

Time-series Data Analysis Software

OS-2000 series



Speedy and freely

Flexible data-edit from huge amount of time-series data

ONOSOKKI

OS-2000 series

Flexible data-edit from huge amount of time-series data. Largely shorten an effort and a time for analysis.

The OS-2000 series allows you to edit and analyze long time-series data freely that is not able to be handled by Microsoft® Excel®.

The OS-2000 series can handle data formats of recorder made by other company as well as general-purpose formats including CSV and WAVE.

Feature

- ▶ Simultaneous display of different data formats, free graph layout such as side-by-side or overlapping display.
- ▶ Easily import large amount of time-series data, PC analysis available.
- ▶ Rapid processing does not disturb the operator's attention.
- ▶ Entire waveforms and zoomed waveforms are able to be simultaneously displayed. Diverse editing functions including search, time correction, clipping and more are provided.

Import

- ASCII file
- WAVE file
- MOVIE file
- EXCEL file
- MDF file
- UFF file
- DS/CF file
- DS-0328 file
- ORF file
- AU-4100A file
- VARTS-II file
- FAMS file
- KY-1000 file
- MCU file
- WS-5160 file
- TEAC Corporation TAFFmat file
- TEAC Corporation AQ-VU file
- HIOKI E.E. Corporation MEMORY HICORDER file
- Meidensha Corporation MEIDACS file
- Yokogawa Electric Corporation WVF/WDF file

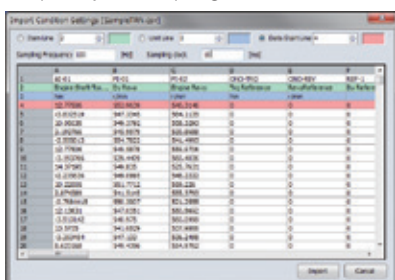


* For data import file, refer to P16.

Operation procedure

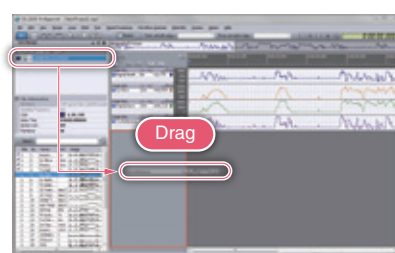
Step 1 Import the data file

The OS-2000 series can import CSV file as well as Ono Sokki's original format (ORF file) and WAVE file. Input the item line, data starting line and sampling frequency or sampling clock.



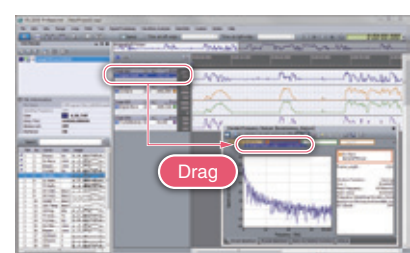
Step 2 Display the data

Data item of imported file is displayed on the screen of the OS-2000 by dragging it. Different format data is able to be displayed simultaneously on the same screen.



Step 3 Analyze the data

Drag the data item to the analysis screen to start analysis. Multiple analysis screens are able to be displayed simultaneously, and it enables comparison of the data before and after analysis.

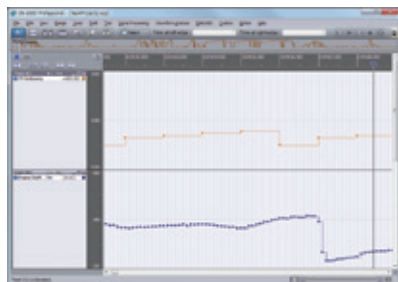


Display function

Displaying waveforms of different sampling frequencies

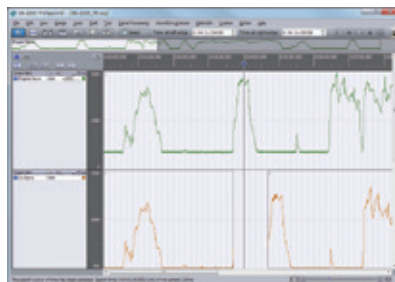
Waveforms of different sampling data are able to be displayed simultaneously.

*The lower waveform in the figure has a sampling frequency which is ten times higher than that of the upper waveform.



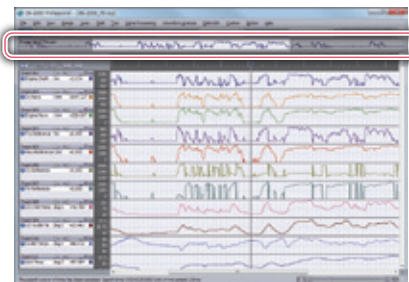
Freely waveform division and moving

You can divide a waveform at any point and then move it to the location that you chose.



Zooming in and out of waveform freely

The Navigation view allows checking of entire waveforms and enlarged areas at a glance. Enlarged areas can be easily scrolled with a mouse.



Playback function

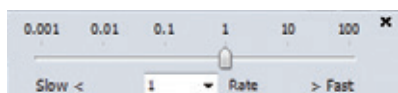
Loop playback of the specified area

Data in a specified area is able to be replayed repeatedly with the loop ON/OFF button.



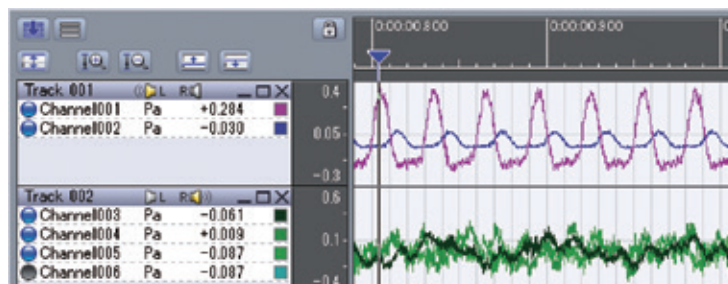
Change of playback speed

Even if multiple events are occurring at short intervals, they may appear to be a single sound at normal speed. Slowing down the playback speed allows them to be identified as separate events.



Switchover of playback channels

Playback channels are able to be changed without stopping the sound, allowing easy identification of subtle sounds. Also you can switch channels of each sound which has been recorded at multiple points with the same timings.



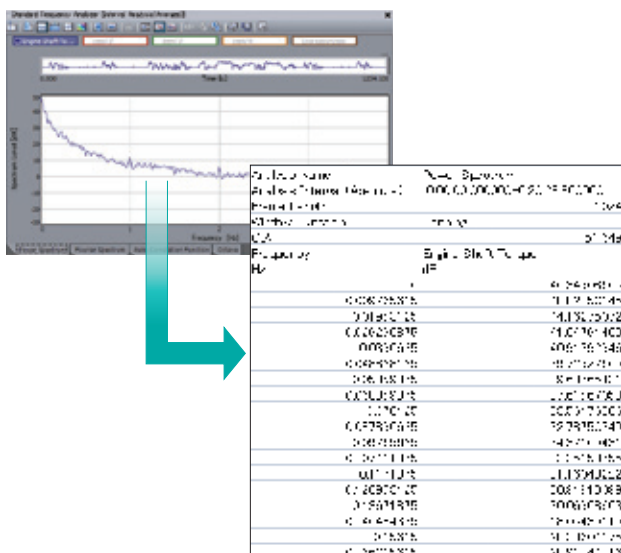
Mixing playback

This function enables mixing, compound, and playback of several data as one file. Recorded sound file of different phenomena, and sound file of frequency-resolved sound are able to be synthesized and replayed.

Output function

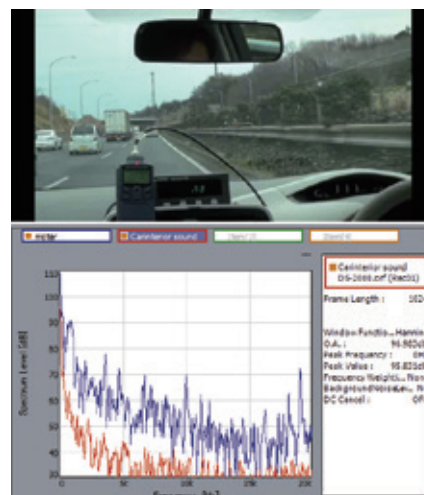
CSV output

The analyzed data is able to be stored in CSV file as a numerical value.



Video (AVI format) output function

You can display and store time-lapse in each frame (minimum : 1 frame) as a video file by using the waveform analysis option.

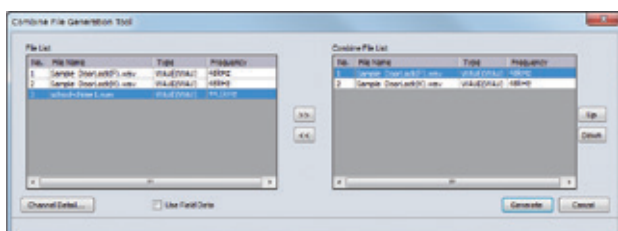


In the OS-0281 Video Playback option, the video data and analysis results are able to be displayed together on the same screen (AVI output).

OS-2700 Professional

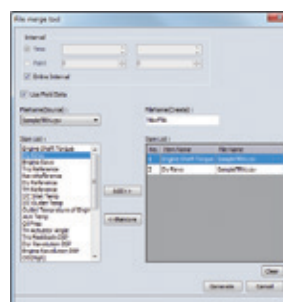
(Included the functions of OS-2500 and OS-2600)

Combine file generation tool



Concatenates any two files to create a new combined file.

File merge tool

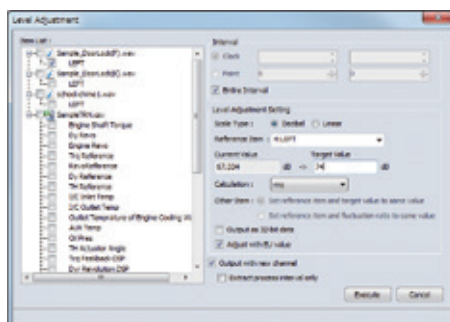


This tool merges necessary items from multiple imported files into a single new file.

OS-2600 Standard

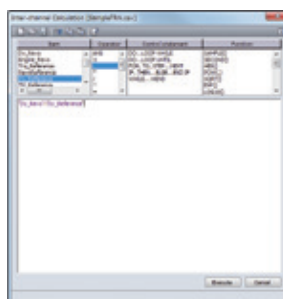
(Included the functions of OS-2500)

Level adjustment



The level of imported data is able to be adjusted to any values.

Inter-channel calculation

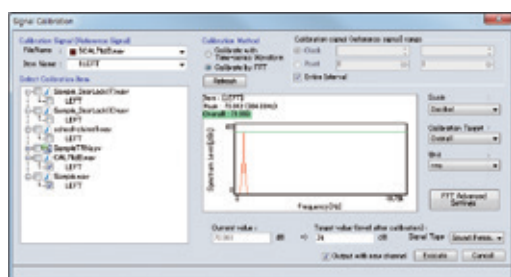


Allows calculation between multiple channels using operators.

- **9 operators:**
Four arithmetic operations, etc.
- **5 control statements:**
DO..LOOP, etc.
- **19 functions:**
ABS, EXP, etc.

OS-2500 Basic

Signal calibration



Allows calibration based on reference signals.
Example: Sound pressure calibration of data using a sound calibrator.

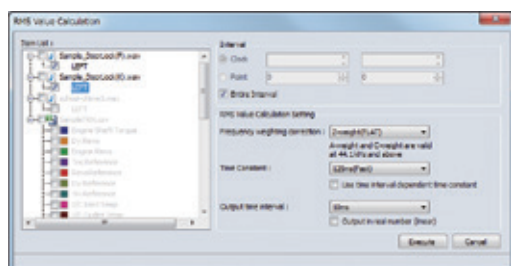
Statistical processing (interval)

Item Name	Sample	Leftmost Value	Rightmost Value	Difference Value	Sum	Average Value	Median	Minimum Value	Maximum Value	Standard Deviation
Sample Data1001.csv	10000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sample Data1002.csv	10000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sample Data1003.csv	10000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sample Data1004.csv	10000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sample Data1005.csv	10000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sample Data1006.csv	10000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sample Data1007.csv	10000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sample Data1008.csv	10000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sample Data1009.csv	10000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sample Data1010.csv	10000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

This command performs statistical processing of the specified channel and specified range. The resulting statistics are displayed as shown above. It can be used for multiple channels.

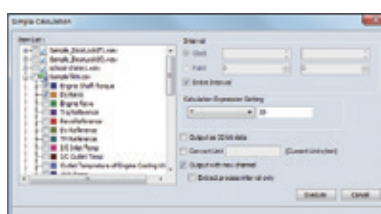
- **Statistical processing item:**
Difference value, Sum, Average value, Median value, Maximum-Minimum value, Maximum value, Minimum value, Standard deviation, Effective value, Local maximum value-Local minimum value, Local maximum value, Local minimum value, Skewness, Kurtosis, Form factor, Peak factor, Average absolute value, Area, Area+, Area-

RMS value calculation



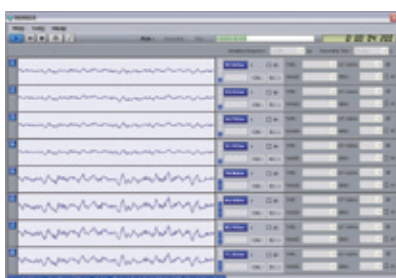
You can see the time difference of the sound pressure level same as the sound level meter.

Simple calculation



This is used to perform simple calculation including arithmetic operations, ABS and LOG, with user-supplied constants, on imported channel data. Can be used for tasks such as changing the data unit or removing extraneous offset values.

Recording function



Records data from the DS-2000/3000 series or audio devices. The recorded data is imported as a new file.

Other function

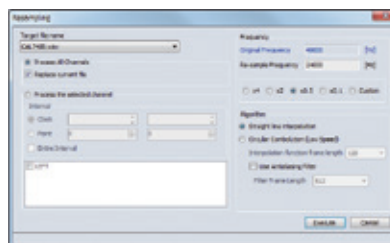
- Waveform generation
- Hilbert transform
- Taper processing
- Playback function (Absolute sound pressure)
- Control API

F/V converter



The F/V converter reads recorded rotation pulse data and converts it to continuous rotation data. It also supports conversion from DC. You can select the pulse data interpolation from linear, spline, and Hermite.

Resampling

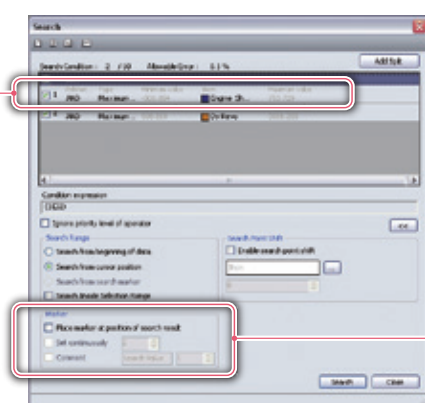


Changes the original sampling frequency and creates new sampling frequency data.

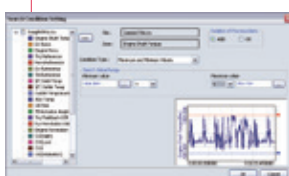
Other function

- Search value extraction
- Time axis calculus

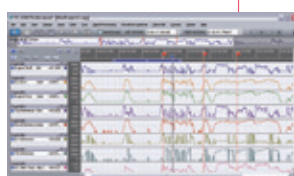
Search function



You can perform search with up to 10 conditions by using AND/OR.

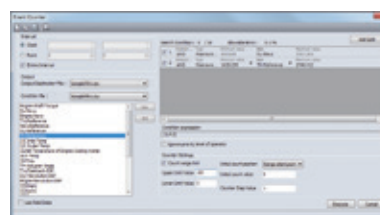


- Search function:**
Allows easy search with the level, edge and amount of variation.



- Marker function:**
Marker and level are placed automatically on the search result. You can edit waveform with smooth operation.

Event counter



This function enables count waveform generation of level, edge, or variation waveform. It extends the application coverage to handle conversion from rotation signal to angle waveform etc.

Meter

Rotation speed, vehicle speed and other data are able to be displayed on analog meters.

* A red zone (warning area) and peak hold function are provided. You can output a movie format file including analysis result together with the video file.



Other function

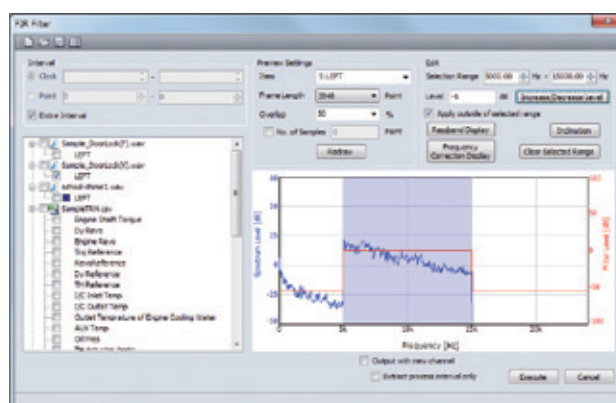
- Changing of channel setting
- Signal type settings
- Moving average
- Synchronizer (function for aligning the positions of time waveforms using trigger signals)

OS-0253

Included in OS-2710, OS-2720, OS-2740, OS-2760 and OS-2770

FIR filter processing:

Filtering for increased/decreased levels, taper or acoustic characteristics can be performed on specified channels and ranges.



IIR filter

OS-0261

Included in OS-2740 and OS-2760

By listening to a sound whose characteristic quantities (frequency and order components) have been increased or decreased after being extracted through various analyses, the validity of analysis results is able to be confirmed. Filter design is specified by frequency and order. It is also possible to listen to sounds which have been processed with a mixture later.

Parametric Equalizer

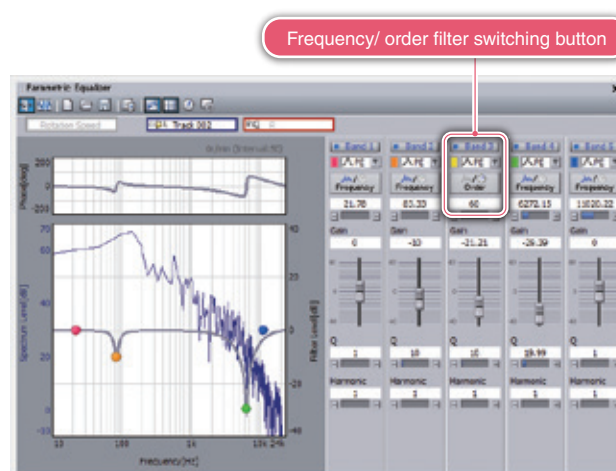
User can design up to 5 filters. This function allows you to adjust an applied filter by listening to the reproduced sound of the signals and to verify the performance of the filter.

- Filter type:

HPF, LPF, BPF, BRF (band reject filter), PE (parametric equalizer: filter for increase/decrease of specified gain)

- Harmonic filter function:

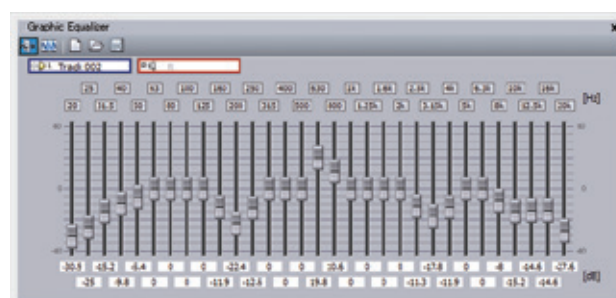
Up to 10 orders of frequency components is able to be increased or decreased in conjunction with the standard frequency.



Parametric Equalizer

Graphic Equalizer

Allows sound levels to be increased or decreased for every 1/3 octave. The adjusted sound is able to be heard in real time.



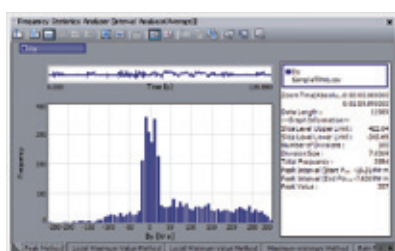
Graphic Equalizer

Statistical Analysis

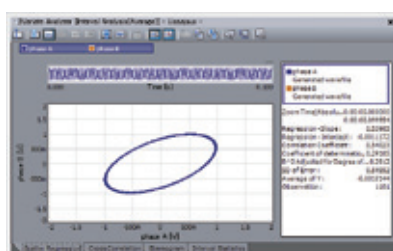
OS-0251

Included in OS-2710, OS-2740, OS-2760 and OS-2770

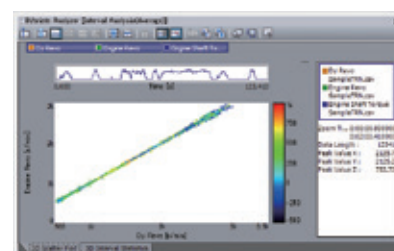
- **Standard Statistical analysis:** Histogram, Auto correlation, Normal probability plot
- **2 Variate analysis :** Scatter plot, Regression analysis, Lissajous, Cross correlation, Stereogram, Interval statistics
- **3 Variate analysis :** 3D scatter plot, 3D interval statistics
- **Frequency analysis:** Peak method/ Local maximum value method/ Amplitude method/ Rain flow method/ Maximum-minimum method



Frequency statistics analysis



Lissajous



3D scatter plot

FFT Analysis

OS-0252

Included in OS-2720, OS-2740 and OS-2760

Capable of standard frequency and cross frequency analysis up to 32 channels. Elapsed time is able to be easily checked by the time trend, color map function and video file (AVI) output for FFT. [Absolute value: ABS] and [Square root value: SQRT] are included to the calculation function. These functions allowed power addition of 3-axis data, and vector calculation of magnetic field evaluation measurement has become available.

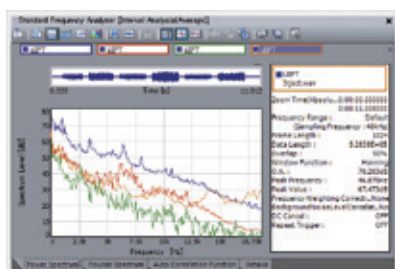
Standard frequency analysis:

Power spectrum, Fourier spectrum, Phase spectrum, Auto-correlation, Bound octave analysis

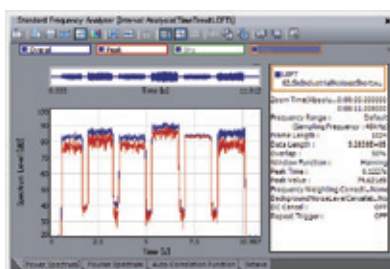
Cross frequency analysis:

Frequency response, Inter-channel phase spectrum, Cross spectrum, Coherence, Cross-correlation, Impulse response

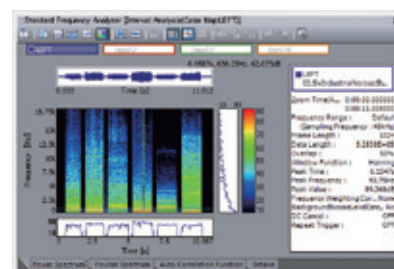
- **Window function:** Rectangular, Hanning, Hamming, Flat-Top, Exponential, Blackman Harris, Force
- **Number of lines:** 50 to 12,800
- **Frequency weighting:** A, B, C
- **Calculus:** 1 differential/ integral, 2 differential/ integral
- **Average:** Arithmetic mean, Peak hold
- **Density:** OFF/ PSD/ ESD



Power spectrum (4ch overlay)



Trend (OverAll, Peak)



Power spectrum color map

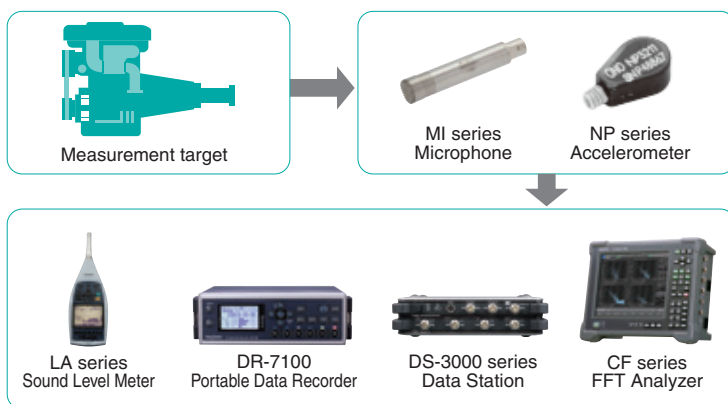


Analysis example

Example

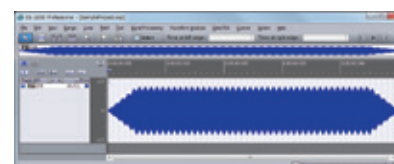
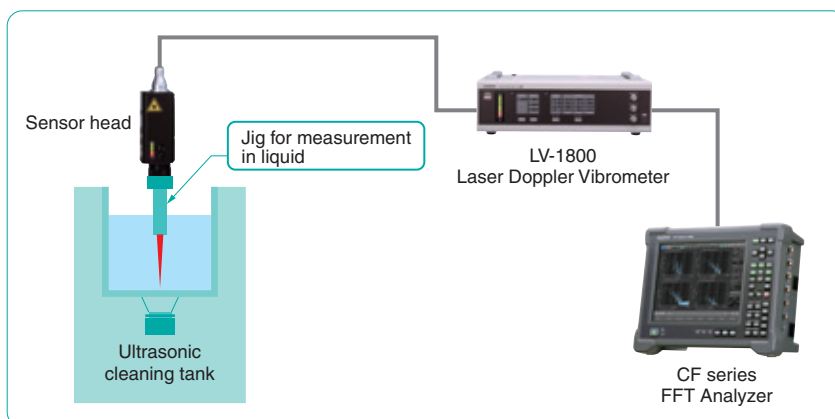
[Frequency analysis of acoustic/vibration]

Frequency analysis is the most effective method for reduction and countermeasure of noise and vibration. OS-2000 series can analyze an acquired data by using various analysis functions from various angles. Offline analysis of specified range is possible while observing the entire recorded data by data editing function.

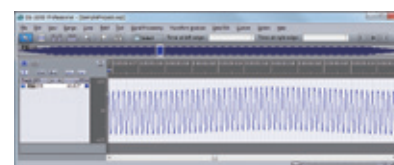


[Vibration measurement in liquid (ultrasonic cleaning tank)]

This is an example of vibration analysis of ultrasonic cleaning tank. After performing vibration measurement of the ultrasonic cleaning tank by the LV-1800 Laser Doppler Vibrometer, the result is stored into the FFT analyzer as a time-axis data. You can perform various analysis of time-axis data by using the OS-2000 series functions, which has been recorded in FFT Analyzer etc. and imported to OS-2000 series.



Entire waveform



Zoomed waveform

Time Frequency Analysis OS-0263

This function discovers the phenomenon that has not been seen until now. The time change of the characteristic quantity (frequency) that has been difficult to catch by FFT Analysis is able to be displayed clearly maintaining its frequency resolution. The calculation processing speed of Wavelet transform is greatly improved when Multi-core CPU or GPU is installed in a PC*¹. The calculation processing speed is 5 times*² faster than before by Multi-core CPU, 7 times*³ faster by GPU.

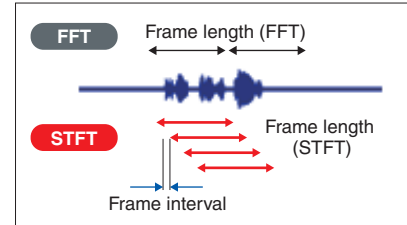
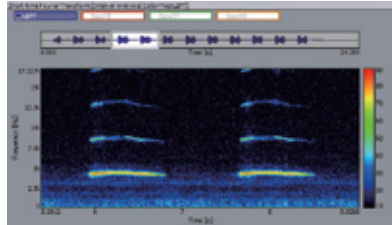
*1: Only for Wavelet Analysis

*2: When compared calculation processing speed by CPU Intel® Core™ i7-930 2.8 GHz with the speed before.

*3: When compared calculation processing speed by GPU GeForce® GTX560 with the speed before.

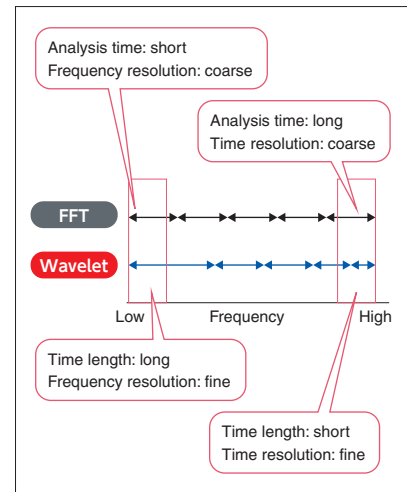
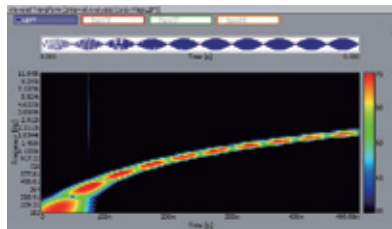
Short-time Fourier Transform

Fourier analysis is able to be performed with any points (frame length and interval) set by the user. In other words, the user can set any cutting out time length, so this method is effective for observing spectrum changes over an extremely short time.



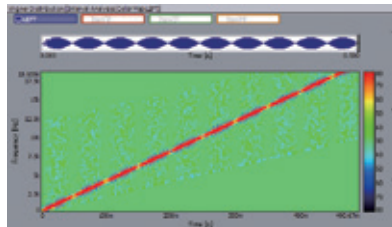
Wavelet Transform

Wavelet transform is an analysis method that enables simultaneous analysis of temporal fluctuation and spatial transition of complicated waveforms such as a sudden or unsteady sound or vibration. The analysis time length is changed depending on the frequency in this method. It brings a good balance between time and frequency, so this method is effective for capturing the analysis result as a whole.



Wigner Distribution

Wigner distribution offers the highest resolutions for both time and frequency, making it possible to capture the characteristics of transient signals more efficiently than other methods. However, negative energy and cross items appear frequently, and you must use the method with caution.



Analysis example

Example

[This example shows the analysis of extremely short noise included in the sound generated from operating machinery]

Wavelet transform in OS-0263 does not overlook the components missed with FFT analysis.

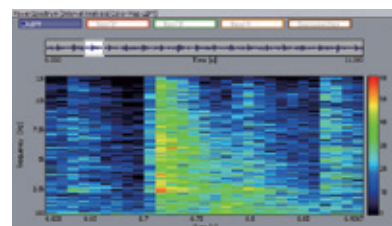
Since the time length of the generated noise is extremely short, with FFT analysis, the frame length cannot be sufficiently increased and the time resolution becomes low. Furthermore, the frequency components of the noise are in a wide range, so the resolution of the low frequency component is reduced.

By using Wavelet transform, exhaustive information of time and frequency is able to be captured. In this example, you can see the component (low frequency component) of the red encircled portion which may be missed with FFT analysis.

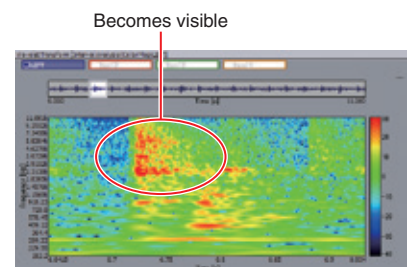
Thus, Wavelet transform is an effective analysis method for observing transient phenomena with wide frequency bands and for other similar purposes.



Noise generation time: Approx. 40 ms



FFT Analysis results of operating machine noise (Time-frequency color spectrum)



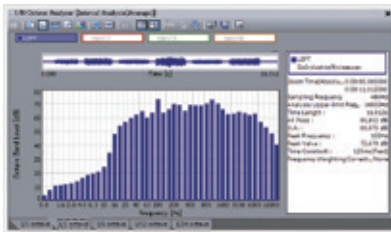
Wavelet analysis results of operating machine noise (Time-frequency color spectrum)

1/N Octave Analysis OS-0264

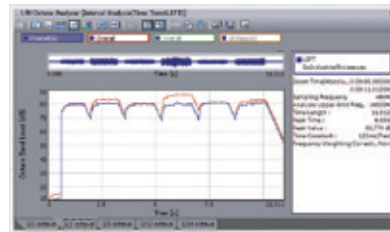
Included in OS-2740 and OS-2760

1/1, 1/3, 1/6, 1/12, 1/24 Octave analysis function suitable for analysis of sounds and vibrations.

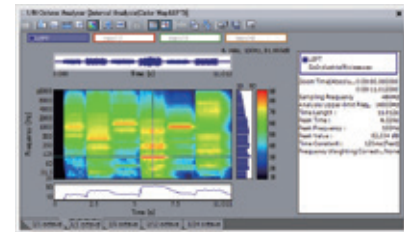
- **Time constant:** None / 10 ms / 35 ms / 125 ms (Fast) / 630 ms / 1 s (Slow) / 8 s / 10 s / Impulse
- **Frequency weighting:** A-weighting, B-weighting, C-weighting, G-weighting Vv-weighting, Vh-weighting, V hand, custom
- **Time rate:** 5 %, 10 %, 50 %, 90 %, 95 %
- **OverAll, AllPass**



1/3 Octave



1/3 Octave Time trend
(A-weighting, FLAT)



1/3 Octave Color map

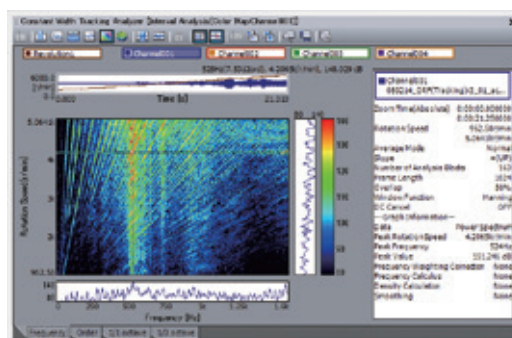
Tracking Analysis OS-0265

This software includes both constant width tracking analysis of which frequency resolution is constant regardless of the rotation speed, and constant ratio tracking analysis of which order resolution is constant regardless of the rotation speed. Up to 4 signals are available for overlapping display in tracking diagram.

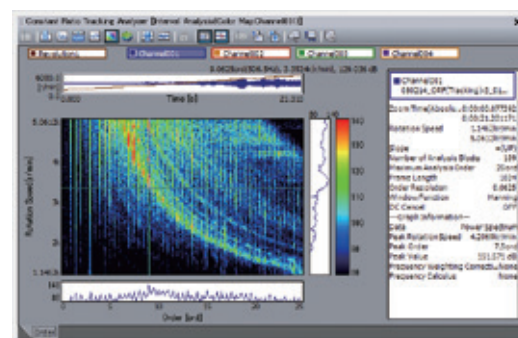
- **Various search cursors for frequency, order, harmonic, band and side band are available.**
- **Order and frequency are able to be displayed in the same tracking diagram.**



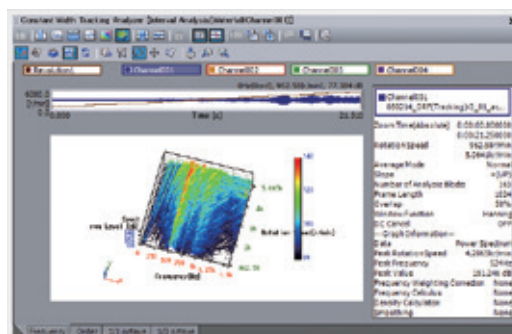
Tracking diagram



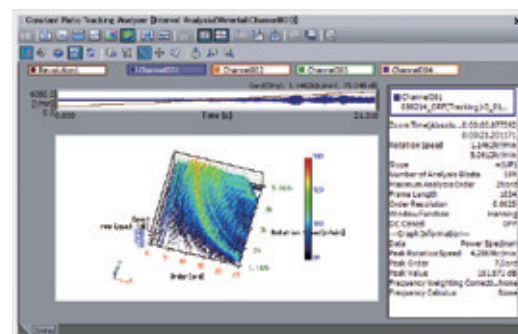
Color map (Constant width tracking)



Color map (Constant ratio tracking)



Waterfall display (Constant width tracking)



Waterfall display (Constant ratio tracking)

It is difficult to quantify subjective evaluation such as comfortable sound or disturbing noise. Sound quality evaluation software quantifies the sound by using six parameters of psychoacoustic evaluation; loudness, sharpness, roughness, fluctuation strength, AI (Articulation Index), tonality as well as conventional physical quantities such as frequency analysis or octave analysis. These parameters enable quantitative determination that helps effective cause investigation and fundamental sound improvement for uncomfortable sound reduction countermeasures. This software conforms to ISO532B Stationary sound loudness, and DIN 45631/A1 Non-stationary loudness.

Six parameters for sound quality evaluation

Loudness

Sharpness

Roughness

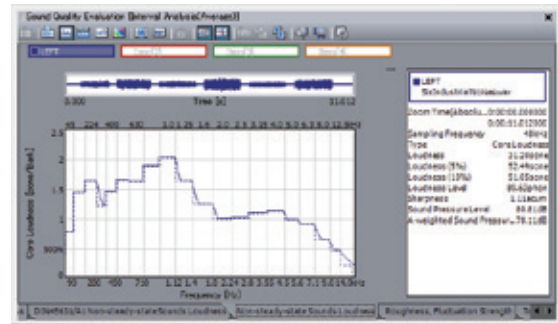
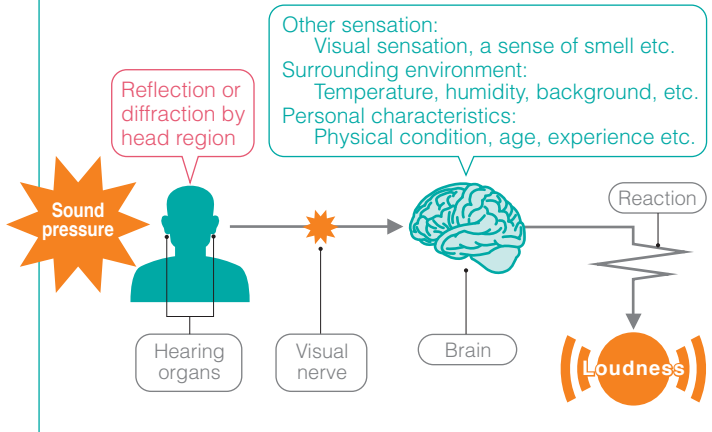
Fluctuation strength

Tonality

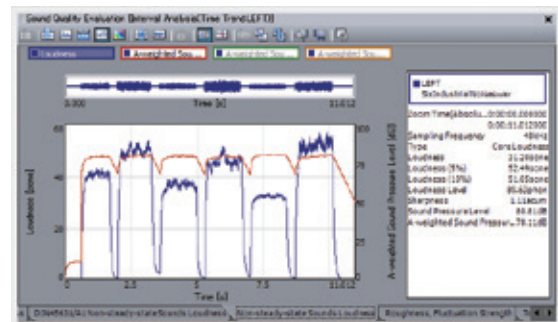
AI

What is Loudness?

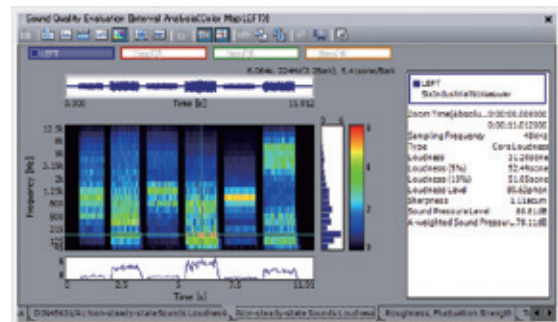
Loudness is the characteristic of a sound that is primarily a psycho-physiological correlate of physical strength (amplitude). It shows the sensation quantity (total amount of auditory sensation excitation) that is sound strength of subjective sensation. The degree of 1 kHz 40 dB SPL pure tone is defined as one. As for the other sound, they are expressed by the number of times those noise are louder than the base unit. "Sone" is used as the unit.



Loudness density



Trend (Loudness level, A-weighting)



Loudness color map

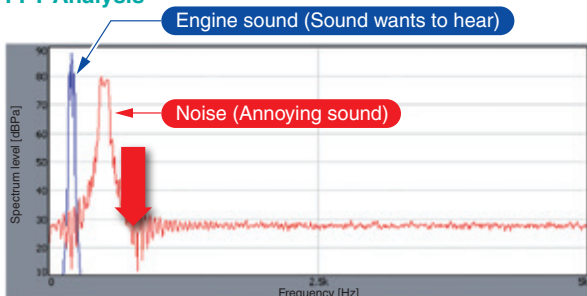


Analysis example

[Effective evaluation of noise reduction]

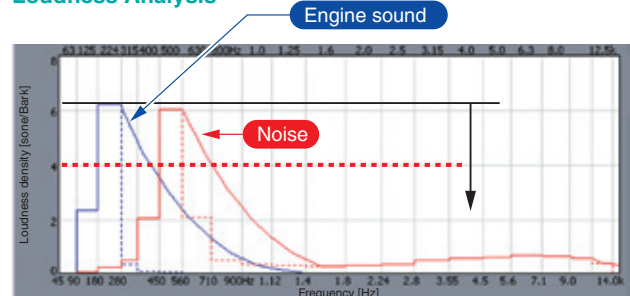
When noise is generated mixed with an engine noise, any characteristics are not able to be found by FFT analysis. You don't know how much noise should be reduced enough not to be annoyed. On the other hand, Loudness analysis can perform noise reduction efficiently by using masking effect of engine sound.

FFT Analysis

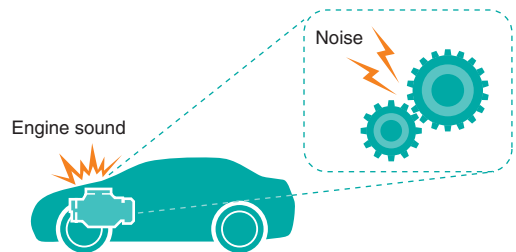


Cannot be obtained the target reducing level of noise.

Loudness Analysis



Example

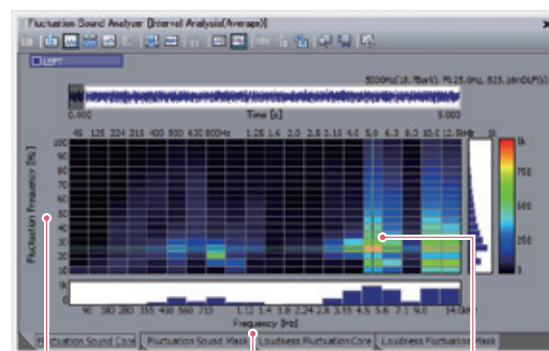


Fluctuation Sound Analysis OS-0272

Included in OS-2760

The fluctuation sound analysis provides an analysis method for clarifying components having significant time fluctuations by showing them on a graph plotting its frequency and fluctuation frequency along the two axes, such as humming or rattling noise which is annoying even if it is faint and difficult to be detected with FFT.

With the combination of fluctuation sound simulator, the analysis result is able to be evaluated while adjusting the fluctuation components. You can eliminate only annoying fluctuation components and amplify only easy-to-hear components.



Fluctuation speed

Fluctuation pitch

Fluctuation strength



Analysis example

Example

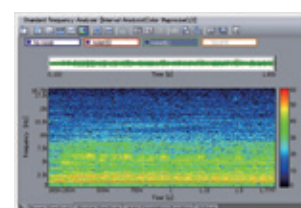
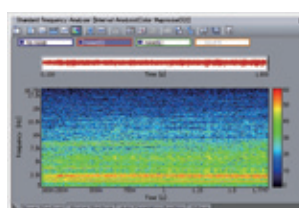
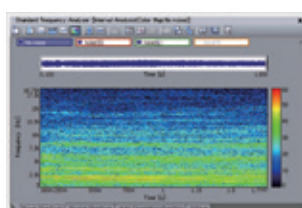
[Abnormal sound measurement of a motor]

FFT analysis cannot make a correct pass/fail judgment of the abnormal sound in each operation sound below; the abnormal sound (none), abnormal sound (small), and abnormal sound (large). Fluctuation sound analysis is used to make the characteristic amount of each level clear by colored result screen.

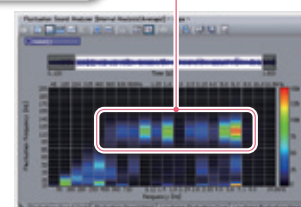
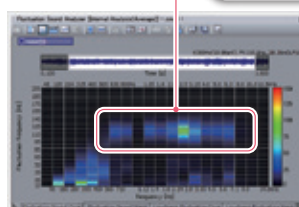
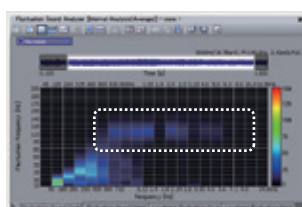


Pass/Fail judgment of abnormal sound (bzzz) generated from a small motor

FFT Analysis



Fluctuation Sound Analysis



Abnormal sound (none)

Abnormal sound (small)

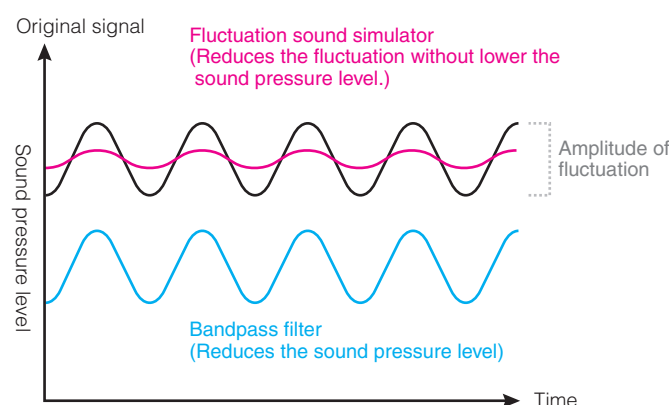
Abnormal sound (large)

Abnormal sound (bzzz sound)

Fluctuation Sound Simulator OS-0273

Included in OS-2760

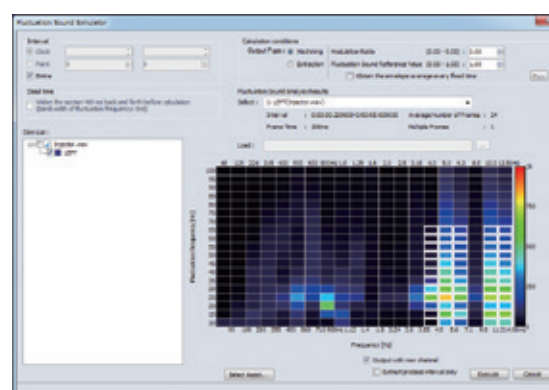
This function can perform simulation of sound of which time fluctuation components identified by the fluctuation sound analysis have been removed or enhanced. You can make a sound source file by extracting only the specified fluctuation component from original sound. Unlike ordinary band-pass filter that increases or decreases the sound pressure level in specified bands, this filter is used to increase or decrease only fluctuation components while minimizing changes in the sound pressure level.



■ Output type (Time waveform generation)

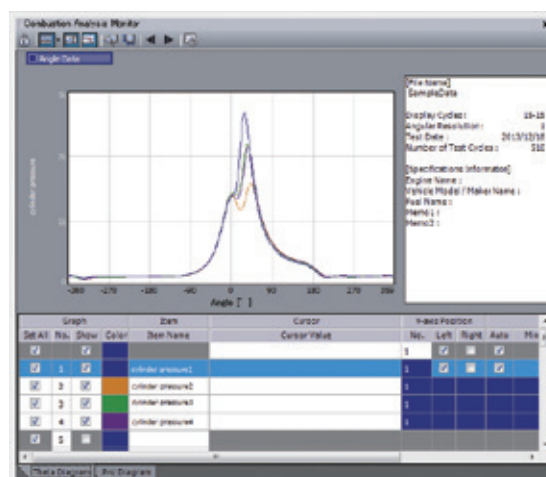
Processing: Outputs sound of which fluctuation component of the selected range has been removed or enhanced. The sound of the range not selected is outputted as original sound.

Extraction: Outputs only the sound fluctuation component that has been removed or enhanced of the selected range. The sound of the range not selected is not included.



This option can display combustion measurement data (angle-axis data) which has been measured by DS-0328 Combustion analysis system on the OS-2000 series as θ diagram or P-V diagram.

* DS-0328 Combustion Analysis Software ver.4 or later



θ diagram (Overlay)



Analysis example

Example

[Combustion Analysis]

You can display and analyze the time-series data which has been converted from angle-axis data, together with the time-series data of performance data or ECU data.

It helps to make analysis on a bench efficient, which takes time for conversion processing from angle data to time data such as data collation with other measurement instrument and analysis using multi-point data.

DS-3000 series Combustion Analysis System



FAMS-R5 Flexible Automatic Measurement System-Release 5

ECU

Supercharged air control
Ignition timing
Fuel injection quantity

Import

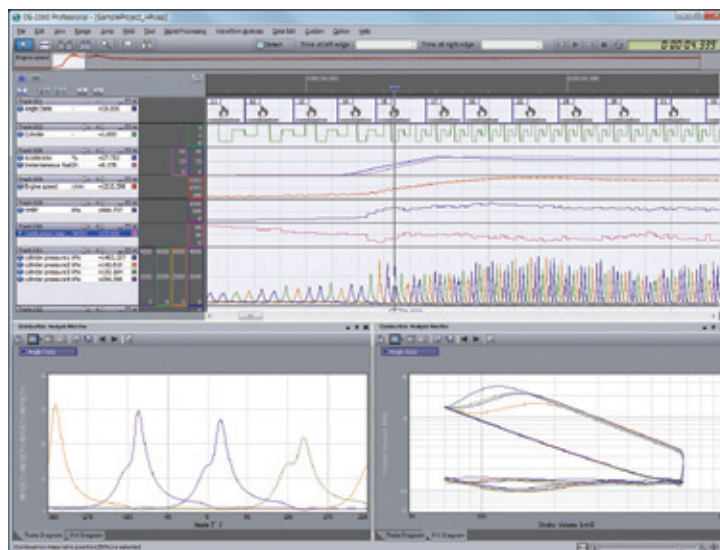
File format

● TDMS

● THD

● MDF

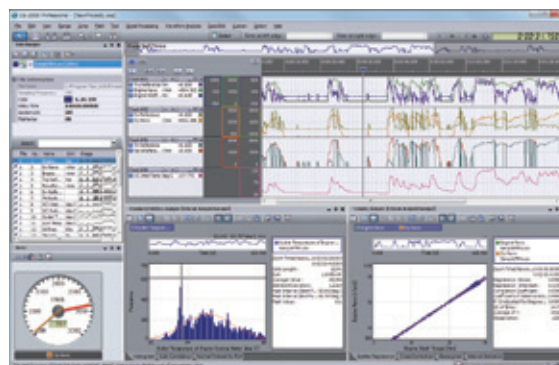
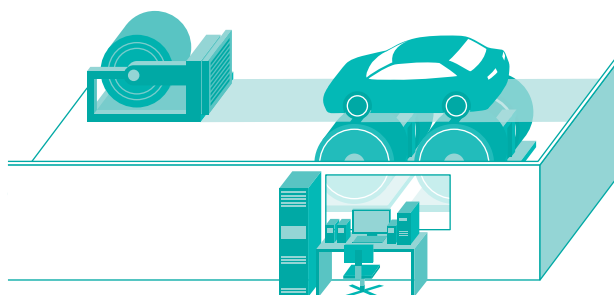
Only applicable for ver.4



[Bench Data Analysis]

OS-2710

Time-series data that is used in various research or development field, such as data recorded inside of actual driving vehicle, the data recorded outside, and data recorded in a laboratory is very large in general. OS-2000 series can handle such large amount of data regardless of the capacity of a PC.



Various measurement data such as rotation, pressure, displacement, humidity, noise and vibration.

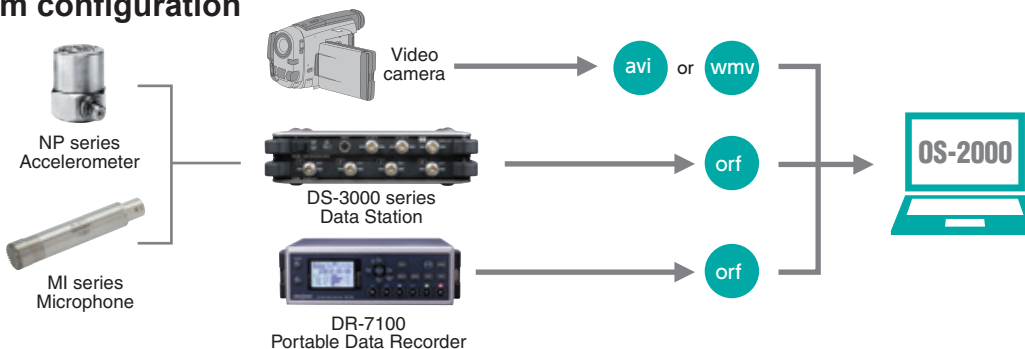
Video Playback OS-0281

By using the OS-0281, OS-2000 series can read the video file that you have recorded measurement scene with a home video camera and replay the video file together with the analysis results of sound or vibration*1*2. You can check the various phenomena occurred at the time of measurement, which are difficult to observe only by analysis graph.

*1: Additional video conversion software may be required depending on the video file format.

*2: Some avi and mwm formats are not supported.

System configuration

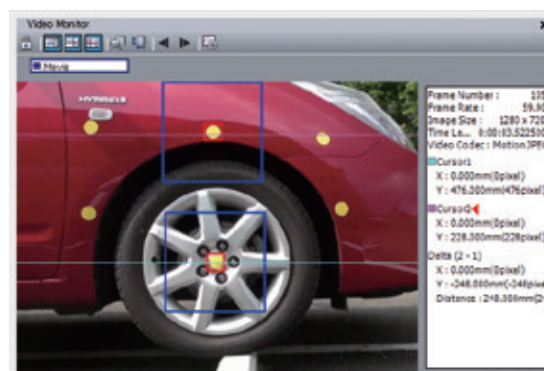


Display of distance between 2 points:

Distance and displacement in an image are able to be checked using 2 search cursors.

Brightness and contrast adjustment:

Dark image due to insufficient lighting is able to be made brighter and visible.



Analysis example

Example

[Analysis of operation sound of compact digital camera]

By recording the movement of the lens tube at the time of pressing the zoom button with a video camera and microphone, the video and sound quality evaluation analysis results are able to be seen together on the same screen. Thus, the sound quality and others at the time lens tube is moved is able to be evaluated quantitatively.

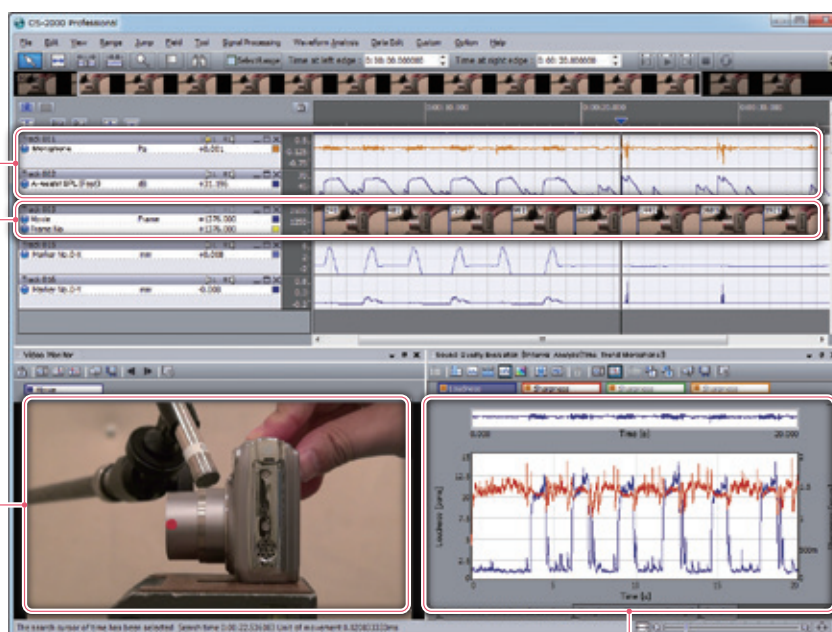


Sound data

Video data

Video monitor

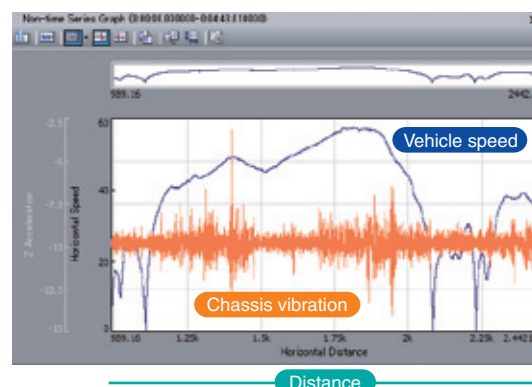
Sound quality evaluation
(Loudness, Sharpness)



Use the Synchronizer function (basic function) to align the position of sound time waveform when the recording start timings of data and video data are different. You can adjust the position of waveform by using trigger signals, to make them start at same time.

Non-time series graph OS-0291

Horizontal axis in a graph of the OS-2000 series generally indicates time. However, when you use non time-series graph, it can be set other item than time. For example chassis vibration with respect to each travel distance or vehicle speed, etc.



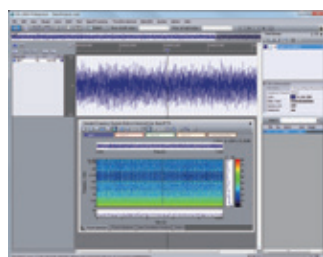
Continuous Automatic Analysis OS-0254

This function is useful when you want to analyze large number of time-series data files. Multiple data files are automatically analyzed and stored as a graph in a specified format. By storing the analyzed 1 data file as a template, the setting operation is automatically performed to multiple data files. Those files are able to be stored in image format or text format.

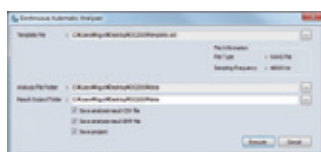
- Up to 100 files are able to be processed at one time. Only .orf and .wav formats are supported.
- Only FFT analysis (power spectrum) and Octave analysis (1/1, 1/3) are supported.
- Graphic format (*.bmp) and text format (*.csv) are supported.

Operation procedure

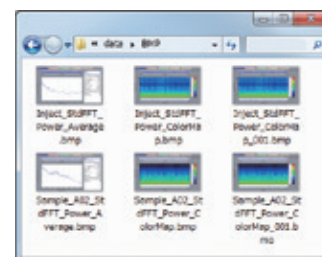
Step 1 Store the analyzed conditions as a template file.



Step 2 Specify the save location and analysis output location of the template file and data file on continuous automatic analysis screen.



Step 3 Check the analysis result



What is template file?

Storing a template is a method for storing the setting conditions of drawing, layout, and analysis on a current project. (Some settings including data file, etc. cannot be stored.) Saving a template as a file enables loading different data to a project with same conditions of drawing, layout, or analysis.

Using a template file saves your time if you need to set same conditions to a project file every day.

Option

Type	Model name	Overview							
Basic	OS-2500	This is the basic version, equipped with the Event counter, Search function, Effective value calculation and other essential capabilities.							
Standard	OS-2600	This is the standard version which is equipped with enhanced features of Inter-channel calculation, Search value extraction, and F/V function added to the Basic version.							
Professional	OS-2700	This is the professional version, equipped with numerous advanced functions in addition to those in the Standard version, including File merge, Waveform generation tool, Hilbert transform, and Recording functions.							
●: Provided as standard / ○: Optionally provided									
	Product name		Model name	OS-2500 OS-2600 OS-2700	OS-2710 Bench package	OS-2720 FFT analysis package	OS-2740 Sound quality evaluation package	OS-2760 Fluctuation sound analysis package	OS-2770 Combustion analysis package
Waveform analysis	Statistical Analysis	Standard Statics Analysis	OS-0251	○	●	○	●	●	●
		2 Variate Analysis/ 3 Variate Analysis							
		Frequency Statistics Analysis							
	FFT Analysis	Standard Frequency Analysis/Standard Frequency Analysis EX	OS-0252	○	○	●	●	●	○
		Cross Frequency Analysis/Cross Frequency Analysis EX							
	Time Frequency Analysis		OS-0263	○	○	○	○	○	○
	1/N Octave Analysis		OS-0264	○	○	○	●	○	○
	Tracking Analysis	Constant Width Tracking Analysis	OS-0265	○	○	○	○	○	○
		Constant Ratio Tracking Analysis							
	Sound Quality Evaluation	Sound Quality Evaluation Analysis	OS-0271	○	○	○	●	●	○
Articulation Index Analysis									
Signal processing	Fluctuation Sound Analysis		OS-0272	○	○	○	○	●	○
	Fluctuation Sound Simulator		OS-0273	○	○	○	○	●	○
	FIR filter		OS-0253	○	●	●	●	●	●
	IIR filter	IIR filter	OS-0261	○	○	○	●	●	○
Graphic Equalizer									
Parametric Equalizer									
Custom	Continuous Automatic Analysis		OS-0254	○	○	○	○	○	○
	Combustion Data Display		OS-0255	○	○	○	○	○	●
	Video Playback		OS-0281	○	○	○	○	○	○
	Non-time Series Graph		OS-0291	○	○	○	○	○	○

Wide variety of applications that OS-2000 series provides

Use with DS-3000 series

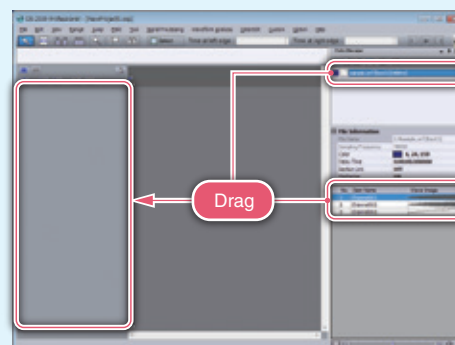
ORF file

ORF file recorded by the DS-3000 is able to be exported to the OS-2000 series for more detailed analysis and several files comparison by clicking the button.

*The DS-0350 Recording function is required.
*Software version of the DS-3000: 2.2.6 or later
*Software version of the OS-2000: 2.7.0 or later



The OS-2000 series is started by clicking the button, and the recorded data is automatically imported to the OS-2000 series!



Use with Sound Level Meter

wav format

The WAVE file measured by the sound level meter is recorded to the SD card. The data has been already calibrated in the sound level meter, so calibration is not necessary to perform in the OS-2000.



LA series
Sound Level Meter

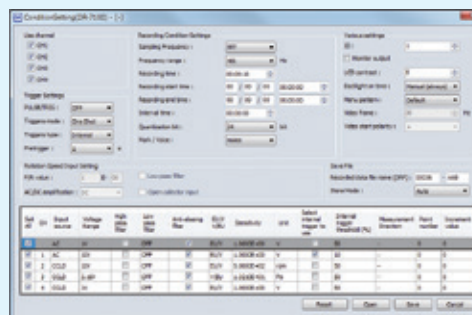
Use with DR-7100

orf format

Set the recording condition for the DR-7100 (Portable Data Recorder for Acoustics & Vibration) before use. The recording condition is able to be stored in the SD card, and is easily read by inserting it to the DR-7100.



DR-7100 Portable Data Recorder

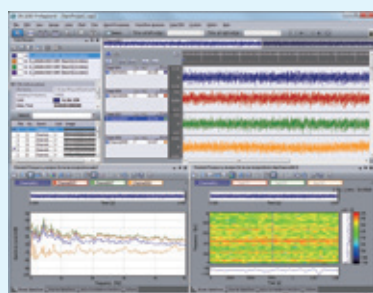


DR-7100 Condition setting dialog

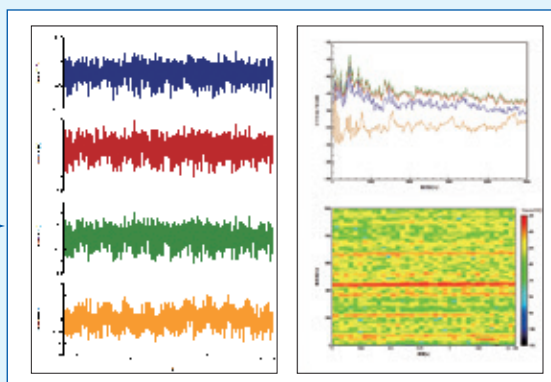
Use with OC-1300 series

When you want to edit the analyzed data, you can transfer the graph to the OC-1300.

- Display of the value at its position by search marker
- Editing of scale, waveform color and axis layout
- Printing as a report



Transfer to
OC-1300



Specification

OS-2000 series ver.2.8

Item	Specification	Remarks	Item	Specification	Remarks
Data import	Number of files	Up to 10 files	Data import format	ASCII file	*.txt, *.csv*2
	Number of channels	Up to 1024 channels		WAVE file	*.wav*3
	Number of data points	Up to 500 million data points (Number of files x number of channels x number of records)		Movie file	*.avi, *.wmv*4,*5,*6
	Sampling frequency	0.01 Hz to 20 MHz		Excel file	*.xls, *.xlsx*7
Basic function		Movie file: Up to 10,000 fps		MDF file	*.mf4*8,*9
	Waveform editing function			UFF file	*.uff, *.unv, *.bunv
	Numerical data display and editing function			DS, CF series file	*.dat, *.rcd*10
	Search cursor function	Delta display supported		DS-0328 file	*.tdms
	Marker function	Automatic marker placement function		ORF file	*.orf
	Sound playback function	Repeat available*1		AU-4100A file	*.inf
	Search function	Logic settings supported, high and low values/ level trigger/ range trigger/ difference values for each condition		VARTS-II file	*.dat
Data export format	Merging/ combining sections			FAMS series file	*.thd, *.lhd, *.fhd
	Printing function			KY series file	*.trn, *.frz, *.ave, *.log, *.txt
	AVI file	*.avi		MCU file	*.mat
	CSV file	*.csv		WS-5160 file	*.s01, *.s02
	MDF file	*.mf4*8		TEAC TAFFmat file	*.hdr*11
	ORF file	*.orf		AQ-VU file	*.aqv*12
	UFF file	*.uff*16		HIOKI E.E MEMORY RECORDER file	*.mem*13
	WAVE file	*.wav		Meidensha MEIDACS file	*.meid*14
	OC-1300 transfer function	*17		Yokoawa WVF/WDF file	*.wvf, *.wdf*15

●: Provided as standard / -: Not provided

		OS-2500 Basic	OS-2600 Standard	OS-2700 Professional
Data function	Changing of channel settings/ Signal type setting	●	●	●
	Combine file generation tool/ File merge tool/ Waveform generation tool	-	-	●
Signal processing	Simple calculation/ Moving average/ Event counter/ Signal calibration/ Effective value calculation	●	●	●
	Search value extraction/ Time-axis calculus/ F/V converter/ Level adjustment/ Inter-channel calculation/ Resampling	-	●	●
	Hilbert transform/ Taper processing	-	-	●
	Statistical processing (interval)/ OC-1300 controller*17/ Synchronizer/ DR-7100 Recording condition settings/ Meter	●	●	●
	Playback (absolute sound pressure)/ Recording*18	-	-	●
	Control API	-	-	●

- *1. The cycle accuracy differs depending on any of the following: Operating environment, processing environment, processing conditions, and sampling frequency
- *2. The comma delimiter and tab delimiter can be read.
- *3. Microsoft®, Windows® standard RIFF format PCM sound data (uncompressed) is supported.
- *4. Up to four screen simultaneous playback is available. However, the number of available playback screens relies on the image size or frame rate.
- *5. Available movie formats are avi and wmv. These formats are not available for all models.
- *6. The optional movie conversion software is required depending on the format of the movie file.
- *7. In order to handle Microsoft® Excel® workbooks, Microsoft® Excel® 2003 or later (sold separately) must be installed on the same PC.
- *8. Measurement data format version 4.0. is supported.
- *9. Supports the channels as follows: the value of CC block (cc_type) is 0 (1:1 conversion), 1 (linear conversion), or 2 (rational conversion). (cc_type represents a method of data conversion.)
- *10. Limited to internal sampling data.
- *11. [DR-C, DR-F/M, DS] series, GX-1, LX-10/20, LX-110/120, es8, WX-7000 series. For applicable models, refer to the manufacturer's web site, etc. before purchasing.
- *12. The image size is as same as the image which is output from the AQ-VU viewer software.
- *13. MR8880, MR8875, MR8847-01/02-03, 8870, 8861-50/8860-50, 8861/8860, 8855, 8847, 8842/8841, 8835-01, 8826, 8808/8807. For applicable models, refer to the manufacturer's web site, etc. before purchasing.
- *14. Supports high-speed measurement and continuous measurement data files measured with Meidensha MEIDACS-DY (6100P, 6200P, 6300P, 6400P, 6500P, 6600P) series ver. 3.0 or later. (Note: Average measurement data files cannot be read.)
- *15. DL750/850/850E/9000/7400/1700/1700E/1600 series, WE7000, SL1400, SL1000, DLM2000, DLM4000. For applicable models, refer to the manufacturer's web site, etc. before purchasing. (Note: Target data for the SL1000 is trigger measurement data only.)
- *16. Only Universal File Format dataset 58 time-series data is supported.
- *17. OC-1300 (option) is necessary.
- *18. Recording function OSRECO (OSRECO.exe) is available. Max. 8 channels can be recorded.

Operating Environment

Item	Specification
OS	Microsoft® Windows® 7/10 (running as a 32-bit application in the 64-bit version) .NET Framework 3.5 Service Pack 1 must be installed. *Microsoft® Windows® 10: ver 2.8 or later
CPU	Recommended: Intel® Core™ i5 2.5 GHz Minimum: Intel® Core2 Duo™ 2 GHz
Memory	Recommended: 4 GB Minimum: 2 GB
Hard disk	Free space 1 GB or more
Display	Recommended: 1280 x 1024 Minimum: 1024 x 768
USB terminal	For protect key connection (accessory)
CD or DVD-ROM drive	For software installation
DirectX	DirectX 9.0c or later (When the use of the OS-0281)

*Microsoft® Windows® are registered trademarks of Microsoft Corporation in the United States and other countries.
Other product names are trademarks or registered trademarks of each individual company. The copyrights are reserved by each individual company.

ONOSOKKI

WORLDWIDE ONO SOKKI CO., LTD.
1-16-1 Hakusan, Midori-ku, Yokohama, 226-8507, Japan
Phone : +81-45-935-3918 Fax : +81-45-930-1808
E-mail : overseas@onosokki.co.jp

* Outer appearance and specifications are subject to change without prior notice.
URL: <https://www.onosokki.co.jp/English/english.htm>

U.S.A.
Ono Sokki Technology Inc.
2171 Executive Drive, Suite 400
Addison, IL. 60101, U.S.A.
Phone : +1-630-627-9700
Fax : +1-630-627-0004
E-mail : info@onosokki.net
<http://www.onosokki.net>

THAILAND
Ono Sokki (Thailand) Co., Ltd.
1/293-4 Moo.9 T.Bangphud
A.Pakkred
Nonthaburi 11120, Thailand
Phone : +66-2-584-6735
Fax : +66-2-584-6740
E-mail : sales@onosokki.co.th

INDIA
Ono Sokki India Private Ltd.
Plot No.20, Ground Floor, Sector-3,
IMT Manesar Gurgaon-122050,
Haryana, INDIA
Phone : +91-124-421-1807
Fax : +91-124-421-1809
E-mail : osid@onosokki.co.in

P.R.CHINA
Ono Sokki Shanghai Technology Co., Ltd.
Room 506, No.47 Zhengyi Road, Yangpu
District, Shanghai, 200433, P.R.C.
Phone : +86-21-6503-2656
Fax : +86-21-6506-0327
E-mail : admin@shonosokki.com

