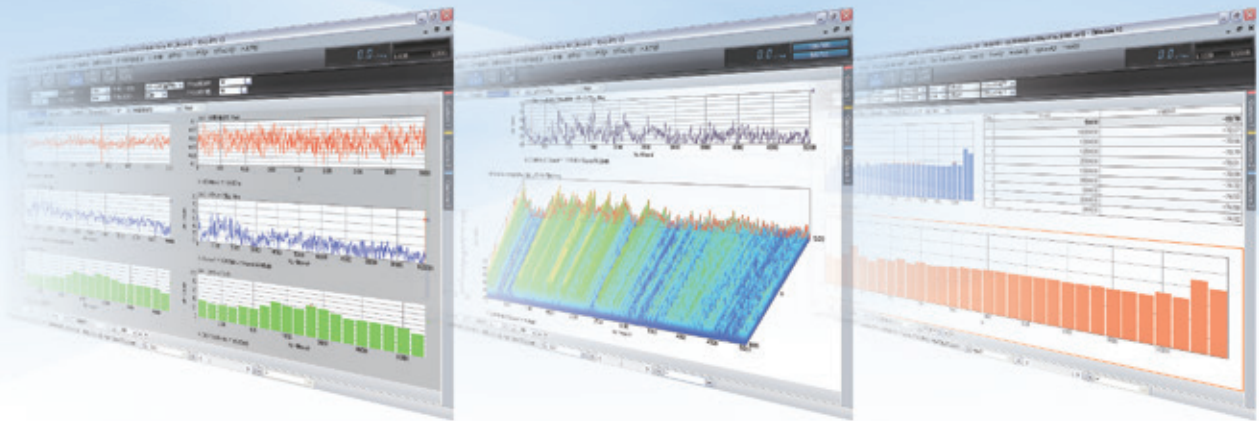




DS-3000 Series

Sound and Vibration Real-time Analysis System



Supports
USB 3.0



Software
Hardware **DS Series** Multi-Channel Data Station

ONOSOKKI

The DS-3000 Series can perform real-time analysis of noise and vibration generated from products in various industries such as vehicles, railways, home appliances or plant facilities. “Quick reference of the required analysis screen” “easy checking of the measurement condition”, such quick and easy responses are one of the most important needs for on-site measurement. The hardware at overwhelming processing speed and easy handling software of the DS-3000 Series exactly satisfy the needs.

DS-3000 Series

Speedy Tough Small size
HARDWARE



Easy-to-use
SOFTWARE

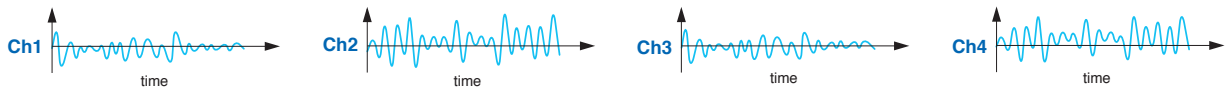
There is increasing interest in sound and vibration analysis to add value to products.

Controlling vibration

Low-noise measure

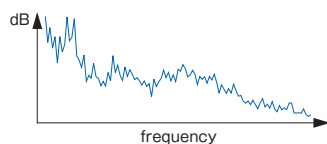
Acoustic comfort design

Data recording



The DS-3000 Series can perform multi-channel data recording of various sound or vibration. Accurate and wide range of simultaneous multi-channel data recording owing to the wide dynamic range and high-speed processing.

FFT Analysis (Fast Fourier Transform Analysis)

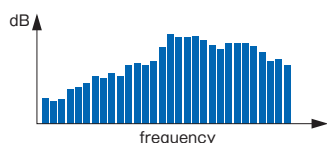


FFT analysis takes apart the time waveform to each frequency component and is useful for watching the level of the each component. This analysis is effective to watch resonance frequency of vibration or details of sound frequency component.



Vibration analysis of home appliances, working sound analysis produced by OA equipments

Real-time Octave Analysis

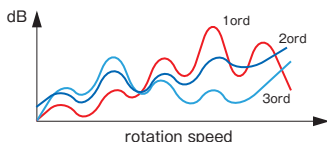


“Octave” represents the 1:2 ratio of frequency, that is, a frequency band where the highest frequency is twice the lowest frequency. The result of octave analysis is close to human hearing sense because human ears have logarithmic feature. Generally the 1/3 octave analysis (one-third of an octave) is used in the sound analysis.



Sound level measurement from factories, road traffic noise

Rotational Tracking Analysis



In sound or vibration analysis from various rotating objects, it is necessary to know which number of rotations makes the noise louder. Then level of each order component for the rotation can be analyzed by recording rotation information (pulse vibration etc.) as well as the sound or vibration signals.



Analysis of abnormal noise from gears, vibration analysis of running vehicles

Feature.

1 Speedy

Fast real-time processing & multi-channel recording with USB 3.0

Supporting up to 32 ch of data recording of 20 kHz range (audio frequency band). You can use a USB cable on the market when connecting to a PC (supports both USB 3.0 and USB 2.0).

Front panel

LED color tells the type of the connecting USB.



Rear panel

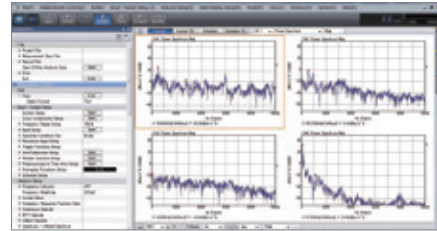


Feature.

2 Easy

Software design placed a high value on on-site measurement

All the installed analysis functions can be used quickly by activating the software. You can change various measurement conditions easily as you watch the measurement screen in real time. To support speedy and smooth measurement on site, commonly-used measurement setup items can be placed as tabs on the window.

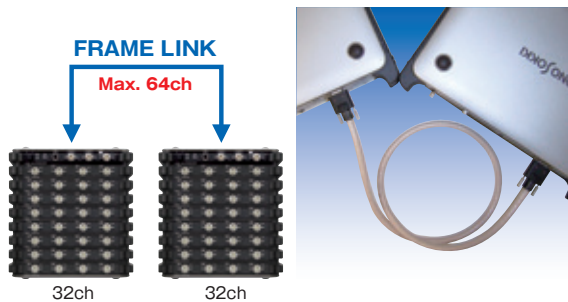


Feature.

3 Flexible

Unit connecting function "FRAME LINK"

"FRAME LINK" provides flexible building of multi-channel measurement system only by connecting two units of the DS-3000 Series via a cable and interfaces. Two DS-3200 (new model) units, or DS-3100 (previous model) unit and DS-3200 unit can be connected.



Feature.

4 Reliable

Simultaneous processing of real-time analysis and recording

This function enables recording of backup data automatically while performing real-time analysis.



*FFT analysis:

DS-0321 and DS-0350 are required.

*Octave analysis:

DS-0323 and DS-0350 are required.

*Tracking analysis (constant width):

DS-0321, DS-0322, and DS-0350 are required.

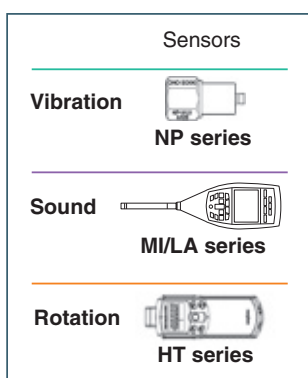
DS-0321: FFT Analysis

DS-0322: Tracking Analysis

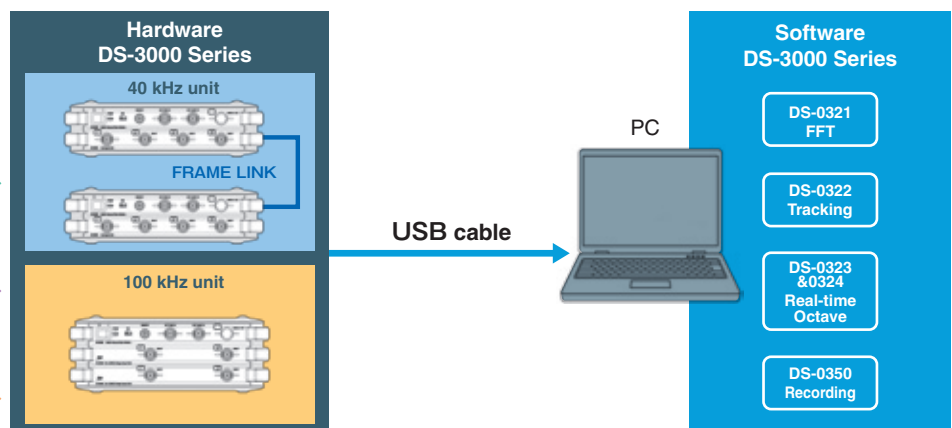
DS-0323: 1/1 and 1/3 Real-time Octave Analysis

DS-0350: Recording Function

System Configuration



DS-3000 Series Sound and Vibration Real-time Analysis System



FRAME LINK (unit connecting function) is only applicable to 40 kHz unit. 100 kHz unit and 40 kHz unit can not be used together.

Making best suited setup for on-site measurement

During measurement, you may have to alter the measuring conditions due to undesired noises (e.g. environmental noise or disturbing vibration from other instruments), changes in tested items or other unpredictable situations at the site. Also, you may need to configure appropriate measuring settings for the object to be measured, such as noises and vibrations. In such cases the DS-3000 Series responds easily and quickly, and helps find the best-suited setup for accurate measurements.



Simplicity

Graph layout selection button

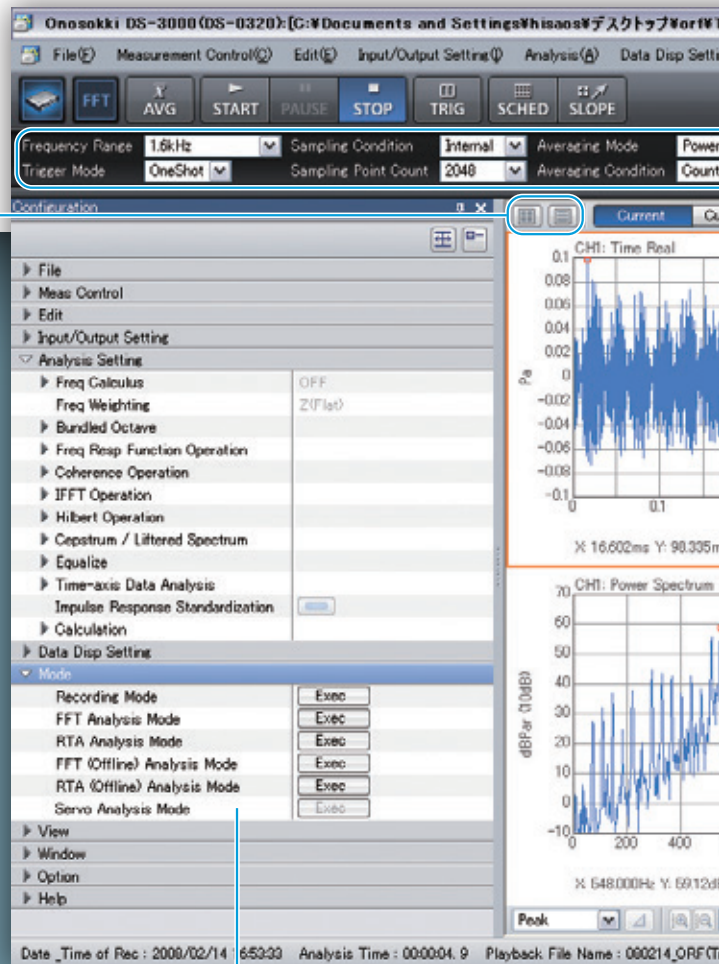
- Easy to set the number of graph screens (M × N) with a mouse.
- Up to 64 (8 × 8) screens can be displayed in one window.
- Up to 10 windows can be displayed.



Data listing button

- Enables you to display the data list and save the data in the list at a time.
- Up to 64 data in one window can be saved at a time (Up to 10 windows can be displayed).
- You can name the data in the list individually. Each data can be saved automatically as files with a sequence of numbers.

Display	Ch	Time	Peak	File No.
1	CH1	Time	Peak	File 2802
2	CH1	Time	Peak	File 2803
3	CH1	Time	Peak	File 2804
4	CH1	Time	Peak	File 2805
5	CH1	Power Spectrum	Peak	File 2806
6	CH1	Power Spectrum	Peak	File 2807
7	CH1	Power Spectrum	Peak	File 2808
8	CH1	Power Spectrum	Peak	File 2809
9	CH1	Power Spectrum	Peak	File 2810
10	CH1	Octave	1.0	File 2811
11	CH1	Octave	1.0	File 2812
12	CH1	Octave	1.0	File 2813



Configuration window

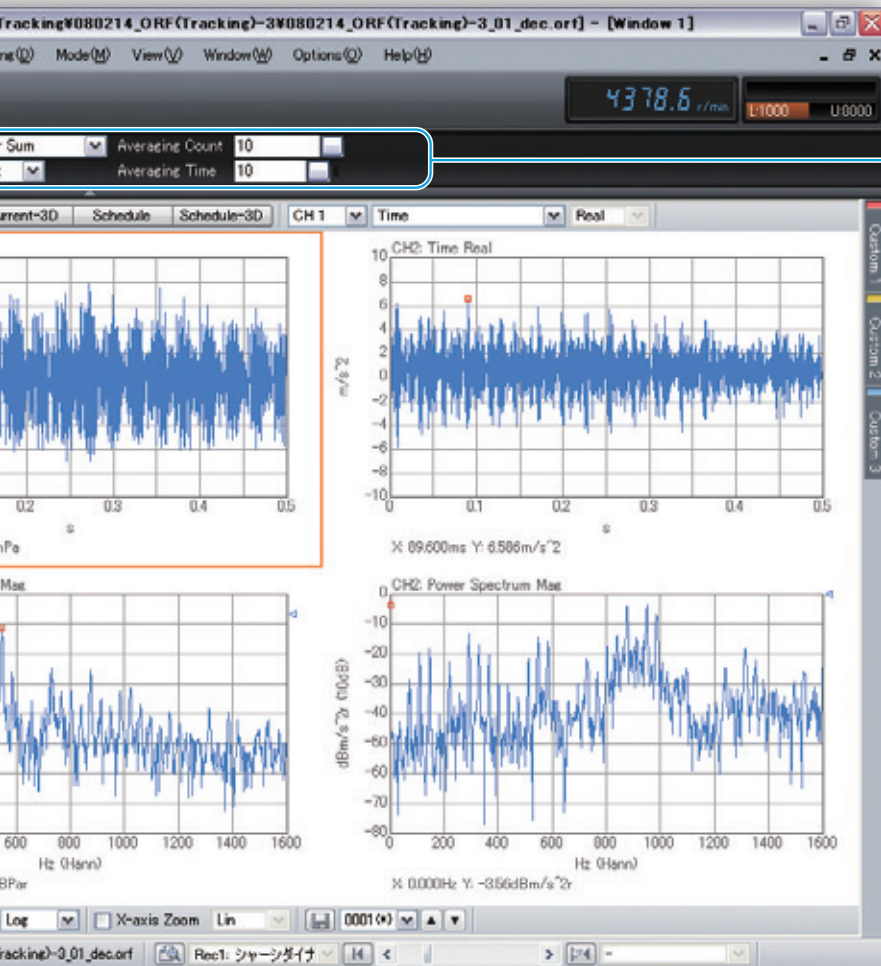
- Setup items are displayed in a tree structure.
- Setup conditions can be changed while checking the graph under measurement in real time.
- The configuration window can be undisplayed with the button to enlarge the graph display area.



Visibility



Example of the undisplayed configuration window



Main window

Option bar

- Frequently-used setup items are allocated.
- Enables you to change the setting values directly.
- Can be displayed or undisplayed with the button under the bar.

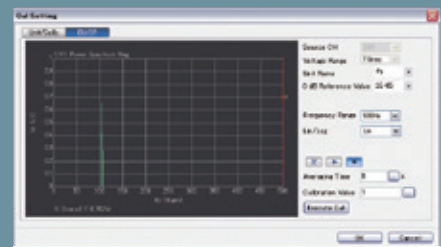
Setup dialogue box

- Necessary setup items for the tracking analysis are displayed and can be setup in the dialogue box.



Scheduled measurement setup

- Setup items for the sensor calibration with a calibrator are displayed and can be set in the dialogue box.



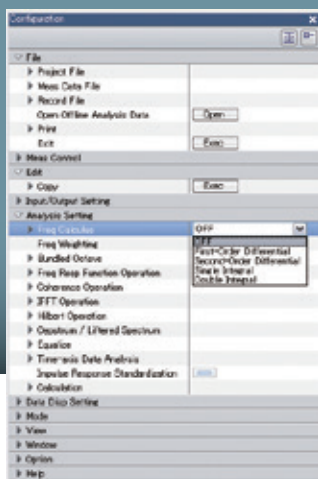
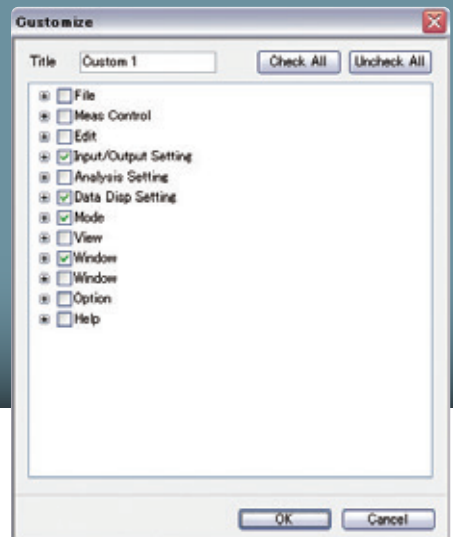
Calibration setup

Custom window

- Commonly-used measurement setup items can be placed as tabs on the window selected from the configuration window. It enables quick checking or changing of measurement conditions.
- Up to 3 tabs can be made depending on the measurement object or user.



Convenience



Frequency calculus setup

New functions contribute to easier operation **option**

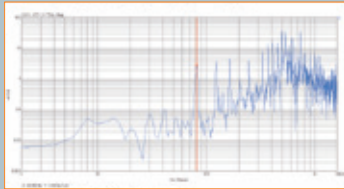
DS-0325 Tripartite Graph and Mouse Gesture Function

Function 1 Real-time tripartite graph display function

Three amplitude values (acceleration: m/s², velocity: m/s, and displacement: m) at any arbitrary frequency can be read simultaneously in real time during FFT analysis of vibration. You do not need to operate individually for differential and integral processing and convert amplitude values using the frequency analysis function as before. Therefore, this function enables you to read three amplitude values quickly.

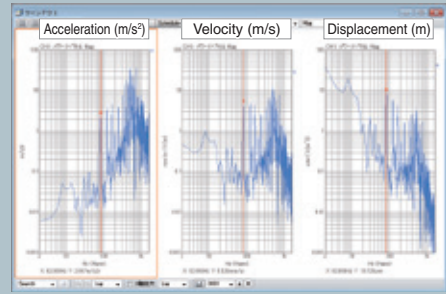
* The tripartite graph (diagram) enables you to read amplitude values of acceleration (m/s²) and displacement (m) which is based on velocity (m/s), on the frequency (Hz) axis.
* DS-0321 FFT Analysis function software is required.

If you want to know both the displacement and the velocity from the measurement result of the accelerometer



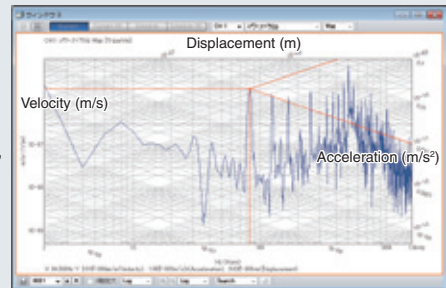
Previous method

You had to operate differential and integral calculus from the data which you measured.



New function Real-time tripartite graph

Three amplitudes (velocity, acceleration, and displacement) can be read out in a same graph.



Function 2 Mouse gesture function

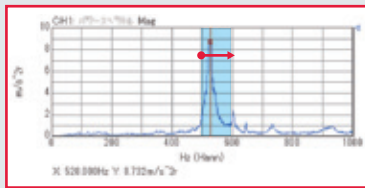
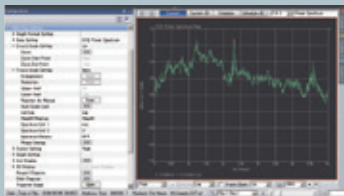
This function enables various operations including X-scale enlargement and Y-scale adjustment only with a mouse. The band you want to measure or gain can be enlarged or reduced with ease and intuitive action. Y-scale also can be adjusted by mouse operation, just double-click the graph.



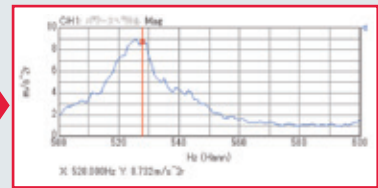
New function Easy operation only with mouse

Previous method

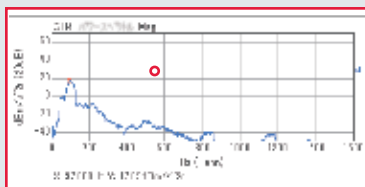
Setting values needed to input to the configuration window for enlargement of axis or scale adjustment



Slide a pointer aside



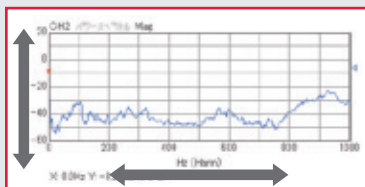
Selected X-axis range is enlarged



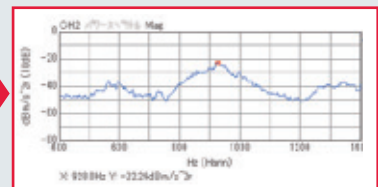
Double-click on a graph



Y-axis scale is adjusted automatically



Drag a pointer to scroll an axis



The axis is scrolled and adjusted

New and enhanced functions **provided as standard**

Data transfer to the OS-2000 Series with a single-button operation

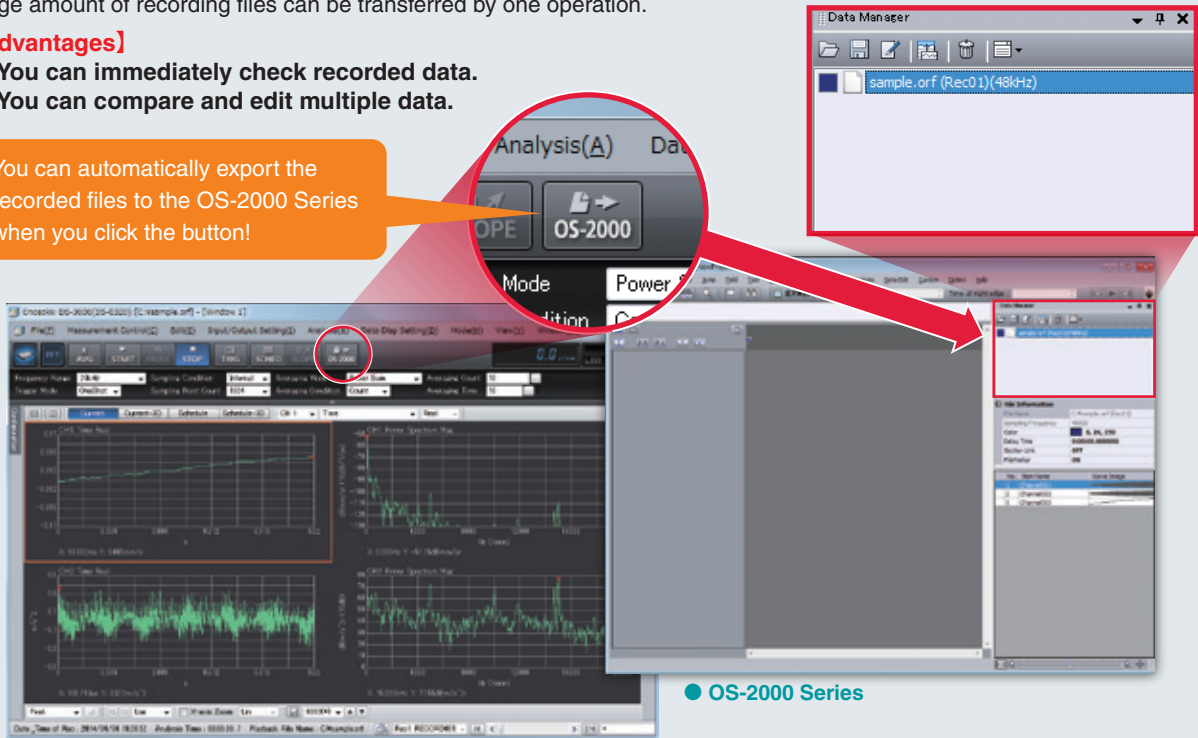
Data recorded on the DS-3000 Series Data Station can be immediately transferred to the OS-2000 Series Time-Series Data Analysis Software.

Huge amount of recording files can be transferred by one operation.

[Advantages]

- You can immediately check recorded data.
- You can compare and edit multiple data.

You can automatically export the recorded files to the OS-2000 Series when you click the button!



● DS-3000 Series

● OS-2000 Series

DS-3000 Series

Saves multiple data after recording and analyzing.

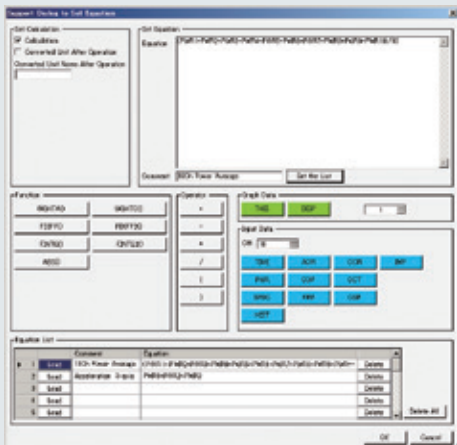
OS-2000 Series

You can immediately compare the recorded data and analyze in detail!

- * DS-0350 (Recording Function) is required.
- * DS-3000 Series software version: 2.2.6 or later
- * OS-2000 Series software version: 2.7.0 or later

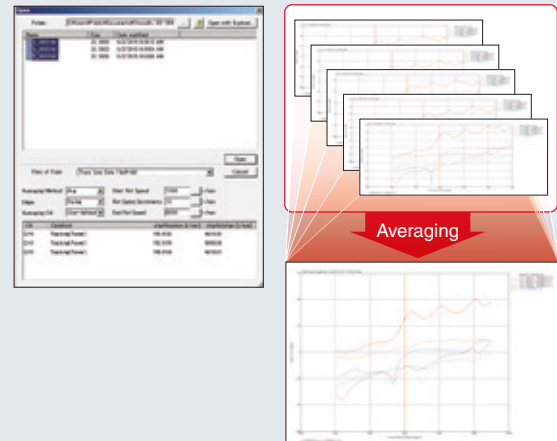
Equation operation function

This function allows you to perform the channel to channel operation of the measured data with setting up numerical formula freely. You also can perform composition of tri-axial acceleration data, and multi-channel sound level averaging in real time.



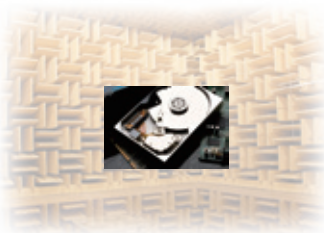
File averaging function for tracking analysis results

This function calculates the average of tracking analysis results. For example, when data was measured five times, it calculates the average value of five files automatically.



1 Measuring sound

FFT analysis and octave analysis of sound Air conditioner, office automation equipment etc.



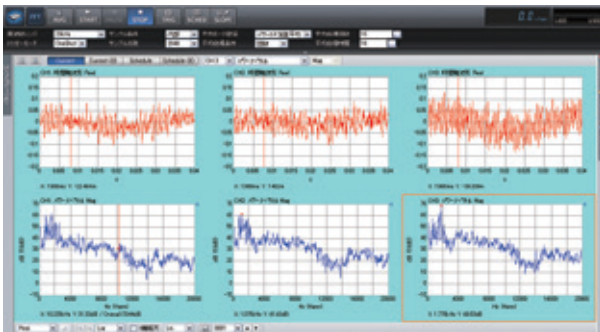
[Hardware]

By means of its fanless design*1, the DS-3000 Series hardware enables accurate analysis of very tiny sound even though it is set nearby the measuring place.

[Software]

Enables an automatic backup data recording while performing FFT analysis or octave analysis. You can analyze the recorded data off-line (later) with a PC.

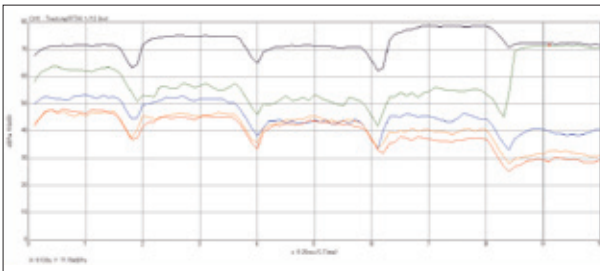
*1: Cooling fan is provided as standard with the system of 5 units or more (40 kHz unit) and 4 units or more (100 kHz unit) at the rear of the DS-3000 Series.



Time waveform (upper row) and power spectrum (lower row)



1/3 real-time octave analysis



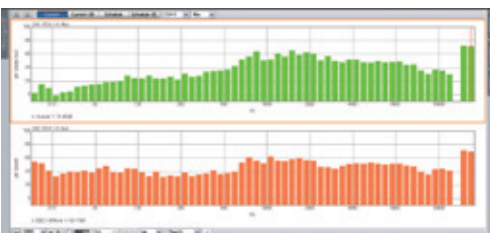
A-weighted sound pressure level trend

The level change at optional specified frequency is displayed.
*Both DS-0322 and DS-0323 are required for level trend display and color mapping display.

[What is real-time octave analysis?]

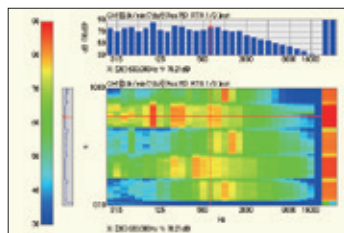
“Octave” refers to a relation that a certain frequency is proportional to another one at a constant ratio. The octave scale is similar to that of the human auditory sense, facilitating frequency analysis. In particular, the 1/1-octave (which means 1 octave) band, where the frequency ratio is 1:2, is normalized as an international standard as well as the 1/3-octave band. The 1/3-octave band is equivalent to the auditory frequency resolution, and is also recognized as a standard for sound frequency measurement. Octave band analysis is a core method for acoustic measurement in various industries and studies. Further, by analyzing in narrower octave bands such as 1/6, 1/12 and 1/24, more detailed frequency classifications and determinations are possible.

Real-time octave analysis enables the analysis and trend measurement with time-weight (Fast, Slow, etc.) equivalent to that of sound level meters.

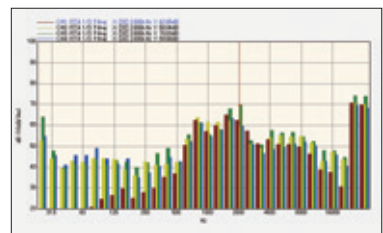


1/6 real-time octave analysis

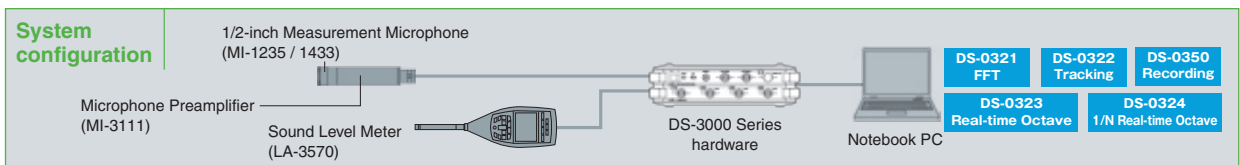
*DS-0324 is required.



Color mapping display



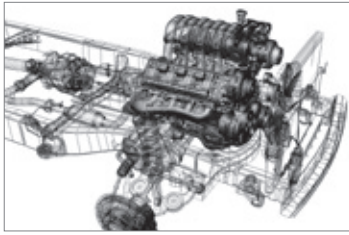
Overlay display



2 Rotational tracking analysis

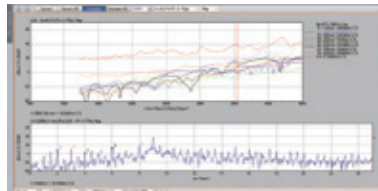
Rotational tracking analysis of vibration and noise

An engine and a transmission of a car, a power generator turbine, and a motor shaft

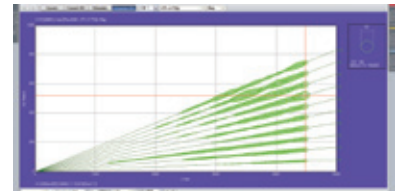


The DS-3000 Series enables tracking analysis from 60 to 240,000 r/min*2 rotation speed and can be used for measurement from low to high-speed rotation. Also when you change the rotation speed, fluctuation of order component in sound and vibration (tracking diagram) can be displayed as up to 8 overlapped tracking lines.

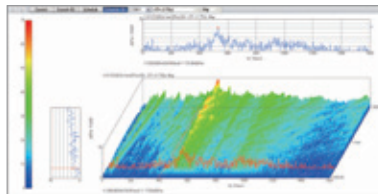
*2: The range of rotational number at 1 P/R.



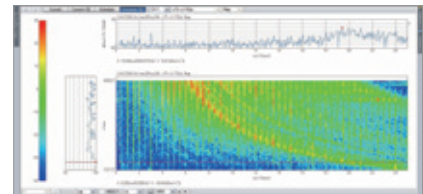
Tracking diagram



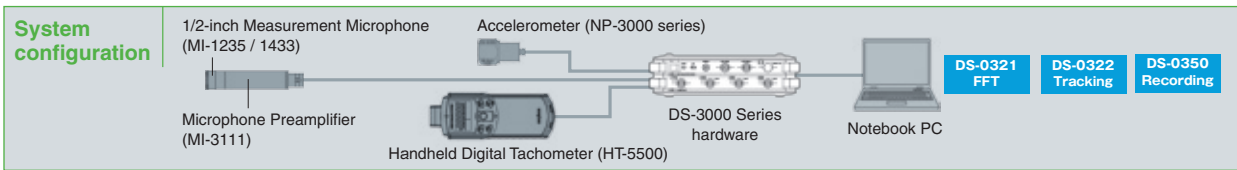
Campbell plot



3D array display



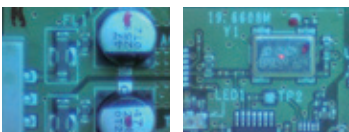
Color mapping display



3 Vibration measurement in a range of ultrasonic

Vibration measurement in a range of ultrasonic using a Laser Doppler Vibrometer

An inverter, a bonding machine, and an ultrasonic cleaning tank



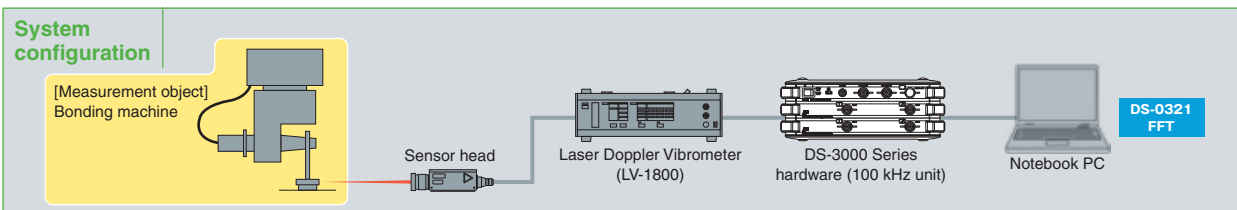
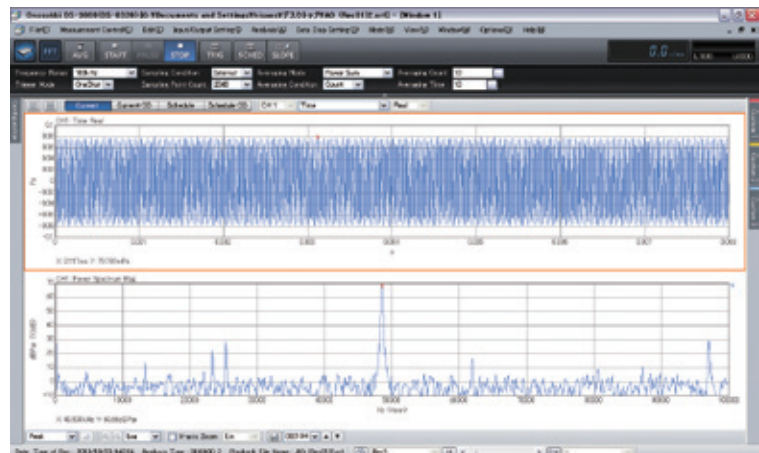
Images by the LV-1801 Built-in Positioning Camera for the LV-1800.

Laser Doppler Vibrometer LV-1800

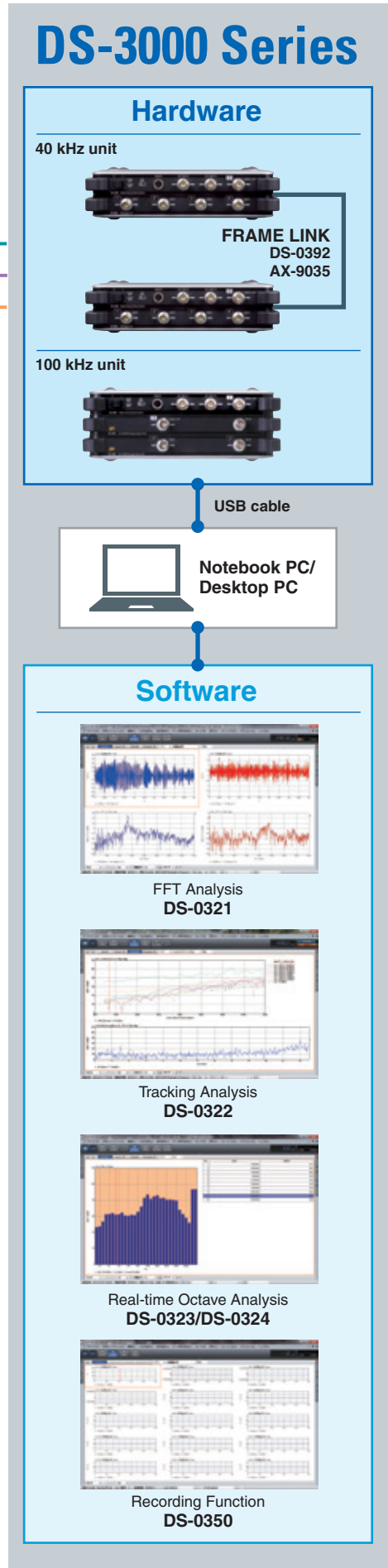
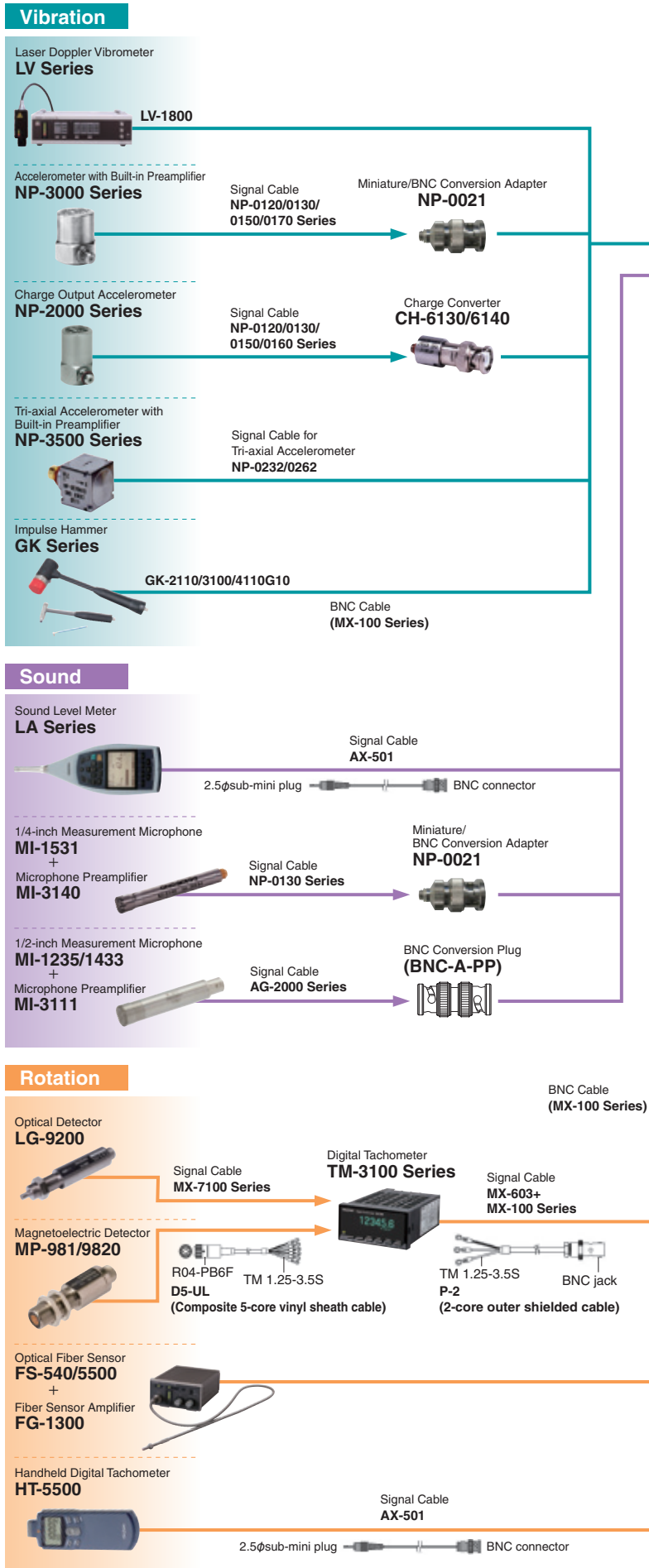


Detection frequency range	0.3 to 3 MHz (fc=-3 dB)
Maximum detection velocity	10 m/s 0-p (20 m/s p-p)
Minimum velocity resolution	0.3 μm/s or less (when at 0.01 (m/s) /v)
Conforming standards	FDA 21CFR Part 1040.10 (CDR H)
(Laser safety standards)	IEC60285-1: 2007 class 2 JIS C 6802 class 2

By using the 100 kHz unit of the DS-3000 Series and the LV-1800 Laser Doppler Vibrometer, you can perform vibration measurement in a range of ultrasonic such as inverters, piezoelectric elements, MEMS, ultrasonic elements etc.



From sensors to a variety of software, ONO SOKKI provides you with the total solution to sound, vibration, and rotation measurement.

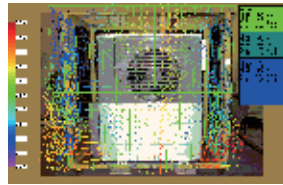


Software for special analysis

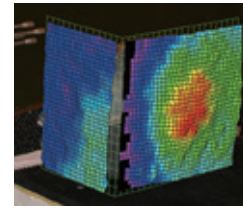
We provide the software for special purpose analyses. (for 40 kHz unit only)

3D Sound Intensity Analysis Software DS-0225A

Sound Intensity is the acoustic energy (power) which passes through a specified area at a certain point in sound field in a specified time. Measuring the energy in 3D achieves to presume the position of sound source, obtain amount of radiation from sound source and direction of flowing acoustic energy which is passing through the measuring surface.



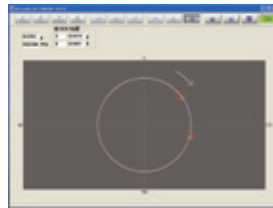
The flow of acoustic energy is visualized and overlaid on an image of the measurement object (vector mapping).



The intensity mapping of approx. 10 mm resolution is available.

Field Balancing Software DS-0227A

The trouble of rotation machinery is caused most frequently by the phenomenon of imbalanced rotating shaft. DS-0227A is calculating the balancing data by software and displays the result; therefore the correction of the imbalanced phenomenon can be made easily and efficiently.



Display of trial weight or correction weight position



Measurement screen

OS-2000 Series

Time-Series Data Analysis Software



Allows you to edit and analyze long time-series data that cannot be handled by spread sheet software. ORF file and data from recorders of different manufacturers* can be handled as well as standard format data files (CSV and WAV). Data in different formats can be displayed simultaneously, placed in order or overlaid as desired.

Model	Product name
OS-2500	Basic
OS-2600	Standard
OS-2700	Professional
OS-2710	Package for Engine Bench Test
OS-2720	Package for FFT Analysis
OS-2740	Sound Quality Evaluation Package
OS-2760	Fluctuation Sound Analysis Package
OS-0251	Statistical Analysis
OS-0252	FFT Analysis
OS-0253	FIR Filter
OS-0261	IIR Filter
OS-0263	Time Frequency Analysis
OS-0264	1/N Octave Analysis
OS-0265	Tracking Analysis
OS-0254	Continuous Automatic Analysis
OS-0291	Non-time Series Graph
OS-0271	Sound Quality Evaluation
OS-0272	Fluctuation Sound Analysis
OS-0273	Fluctuation Sound Simulator
OS-0281	Video Playback

* TEAC (hdr and aqv format), HIOKI (mem format), YOKOGAWA (wvf and wdf format). Please refer to the OS-2000 Series brochure for details.

The OS-2000 Series features the ability to edit, process and analyze time-series data that are recorded by the DS-3000 or CF-9200/9400 Portable FFT Analyzer. It also allows differential and integral calculus processing of recorded data and other complicated data processing and analysis, including reproduction and filtering of recorded sounds and analysis of fluctuating sounds.

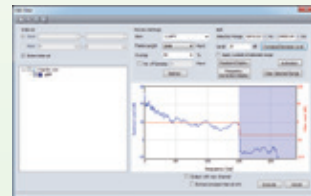
●Main screen



●Tracking Analysis



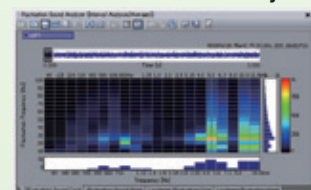
●FIR Filter



●Video Playback and Standard Frequency Analysis



●Fluctuation Sound Analysis



Hardware Specifications

Each unit of the DS-3000 Series is just about the size of B5 and 30 mm in height. Input and output units can be stacked up to 8 units (40 kHz units) or up to 5 units (100 kHz units) depending on a use and a purpose. (Generally, they are stacked in order of the main unit, the output unit, and the input unit from the top.)

We also provide the input main unit which is the main unit stacked on the 2ch or 4ch input unit, and you can add channels using it as a base.

Input main unit DS-3200 + (40 kHz 2ch / 4ch input unit, 100 kHz 2ch input unit)		
	40 kHz unit	100 kHz unit
Model	DS-3202 (DS-3200 + DS-0362) / DS-3204 (DS-3200 + DS-0364) DS-3102 (DS-3100 + DS-0362) / DS-3104 (DS-3100 + DS-0364)	DS-3200 + DS-0366 DS-3100 + DS-0366
Frequency range	DC to 40 kHz	DC to 100 kHz
Number of processing channels	2ch to 32ch (1 housing (= stacked units)) / 4ch to 64ch (when 2 housings are connected)	2ch to 4ch (can be used only by 1 housing)
External sample input	Voltage range ± 12 V, 0 to 300 kHz (with out of band filter) Detection level -12 V to +12 V (0.025 V-step) / + (rising) or - (falling) 0.5 to 1024 P/R, 1 to 1024 with frequency dividing function When inputting rotation pulse (in the case of 1 P/R), range of detectable rotational speed: 60 to 192,000 r/min or 80 to 240,000 r/min	
External trigger input	Voltage range ± 12 V, 0 to 300 kHz (with out of band filter) -12 V to +12 V (0.025 V-step) / + (rising) or - (falling) Repeat, single, one-shot: depending on software	
Monitor output	Input signal which is standardized by voltage range is outputted from the terminal on the rear panel of the input unit. (1 Vrms max.) *Monitor signal after filtered is outputted when sound filter is used.	
Terminal for monitor output	$\Phi 3.5$ stereo-mini jack Number of terminals: 1 (DS-0362), 2 (DS-0364) / input unit	$\Phi 3.5$ monaural-mini jack Number of terminals: 2 / input unit
PC interface	[DS-3200] USB 3.0 interface is built-in [DS-3100] •For desktop type PC: PCI Express •For notebook type PC: CardBus or ExpressCard 34 / 54	
Accessory	Instruction manual, AC adapter, power cable for AC adapter, USB 3.0 cable (2 m)	

Common specification for units		
	40 kHz unit	100 kHz unit
Power voltage / power consumption	100 to 240 VAC, 15 VDC / 25 to 95 VA (when 15 VDC)	100 to 240 VAC, 15 VDC / 25 to 55 VA (when 15 VDC)
Outer dimensions	269 (W) \times 71 to 267 (H) \times 217 (D) mm (including projections)	269 (W) \times 71 to 155 (H) \times 217 (D) mm (including projections)
Weight	Approx. 2.2 kg (4ch system: 2 units) to 8.2 kg (32ch system: 9 units)	Approx. 2.2 kg (2ch system: 2 units) to 4.6 kg (input 4ch + output 2ch system: 5 units)
Cooling fan	Required for a system of 5 units or greater. (Provided as standard with the system of 5 units or more.)	Required for a system of 4 units or greater. (Provided as standard with the system of 4 units or more.)
Operating temperature range	0 to +40 °C (with no condensation)	
Storage temperature range	-10 to +60 °C (with no condensation)	
Applicable standard	CE marking	

AC adapter specification (common to 40 kHz unit and 100 kHz unit)		
	AC adapter 60 W type (PS-P20018A)	AC adapter 150 W type (PS-P20017B)
Input voltage / current	Rated 100 to 240 VAC (90 to 264 VAC), max. 1.4 A	Rated 100 to 240 VAC (90 to 264 VAC), max. 2.5 A
Output voltage / current	15 VDC / 4 A	15 VDC / 10 A
Number of applicable units	Up to 4 units	5 units or more
Safety standard	CE / UL / GS / PSE	

Unit connecting (FRAME LINK) function DS-0391 / DS-0392 (option)	
Model	DS-0391 (for DS-3100) DS-0392 (for DS-3200)
Mounting form	Built in the main unit to connect
Connecting cable (sold separately)	AX-9035 Cable length 75 cm
Applicable hardware	Connection between two 40 kHz units (also connectable between DS-3200 and DS-3100) Not applicable to 100 kHz unit.
Applicable software	FFT analysis, Real-time octave analysis (RTA analysis), Tracking analysis, Recording function

Input unit DS-0362 / DS-0364 / DS-0366		
	40 kHz unit	100 kHz unit
Model	DS-0362 / DS-0364	DS-0366
Number of input channels	2ch / 4ch	2ch
Input terminal	BNC	
Input impedance	1 M Ω \pm 0.5 % 100 pF or less	
Input coupling	DC or AC (-3 dB at 0.55 Hz)	
Isolation	Non-insulation	Insulated between each channel. (Permanently)
Power supply for sensor (CCLD)	Electric current is supplied to a constant current supply-type sensor through the input connector (BNC). +24 VDC / 4 mA	
TEDS function	TEDS: IEEE 1451.4 Ver.1.0 Applicable to accelerometer and force sensor	
Sound filter	A and C weighting (provided as standard) Conforms to IEC 61672-1: 2002 class1, ANSI_S1.4-1983 TYPE1, and JIS C 1509-1: 2005 class 1	
Input voltage range	10 mVrms to 10 Vrms (7-range, 10 dB-step)	
Input level monitor	Excessive voltage input turns on the red LED. (Lights when the voltage is 95 % or more of the input range.)	
A/D converter	24 bits Type $\Delta \Sigma$	16 bits Type $\Delta \Sigma$
Accuracy between channels	Within ± 0.3 dB, within ± 0.4 deg (0 to 20 kHz) Within ± 0.3 dB, within ± 0.8 deg (20 kHz to 40 kHz)	Within ± 0.05 dB, within ± 0.3 deg (0 to 20 kHz) Within ± 0.1 dB, within ± 0.7 deg (20 kHz to 100 kHz)
Dynamic range	110 dB (40 kHz range, 1 Vrms range, when analyzed at 2048 points)	90 dB (100 kHz range, 1 Vrms range, when analyzed at 2048 points)
Outer dimensions	271 (W) \times 28 (H) \times 217 (D) mm (including projections)	
Weight	900 g or less	

Signal output DS-0371 / DS-0372 / DS-0373 (option)		
	40 kHz unit	100 kHz unit
Model	DS-0371 (module) / DS-0372 (unit)	DS-0373 (unit)
Number of output channels	1ch / 2ch DS-0371 is built in the main unit DS-3100 / DS-3200	1ch
Output terminal	BNC	
Output impedance	50 Ω±10 %	0 Ω or 50 Ω±10 %
D/A converter	24 bits Type ΔΣ	16 bits
Isolation	Non-insulation	
Output voltage amplitude	±10 mV to ±10 V	±1 mV to ±10 V
Offset voltage	±10 V However, sum of the value of output voltage amplitude and the value of offset voltage is within ±10 V.	
Maximum output current	10 mA	
Frequency range	DC to 40 kHz	DC to 100 kHz
Output waveform	Sine wave, swept sine, random (decorrelation between channels), pseudo random, impulse, octave band noise, pink noise, recorded data (ORF format)	
Outer dimensions (unit)	271 (W) × 28 (H) × 217 (D) mm (including projections)	
Weight (unit)	900 g or less	

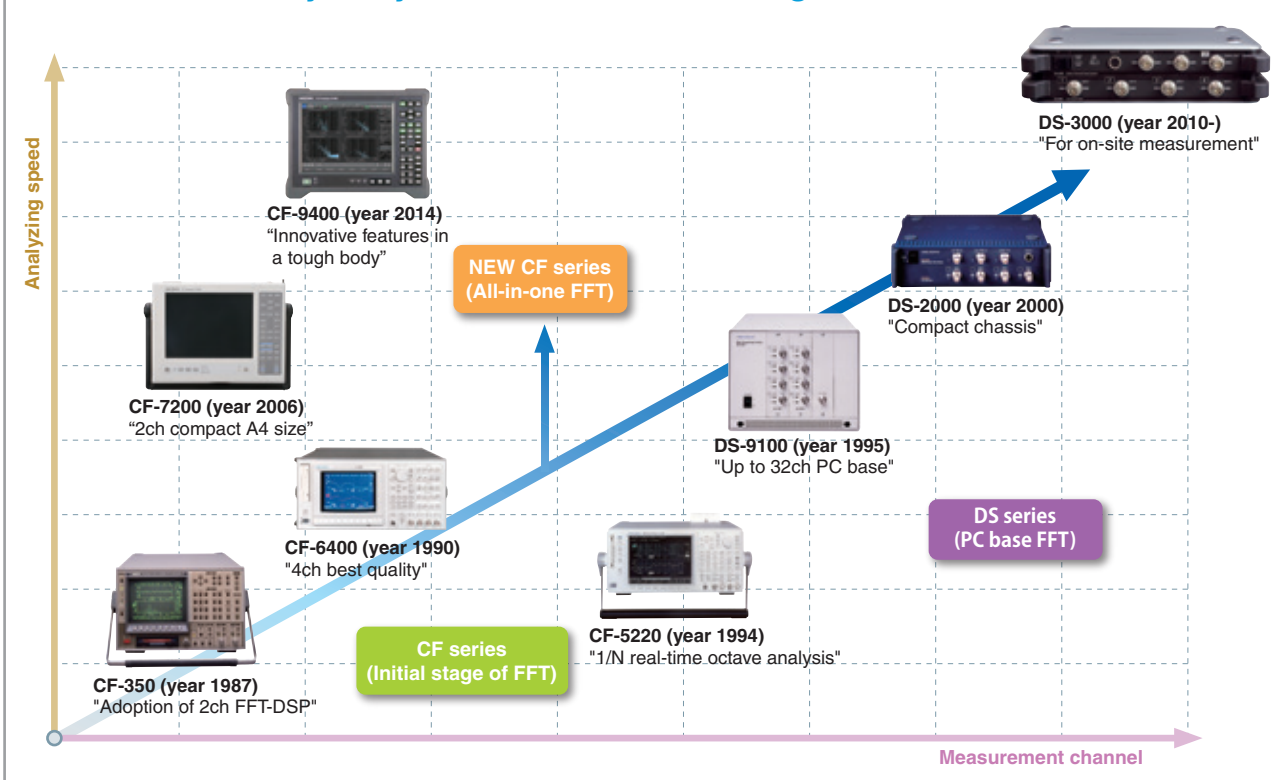
Hardware option	
Model	Product name
DS-0391	Unit connecting interface (for DS-3100)
DS-0392	Unit connecting interface (for DS-3200)
DS-0395	Remote controller (cable length 2 m)
AX-9035	Unit connecting interface cable (75 cm)

Addition function option DS-0374	
	100 kHz unit
Model	DS-0374 (module)
Mounting form	Built in the DS-0373 Signal output unit
Number of input channel	1ch
Input terminal	BNC
Input impedance	1 MΩ±0.5 % 100 pF or less
Input voltage range	±10 V However, sum of the value of input voltage amplitude, the value of summation signal and the value of offset voltage is within ±10 V.
Input coupling	DC
Isolation	Insulated (Permanently) Summation input and signal output are insulated together from other input signals, etc.
Function	The function which inputs disturbance noise and outputs it after the addition to the preset signal.

Hardware specification notes

- 100 kHz unit and 40 kHz unit cannot be used together.
 - 100 kHz unit cannot be used with the unit connecting function.
 - Maximum formation of 100 kHz unit is as follows. DS-3200 + (DS-0366 × 2) + (DS-0373 × 2) (Input 4ch, output 2ch)
 - DS-0371 is built in a main unit.
 - DS-0373 can be add only with DS-0366.
 - DS-0374 is only applicable to DS-0373.
 - In the formation of 40 kHz units, a cooling fan is mounted on the backside of the units when there are 5 units or more (including a main unit).
In the formation of 100 kHz units, a cooling fan is mounted on the backside of the units when there are 4 units or more (including a main unit).
 - Large size AC adapter (150 kW type, sold separately) is required for the system of 5 units or more (including a main unit).
 - DS-3200 USB 3.0 interface cannot be used with a USB hub. USB protection key can be used with a USB hub.
 - If you would like to add hardware after the purchase, an extra fee for installation will be charged.
- For more details, please contact your nearest distributor or send an e-mail to us (overseas@onosokki.co.jp).

ONO SOKKI's analysis systems have been evolving for over 2 decades



Software specifications

We provide **FFT Analysis, Real-time Octave Analysis (RTA Analysis), Tracking Analysis, and Recording function (throughput disc function)** as software for the DS-3000 Series, and thus you can compose the best system for on-site and real-time measurement based on a common screen structure and operability.

Starting or operating application software	
Starting procedure	FFT analysis (DS-0321), Tracking analysis, (DS-0322), RTA analysis (DS-0323), Recording function (throughput disc function) (DS-0350), can be selected on the activated basic software. Recording function (DS-0350) is operated with FFT (excluding constant ratio tracking) or RTA analysis.
Control of activation	The functions that are licensed in the USB protection key can be activated or used in analysis software
Basic operation	Operated by menu bar, tool bar, configuration bar, custom bar, and option bar. The layout / size of the configuration bar can be changed. Configuration bar can be selected from the menu bar. Commonly-used measurement setup items can be placed as tabs on the custom bar selected from the configuration bar. The layout / size of the custom bar can be changed. Display / undisplay of the option bar can be changed.
On-line analysis and off-line analysis	On-line analysis: Performs analysis while operating the DS-3000 hardware. Off-line analysis: Analyzes recorded time sampling data. On-line or off-line analysis can be selected on the basic software. Both on-line and off-line analysis are available with the on-line analysis license.
Operation in the measurement window	Specified graph screens or all graph screens displayed in the window can be saved as files or taken as screenshots. Specified data screens or all data screens can be saved as files with arbitrary file names.

Recording function (throughput disc function) DS-0350					
Maximum recording time	22 minutes (40 kHz range, 16ch, 16 bits, without rotation information) For more details about other conditions, please e-mail us (overseas@onosokki.co.jp).				
Frequency range / channel	<table border="1"> <thead> <tr> <th>40 kHz unit</th> <th>100 kHz unit</th> </tr> </thead> <tbody> <tr> <td>40 kHz range / 16ch, 20 kHz range / 32ch, 10 kHz range / 64ch</td> <td>100 kHz range / 4ch</td> </tr> </tbody> </table>	40 kHz unit	100 kHz unit	40 kHz range / 16ch, 20 kHz range / 32ch, 10 kHz range / 64ch	100 kHz range / 4ch
40 kHz unit	100 kHz unit				
40 kHz range / 16ch, 20 kHz range / 32ch, 10 kHz range / 64ch	100 kHz range / 4ch				
Sampling frequency	Frequency range × 2.56 Hz				
File format	ORF file (Ono Sokki original format): Rotation information can be recorded.				
Unit connecting function (FRAME LINK function)	Connects up to 2 housings (= stacked units) for multi-channel measurement system. (32ch + 32ch = 64ch max.)				
Simultaneous analysis recording function	Available in FFT analysis, RTA analysis, and Constant width tracking analysis *Recording condition changes from the case of only recording.				
Conversion function	File export function: Converts to TXT, WAV, DADISP, MATLAB, UFF format.				

FFT Analysis function DS-0321					
Frequency range	<table border="1"> <thead> <tr> <th>40 kHz unit</th> <th>100 kHz unit</th> </tr> </thead> <tbody> <tr> <td>4 mHz to 40 kHz</td> <td>10 mHz to 100 kHz</td> </tr> </tbody> </table>	40 kHz unit	100 kHz unit	4 mHz to 40 kHz	10 mHz to 100 kHz
40 kHz unit	100 kHz unit				
4 mHz to 40 kHz	10 mHz to 100 kHz				
FFT real-time rate	40 kHz range / 8ch, 20 kHz range / 16ch, 10 kHz range / 32ch				
Number of FFT samplings (number of spectrum lines)	64 points (25 lines), 128 points (50 lines), 256 points (100 lines), 512 points (200 lines), 1024 points (400 lines), 2048 points (800 lines), 4096 points (1600 lines), 8192 points (3200 lines), 16384 points (6400 lines)				
Window function	Rectangular, hanning, flat-top, force, exponential, and user-defined				
Averaging function	Time-axis summation averaging, time-axis exponential averaging, power spectrum summation averaging, power spectrum exponential averaging, etc.				
Analysis function (time-axis)	Time waveform, auto-correlation function, cross-correlation function, impulse response, cepstrum				
Analysis function (frequency-axis)	Power spectrum, Fourier spectrum, filtered spectrum, cross spectrum, frequency response function (FRF), coherence function, coherence output power				
Analysis function (time-axis statistical processing)	Mean value, absolute mean value, rms value, standard deviation, maximum value, minimum value, form factor, crest factor, skewness, kurtosis				
Analysis screen display	Up to 64 screens / 1 window (overlapping display in a window), up to 10 windows Up to 64 screens / 1 window with list display				
Cursor function	Search cursor, peak cursor, delta cursor				
List function	Peak list, harmonics (entire harmonics, harmonic distortion) list, arbitrary list, all list				
Calculation function	Inverse Fourier transform, frequency calculus, Hilbert transform, opening and closing loop calculation, damping ratio calculation, FRF reciprocal calculation, four arithmetic operation				

Tracking analysis function DS-0322	
Tracking analysis type	Amplitude tracking, phase tracking
Sampling method	Constant ratio tracking (external sampling): up to maximum analysis orders Constant width tracking (internal sampling): Frequency range is same as its FFT analysis.
Number of FFT sampling points	64 to 16384 points (power-of-two step)
Averaging function	Power spectrum exponential averaging, Fourier spectrum exponential averaging
Maximum number of analysis orders	6.25, 12.5, 25, 50, 100, 200, 400, 800
Maximum number of blocks	100, 200, 400, 800, 1000
Schedule function	Rotation schedule (provided automatic falling determination function), time schedule (time trend)
Range of rotational speed	60 to 192,000 r/min or 80 to 240,000 r/min (1 P/R)
Upper / lower-limit setting of number of rotations	UP (lower limit→upper limit), DOWN (upper limit→lower limit), UP / DOWN (lower limit→upper limit→lower limit), DOWN / UP (upper limit→lower limit→upper limit)
Tracking diagram	Up to 64 screens / 1 window (overlapping display in a window), up to 10 windows Designated order 8 lines + MAXord + OA + POA per 1 screen can be plotted.
Averaging function of tracking diagram file	The function that specify the tracking diagram data saved as files and make and display an averaged tracking data from them.
Tracking 3D display	Up to 64 screens / 1 window, up to 10 windows When 3D display 1 screen / 1window 3D array display (monochrome / color), color mapping display, Campbell plot

Real-time octave analysis function DS-0323	
Octave type	1/1 octave and 1/3 octave (filter: 6-order Butterworth) Conforms to IEC 61260 Ed. 1.0 (1995) Class1 / ANSI S1.11:2004 Class1 / JIS C 1514:2002 Class1
Time-weight (time constant)	10 ms, 35 ms, 125 ms (FAST), 630 ms, 1 s (SLOW), 8 s, IMPULSE (rising: 35 ms / falling: 1.5 s) Conforms to IEC 61672-1:2002 Class1 / JIS C 1509-1:2005 Class1
Frequency range	0.8 to 20 kHz (1/3 octave), 1 to 16 kHz (1/1 octave)
Calculation function	Instantaneous value, maximum value of every 1 second, maximum value hold, minimum value hold, power averaging value, power sum value, Linear Leq operation
Analysis screen display	Up to 64 screens / 1 window (overlapping display in a window), up to 10 windows
1/N octave function	Can be used by adding DS-0324 optional software 1/6, 1/12, 1/24 octave function is available However, the signals of 2channels from the left / each input unit (when using 4ch input unit), and the signal of the leftmost channel / each input unit (when using 2ch input unit) can be analyzed.
Octave tracking function	Can be used by adding DS-0322 optional software Tracking analysis function in octave band is available. (DS-0322 is required for rotational tracking and time trace processing)
List function	Peak list, arbitrary list, all list

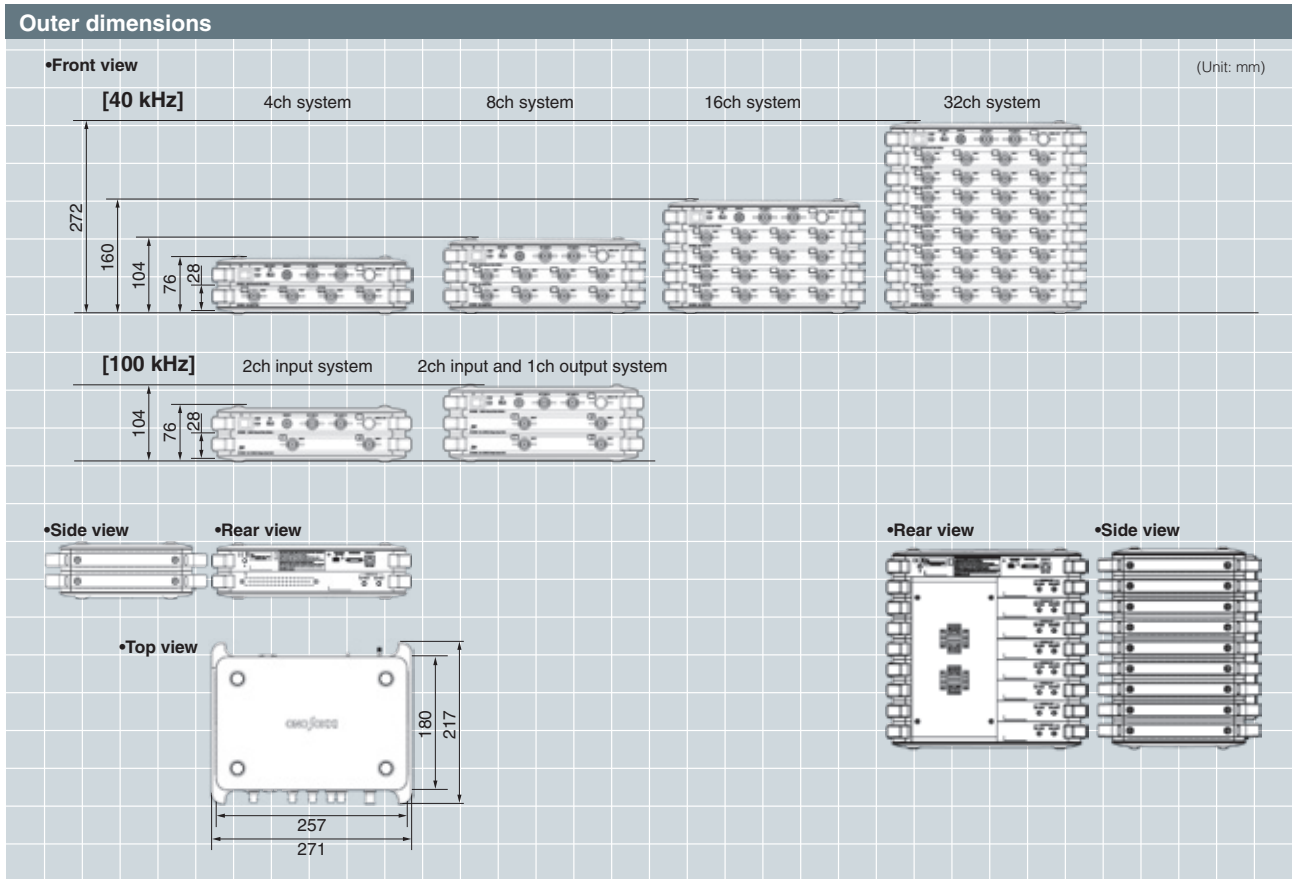
Operating Environment

Interface: [DS-3200] USB 3.0 Supports USB 2.0 and USB 3.0. (Data transmission using USB 2.0 is slower than using USB 3.0)	[DS-3100] Required to be equipped with any one of the followings. PCI Express slot, CardBus slot, ExpressCard slot
OS: Required to be equipped with any one of the following OS (Operating System) Microsoft® Windows® 7 Ultimate / Professional (32-bit ver. / 64-bit ver.) Microsoft® Windows Vista® Ultimate / Business (SP2 or later / 32-bit ver. only) Microsoft® Windows® XP Professional (SP2 or later / 32-bit ver. only)	Required to be equipped with any one of the following OS (Operating System) Microsoft® Windows® 7 Ultimate / Professional (32-bit ver. only) Microsoft® Windows Vista® Ultimate / Business (SP2 or later / 32-bit ver. only) Microsoft® Windows® XP Professional (SP2 or later / 32-bit ver. only)

Optical drive: Optical drive capable of reading DVD-R and CD-R is required. (For installation and update)

Recommended specifications: CPU: Intel® Core™ i5 or more
Memory: 4 GB

* Some application software may not be applicable to the above operating environment. For more details, please contact your nearest distributor or send an e-mail to us (overseas@onosokki.co.jp).
 * Please note that the DS-3000 Series does not work normally when it is used on the above OS by using compatible mode or Microsoft® Virtual PC etc.
 * The PC environment may be subject to certain constraints, depending on the type of application software or hardware used. For more details, please contact your nearest distributor or send an e-mail to us (overseas@onosokki.co.jp).
 * The DS-3000 Series operates on Windows® 7 64-bit ver. by means of a compatibility mode with 32-bit ver. (WOW64).



DS-3000 Series

Sound and Vibration Real-time Analysis System



Software

Model	Product name
DS-0321	FFT Analysis
DS-0321L	FFT Analysis (off-line license)
DS-0322	Tracking Analysis
DS-0350	Recording Function (throughput disc function)

Model	Product name
DS-0323	1 / 1 and 1 / 3 Real-time Octave Analysis
DS-0323L	1 / 1 and 1 / 3 Real-time Octave Analysis (off-line license)
DS-0324	1 / N Real-time Octave Analysis
DS-0325	Tripartite Graph and Mouse Gesture Function

Hardware

Model	Product name
DS-3200	Main Unit
DS-3202	40 kHz 2ch Main Unit
DS-3204	40 kHz 4ch Main Unit
DS-0362	2ch 40 kHz Input Unit (for expansion)
DS-0364	4ch 40 kHz Input Unit (for expansion)
DS-0371	1ch Signal Output Module for 40 kHz Unit (built-in)
DS-0372	2ch 40 kHz Signal Output Unit

Model	Product name
DS-0366	2ch 100 kHz Frequency Band Input Unit
DS-0373	1ch 100 kHz Frequency Band Signal Output Unit
DS-0374	Addition Function Option (built in the DS-0373)
DS-0392	Unit Connecting Interface (for DS-3200)
AX-9035	Unit Connecting Interface Cable (75 cm)
DS-0395	Remote Controller (cable length 2 m)

Hardware option

Model	Product name
CC-0025	Soft Carrying Case (up to 3 units)
CC-0026	Hard Carrying Case (up to 3 units)
PS-P20018A	AC Adapter (up to 4 units)

Model	Product name
PS-P20017B	Large Size AC Adapter (5 units or more)
-	Power Supply Cable for AC Adapter (2 m)
PS-E10008G5.4	Power Cable for DC Input (5.4 m, with alligator clips and a fuse) *Up to 4 units

Software for special analysis

Model	Product name
DS-0225A	3D Sound Intensity Analysis Software
DS-0227A	Field Balancing Software

Time-series data analysis software (OS-2000 Series)

Model	Product name
OS-2500	Basic
OS-2600	Standard
OS-2700	Professional

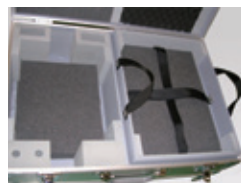
* Please refer to the OS-2000 Series brochure for details.



Soft carrying case CC-0025



Hard carrying case CC-0026



CC-0026 (inside)
Inside dimension of PC storage space 273 x 335 x 55 mm



Remote controller DS-0395



Large size AC adapter
*Power cable is sold separately.



Power cable for DC input

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