

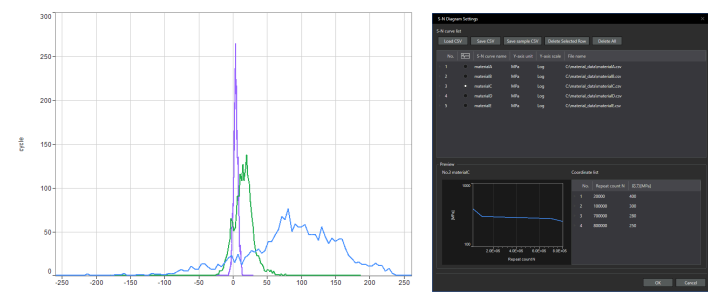
O-Solution/DS-5000

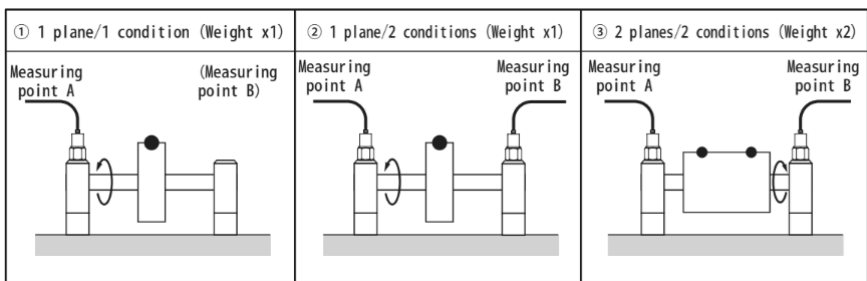
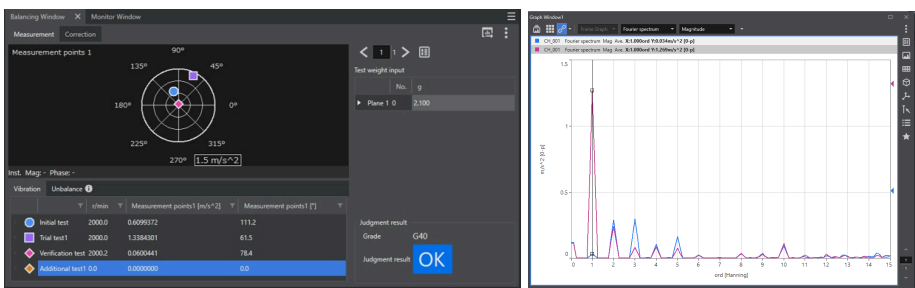
Upgrade history

This document describes the upgrade contents and specifications of O-Solution.



Additional License

Model	License name
OS-0533	Frequency Analysis & Fatigue Life Estimation This application imports strain and stress time-series data acquired by data loggers and other measurement systems, and analyzes the occurrence frequency (cycle count) for each stress amplitude. It also combines the analysis results with S-N curves (material fatigue characteristics) to provide a seamless workflow from cumulative fatigue damage calculation to fatigue life estimation, helping evaluate product durability and safety. Frequency Analysis Methods: Extreme Value Counting / Peak Counting / Valley Counting / Peak-to-Peak Counting / Rainflow / Amplitude Linear Cumulative Damage Rules: Miner's Rule / Modified Miner's Rule 

OS-0551	Field Balancing This application measures vibration data from rotating machinery, analyzes unbalance that causes abnormal vibration, and calculates the optimum balance correction using available balancing weights. It provides a seamless workflow from the initial run and trial run to the verification run, enabling highly accurate balance correction in the field.  
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Additional Function

Function	Details
Importer	Supports KYOWA Electronic Instruments file formats (.ks2 and .ks3).
Under-Range Monitor	Added function to monitor whether the signal level of each channel falls below the linear operating range of the selected microphone during measurement.

2026/04/23

Functional addition, fixed bugs

Ver.5.2.4

DS-5000 Firmware Ver.1.1.1.5
DSP Ver.05.03.2109

Additional Function

Function	Details
Sound power level using sound pressure	Compliant with ISO 3744:2025.

*This function requires an annual support contract.

Fixed bugs

Function	Details
Calibration	Fixed a bug that caused the software to become unresponsive under certain conditions during the automatic calibration.

2026/02/13 Fixed bugs

Ver.5.1.5

DS-5000 Firmware Ver.1.1.1.5
DSP Ver.05.03.2109

Fixed bugs

Function	Details
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Sound Power Level
Form File

Fixed a bug where the overall A-weighted sound pressure level ("Overall (A)") was output incorrectly in the form file.

2025/11/19

Additional functions, improvements

Ver.5.1.3

DS-5000 Firmware Ver.1.1.1.5

DSP Ver.05.03.2109

Additional functions

Function	Details
Sound Power Level	Calculation of sound power levels is available from a lower frequency of 0.8 Hz (1/3 octave band) and 1.0 Hz (1/1 octave band).
Quick Access Window *	Added Quick Access Window, which facilitates the execution of necessary operations by assigning O-Solution operations to any buttons on this window.
OS-2000 series Project file *	Data can be imported from a project file (.osp file) of the time series data analysis tool "OS-2000 series". *Irregularly spaced data, video data, and analysis data will not be restored.
Graph Window	Added frequently used settings such as graph types and data types to the graph window toolbar.
Graph Window	Add 'Favourites' to the graph window properties.
Importer	Supports importing video files (*.mov) recorded using Sound One Recorder Ver.4.0 or later.
Analysis Condition List	Added Analysis Condition List. Various analysis settings such as FFT, octave, and tracking analysis can be saved and restored without switching projects.
Calculation between Analysis Result Items/ Calculation within Analysis Result File	Added MAX (maximum)/MIN (minimum) functions into the Calculation between Analysis Result Items/Calculation within Analysis Result File.

*This function requires an annual support contract.

Improvements

Function	Details
Project	Improved that when performing automatic clean-up processing, the files will be moved to the Windows Recycle Bin.
Time Axis Preprocessing	Changed the processing order of time-axis preprocessing in measurement mode. Before : Digital filter → Absolute value → Time axis calculus After : Digital filter → Time axis calculus → Absolute value
Graph Window	Improved to retain the previously configured settings for “Any list” in the list type of Graph Window.
Graph Window	Improved that Trace line settings are not be reset and their original settings are retained when re-registering graphs or creating new projects (“Apply setting file” is ON).
Analysis UFF exporter	When executing Analysis UFF exporter, partially added axis label information to the header information. (UFF Type 58 (ASC II) Record 8 to 10 Field 5)
O-Step API	Added a command that allows specifying the files used for reference rotation and external trigger when executing analysis plugins from O-Step commands.
O-Step API	Improved the system so that the O-Step can reconnect to the O-Solution without any operation on the O-Solution side when the O-Solution is restarted after communication via the O-Step without sending a disconnect command.

2025/07/14

Functional addition, fixed bugs

Ver.5.0.11

DS-5000 Firmware Ver.1.1.1.5

DSP Ver.05.03.2109

Additional Function

Function	Details
Importer	Supports importing data files (*.orf) from the portable vibration meter (VW-3100).

Fixed bugs

Function	Details
Graph Window	Fixed a bug in FFT tracking analysis where, when the trace line setting is set to P.O.A. and 'Copy → Paste → Trace Line' is performed, the upper and lower frequency limits of the P.O.A. at the copied destination are not correctly reflected.
Graph Window	Fixed a bug where the cursor value and drawing position were misaligned when the X-axis was set to "Log" under certain conditions.
Sound Power Level	Fixed a bug that caused an error when performing sound power level analysis using sound pressure with [Analysis type] set to octave analysis, [Conforms to standard] set to 'disabled', and the upper limit of the analysis frequency range set to 20 kHz.
Expoter	Fixed a bug that caused an exception to occur when importing FFT tracking analysis results (.datx) from Ver.4.5.2 or earlier and exporting a trend graph as CSV from the graph window.

2025/04/23 Fixed bugs

Ver.5.0.8

DS-5000 Firmware Ver.1.1.1.5
DSP Ver.05.03.2109

Fixed bugs

Function	Details
License Manager	Fixed to extend the timeout period for accessing the license server to 60 seconds.

2025/04/08 Fixed bugs

Ver.5.0.5

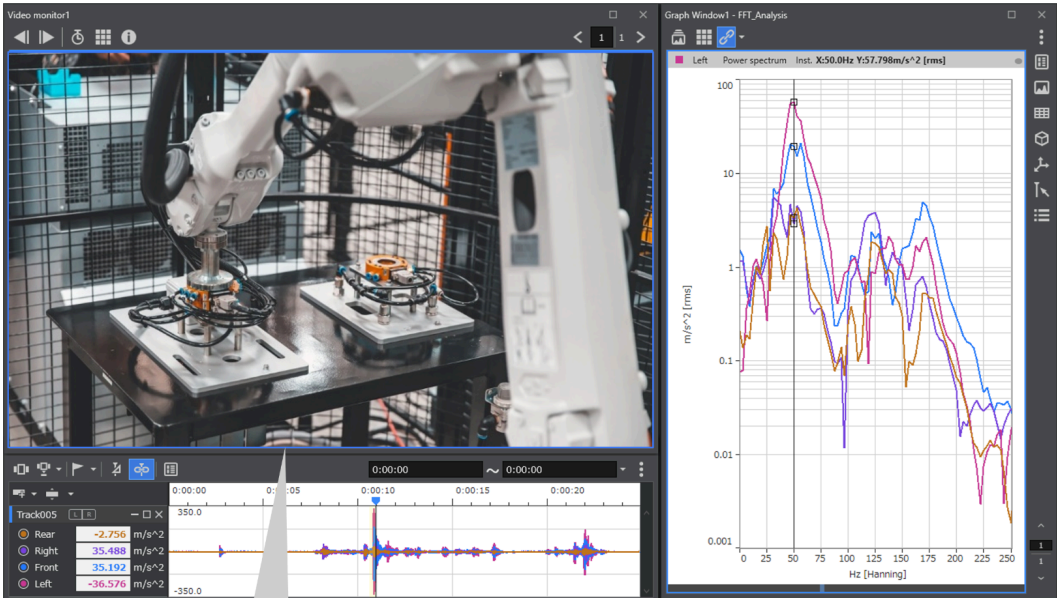
DS-5000 Firmware Ver.1.1.1.5
DSP Ver.05.03.2109

Fixed bugs

Function	Details
Graph Window	Fixed a bug where incorrect X-axis values were saved when enabling the setting any unit on the schedule diagram and exporting the CSV file.
Graph Window	Fixed a bug in which the Z-axis auto scale did not function correctly when the setting any unit on the schedule diagram was enabled in the measurement mode.
Graph Window	Fixed a bug in which the setting any unit on the schedule diagram was not reflected immediately when the graph type was set to 3D graph in the FFT tracking analysis results.
Graph Window	Fixed a bug that caused an exception to occur when starting measurement in the measurement mode with the graph type set to 3D graph and the setting any unit enabled on the schedule diagram.
Graph Window	Fixed a bug in which the setting any unit on the schedule diagram was not reflected for the data list of FFT/octave tracking analysis in measurement mode.
Graph Window	Fixed a bug that caused an exception to occur when the setting any unit on the schedule diagram is enabled and the time-axis waveform of the

	FFT tracking analysis results is displayed in a 3D graph in the measurement mode.
Graph Window	Fixed a bug in which the trend graph list information of FFT tracking analysis results was not saved to a CSV file in measurement mode.
Graph Window	Fixed a bug where past data was exported when the settings did not allow exporting CSV files.
Graph Window	Fixed a bug where an exception would occur and the graph would not update when changing certain settings while multiple graphs were selected after displaying trend/3D graphs of time-frequency analysis results.
Graph Window	Fixed a bug where the upper and lower limits of the scale were not updated when clicking the "Execute" button in Autoscale when setting the Z axis of a 3D graph.
Graph Window	Fixed a bug where the upper and lower limits of the scale were not updated when the conversion factor is changed after measurement in measurement mode.
Graph Window	Fixed a bug that caused an exception to occur when performing FFT tracking analysis in measurement mode, setting the data type to time-axis waveform, and changing the graph type from trend graph to 3D graph.

Additional License

Model	License name
OS-0532	Video Playback Function Video files recorded with a video camera or smartphone can be loaded into the O-Solution and played back along with analysis results of sound, vibration, etc. By displaying video, time series data, FFT analysis results, etc. side by side, you can determine which part of the target object's behavior is causing a problem.  Vibration increases when the movement of the robot arm changes.

Additional Function

Function	Details
Replay analysis *	Added the function to analyze the recorded time-series data while replaying it in the measurement mode.
Importer *	Reference the time series data files without copying them into the project file, which reduces data loading time and the size of project files.
Graphic Equalizer *	Added the function to apply filters visually in 1/3 octave bands and check the filtered sound in real time.

Calibration	Added display information for "Serial Number", "Manufacturer ID" and "Model Information" when reading TEDS-compatible sensors.
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*This function requires an annual support contract.

Improved Function

Function	Details
Octave Analysis	The initial value of the power calculation type changed to P.Ave. when setting the octave analysis in the analysis result averaging function.
Data Manager	Improved that when adding new time series files or analysis files while sorting, the files will be added according to that sorting conditions.
Data Manager	Added display of the number of files and selected files in the Time Series/Analysis Data Manager.
Time Series Data Manager	Added to the right-click menu to add tracks with the same "Item name", "Item2 name", "unit", and "DOF" when registering from the Time Series Data Manager to the Scope Window.
Analysis Data Manager	Added to the menu to overlay multiple selected files each "File", "Item", "Item2", and "DOF" when registering from the Analysis Data Manager to the Graph Window.
Start	Improved speed when opening project files.
Exit	Improved to automatically clean up when exiting the O-Solution.
Scope Window	Added the marker shortcut key to the Scope Window right-click menu.
Window Manager	Improved that Window Manager can now be docked to the main window.
Print preview	The number of tracks displayed per page in the Scope Window expanded from 6 to 48.
Graph Window	Added the delete key and right-click "Delete" menu when deleting items in the Graph Window.
Graph Window	When saving data from a graph window to a file, the file name is displayed in the preview. Also, the file name of each item is displayed in the header of the output file.
Graph Window	When copying only one piece of data to the clipboard from the right-click menu, a blank line will no longer be copied at the end.

Fixed bugs

Function	Details
Scope Window	Corrected that the Y-axis scale is common when "Plot common units on the same Y axis" is turned on.
Start	Fixed to restore the "pinning OFF" (auto-hide) state of docked windows.
Save	Fixed a bug that the file size increased unintentionally when saving a project file.
Graph Window	Fixed so that the cursor position and delta cursor position set in the flame graph, trend graph or 3D graph can be saved in the project file and be restored when loading.
Graph Window	Fixed so that the X-axis scale can be restored when copying a graph in the Graph Window.
Graph Window	Fixed a bug where the line color of item set in the Graph Window reverted to the line color of item in the Data Manager without the Sound Power Level License.
Graph Window	Fixed so that the file name is displayed like other graph types in the Item Detail mode of the trend graph,

2025/01/27 Fixed bugs

Ver.4.6.14

DS-5000 Firmware Ver.1.1.1.4
DSP Ver.05.03.2108

Fixed bugs

Function	Details
Graph Window	Fixed a bug where the frame graph and trend graph of the sound quality evaluation were not drawn.

Fixed bugs

Function	Details
Graph Window	Fixed a problem with graph drawing when the number of sample points was 10,000 or more.
Graph Window	Fixed a problem where the line color of the graph window saved in the project file was not restored under certain conditions.
Project file	Fixed a problem where an error was displayed and settings could not be restored when switching from a project with the Level Monitor docked to another project.

2024/08/07 Functional addition, improvement, fixed bugs Ver.4.6.3

Additional Function

Function	Details
Data integration based on revolution speed	Added the function to create tracking data from FFT data for FFT average data at each constant rotation speed.
Graph Window	P.O.A. trend graph function added to FFT analysis and octave analysis.
Importer	Support for FAMS-R6 file import.

Improved Function

Function	Details
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Graph Window	Improved to be able to copy the X and Y-axes value of a selected graph window to the clipboard by right-clicking.
Graph Window	Improved to restore Y-axis scale settings for the second and subsequent axes.
Graph Window	Improved that the drawing at re-measuring is updated correctly in 3D display with FFT tracking.
Graph Window	Improved performance of "Prioritize average data" and "graph type switching."
Graph Window	Improved the initial display when multiple sound quality evaluation data are registered.
Data File Limit	Increased the maximum number of data file registration up to 10,000 for time series data files and 8,000 for analysis data files. However, the maximum number of files that can be imported in a batch is 5,000.
Data Manager	Improved the Data Manager for instant updates.
Data Manager	Improved when multiple files are analyzed at once, the data is registered in the order of analysis execution.
Expoter	Improved to export the orbit diagrams from the graph window.
Project files	Improved the display speed of the scope window when a saved project is opened.
Operation environment	.NET 8 compatible.

Fixed Function

Function	Details
Monitor Window/Scope Window	Fixed so that when frequency calculus is performed in time calculus, the unit of measure is the unit that the calculus was applied to.
Exporter	Fixed so that the ItemID is correctly displayed after linear compensation is performed on tracking analysis results.
Exporter	Fixed header information when exporting TNR/PR trend graphs from the graph window in CSV file.

Exporter	Fixed a bug that caused extra header information to be output when exporting octave analysis from the graph window to CSV.
Data Manager	Fixed a bug in updating the data list.

2024/07/01

Fixed function

Ver.4.5.6

DS-5000 Firmware Ver.1.1.1.4
DSP Ver.05.03.2108

Fixed Function

Function	Details
Sound Power Level Calculation Report File	Fixed a bug that incorrect values were output for "apparent surface sound pressure level non-uniformity index" and "standard deviation of time-averaged sound pressure level".

2024/06/14

Fixed function

Ver.4.5.5

DS-5000 Firmware Ver.1.1.1.4
DSP Ver.05.03.2108

Fixed Function

Function	Details
Graph Window	Fixed a bug that incorrect values were displayed when frequency calculus operations were repeated for 1/1 and 1/3 bundle octave data.

2024/04/05

Fixed function

Ver.4.5.3

DS-5000 Firmware Ver.1.1.1.4
DSP Ver.05.03.2108

Fixed Function

Function	Details
Signal Output	Fixed a problem that signal is output at an incorrect sampling frequency when outputting the data with a sampling frequency not included in the DS-5000 sampling frequency table.

2024/03/06

Sound Power Level Using Sound Pressure Ver.4.5.2

DS-5000 Firmware Ver.1.1.1.4
DSP Ver.05.03.2108

Additional Function

Functions	Details
Measurement Setting※	Added multiple analyses that can be performed octave analysis with two conditions at the same time.
Calibration※	Added automatic calibration function in measurement mode.
Recoding Function	Pre-recording is possible even when the trigger mode is OFF.
Calculation between analysis results items	Added the function to perform four arithmetic operations between files by selecting items in the analysis results.
Calculation within analysis results files※	Added the function to select items in a file and calculate them.
IIR Filter	Increased the number of IIR filters to 20.
Tracking Analysis※	Extended base sample clock and maximum analysis order during the constant ratio tracking analysis.

Tracking Analysis※	Added the function to remove abnormal rotation speed during measurement and analysis and to create an Item with abnormal rotation removed.
Tracking Analysis	Extended the maximum number of blocks to 5000 during the FFT tracking analysis in the measurement mode .
Tracking Analysis	Extended the maximum number of blocks to 10,000 during the octave tracking analysis in the measurement mode.
Tracking Analysis	Added offset tracking cursor.
Tracking Analysis	Added the function to convert the frequency axis of the constant-width tracking analysis to order or rotation speed.
Tracking Analysis	Added the function to perform the tracking analysis continuously as the rotation speed Up/Down .
Tracking Analysis	Multiple files can be executed simultaneously during the tracking analysis in the analysis mode.
Graph Window※	Added the function to display enlarged numerical values such as cursor values and O.A. values.
Graph Window	Added Y-axis constant auto scaling.
Graph Window※	Added the function to set the rotation speed range of trace lines for offset tracking analysis during the tracking analysis.
Graph Window	Added the function to display the set trace lines on a 3D graph.

※This function requires an annual support contract.

Improved Function

Functions	Details
Data saving	When saving the average data of the power spectrum in the measurement mode, the time axis waveform of the last frame is also saved.
Calibration	Enlarged display of the value to be calibrated.
Calibration	Improved calibration data can be imported/exported.
Multi Analysis	Improved to set the time axis preprocessing only for sub analysis in multiple analyses.

License manager	Increased the maximum number of licenses that can be activated to 50.
License manager	The version of the application is displayed in the title.
License manager	Improved license files can be copied to an optional location.
License manager	Improved revoked and expired licenses can be non-displayed.
Exporter	Improved to output the frequency range along with P.O.A. values of FFT analysis.

Fixed Function

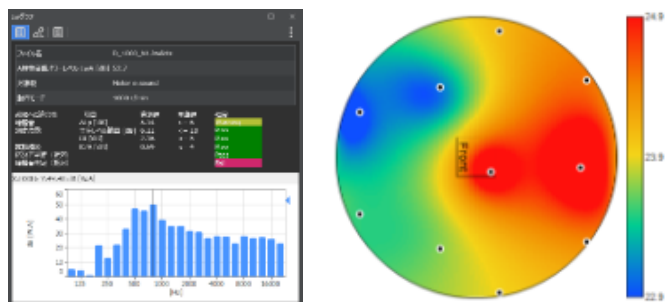
Functions	Details
Exporter	Fixed that O.A. values are output when exporting time frequency analysis results as a csv file.
Monitor Window	Fixed that Y-axis scale is restored when restoring a project.

2024/02/07 Sound Power Level Using Sound Pressure Ver.4.0.6

DS-5000 Firmware Ver.1.1.1.4
DSP Ver.05.03.2108

Additional License

Model	License name
OS-0541	Sound Power Level Using Sound Pressure Sound power level is the total amount of sound energy emitted by a sound source and the measurement method is defined by international standards. It allows you to take efficient noise countermeasures by the measurements that comply with standards and easily confirming sound sources and frequency peaks.



OS-0542

Information Technology Equipment Option

The measurement of noise emitted by computers, printers, multifunction devices, etc. is specified in the standard ISO 7779. It calculates emission sound pressure level at defined operator or bystander position as well as sound power level and the prominent discrete tones.

Additional Function

Functions	Details
Data Manager	Added [Always close trees] menu.
Editing Analysis Files	Analysis items from multiple files can be combined into one file.

Improved Function

Functions	Details
Graph window	Improved the loading time of the project is reduced when displaying 3D graphs and saving it.
License manager	Added [Copy EID] button.

Fixed Function

Functions	Details
Analysis UFF exporter	Fixed so that the square amplitude value can be output as the amplitude display unit, when exporting the power spectrum data.

Sound quality evaluation, Fluctuation sound analysis	Fixed a problem that the "A-weighted sound pressure level", the "CI value (DIN45692, Aures, Bismarck)" are incorrectly displayed and output when performing Sound quality evaluation or Fluctuation sound analysis using time series data with a sampling frequency other than 48kHz in Analysis mode.
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2023/11/10

Fixed function

Ver.3.5.10

DS-5000 Firmware Ver.1.1.0.4
DSP Ver.05.02.2107

Fixed Function

Function	Details
FFT Analysis	Fixed a problem that the unit conversion was not correctly performed when performing the FFT analysis in analysis mode, displaying O.A. on the trend graph, and converting its units.
Graph Window	Fixed a bug that line colors were not restored when saving the project with trace lines overlaid, then reopening it.
Multi Analysis	Fixed a bug that when performing the FFT analysis or the octave analysis for multiple time series data files with different lengths simultaneously, the analysis would end only after the time length of the first selected item.
Graph Window	Fixed a bug that the correct graph was not displayed when P.O.A. was added between Lines in the registered Item list.
Scope Window	Fixed a bug that when changing the format or the number of decimal places in Properties [Item Settings] from item registration, items with different settings were not displayed on the Scope Window.
Graph Window	Fixed a bug that the spectrum display conversion of DC values is accidentally enabled during P.O.A..
Graph Window	Fixed a problem in which the Y-axis scale of the graph window was not reproduced correctly when an existing project file was started.

Additional Function

Function	Details
Measurement Setting	Added multi-analysis that can be performed by combining FFT and octave.
Measurement Setting	Added real-time 1/6, 1/12, and 1/24 octave analysis.
Measurement Setting List	Only measurement settings can be easily switched without switching projects.
Edit File	Time-series Items in multiple files can be combined into a single file. In addition, it is possible to concatenate time-series data for each Item.
Tracking Analysis	O-Solution's FFT tracking analysis results (trend data) are adjusted on the X-axis to equal intervals and exported as CSV files.
Monitor Window	Added the function to change the height of the track during the track fitting as desired.
Scope Window	Added the function to change the height of the track during the track fitting as desired.

Improved Function

Function	Details
FFT Analysis	Improved that frequency range can be switched when multiple files are selected, if they are all in the same frequency range.
FFT Tracking Analysis	A lower limit of 1 ms was added to the time interval for constant-time tracking in analysis mode.
FFT Tracking Analysis	Upper block limit extended to 5000.
FFT Tracking Analysis	Improved that the error is immediately displayed if there is no data within the specified rotation speed range when performing rotation tracking.

FFT Tracking Analysis	Changed so that peak search and band are turned off when the constant ratio tracking is selected in the initial values of trace lines.
Octave Tracking Analysis	Upper block limit extended to 10000.
Graph window	Overlaying of average results with different time lengths is possible.
Graph window	When displaying the analyzed Octave items graphically, Power operation type: P.Ave Number of decimal point display digits for cursor value (X-axis): 1 decimal place O.A. display: ON are set as the initial values.
Graph window	Changed the notation of the average data priority display when octave analysis Item is displayed.
Graph window	Improved to display the average number of FFTs in the calculation results/condition list.
Graph window	Added spectrum display format settings in the Item settings.
Graph window	Changed the initial value of the auxiliary scale increments to 10 dB.
Importer	Faster import of MDF (.dat) files.
Importer	Improved to reflect MEM file comments when importing.
Exporter	Improved to include the O.A. value when exporting the time-frequency analysis results in CSV format.
Calibration	Added "mV/EU" and "EU/mV" to EU type.
Item Setting	Improved that the Items calibrated and recorded in V/EU are displayed as set V/EU without converting to EU/V.
Signal Output	Improved to maintain continuity of output signals in the Signal Output Linked Sweep Mode when switching frequencies.
Time Series Position Alignment	Added the function to reflect the reference detection position and level to all targets.
Time Series Position Alignment	Extended the maximum number of target items to 1000.
Time Series Position Alignment	Added the delay time to the item information.

Effective Value Calculation	Added a time constant of 25 ms.
Effective Value Calculation	Added 0 dB reference value and unit to the item information.
Environment Setting	Added a monitor button to the notification sound settings for user notifications.

Fixed Function

Function	Details
Tracking Analysis	Fixed a bug that the number of blocks in the FFT/octave tracking setting was not displayed correctly.
Graph Window	Fixed a bug that the app closes unexpectedly when displaying the results of sound quality evaluation and deleting the multiple selected items.
Graph Window	Fixed a bug where only the maximum positive value was detected by the peak cursor when displaying the cross-correlation function, so that it detects positive and negative values.
Graph Window	Corrected so that the frequency weighting is not listed in the Allpass units when weighting is applied on the frequency axis in octave analysis.
Graph Window	Fixed Y-axis default scale to reflect calibration values.
Graph Window	Fixed a bug where the item of the average analysis result disappears when displaying the average analysis result items overlaid and adjusting the scale.
Graph Window	Fixed a case in which changes to the FFT settings were not reflected correctly when using the trigger in measurement mode.
Scope Window	Correction of displaying the updated time.
IIR Filter	Corrected the values of the axes displayed on the right side of the graph.
Window Manager	Fixed a bug that an error was displayed when opening a project saved with the window hidden state.

2023/09/21

Fixed function

Ver.3.1.10

DS-5000 Firmware Ver.1.1.0.4
DSP Ver.05.02.2107

Fixed function

Function	Details
FFT Analysis (Measurement Mode)	Fixed a bug that incorrect "Damping Ratio", "Loss Factor", and "Peak Frequency" were output in the graph list display and CSV export process when frequency response function analysis was performed with frequency zoom turned on.

2023/05/10 Functional addition, Improvement, fixed bugs Ver.3.1.4

DS-5000 Firmware Ver.1.1.0.4
DSP Ver.05.02.2107

Additional function

Function	Details
Tripartite Graph	Added the tripartite graph to the graph window. VC curves can be displayed.
Graph window	Graph display settings that have been set once can be retained.
Calculation between time series items	Added the [Repeat setting].

Improved function

Function	Details
Data manager	Item name can be changed on Data manager.
License manager	Licenses can be switched in a batch by turning checkboxes on and off.
External CH setting	Added the function to set the external channels to be enabled.

Analysis	Added the description of Start delay time (i-mark).
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Fixed funcion

Function	Details
Graph window	Fixed so that the change of the Y-axis scale is properly reflected when displaying the phase graphs overlaid.
Graph window	Fixed so that data is correctly updated when the conversion factor of the 3D graph is changed.
Graph window	Fixed so that the unit becomes the square when the square amplitude is set for octave tracking data.
Signal output setting	Fixed a bug that an exception occurs when the signal output channels are disabled, the signal output mode is set to [Signal Output Linked sweep], and press [OK].
Measurement setting	Fixed a bug that an exception occurs when double-clicking on an empty field in the list box.
Graph window	Fixed the discrepancies in the graph window between the items checked in the right-click menu [Calculation Result/Condition List] and the actual graph/list displayed in the graph window. Fixed so that the list can be displayed when the mode circle and the trace lines are displayed.
Measurement setting	Fixed so that Count and Time can be input in the text boxes when setting as follows: 1) Measurement setting : FFT average Detailed setting: Averaging setting Averaging method: Power Spectrum Max O.A. or Fourier Spectrum Max O.A 2) Averaging method: other than Exponential Averaging or Max O.A.
Measurement setting	Measurement setting : FFT average Detailed setting: Averaging setting Averaging method: Power spectrum sweep Fixed the averaging condition can be set to [Time] on the combo box.
Level monitor	Fixed the discrepancy between the voltage level displayed on Level Monitor and the voltage level on the DS5000 (hardware).
Hardware connection	Fixed unexpected application termination when reconnecting hardware.

Viewer function	Modified the message telling that some file formats do not have licenses and can not be imported when importing data with the viewer function.
Graph window	Fixed the decimal places displayed of total harmonic distortion and harmonic distortion rate in the Harmonic list refer to the number of digits for the list value of %.

2023/02/16

Fixed function

Ver.3.0.15

DS-5000 Firmware Ver.1.1.0.0
DSP Ver.05.02.2107

Fixed function

Function	Details
FFT Analysis (Measurement mode)	Fixed so that when performing the exponential averaging (Time axis summation averaging, Power spectrum summation averaging, Fourier spectrum summation averaging) in the measurement mode, results are correctly displayed and saved.
Recording	Fixed so that continuously recorded files can be saved properly.

2022/12/13

Fixed function

Ver.3.0.13

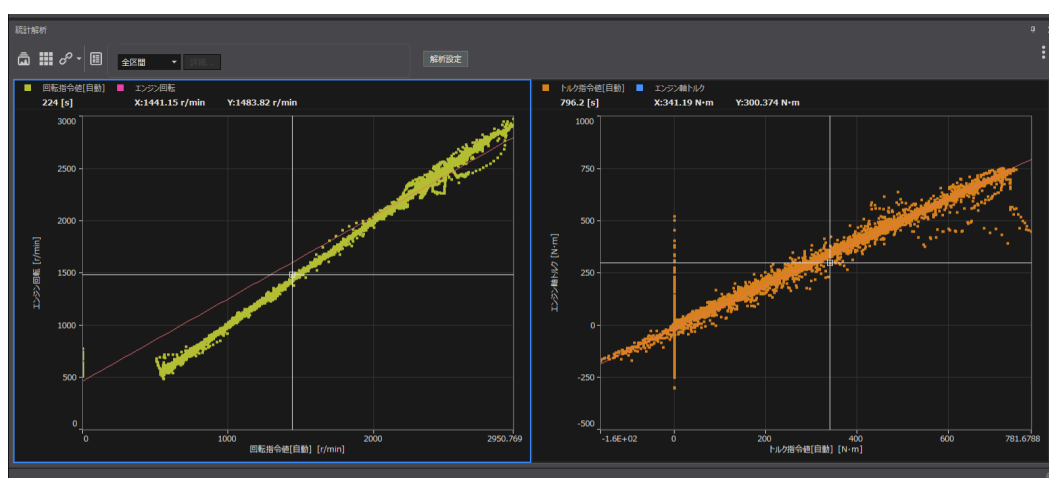
DS-5000 Firmware Ver.1.1.0.0
DSP Ver.05.02.2107

Fixed function

Function	Details
Graph window	Fixed so that all the measurement data selected in the measurement mode is correctly updated even when some graphs are hidden.

Additional Licenses

Model	License name
OS-0531	Statistical Analysis Function Performing various statistical analyses in one window. Various statistical analyses such as obtaining correlation coefficient by performing bivariate analysis of the command value and feedback value can be performed in one window. • Basic statistical analysis Histogram, autocorrelation function, normal probability plot • Bivariate analysis Scatter plot, cross-correlation function, stereogram, interval statistics • 3-variable analysis 3D scatter plot, 3D interval statistics



Additional function

Function	Details
DS-5000 individual recording function	Record using only the DS-5000 without a PC by preparing a condition file (calibration value, frequency range, etc.) in advance with the O-Solution and importing it into the DS-5000. Operate from the touch panel of DS-5000 or from a smartphone or tablet by attaching a wireless LAN module. The remote control app does not need to be installed and can be used with a web browser.

Analysis result averaging	Preview of the average result immediately after selecting the analysis data obtained by performing FFT or Octave analysis.
Statistical trend calculation	The maximum value, minimum value, standard deviation, effective value, skewness, kurtosis, form factor, crest factor, etc. for any interval are displayed as a trend graph. Quickly find the change point of the time-series data by setting the interval and the conditions.
Extension of O-Step API function	External control O-Step API supports more development languages such as Python, MATLAB, LabVIEW, C++, VBA.
Time series UFF Importer/Exporter	File import/export format (time series data) supports UFF files.
Calibration	EU offset

Improved function

Function	Details
Windows 11	Compatible with Windows 11 and .NET 6
TNR/PR	Frame graph and 3D graph are available.
Data manager	The waveform of time-series data can be displayed.
Graph window	Copy and paste in the cursor value area
External CH setting	Added On/Off setting whether to include external CH in recorded data
Signal output	Added a function to link signal output with measurement and recording start/stop
Graph window	Calculation condition list and calculation result list were integrated into calculation result/condition list. Calculation condition list can be displayed side by side with the graph.
Graph window	Changed the UI so that you can collectively change On/Off of display items in the calculation result/condition list.

Fixed function

Function	Details
Analysis UFF exporter	Fixed so that the amplitude display unit is set to the square amplitude value when exporting power spectrum data.

2022/09/20

Fixed function

Ver.2.1.7

DS-5000 Firmware Ver.1.0.3.0
DSP Ver.05.01.2105

Fixed function

Function	Details
Sound Quality Evaluation Function	Fixed so that the graph display and export results are displayed correctly when performing TNR (Tone-to-Noise Ratio) and PR (Prominence Ratio) calculations with data with a sampling frequency other than 48 kHz.

2022/06/23

Chinese version added

Ver.2.1.3

DS-5000 Firmware Ver.1.0.3.0
DSP Ver.05.01.2105

Additional function

Function	Details
Chinese version	Added Chinese to the O-Solution language. Able to change UI to Chinese by selecting Chinese in the Language Setting. (Japanese/ English/ Chinese)

Improved function

Function	Details
Exporter	Added items to be output when exporting to the CSV file •FFT Analysis Function : frequency range of P.O.A. •FFT Tracking Analysis Function : Peak trace line order/frequency value •Sound Quality Evaluation Function : TNR/PR- YES/NO, Tone frequency
FIR filter	The level can be increased or decreased outside the selected range.
Monitor Window Graph Window	Improved that the only CHs enabled in the Input Settings of the measurement mode are displayed.
Graph Window	Added the OS-2000 series color scheme to fill colors in the 3D graph settings
Graph Window	Improved to display only applicable items in the calculation result list.
Importer	Improved that the 0 dB reference value is set appropriately regardless of the recording device or application when importing the ORF file.

Fixed function

Function	Details
Graph Window	Fixed so that when performing the unit conversion of cross spectrum, the prefix will be only on its response side.
DS-5000	Fixed that the battery icon is properly updated to display.
Exporter	Fixed so that the average results of "Power spectrum" or "Cross spectrum" can be exported to the UFF file from the Analysis Data Manager. (This bug has occurred since Ver. 2.0.4)
Voltage range	In the DS-0534 4ch 100kHz Input Unit, when CH3 and CH4 are not in the same voltage range and each range is changed in the order of CH3 and CH4, the DC components become large (0.0865% offset) only in CH3. *Please connect the DS-5000 hardware and a PC at the time of installation and update the DSP of DS-5000. (DSP: Ver. 05.01.2105)
FFT Analysis	Fixed so that the average calculation can be executed through calculation between analysis results of FFT analysis in the Analysis Mode. (This bug has occurred since Ver. 2.0.4)

2022/03/22

Fixed function

Ver.2.0.6

DS-5000 Firmware Ver.1.0.2.0

DSP Ver.05.01.2104

Fixed function

Function	Details
Calibration	Fixed so that the CH 3 and CH 4 can be read normally by TEDS in the DS-0534 4ch 100 kHz unit. *Please connect the DS-5000 hardware and a PC at the time of installation and update the DSP of DS-5000. (DSP: Ver. 05.01.2104)

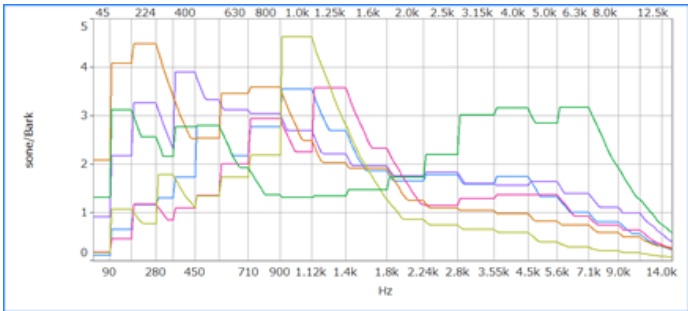
2022/02/16

Functional Enhancement for Sound Analysis Ver.2.0.4

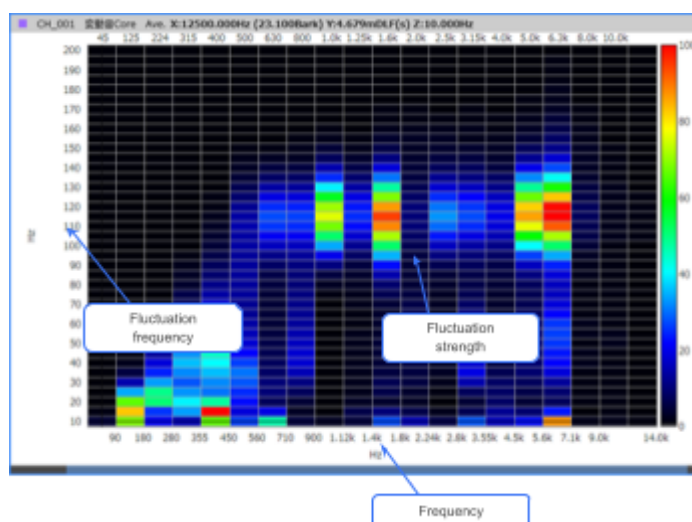
DS-5000 Firmware Ver.1.0.1.0

DSP Ver.05.01.2103

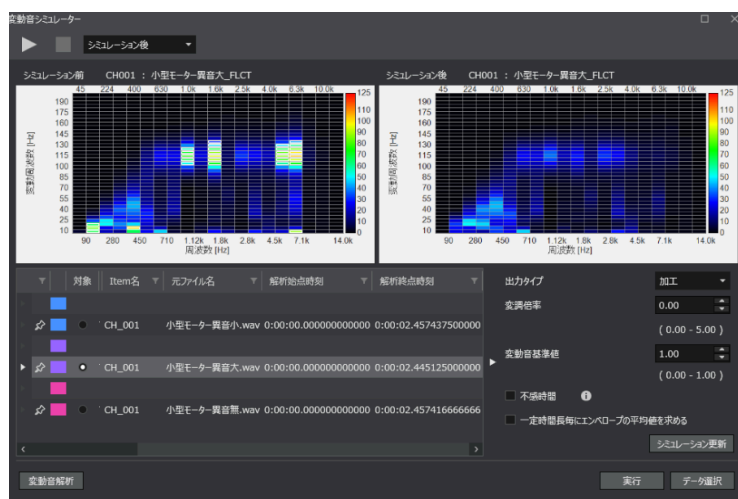
Additional Licenses

Model	License name
OS-0525	Sound Quality Evaluation Function Using psychoacoustic parameters such as "loudness" and "sharpness" that are related to the physical quantities of "sound pressure level" and "octave analysis", it is possible to quantitatively evaluate human sense of sound such as "high-pitched" and "feeling of fluctuation". 
OS-0526	Fluctuation Sound Analysis Function It enables to extract only the components with temporal fluctuations that cause abnormal sound. It can detect and analyze variable components

that are difficult to detect, such as "rattling sound" and "humming sound" when the car is running, and "buzzing sound" that can be heard in the rotation sound of a small motor. As a result, it is possible to improve the abnormal noise generated by various products.



With the fluctuation sound simulator, the analysis result can be evaluated while reducing or amplifying the fluctuation components to compare sounds.

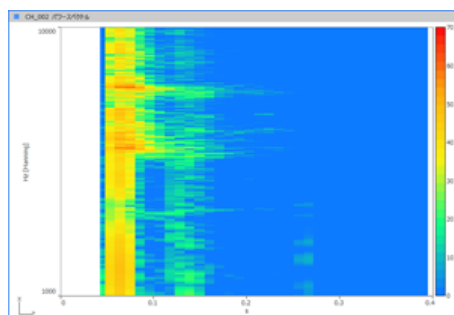


OS-0527

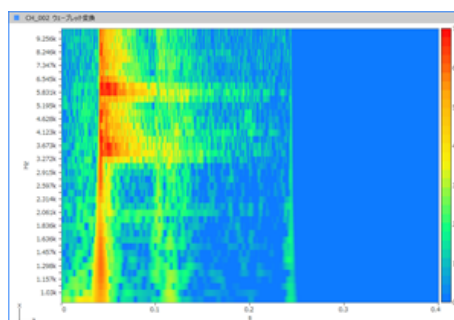
Time Frequency Analysis Function

By using STFT (Short Time Fourier Transform) and Wavelet transform, it can evaluate transient phenomena that were difficult to capture by FFT analysis and octave analysis, and display clearly time changes of the frequency components while maintaining the frequency resolution.

FFT analysis



Wavelet transform



Additional functions

Function	Details
Statistical processing window	It performs statistical processing in the specified range of time-series data and displays statistical indicators. It can process multiple data at the same time. Statistical indicators: Difference/Sum/Average/Median/Max - Min/Max/Min/Standard deviation/Effective value/Peak to peak/Local max/Local min/Skewness/Kurtosis/Form factor/Crest factor/Abs. average/Area/Area +/Area -/Left value/Right value
Graph window	Function that registers trend graph data in the time-series data manager

Improved function

Function	Details
O-Step API	Improved processing speed when executing JSON file

Fixed function

Function	Details
Exporter	Fixed so that when exporting data in TEXT format from Analysis Data Manager, if the unit of Item is not set, the display scale on the exporter side is output to be as set.
User-defined filter	Fixed so that when reading a user-defined filter from the analysis data file, it does not terminate abnormally even if the number of elements exceeds 1000.

2021/11/17 Functional addition, Improvement, Bug fix Ver.1.4.10

DS-5000 Firmware Ver.1.0.1.0
DSP Ver.05.01.2103

New Function

Function

Details

Export

Data formats such as Lin/Log can be selected when exporting data via Analysis Data Manager.

Export CSV files

Export target selection

Export type

Export destination settings

Save target

FFT Analysis Details

FFT Tracking Analysis Details

Octave Analysis Details

Octave Tracking Analysis Details

Graph type

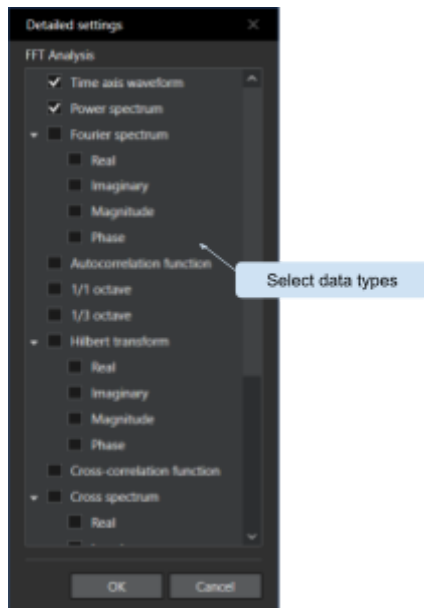
- ☐ Frame (instantaneous)
- ☐ Applies to all frames
- ☒ Frame (average)
- ☐ Trend
- ☐ 3D

Select graph types

Signal type	Display scale	Spectrum display for	Amplitude display u	Unit conversion
Not defined	Log	rms	Amplitude	dB
Sound pressure level	Log	rms	Amplitude	dB
Acceleration	Lin	rms	Amplitude	No conversion
Gravitational acceleration	Log	rms	Amplitude	dB
Velocity	Log	rms	Amplitude	dB
Displacement	Log	rms	Amplitude	dB
Force	Log	rms	Amplitude	dB
Torque	Log	rms	Amplitude	dB
Revolution speed	Log	rms	Amplitude	dB

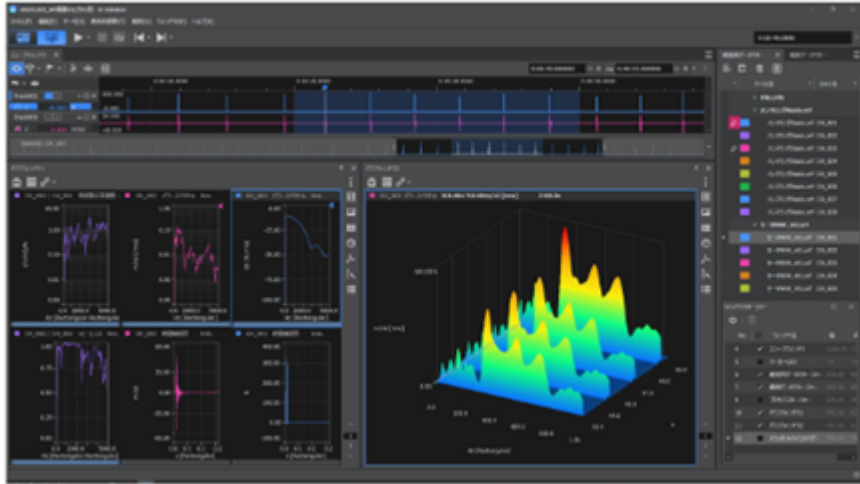
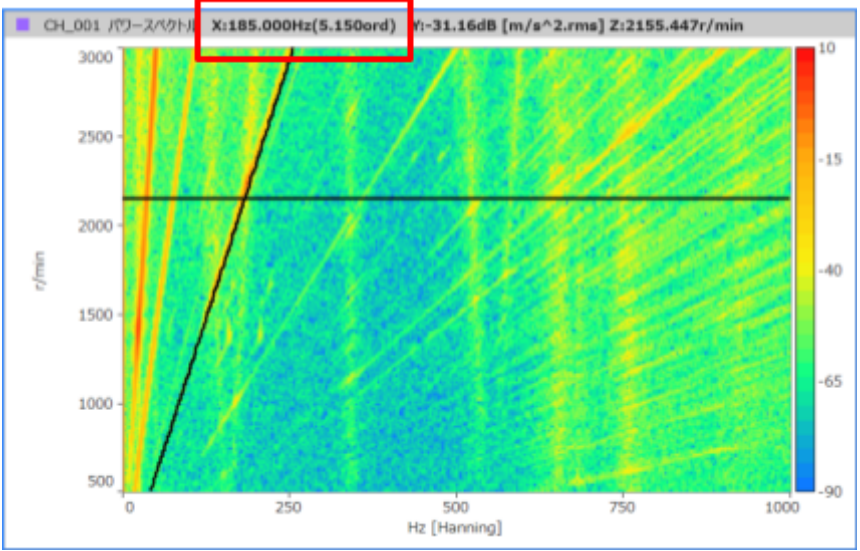
Select the scale by the signal types

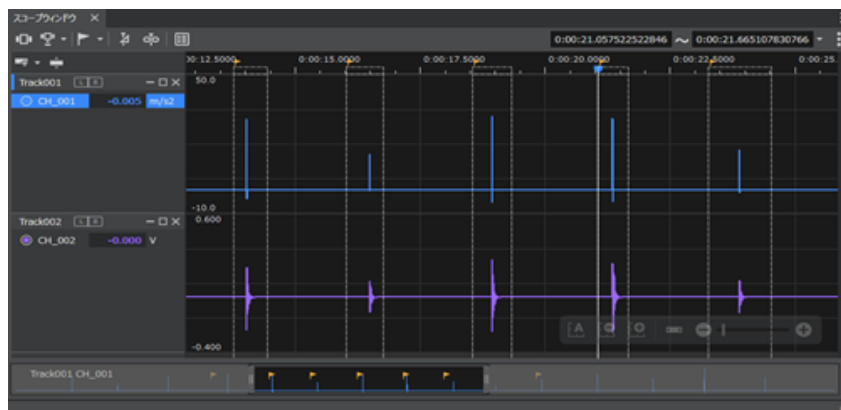
Execute Cancel



Import	Supports YOKOGAWA DL950 / DLM5000 format and WDF format
Project	Added the "Cleanup project" function to delete the data, which is/are deleted on the Data Manager, from the project folder including time-series data files, analysis files.
FFT Analysis	Added "Save all frames" on the FFT interval. By unchecking "Save all frames", you can get only the average result.
Viewer	Supports importing various data formats in addition to the O-Solution binary files (ORFX, DATX) Supporting data formats: Onosokki FAMS file(*.fhd, *.lhd, *.thd) ORF file(*.orf) Others GRAPHTEC GBD file(*.gbd) HIOKI MEMORY HiCORDER file(*.mem) TEAC TAFFmat file(*.hdr) YOKOGAWA WDF/WVF file(*.wdf)
Extract	Added the function to extract the outside selected range and the marker selected range.
Extract	Added the function to apply the taper to the extracted waveform

Improvements

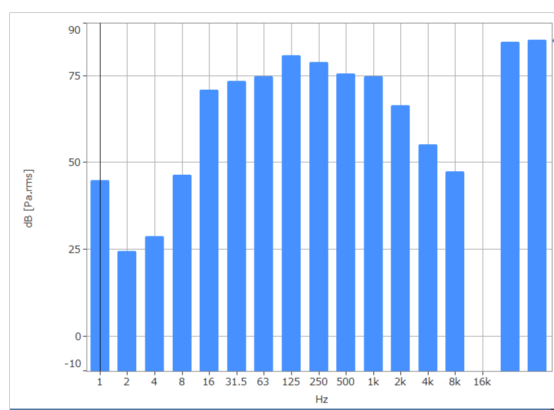
Function	Details
3D graph	Improved switching speed to 3D graph (display speed increased by 30%)
	
3D graph	Added displaying "frequency" and "order" in the cursor value of X-axis during the tracking analysis.
	
Marker	Improved marker operability -Added a shortcut to add marker (Ctrl + M) -Select multiple time length and set them at once. -Added a marker number or comment to the file name of the analysis result specified with the marker.



Graph window

Added displaying "frequency" or "order" at the peak in the cursor value of the peak tracking line chart.

Graph window



Added "All" to the display range of octave analysis

Bug fix

Function	Details
Notification sounds	Fixed so that 6 types of notifications sound respectively.
Import	Fixed so that the signal type is automatically reflected when the WAV data recorded by LA-7000 is read.
Scope window	Fixed so that the volume of audio playback changes according to the ratio of the waveform to the scale.
3D graph	Fixed so that the frequency scale of the synthesized octave graph can be displayed in octaves.

Fixed functions

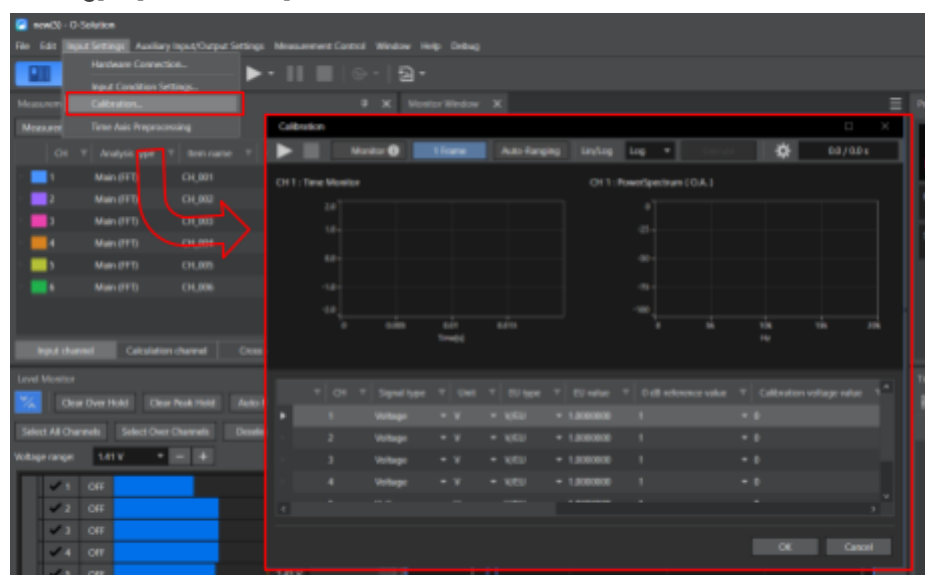
Functions	Details
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Calibration Improved so that the calibration will be executed accurately when the window function is set to the Flat-Top.

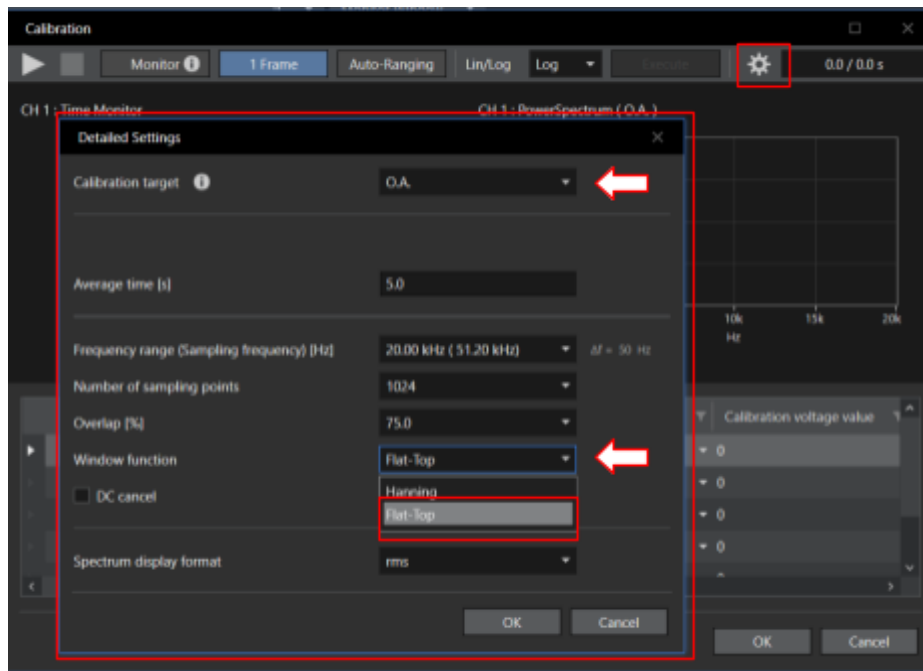
*The error occurs under the following setting conditions.

(Ver1.3.9 to Ver1.3.12)

In the measurement mode, Open the [Calibration] window by selecting the [Input Setting] > [Calibration].



Click the setting button in the [Calibration] dialog, select O.A. as the calibration target and the Flat-Top as the window function.



When performing calibration using a calibrator such as sound calibrator, etc. in the above setting, the calibration value was not calculated accurately.

*Bug details

The calibration value (EU value) is calculated smaller than the accurate value when the window function is set to the Flat-Top and the calibration target is selected as O.A. The cause is that the O.A. is calculated applying the correction value of Flat-Top to the FFT spectrum obtained by the Hanning window, even though the window function is set to the Flat-Top.(e.g. If the accurate value is 1, it is 0.6392.*)

*Square root ratio of the O.A. correction value of Flat-Top (around 0.2724) and that of Hanning (around 0.6667) when calculating O.A.

2021/6/15

Bug fixing

Ver.1.3.12

DS-5000 Firmware Ver.1.0.1.0
DSP Ver.05.01.2103

Fixed functions

Functions	Details
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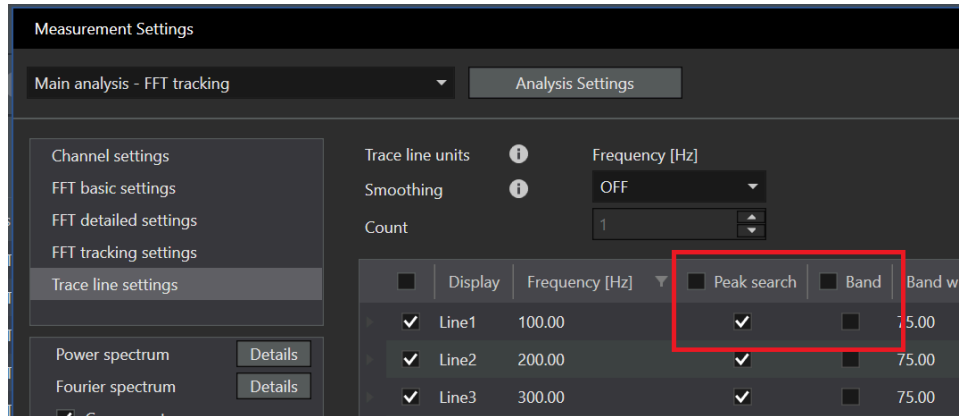
FFT Tracking analysis	Improved so that the peak search process is executed, even if the Peak search is checked and the Band is unchecked in the Trace Line Settings.
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*The error occurs under the following setting conditions

(ver. 1.3.11 or earlier)

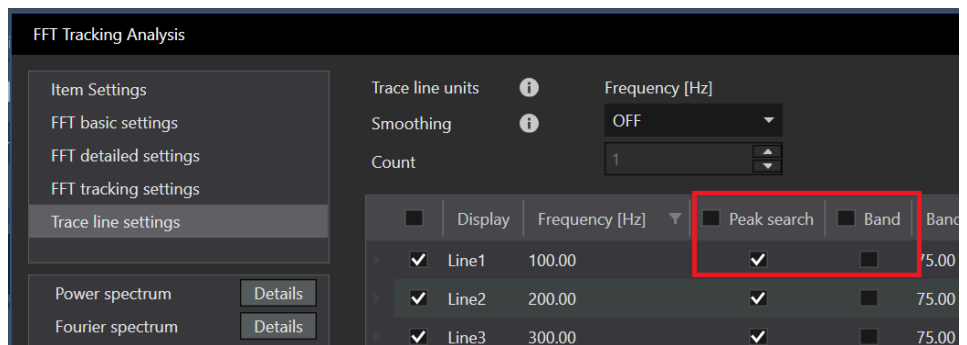
-In Measurement Mode

1. Open [Measurement Control]-->[Measurement Settings].
2. Click [Analysis Setting] and select [FFT tracking].
3. Open [Trace line settings].
4. Check "Peak search" and uncheck "Band".
5. Click [OK] to close [Measurement Settings].



-In Analysis Mode

1. Open [Analysis]-->[FFT Tracking Analysis]
2. Open [Trace line settings]
3. Check "Peak search" and uncheck "Band"
4. Click [Execute] to start analysis



2021/5/31 Updating DSP and operational improvements Ver.1.3.11

DS-5000 Firmware Ver.1.0.1.0
DSP Ver.05.01.2103

Improved functions

Functions	Details
Main unit	Updated DSP due to change of DAC converter parts. *When you use the O-Solution with the DS-5000 hardware, the hardware must be connected during the update.
Graph Window	Improved the scale of Nyquist diagram and Orbit diagram can be changed.
Graph Window	Improved measurement can be started in displaying the cross- channel data and enlarging the X-axis display.
Graph Window	Improved the calculation channel of measurement can be restored when reading a project file.

Additional functions

Functions	Details
Octave analysis	(Analysis mode) 1/N octave analysis is available.
Octave analysis	(Analysis mode) Time ratio display is available.
Octave analysis	(Analysis mode) Analysis time interval is available.
Octave analysis	(Analysis mode) Multiple octave band widths can be performed simultaneously.
Octave analysis	(Measurement mode/Analysis mode) Calculation result list is available.
Export	Exports analysis results from the graph window.
Graph Window	SI prefix can be added to the display unit.
Graph Window	Displays tracking cursor on the revolution tracking data in 3D graph.
Graph Window	The settings for the selected trace line are applied to all graph areas.
Calibration	One frame can be displayed in the calibration dialog.

Improved functions

Functions	Details
Starting	Added " Existing Project" onto the Selecting Project.
Cursor	Added a  mark to the cursor to make it easier to indicate where the graph is shown.
Cursor	Added "Revolution speed priority" to the linkage items.
Graph Window	P.O.A. value is displayed at the cursor value.
Graph Window	Supports light white theme for list display and cursor value display
Graph Window	Improved the data list on the trend graph during overlapping multiple trace lines.

Graph Window	Batch deletion / setting are also available in the trace line settings
Signal output	32768 of sampling points can be selectable when outputting random signals.
Level monitor	CCLD setting is available on the level monitor.
FIR, IIR	Setting files can be saved/restored.

2021/3/3

Octave analysis 1st released

Ver.1.2.7

DS-5000 Firmware Ver.1.0.0.0
DSP Ver.05.00.2100

Additional licenses

Model	License
OS-0524	Octave Analysis Function
OS-5320	O-Solution Subscription Standard

Additional fuctions

Functions	Details
Octave Analysis	1/1,1/3 octave analysis is available. Power calculation is displayed.
Octave Tracking	Octave tracking analysis is available. Revolution and time tracking analysis for 1 / 1, 1 / 3 octave analysis is available.

Improved functions

Functions	Details
Graph Window	Changed 3D graph display options to 3 types: "Time series analysis", "Revolution tracking", and "3D".

Additional licenses

Model	License
OS-0523	Tracking Analysis Function

Additional functions

Function	Details
Export	Analysis results can be exported in CSV format.
Export	Analysis results can be exported in UFF format.
Measurement setting	Copy the set items in the main to the sub when setting multi-analysis.
Setting revolution input	CCLD is available.

Improved functions

Functions	Details
General	Shorten software startup time.
Calibration	Shorten startup and closing time for calibration screen.
Environment setting	Shorten the reflection time when switching color modes (file or data).
Scope window	Multiple items can be selected and deleted at once.
Scope window	The cursor can be moved with Shift + left / right keys or Ctrl + left / right keys
Monitor window	The scale can be enlarged up to 0.5 sec.
Monitor window	Changed the color of the cursor head during recording to red
Graph window	The file information and hardware information of the graph displayed in the graph window can be displayed.
Graph window	Shorten display/switching time

Licenses issued

Model	License name
OS-5100	Platform
OS-0510	External Control Function
OS-0512	Hardware Connecting Function
OS-0521	Digital Filter Function
OS-0522	FFT Analysis Function
OS-5310	O-Solution Subscription Basic