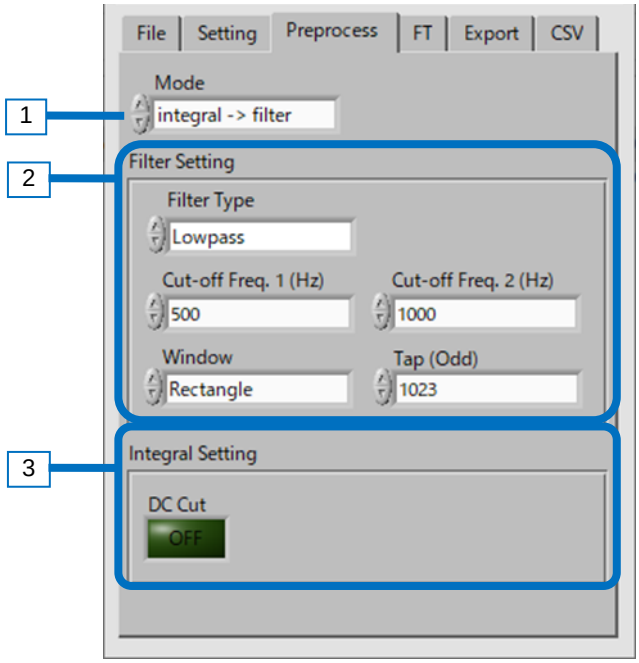
1	File Information	Path	Displays the folder path of the CSV file being read.
		Size	Displays the size of the CSV file being read.
		Read Start Line	Sets the start line for reading data in the CSV file.
		Read Length	Sets the number of rows to read from the start line in the CSV file.
2	Read Data	Displays the values for the first 100 lines in the CSV file being read.	

[Setting] tab



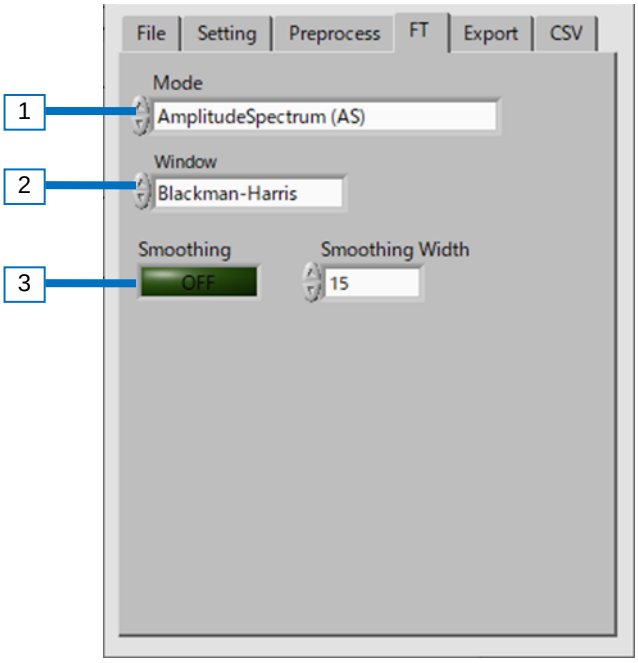
1	Sampling Rate (sps)	Sets the sampling rate.
2	Unit Conversion Mode	Select the unit conversion mode.
3	Unit Conversion Factor	Sets the factor multiplied by the waveform data when "User defined" is selected as the "Unit Conversion Mode".
4	Unit	Enter the display unit when "User defined" or "none" is selected as the "Unit Conversion Mode".
5	Graph Plot	Select the axes to be displayed on the graph.

[Preprocess] tab



1	Mode	Sets the type of pre-processing.	
		none	No pre-processing is applied.
		filter	Applies a filter to the data.
		integral	Applies integral processing to the data.
		filter -> integral	Applies a filter to the data, and then applies integral processing.
		integral -> filter	Applies integral processing to the data, and then applies a filter.
2	Filter Setting	Filter Type	You can set the following four types of filters. - Lowpass: Attenuates the high-frequency side of the cut-off frequency. - Highpass: Attenuates the low-frequency side of the cut-off frequency. - Bandpass: Attenuates frequencies outside the range of the two cut-off frequencies. - Bandstop: Attenuates frequencies within the range of the two cut-off frequencies.
		Cut-off Freq. 1 (Hz)	Sets cut-off frequency 1. Applied when one of the following is set as the Filter Type. - Lowpass - Highpass - Bandpass (low-frequency side) - Bandstop (low-frequency side)
		Cut-off Freq. 2 (Hz)	Sets cut-off frequency 2. Applied when one of the following is set as the Filter Type. - Bandpass (high-frequency side) - Bandstop (high-frequency side)
		Window	Select a window function. If you select "Rectangle", the window function will not be applied.
		Tap (Odd)	Sets the number of taps (an odd number).
3	Integral Setting	When this is set to "ON", DC cut is applied to the waveform data before integral processing.	

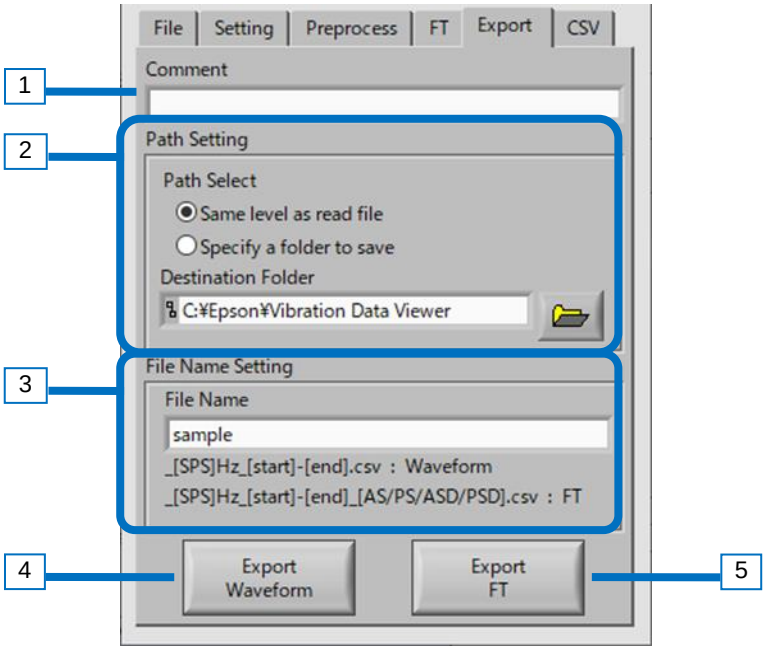
[FT] tab



1	Mode	Select the Fourier transform mode.
2	Window	Select the window function you want to apply during the Fourier transform. This improves the resolution degradation associated with data discontinuities. If you select "Rectangle", the window function will not be applied.
3	Smoothing	Click "OFF" to smooth (perform moving average processing) the data after the Fourier transform with moving average interval (= “moving average half-width” x 2 + 1). You can set the moving average half-width value in “Smoothing Width”. If this setting is on, the data may not be accurate. Smoothed data should only be used as supplementary reference data.

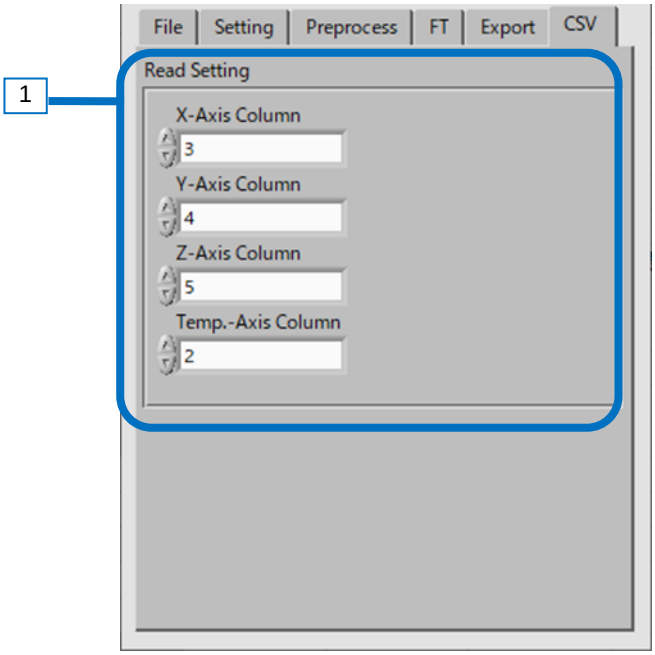
[Export] tab

On the "Export" tab, you can output waveform data processed by the software and the data after Fourier transform as CSV files.



1	Comment	Enter a comment that will be entered in the "Comment" line in the CSV file being exported.
2	Path Settings	Sets the save location of the CSV data.
3	File Name Setting	Sets the text added to the beginning of the output CSV file name. The following values are added to the file name after the text entered in "File Name". Waveform data: _[SPS]Hz_[Data Start Line]-[Data End Line] FT data: _[SPS]Hz_[Data Start Line]-[Data End Line]_[AS/PS/ASD/PSD]
4	Export Waveform	Exports the waveform data processed by the software.
5	Export FT	Exports the Fourier transform data processed by the software.

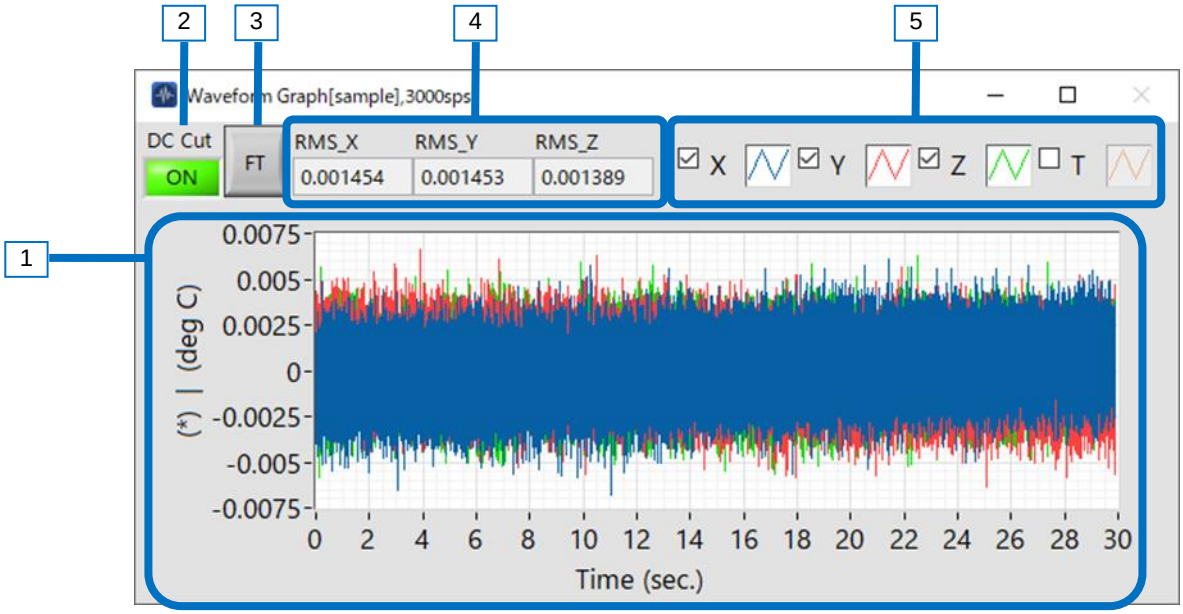
[CSV] tab



1	Read Setting	Sets the read columns of the CSV file being read. Do not change from the default values, as this will prevent the CSV file from being read. Set this only if the format of the CSV file has been changed. Also, the column setting starts from 0. For example, if you want to specify the first column of the CSV file, enter "0"; if you want to specify the second column, enter "1".

3.3.2. Waveform Graph Window

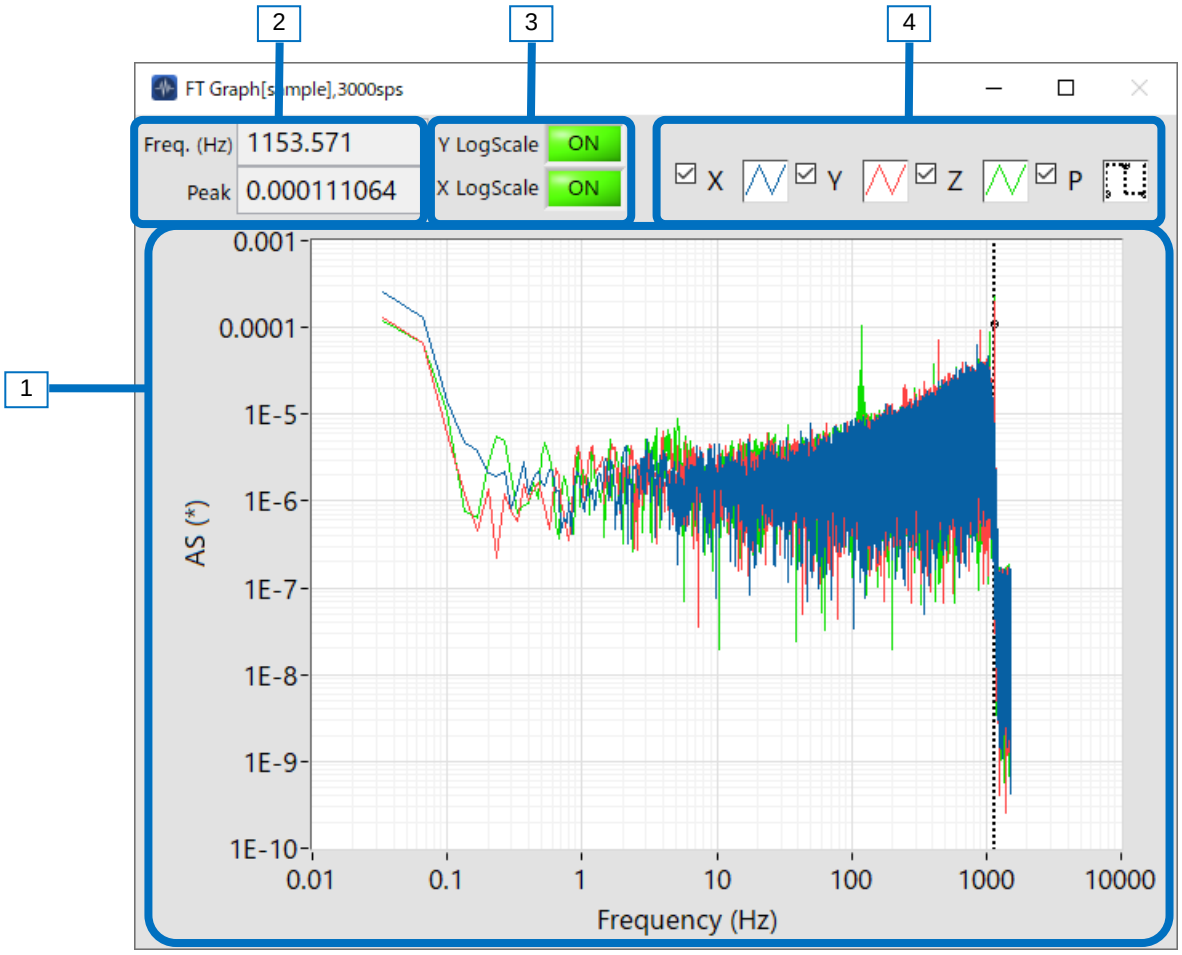
Displays the waveform graph read from CSV.
You can export the data to a CSV file by right-clicking in the graph.



1	Graph	- You can drag any area in the graph to zoom in on the dragged area. Double-click to return to the original view. - You can change the display range of the graph by clicking on the maximum or minimum value of the vertical or horizontal axis in the graph and entering a new value. Double-click to return to the original view. - Hold down the mouse wheel and drag the desired section to display the number of seconds in the selected section. Click again to clear the display.
2	DC Cut	Click this button to switch the DC component removal on or off.
3	FT	After zooming in on the graph, click this button to perform a Fourier transform on the selected range and display it on the FT graph area.
4	RMS_X RMX_Y RMS_Z	Displays the RMS value for the displayed section.
5	X / Y / Z / T axis	You can select to show/hide the axis by clicking each checkbox. Click on each icon to change the display settings for that axis.

3.3.3. FT Graph Window

Displays the Fourier transform graph.
You can export the data to a CSV file by right-clicking in the graph.



1	Graph area	- You can drag any area in the graph to zoom in on the dragged area in the FT graph. Double-click to return to the original view. - You can change the display range of the graph by clicking the value of the vertical or horizontal axis in the graph and entering a new value. Double-click to return to the original view.
2	Freq. (Hz) Peak	Hover your cursor over a point in the graph area to display the frequency and peak for that point.
3	Y LogScale X LogScale	Click to switch between linear scale and log scale for each axis. "ON": Log scale "OFF": Linear scale
4	X / Y / Z / P axis	You can select to show/hide the axis by clicking each checkbox. Click on each icon to change the display settings for that axis.

4. CSV File Format Specifications

You can export data analyzed in the Vibration Data Viewer to a CSV file as Waveform or Fourier transform data.

Information about the CSV file is entered in the header of the CSV file (lines 1 to 27).

ID	Parameter	Information
H-001	#Vibration Data Viewer	Vibration Data Viewer version
H-002	#Original CSV File	Name of CSV file being read from
H-003	#CSV X-Axis Column	X-axis column of CSV file being read from
H-004	#CSV Y-Axis Column	Y-axis column of CSV file being read from
H-005	#CSV Z-Axis Column	Z-axis column of CSV file being read from
H-006	#CSV Temp.-Axis Column	Temperature-axis column of CSV file being read from
H-007	#CSV Read Start Line	Read start line of CSV file being read from
H-008	#CSV Read Length	Read length of CSV file being read from
H-009	#Data Start Line	Analysis start line of read data
H-010	#Data End Line	Analysis end line of read data
H-011	#Sampling Rate (sps)	Sampling rate
H-012	#Unit Conversion Mode	Unit conversion mode
H-013	#Unit Conversion Factor	Unit conversion factor
H-014	#Unit Name	Unit name
H-015	#Preprocess Mode	Pre-processing mode
H-016	#Filter Type	Filter type
H-017	#Filter Cut-off Freq. 1 (Hz)	Filter cut-off frequency 1
H-018	#Filter Cut-off Freq. 2 (Hz)	Filter cut-off frequency 2
H-019	#Filter Window	Filter window function
H-020	#Filter Tap	Number of filter taps
H-021	#Integ. DC Cut	Integral DC cut
H-022	#FT Mode	Fourier transform mode
H-023	#FT Window	Fourier transform window function
H-024	#FT Smoothing	Fourier transform smoothing process
H-025	#FT Smoothing Width	Fourier transform smoothing process width
H-026	#Comment	Comment
H-027	#File Format Type	File format

Values for the analysis results are entered in line 28 and onward in the CSV file.

<Waveform example>

	A	B	C	D	E	F	G	H
27	#File Format T	Waveform						
28	#Index	Time (sec.)	Temp. (deg C)	X (*)	Y (*)	Z (*)		
29	0	0	25.56883723	4.44575E-07	1.70882E-05	9.808669173		
30	1	0.001	25.03729115	0.000294847	0.000147239	9.75430381		
31	2	0.002	25.24623848	9.53269E-05	4.88952E-05	9.73812179		
32	3	0.003	25.16441152	9.51499E-06	7.24292E-06	9.782528987		
33	4	0.004	25.78149521	7.50277E-06	2.69752E-06	9.777020876		
34	5	0.005	25.64273898	2.84485E-06	3.49332E-07	9.778047812		
35	6	0.006	25.76667471	2.10438E-06	1.61411E-06	9.800422567		
36	7	0.007	25.29453148	2.75645E-06	5.59444E-07	9.780786308		
37	8	0.008	25.68541956	1.41377E-06	1.40772E-06	9.786294419		
38	9	0.009	25.76933225	1.38731E-06	7.20361E-07	9.781844363		
39	10	0.01	25.6778133	1.48593E-06	6.56923E-07	9.758100361		
40	11	0.011	25.96625831	2.81225E-06	1.42174E-06	9.791117905		
41	·	·	·	·				
42	·	·	·	·				
43	·	·	·	·				

<FT example>

	A	B	C	D	E	F	G	H
27	#File Format T	FT						
28	#Frequency (H	X (*)	Y (*)	Z (*)				
29	0	4.44575E-07	1.70882E-05	7.19842E-05				
30	0.03346011	0.000294847	0.000147239	0.000110616				
31	0.06692022	9.53269E-05	4.88952E-05	5.67162E-05				
32	0.10038033	9.51499E-06	7.24292E-06	1.97407E-06				
33	0.13384044	7.50277E-06	2.69752E-06	1.06176E-06				
34	0.16730055	2.84485E-06	3.49332E-07	9.42861E-07				
35	0.20076066	2.10438E-06	1.61411E-06	2.7753E-06				
36	0.23422077	2.75645E-06	5.59444E-07	4.98802E-06				
37	0.26768088	1.41377E-06	1.40772E-06	4.96586E-06				
38	0.30114099	1.38731E-06	7.20361E-07	1.72044E-06				
39	0.3346011	1.48593E-06	6.56923E-07	7.73807E-07				
40	0.36806121	2.81225E-06	1.42174E-06	1.07712E-06				
41	·	·	·	·				
42	·	·	·	·				
43	·	·	·	·				

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