

CF-7200

Portable 2-channel

**FFT**  
Analyzer

# CF-7200

Lightweight, compact and highly portable  
The de facto standard for the next generation,  
for worldwide use



*Portable Size* **Multi interface** *Direct Operation*



**ONO SOKKI**

Portable 2-channel FFT Analyzer

# CF-7200



# Multi

## Flexible Data Sharing

Accepts USB, Compact Flash Card, and other general-purpose interfaces for compatibility with PCs and easy data sharing in the existing environment.

## Intuitive Button and Touch-panel Operations

The CF-7200 needs no mouse - simply press buttons for all operations. The click-feel buttons and touch panel allow immediate operations ranging from start/stop of analysis to display of basic functions.



An Advanced FFT Analyzer  
Covering Sophisticated Needs on Site

## The CF-7200 Has Arrived

In this easy-to-use FFT analyzer designed for modern needs, all aspects of the CF Series have been upgraded. With improved PC compatibility and a much smaller size of the main body, the CF-7200 delivers quick and easy measurement and analysis, yet with exceptionally high accuracy. Integrating all on-site needs into its compact body, the CF-7200 is a multi-functional high-performance analyzer that will become the de facto standard for the next generation.



# Interface



# Direct Operation



# Portable Size



## **Lightweight, Compact and Highly Portable for All Sites**

No setup needed before measurement or troublesome installation on site, such as connecting a personal computer, cables, and power supply to a measuring instrument.

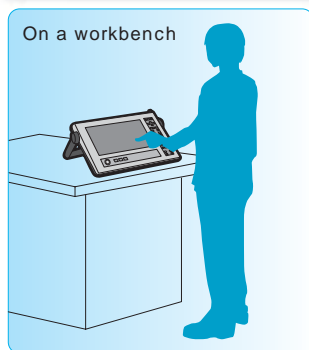
All functions necessary for measuring and analyzing noise and vibration are built into the CF-7200's small file size, for greater flexibility on all sites.

# High On-site Flexibility Sets a New Standard for FFT Analyzers

All Field-oriented Functions Integrated into Small File Size



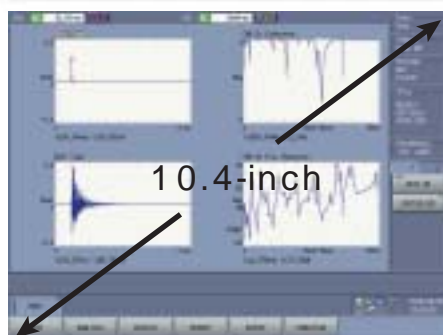
## 1 Flexible Placement for Good Visibility



360-degree rotary handle for setting at any angle



## 2 Highly Legible Large Screen with Easy Input



Thanks to the 10.4-inch TFT liquid crystal display, detailed data can be displayed even though QUAD display mode is selected. Simple and easy operation is also possible by touch panel.

## 3 Data Management by Entering Memos Directly



With the supplied stylus pen, comments, marks and memos can be entered directly, making it easier to recognize the working efficiency and data. Memos can be saved simultaneously and be shown or hidden.

## 4 Intuitive Button Operations



Selection of main data of the FFT analyzer, selection of the input voltage range and frequency range, and saving and loading of data can be performed directly from the hardware keys on the front panel. The CF-7200 offers simple, quick operations and much more. Even when observing a signal with unknown magnitude and frequency, an appropriate range and display conditions can be set with intuitive continuous button operations. And the signal output function\* can be turned on or off with the hardware keys, so signal output can be started or stopped with a simple ON/OFF, preventing careless operations.  
(\* Option:CF-0771)

## 5 Voice Memos Attached to Data



Equipped with a built-in microphone for voice recording and a speaker, voice memos can be attached to data and played back when the data is displayed, supporting data arrangements. There are also connectors for connecting an external speaker and microphone, allowing you to create voice memos even in a noisy place.

## Input and Output Connectors Conveniently Arranged on Top



## 6 Automatic Sensor Data Input with TEDS

Each channel is equipped with a CCLD (power supply for sensors) which can directly drive an accelerometer, a microphone, and other sensors requiring a power supply. TEDS reads data retained in a TEDS sensor and then automatically supplies the power to the sensor and performs unit calibration.

**TEDS**  
**CCLD**

### \* TEDS

TEDS, an abbreviation for Transducer Electronic Data Sheet, is an information description format for sensor-specific information, prescribed by the IEEE1451 Series. When TEDS data is implemented in a sensor, the sensor has a function called "plug-and-play sensor" which allows sensor data (sensitivity, weight, etc.) to be transmitted and recognized by a measuring instrument connected. As a result, troublesome unit calibration, which can easily lead to errors, can be performed automatically.

### \* CCLD

CCLD, an abbreviation for Constant Current Line Drive, is a method for driving a constant-current type preamplifier incorporated in a sensor. Either an accelerometer or microphone with a built-in preamplifier can be driven by connecting it to a signal input terminal.

## 7 Direct Driving of Rotation Detector

Equipped with exclusive connectors which directly drive a rotational detectors\*<sup>1</sup> and can be used as an external sampling clock. This makes it easy to perform order ratio analysis\*<sup>2</sup> which analyzes noise and vibration of engines, motors, and other rotating machineries with rotation-based values.

<sup>\*1</sup> Applicable to the MP-981/LG-916.  
<sup>\*2</sup> CF-0722 (option) Tracking Analysis Function Software is required.

## 8 Cable Disconnection Detecting Function

Automatically detects cable disconnection of an accelerometer and a microphone\*, preventing trouble before measurement.

\* Intended for sensors with a built-in constant-current type preamplifier.



## 9 Visual and Aural Check of Phenomena



A signal coming from an acoustic or vibration sensor connected to each channel can directly be monitored as sound using a headphone or an external speaker. This makes it possible to check aurally whether an intended vibration or sound is input correctly as well as by waveform observation, allowing you to check sensor setup and operation intuitively and with your senses.

&



## 10 Noise/Vibration-Free Operation with cooling fan OFF

CF-7200 can be operated under the condition of noise/vibration-free up to about 5 minutes by means of cooling fan off. Since the CF-7200 itself would not be the source of noise/vibration, analyzing or collecting for subtle noise/vibration is easy without worrying about self-noise/vibration.

Panel for rack mounting (for special orders)  
Ono Sokki offers a panel which enables the CF-7200 to be rack-mounted.



# Meticulously Designed for Easy Operation on Site

## Smooth Operations on a Desk

### USB Mass-storage Function with Direct PC Connection



The USB mass-storage function makes it possible to transfer data of the CF-7200 to a PC through a USB cable\* without having to remove a storage medium and without needing special software (Windows® XP).

\* USB connector mini-B type

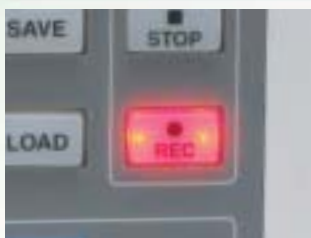
### Accepts Large-capacity CF Cards



Data can be recorded in a high-speed 2GB CF card (compact flash memory card\*), enabling long-time recording of a large volume of data.

\* Recommended by Ono Sokki.

### Data Recording Function\*<sup>1</sup>



The data recording function for recording a signal waveform in the CF-7200 at a touch of the REC button makes it possible to record long-time phenomena, which are difficult to be caught timely and the like in a memory card\*<sup>2</sup>. The recorded data can then be reproduced and analyzed on the CF-7200 at a later time and place. Data can also be analyzed using PC-based sound and vibration analysis software.

CF card capacity (bytes)	512M	1G	2G
Recording time (approx.)	8 minutes	16 minutes	33 minutes* <sup>3</sup>

\*<sup>1</sup>CF-0722 (option) is required for recording rotational data.

\*<sup>2</sup>Recording format: ORF (Ono Sokki Record Format)

\*<sup>3</sup>Maximum record time at single time



### Saving Data Simultaneously in Various Data Formats



The DAT format (binary), TXT format and BMP format can also be saved simultaneously. Data can also be processed using Office software and pasted into reports. Since the underlying data in DAT format are securely saved, data can be displayed and processed using PC-based FFT software (DS-2000 Series, XN-8000 Series) and the CF unit.

### Diverse Data Processing on a Desk



Data recorded by the CF-7200 can be reproduced and analyzed by various sound and vibration analysis software on a Windows®-based PC.

\* See page 11 for details.



Outdoor noise analysis using the CF-7200 and an LA Series Sound Level Meter

# Highly Portable Analyzer for Use Anywhere

## Weighs just 3.5kg



The main unit of the CF-7200 weighs about 3.5kg\*, thanks to the simple and compact body for high portability.  
\* Excluding battery pack

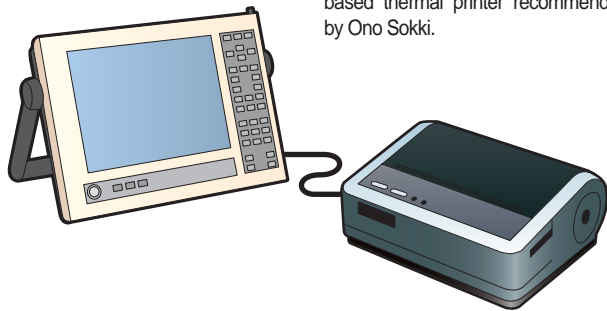
## 4-hour Battery Operation



By using the detachable lithium rechargeable battery, the unit can run continuously for about 4 hours\*. Measurement can be performed freely, even outdoors or where no power supply.

\* Without signal output, at 25 °C ambient temperature

## Printing Function



Display data can be printed to a USB-based thermal printer recommended by Ono Sokki.

## Remote Control



When the remote controller\* (DS-0295) is connected to the CF-7200, three main operations can be performed in addition to analysis start/stop. Operating the CF-7200 from near the working or supervising position makes measurement much easier.

\* Option

## State-of-the-art Technologies and High Specifications, All in a Compact Body



Frequency range

10 mHz ~ 100 kHz

Voltage input range

10 mV<sub>r</sub> ~ 31.62 V<sub>r</sub>

Data recording

100 kHz range max.,  
2 channels

Number of analysis points

6400 points max.

# ANALYSIS

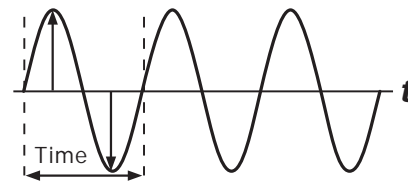
New Possibilities for Measurement and Analysis, from Laboratories to Production Sites

## Time-axis Waveform

TIME



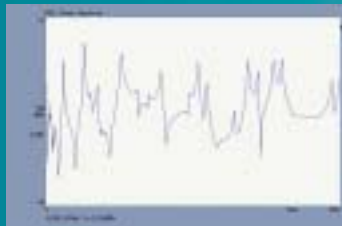
Time-axis waveform



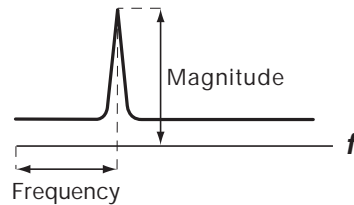
Performs A/D conversion of the direct waveform of an electrical signal of vibration, noise, pressure, strain, etc. coming from a sensor and then displays the result as time-domain data. The X- and Y-axis values at any point can directly be read using the search cursor. The delta cursor function makes it easier to read the time difference and level difference.

## Power Spectrum

SPECT



Power spectrum

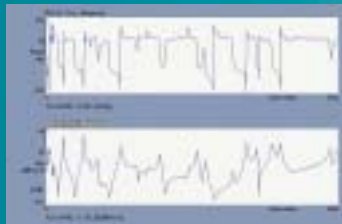


The power spectrum indicates the magnitude of frequency components contained in a sampled time-axis waveform. Frequency analysis enables detection of abnormal conditions of a facility, which are difficult to estimate through measurement of vibration and noise level and observation of direct time-axis waveform. The natural frequency of a structure can also be measured.

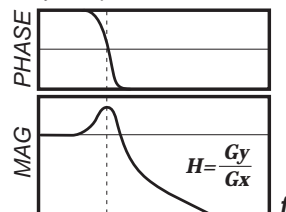
## Frequency Response Function

FRF

PHASE



Frequency response function



The frequency response function indicates the ratio of output to input and the frequency characteristics of phase difference. The resonant frequency and phase of a structure can easily be obtained accurately by entering the signal of vibration force generated by an impulse-force hammer or shaker and then inputting the response (signal of acceleration, velocity and displacement) to Ch2.



Hammering measurement with the CF-7200, GK-3100 Impulse-force Hammer and an NP Series Accelerometer

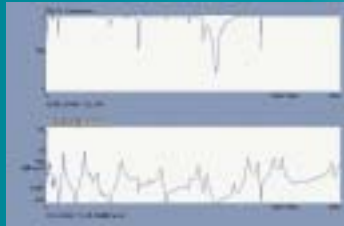


Analysis of micro-object using a LV Series Laser Doppler Vibration Meter and a magnetoelectric shaker

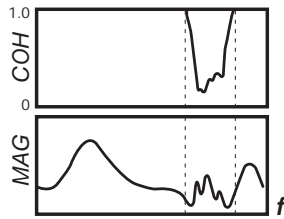


## Coherence Function

COH

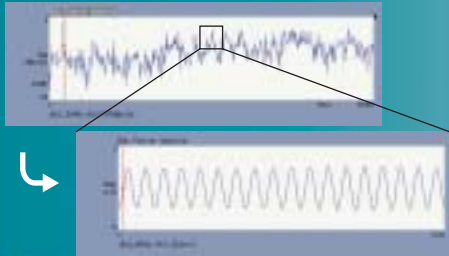


Coherence function

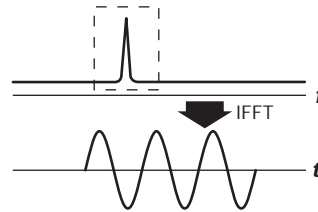


The coherence function is for evaluating the linearity and correlation of input and output of a transmission system, obtained in the frequency domain. The rate of contribution of the input signal to the output signal is represented as a digit from 0 to 1 for each frequency, for evaluating the reliability of the frequency response function, locating a key factor from multiple noise and vibration sources, and evaluating the correlation.

## Inverse Fast Fourier Transform (IFFT)

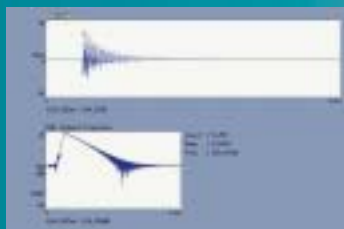


Inverse Fast Fourier transform (IFFT)

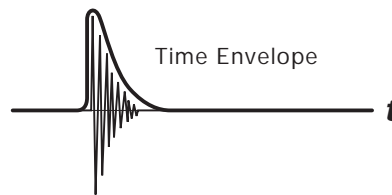


After frequency analysis, a time-axis waveform of a selected band can be obtained again by performing Inverse Fast Fourier Transform (IFFT) for the selected frequency band. For example, by selecting a waveform portion excluding an unnecessary frequency band confirmed in the FFT result and then performing Inverse Fast Fourier Transform (IFFT) for it, a time-axis waveform can be obtained with the selected high frequency band eliminated.

## Hilbert Transform

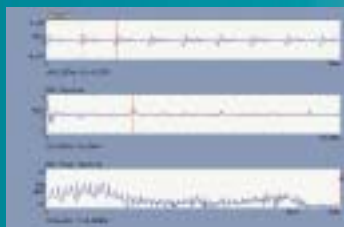


Hilbert transform

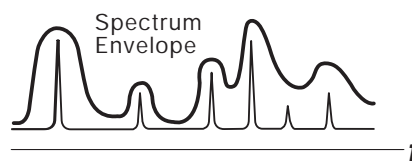


A logarithmic damping factor can be obtained by obtaining a time envelope of a time-axis signal by means of Hilbert transform.

## Cepstrum

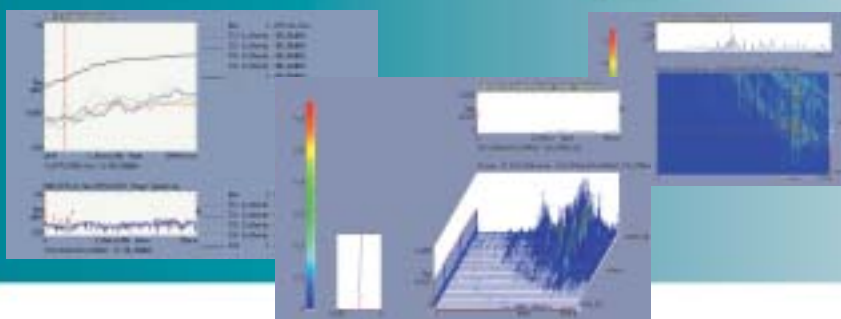


Cepstrum



Cepstrum is obtained by performing Fourier transform of the power spectrum again, allowing detection of the periodicity contained in the spectrum. In addition, reflected waveforms can be eliminated and fundamental frequency extracted by estimating a spectrum envelope from the Cepstrum. Cepstrum can be applied to make an analysis of the sound waves, seismic waves, biowaves, etc.

## Traking Analysis Function



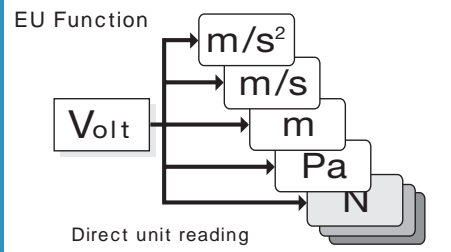
For automobile or office equipment with built-in rotating equipment including engine or motor, resonance which is occurred between rotation speed and natural frequency of each part would be a serious problem. Tracking Analysis Function helps to solve the problem.

\*CF-0722 Tracking Analysis Function Software is required.  
See page 13 for details.

# FUNCTION

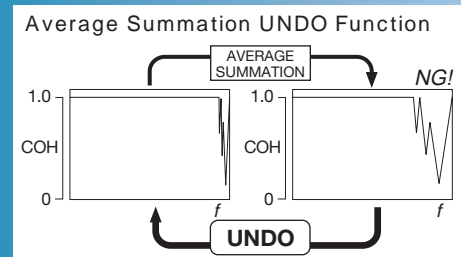
Multiple Applications with a Single CF-7200

## EU Function



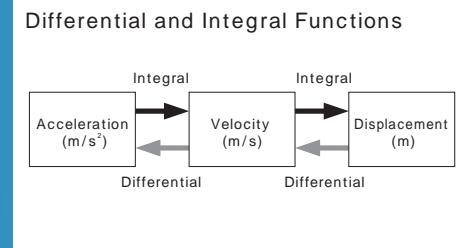
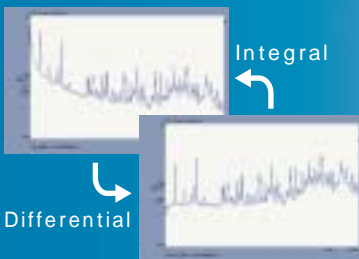
The CF-7200 FFT analyzer can not only directly read values as a voltage (V) but also as a physical quantity. When the input sensitivity has been set and calibration with a reference signal performed for each sensor, waveform values are converted to physical quantities when displayed, eliminating the need to convert from voltage values to physical quantities.

## Average Summation UNDO Function



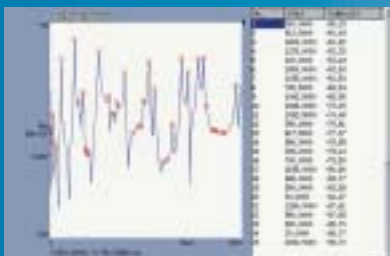
This function is used during average summation to UNDO one average summation. For example, if you end up with a bad result of summation in impulse-force hammer shaking, you can cancel the result data (by UNDOing the summation) and then try the summation again.

## Differential and Integral Functions



First and second order differential operations and single and double integral operations are possible for time-axis and frequency-axis waveforms. Acceleration data from an accelerometer can be converted to velocity and displacement; and velocity data from a laser doppler vibration meter can be converted to acceleration and displacement and displayed. When the EU function is used together, unit conversion (among "m/s<sup>2</sup>", "m/s" and "m") is also performed automatically.

## List Display



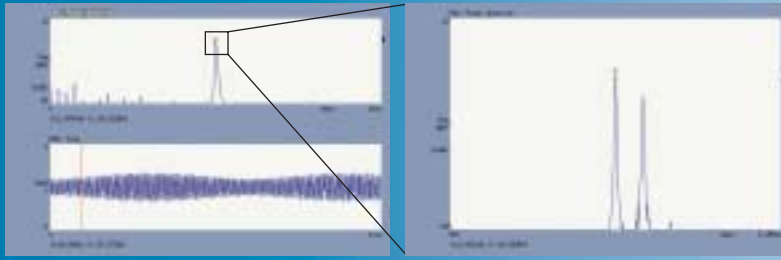
This function displays a list of X-axis and Y-axis values for selected points on a displayed waveform. Numeric list for 40 points selected, peak value list and harmonic list enable numeric values to be simultaneously checked for multiple points. Also, the displayed data can be saved at TXT format.

## Multi-screen



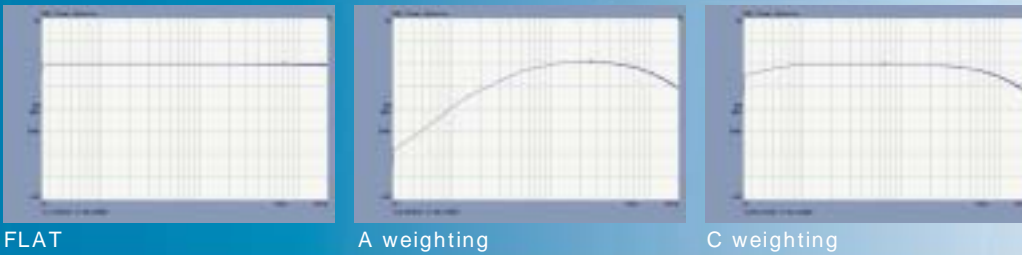
Display data can be arranged flexibly in the SINGLE, DUAL, TRIPLE and QUAD screen display modes. In the DUAL, TRIPLE and QUAD screen display modes, the difference between screens can be viewed by means of overlay display.

## Zooming Analysis



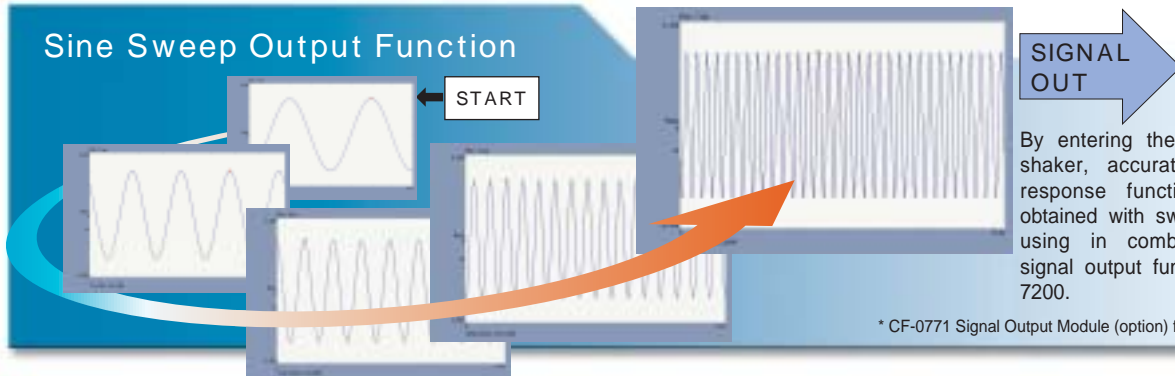
In frequency analysis, zooming analysis is possible by selecting a central frequency. This function is useful for more detailed frequency analysis, for example, analysis of beating and other waveforms involving indistinguishable adjacent frequency components.

## Frequency Weighting Filters



Frequency weighting filters such as A, C and Flat weighting are provided. This makes it easier to perform auditory sense correction in microphone-based acoustic analysis.

## Sine Sweep Output Function



By entering the signal from shaker, accurate frequency response function can be obtained with sweep average using in combination with signal output function of CF-7200.

\* CF-0771 Signal Output Module (option) for 1ch is required.



Vibration measurement in a plant using the CF-7200 and an NP Series Accelerometer



Rotational vibration measurement of a large blower using the CF-7200



# A Variety of Software for Diverse Applications

Portable 2-channel FFT Analyzer

## CF-7200



Measurement Processing Software  
**XN-8000 Series** | Simultaneous analysis of multi-frequency ranges, digital filtering and report creation

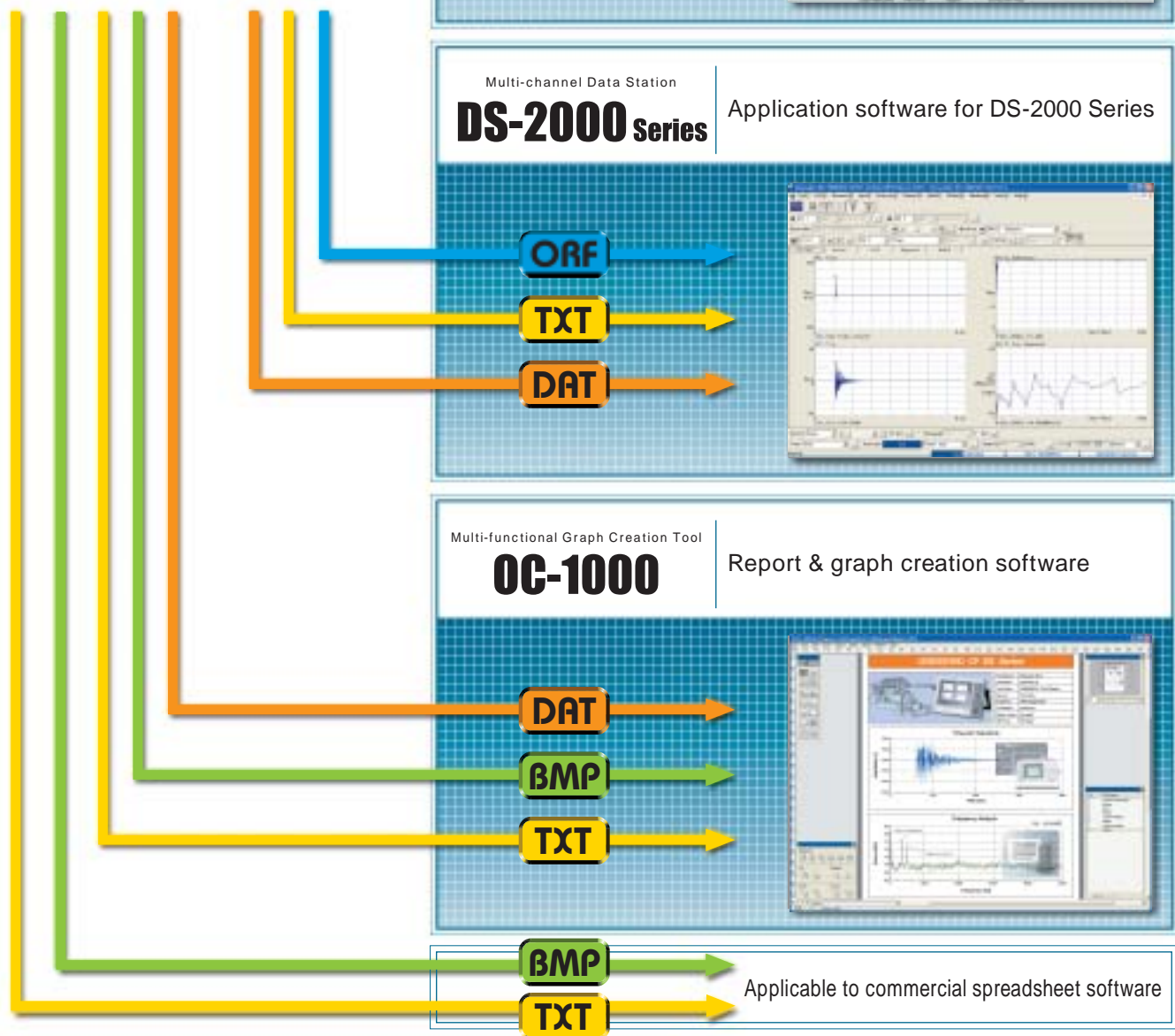
ORF  
 BMP  
 TXT  
 DAT

Multi-channel Data Station  
**DS-2000 Series** | Application software for DS-2000 Series

ORF  
 TXT  
 DAT

Multi-functional Graph Creation Tool  
**OC-1000** | Report & graph creation software

DAT  
 BMP  
 TXT



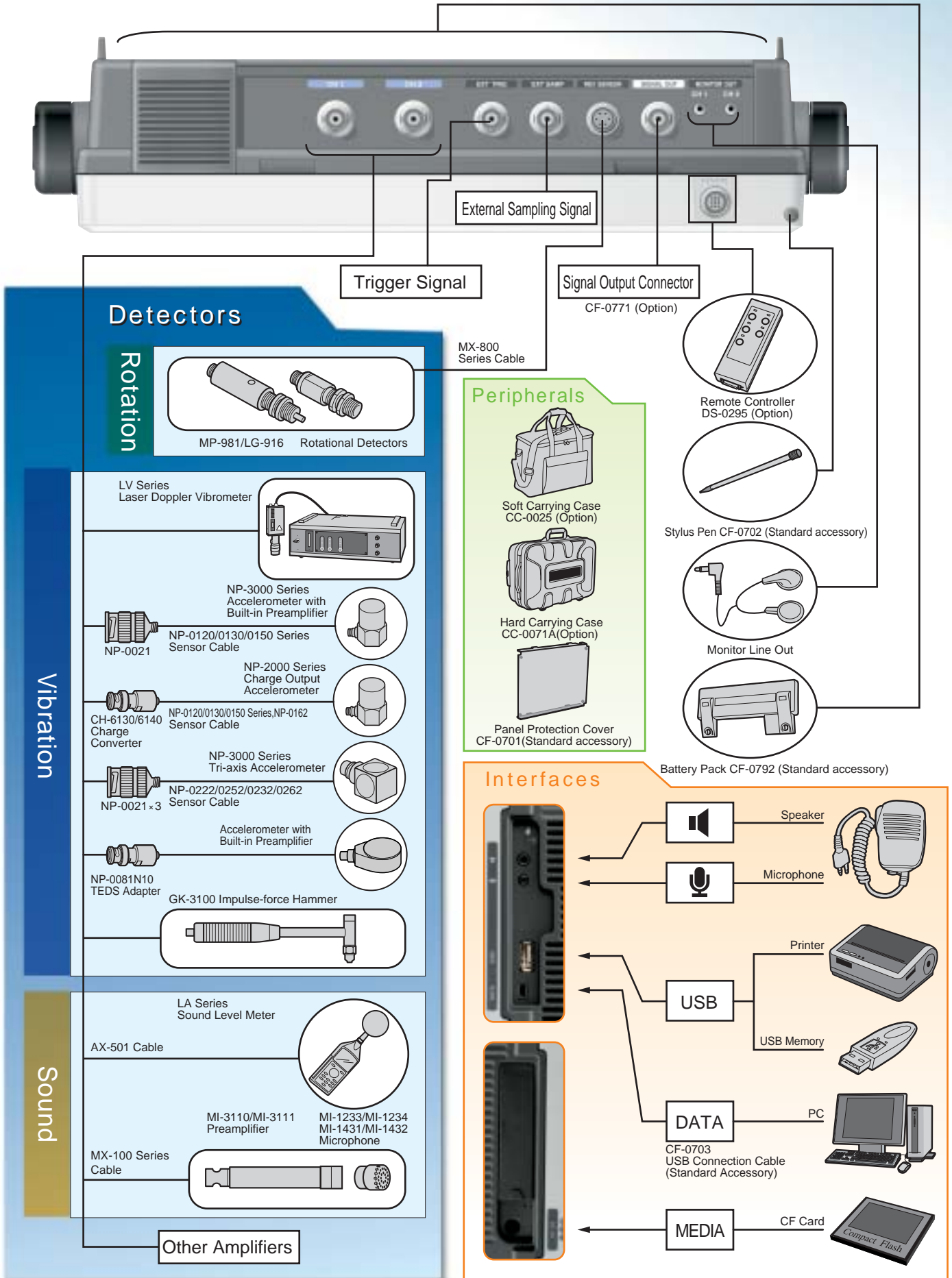
Functions	
Function	CF-7200 Data Format
Off-line analysis	ORF format
Report	DAT format, TXT format, BMP format

Software	
Software	Model
XN-8000 Series	XN-8100( Platform ) XN-0821( FFT analysis function )
General-purpose FFT Analysis Software	DS-0221L
Report & graph creation software	OC-1000

\* Refer to catalogs for details.

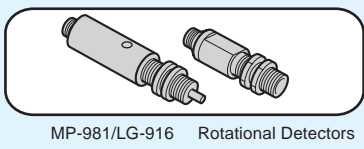
# System Configuration of CF-7200

Diverse options and peripheral devices can be added according to intended applications, expanding the possibilities for the portable FFT analyzer.

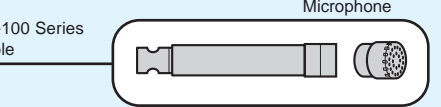
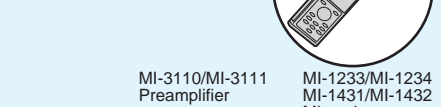
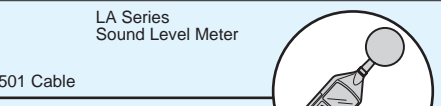
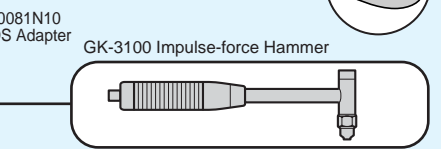
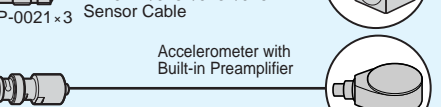
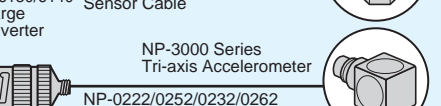
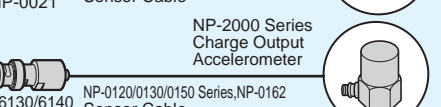
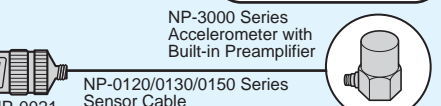
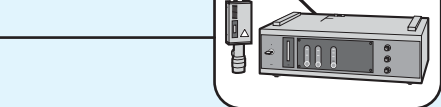


## Detectors

### Rotation

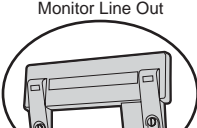
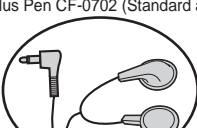
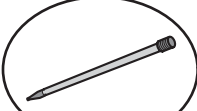
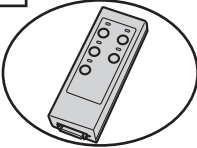
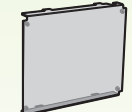


### Vibration

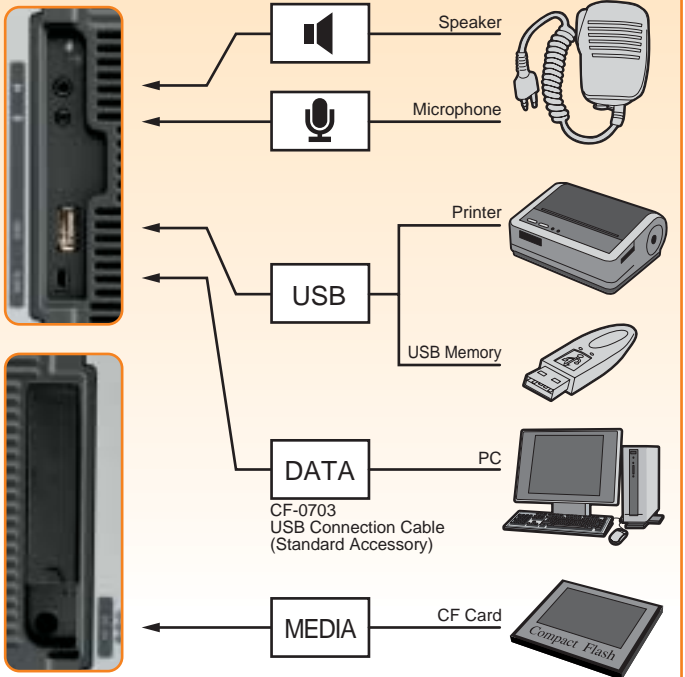


### Other Amplifiers

## Peripherals



## Interfaces



# Tracking Analysis Function

Equipments with built-in rotating machines, such as engines and motors in products like automobiles and office equipments, may have some problems of quality and performance due to noise and vibration by these rotating machines themselves or transmission.

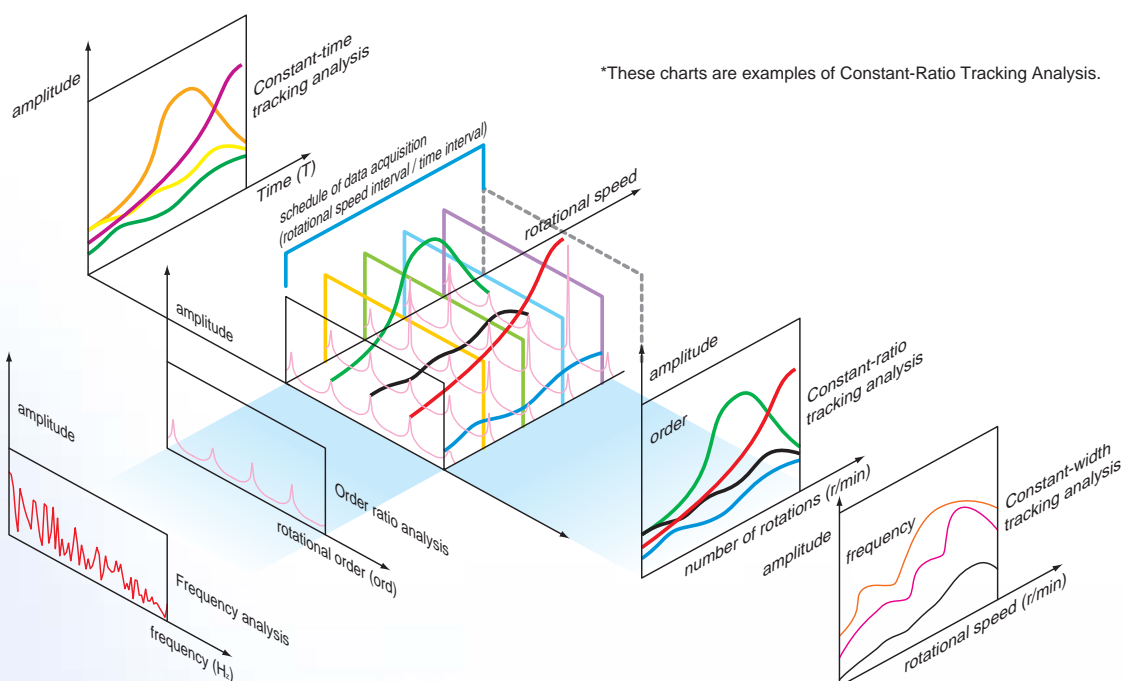
Taking automobiles as it is example, when the rotational speed of the engine changes, vibration is caused to the automobile from the frequency corresponding to the rotational speed. In home appliances, an air conditioner's compressor or fan motor also causes various changes in noise and vibration depending on the rotational speed. If the product's resonance frequency and the rotating vibration frequency by the rotating machine are same, resonance will occur, which may cause the trouble and worse quality due to increase of unpleasant noise and vibration.

Tracking analysis helps greatly in analyzing ever-changing noise and vibration depending on the rotational speed such as which rotational speeds increase noise and vibration, which rotating parts cause this noise and vibration, and how many times of the frequency component

(order) of noise and vibration to the rotational speed occur. Using the CF-0722 Tracking Analysis Function (optional) makes it possible to analyze rotating equipments based on the rotational speeds of under measurement obtained by rotational detectors (MP-981 or LG-916) that can be connected directly to the CF-7200.

The CF-0722 performs FFT analysis on noise and vibration, while maintaining synchronization with changes in rotational speed within an arbitrarily setting range of rotational speed. It continuously saves and accumulates an order-ratio-analysis graph, which is represented in multiple of rotational speed, with the specified conditions.

It is then possible to create multiple simultaneous plots in accordance with changes in rotational speed by specifying the noise and vibration orders of interest. It is also possible to visualize the phenomena of ever-changing noise and vibration due to rotation with many different types of graph.



\*These charts are examples of Constant-Ratio Tracking Analysis.

It is possible to measure the noise and vibration over time as well as changes in rotational speed. Equipping CF-0722 Tracking Analysis Function (option) with CF-7200 makes it possible to greatly improve the performance of analyzing noise and vibration due to rotation. This option allows to perform tracking-analysis with high-speed and high-resolution. It is also possible to draw rotation-tracking graphs during performing calculation, and configure and draw the desired order or frequency after calculation is completed.

Note: Rotational order indicates the multiple of rotational speed. A phenomenon that occurs once per a rotation is defined as a 1st-order rotation component; n times the number of rotations is defined as an n-order rotation component. It can express the analysis of noise and vibration, which is caused and influenced by the number of teeth on a gear at the transmission or ball of ball-bearings.







### Display examples of Tracking Analysis

Various types of display can be selected.

#### Color map display

#### Data & trace display

#### 3D color map display

Adding the optional CF-0722 Order Ratio Analysis Function makes it possible to perform constant-ratio tracking / constant-width tracking / time tracking analysis and recording with the rotational data. You can use the recorded data (ORF file) to perform off-line analysis.

#### Notes for performing constant-ratio and constant-width order tracking analysis

##### Constant-ratio order tracking

Tracking analysis is performed by using the rotation pulses obtained from the rotator as an external sampling clock. It plots the changes in the spectrum level of order component of interests corresponding to the rotational speed.

The order-analysis resolution is fixed regardless of rotational speed. In case of the signals resembling random noise without any clear peak as order component, the frequency's bandwidth (resolution) becomes high at the higher rotational speed. Therefore, there is a tendency of the spectrum numerical value becoming large.

##### Constant-width order tracking

Frequency analysis is performed via an internal sampling clock. Each time the rotational speed changes, the frequency of the order of interest is measured from the frequency range and the rotational speed at that time. A plot is then created for the changes in the spectrum level of this frequency component corresponding to the changes in rotational speed.

The frequency resolution is fixed regardless of rotational speed. With the low frequency range, it will be impossible to increase the rotational speed ratio so higher comparing with the fixed ratio order tracking. It is necessary to determine the maximum frequency before setting the number of analysis order (because the upper-limit frequency is limited by setting the frequency range.)

# Specifications of Portable 2-channel FFT Analyzer CF-7200

1. Input Section			
Number of input channels	2 channels		
Input configuration	Isolated single-ended		
Input connector	BNC (C02 type)		
Power supply for sensor (CCLD)	Supplies the current to a constant-current type sensor via a coaxial cable from the input connector (BNC connector) +24V / 4mA		
IEEE1451.4( TEDS)	Accepts an IEEE1451.4 (TEDS)-based sensor		
Input impedance	1M $\pm$ 0.5% 100pF or less		
Input coupling	AC	-3dB at 0.5Hz or less	Automatically set to AC when CCLD is used.
	DC	-	
Absolute maximum input voltage	100Vrms AC for 1 minute (50Hz)		
Amplitude voltage range	+30dBVr	31.62Vr	-40dBVr to 30dBVr in all 8 steps
	+20dBVr	10.00Vr	
	+10dBVr	3.162Vr	
	0dBVr	1.000Vr	
	-10dBVr	0.3162Vr	
	-20dBVr	0.100Vr	
	-30dBVr	31.62mVr	
-40dBVr	10.00mVr		
Input range step	10dB		
Input level monitor	OVER	Over: Red LED ON (95% F.S. or more)	
	FINE	Appropriate level: Green LED ON (-12dB F.S. or more)	
Auto range	Whenever the 1-frame data is sampled, the amplitude voltage range changes automatically if input range-over occurs.		
A/D converter	16 bits		
Dynamic range	90dB or higher: +30 to -30dBVr range	800 lines, Hanning window, 50 averages, 20 , high-pass filter OFF	
	70dB or higher: -40dBVr range		
Harmonic distortion	-70dB: 10 to 20dBVr range		
	-80dB -40 to 0dBVr range		
Aliasing	-80dB or less		
Amplitude flatness	20kHz or less $\pm$ 0.1dB		
	20kHz to 100kHz $\pm$ 0.2dB (0dBVr or less)		
Full-scale accuracy	$\pm$ 0.1dB	at 1kHz	
Amplitude linearity	$\pm$ 0.015%	at F.S.	
Cross-talk	-100dB or less		
Channel to channel Gain accuracy	20kHz or less: $\pm$ 0.1dB (0dBVr or less)	Gain accuracy measured in the same voltage range	
	20kHz to 100kHz: $\pm$ 0.2dB (0dBVr or less)		
Channel to channel Phase accuracy	20kHz or less: $\pm$ 0.5deg (0dBVr or less)	Phase accuracy measured in the same voltage range with Equalize OFF, same voltage range $\pm$ 0.1deg (typ.) with Equalize ON	
	20kHz to 100kHz: $\pm$ 1.0deg (0dBVr or less)		
DC offset	- 60dB F.S.	Auto zero ON, +30 to -20dBVr range (DC coupling)	
	- 40dB F.S.	Auto zero ON, -30 to -40dBVr range (DC coupling)	
Trigger	AUTO ZERO: Collective operation of all channels		
	"TRIG ON" LED goes ON when trigger function turns ON		
	LED (TRIG'D) blinks when triggered		
	Position	$\pm$ 8191	
	Mode	Free / Repeat / Single / One-shot	
	Source	1 channel / 2 channels / External trigger signal	
	Slope	+ / - / $\pm$	
	Hysteresis level	Arbitrary setup	
	Trigger level	Arbitrary setup	
	External trigger	Input connector: BNC (C02 type)	
Input voltage: $\pm$ 10V			
Input coupling: AC / DC			
Input frequency: 100kHz max			
Hysteresis level: Arbitrary setup (default 500mV)			
Input impedance: 100k			
Filter (Simultaneous use of filters not possible)	A weighting filter, C weighting filter	Conforms to IEC 60651-1979 TYPE1, ANSI S1.4-1983 TYPE1, and JIS 1505-1988 TYPE1	
	High-pass filter	10Hz( -18dB / oct ), 100Hz( -18dB / oct )	
	Low-pass filter	1kHz( -18dB / oct ), 10kHz( -18dB / oct )	
External sampling input	Input voltage: $\pm$ 10 V / TTL		
	Input impedance: 100k		
	Input coupling: AC / DC		
	Hysteresis level: Arbitrary setup (default 500mV)		
	Input frequency: 256kHz (direct sampling not possible)		
EXT SAMP Connector BNC (C02 type) input	MP-981or LG-916 rotational detector		ONO SOKKI's made detectors (DC12V $\pm$ 0.6V, max. 100mA)
	* BNC (C02 type) input or rotational signal input is selected. Simultaneous input not possible		
REV SENSOR Connector R03-R6F input			
Remote control	When the DS-0295 Remote Controller is connected, start / stop and custom-selection operations are possible.		
Voice input / output for voice memo	Sound input and playback with a built-in microphone and speaker Voice memo can be stored by linking the measurement data. External connection has priority.		
	External MIC input: 2.5 stereo mini jack input (L) External SPEAKER output: 3.5 stereo mini jack output (L)		

2. Display Functions			
Display mode	SINGLE screen display mode / DUAL screen display mode / TRIPLE screen display mode / QUAD screen display mode / OVERLAY display mode		
3D (colour) Display	X-axis	Number of samplings	Number of lines
		16384 (max)	6400 (max)
	Z-axis	10/20/30/50/100/200/400	
	Angle of Z-axis	45/60/75/90	
	Y-axis	50/100/150/200	
Display mode	3D (colour) / 3D (colour) & data / 3D (colour) & data & trace		
	Harmonic / Total Harmonic Distortion		
List display mode	Peak list display / Arbitrary point list / Octave list display / Can be saved at TXT format		
Label function	Input	Direct handwriting using a stylus pen	
	Color	8 colors	
	Line type	3 different thicknesses	
	Display	Show / hide	
Search function	Delta function   X mode / Y mode / XY mode		
	Partial OA / Peak / p-p / MAX-MIN / Search enhance		
Vertical axis unit	rms / PEAK / 0-p / p-p / V / V <sup>2</sup> / PSD / ESD		
	Automatic unit conversion function Unit conversion by integral / differential operations (displacement — velocity — acceleration)		
Vertical axis scale	Auto / Manual / Default / Gain / Phase unwrap function / Delay		
Horizontal axis unit	Hz / r/min / ORDER / s( sec ) / EXT		
Horizontal axis scale	Default / Zooming with delta cursor		
Calculation function	Differential and integral operations / FRF equalization / Inverse Fast Fourier Transform / Hilbert transform / Damping calculation by half-value width method		

3. Display Unit	
Size	10.4-inch
Type	TFT color LCD with touch panel function
Resolution	800 x 600 dots
Lighting (back light)	Cold-cathode tube, 2-level brightness adjustment (back light power saving timer : 1 minute to 60 minutes)

4. Analysis Section			
Frequency accuracy	± 0.005% of reading (± 50ppm)		
Frequency range	10mHz to 100kHz		
Sampling frequency	Frequency range x 2.56 (internal sampling)		
Number of sampling points / analysis points	Number of sampling points	Number of analysis points	
	256	100	
	512	200	
	1024	400	
	2048	800	
	4096	1600	
	8192	3200	
	16384	6400	
Overlap processing	MAX / 66.7% / 50% / 0% / Arbitrary setup		
Window function	Rectangular / Hanning / Flat-top / Force / Exponential / User-defined		
Delay function	Time frame of channel 2 can be delayed by 0 to 8191 points with reference to channel 1.		
Time-axis waveform processing function	The time-axis waveform processing function can be selected with soft keys.		
	First and second order differentials / Single and double integrals		
Real-time analysis	Absolute value conversion / DC cancel / Trend elimination / Smoothing / Hilbert transform		
	40kHz / 2ch (internal sampling: 4096 points)		
Search enhance	Calculation resolution	x32	
	Y-axis accuracy	± 0.1dB	
Averaging mode	Setting of number of averages: 1 to 65535		
	Averaging setup time: 0.1 to 999 seconds (in 0.1-second steps)		
	Averaging can be stopped in terms of the number of times or time.		
	Time domain	Summation average / Exponential average	
Frequency domain	Summation average / Exponential average / Peak hold / Subtraction average / Sweep average / Fourier average / Max OA		
	Amplitude domain	Summation average	
A/D-over cancel / Double hammer cancel / Averaging permission select function (ADD+1) / Averaging undo function	A/D-over cancel / Double hammer cancel / Averaging permission select function (ADD+1) / Averaging undo function		
	32-bit floating point (IEEE single-precision format)		
FFT operation	32-bit floating point (IEEE single-precision format)		

5. Processing Functions		
Time domain	Time-axis waveform / Auto-correlation function / Cross-correlation function / Impulse response / Cepstrum / Liftered envelope / Hilbert transform	
Amplitude domain	Amplitude probability density function / Amplitude probability distribution function	
Frequency domain	Spectrum	Power spectrum / Fourier spectrum / Cross spectrum / Phase spectrum
	Frequency response function (FRF)	Real part / Imaginary part / Nyquist diagram / H1 / H2 / Equalized waveform of FRT / Coherence function / Coherence output power / Coherence blanking
	Miscellaneous	Power spectrum to 1/1 octave / Power spectrum to 1/3 octave / Vibration sensory correction (horizontal / vertical)

6. Memory Functions			
Data record	Frequency range	100kHz(max)	
	Recorded channel	Ch1&Ch2 (100kHz max), recording not possible for one channel.	
	Recording time	2GB: Approx. 33 minutes (Ch1 and Ch2 at 100kHz)	
	Recording format	ORF	
	Max. recordable memory capacity	2GB (in a CF card slot)	
	Record number	Automatic numbering by main unit start/stop operation	
	Event mark number	Arbitrary numbering by [MARK] button operation	
Off-line analysis	ORF		
	FFT analysis is possible at recording frequency range or lower.		
Data file	Max. recordable memory capacity	200 data items or less in internal memory / CF card (depending on the CF card capacities)	
File format	Analysis data can be saved simultaneously with three different formats: DAT, TXT and BMP (TXT and BMP selectable). The list data displayed can be saved simultaneously in TXT format.		
	Panel condition memory	10 types	
Contents of panel condition memory	Memorizes parameters which can reproduce all software and hardware settings in the panel condition memory mode.		
Voice memo memory	200 data items or less (depending on the CF card capacity)		
Handwritten memo memory	200 data items or less (depending on the CF card capacity)		
Recording device	Main unit built-in memory (fixed) or CF card can be selected.		
	Main unit built-in memory	x1 (cannot be replaced by user)	
	Card slot (CF card)	x1	
	CF card insertion / removal warning LED	When LED (green) is lit, insertion or removal of memory card is inhibited.	

7. Output Functions			
Interface	USB	Number of ports	2
		Standard	USB Ver.1.1 / 2.0 (High Speed)
		USB (type A)	For USB1.1 printer / USB memory
		DATA (mini B type)	For USB2.0 USB node function
External SPEAKER output	Number of connectors	1	
	Maximum output	100mW or more	
	Impedance	8	
	Voice memo	Playback	
	Connector	Accepts =3.5 stereo mini jack (L)	
	Output adjustment	By software	
Printer output	Printer interface		USB
	Device	Accepts thermal printers of recommended model	
	Source	On-line data	
		Saved data	
Monitor output	Number of connectors	2	Each connector outputs Ch1 or Ch2 data
	Output voltage	1Vrms F.S. ±1% for input voltage range F.S. (1kHz sine wave, 1M loaded)	
	Impedance	Approx. 33	
	Source	Input signal (after analog filtering)	
	Connector	=2.5 monaural jack	



8.Signal Output (CF-0771) Option			
Number of channels	1		
Output connector	BNC (C02 type)		
D / A converter	16 bits		
Maximum output voltage	± 10V (amplitude + DC offset)		
Amplitude resolution	Approx. 2.5mV		
Offset resolution	Approx. 5mV		
Output format	Unbalanced output		
Protection circuit	Short-circuit protection		
Isolation	No isolation	No isolation between chassis and digital common	
Output impedance	0	Low impedance output (unbalanced)	
	50	± 10%	
Output current	50mA (If 10mA is exceeded, harmonic distortion, flatness, and crest factor are not prescribed.)		
Output mode	Continuous		
	Burst	Can be set from 1 to 32767 in 1-cycle steps	
		Interval 62.5µs to 524s (can be set in 62.5-µs steps)	
		Single-shot	
		Continuous	
Time setup is possible.			
Sine Sweep	Able to output using in combination with sweep average		
Taper function	The output can be gradually increased or decreased when the signal is turned ON or OFF.		
	Taper rising time	1ms to 32s (in 1-ms steps)	
	Taper falling time	1ms to 32s (in 1-ms steps)	
Frequency range	0.1mHz to 100kHz (sine wave) Band limiting not possible		
Harmonic distortion	-70dB or less Prescribed with 1V <sub>p</sub> -p amplitude value		
Output ON/OFF	Turned ON or OFF with the SIGNAL OUT button (turned OFF at the time of activation)		
	ON/OFF for each button	ON	LED goes on when ON.
Output waveform	OFF	LED goes off when OFF.	
	Sine wave		
	Swept sine		
	Pseudo random		
	Random		
Analysis frame length	256 to 4096		
	Zoom mode analysis		
Spectrum flatness	± 1.0dB or less	20kHz to 100kHz	
	± 0.2dB or less	0 to 20kHz	
Crest factor	Sine wave	Approx. 1.41	
	Swept sine	Approx. 1.4 to 1.6	
	Pseudo random	3.3 or less	
	Random	3.3 or less	
Pink filter	Impulse	32.0 or less	
	Analog filter: -3dB / oct ± 1.0dB (prescribed for 20Hz to 20kHz)		

9.Tracking Analysis Function (CF-0722) Option				
Analysis section	Tracking analysis	Constant-width or Constant-ratio tracking analysis		
	Schedule	Rotational speed or time		
	Data type	Power spectrum or Fourier spectrum		
	Number of memory blocks	200 to 1,000		
	Maximum analysis order	6.25 to 800		
	Number of FFT sampling points	256 to 2,048 (default value 1,024 points)		
	Order resolution	100 to 800 lines (default value 400 lines)		
	Range of rotational speed under measurement (1 P/R input)	Maximum analysis order	Measurable rotational speed (r/min)	Number of sampling points/rotation
		6.25	300 to 190,000	16
		12.5	200 to 96,000	32
		25	150 to 48,000	64
		50	150 to 24,000	128
		100	150 to 12,000	256
		200	100 to 6,000	512
	400	100 to 3,000	1,024	
800	100 to 1,250	2,048		
Analysis dynamic range	60dB F.S. or more			
FFT calculation speed	Approx. 20ms/ 2ch or less (2,048 sampling points)			
Display function	Time-axis waveform / Frequency analysis (amplitude and phase) / Tracking analysis (amplitude and phase) / Constant-ratio tracking analysis (amplitude and phase) / Constant-width order tracking analysis (amplitude and phase) / Constant-width frequency tracking analysis (amplitude and phase) / Time tracking analysis (amplitude and phase)			
3D (color) display	X-axis	Number of samplings	Number of lines	
		16,384 (MAX)	6,400 (MAX)	
	Z-axis	10/20/30/50/100/200/400		
	Angle of Z-axis	45/60/75/90		
	Y-axis	50/100/150/200		
Display modes	3D (color) / 3D (color) & data / 3D (color) & data & trace			
Processing function	Exponential averaging / Maximum amplitude order tracking / Partial overall tracking / Smoothing processing (2 types)			
External Sampling (Rotational Pulse) signal input	Number of input pulses	0.1 to 1,024 pulses/rotation		
	Input impedance	100 k		
	Input coupling	DC or AC coupling (0.5Hz / -3dB)		
	Input voltage range	± 10V		
	Detection level	TTL or arbitrary setup (set in 1% steps)		
	Hysteresis level	Arbitrary setup (default value 0.5 V; range 0.1 to 20 V)		
	Slope	+ (rising) or - (falling); marked by plus and minus signs (+/-)		
	Pulse waveform monitor	Waveform check is possible with EXT SAMP VIEW		
	Maximum pulse frequency	3.2kHz (If the value is exceeded, use the pulse dividing function so that the maximum pulse frequency is not exceeded.)		
	Pulse dividing function	1 to 1,024 (division in input circuit)		
Memory Functions	File format	Analysis data can simultaneously be recorded in three different formats. (select TXT or BMP)		
		Tracking data	TRC format	
	Data record*	Frequency range	40kHz max	
		Number of channels recorded	Ch1 & Ch2 (40kHz max) + Rotational data (recording not possible for one channel) formats	
	Off-line analysis	ORF format Tracking analysis is possible with the frequency range at the recording or less.		

\*The CF-0722 is required for data recording with rotational data.

## 10. Miscellaneous Functions

Condition view	List display of condition settings Can be saved in the XML (Text) format of condition.	Clock	Date (year, month, day) and time (hour, minute, second)
Remote controller (option)	Operating switches: 5( START/STOP/F1/F2/F3 )  Settable at F1/F2/F3	AVERAGE	ON/OFF
		TRIG	ON/OFF
		DATA	SAVE
		SIGOUT	ON
		REC	ON
Operation beep	Can be turned ON or OFF (in conjunction with ON / OFF of warning beep)	Warning beep	Can be turned ON or OFF (in conjunction with ON / OFF of operation beep)

## 11. General Specifications

Power requirement	Input voltage	10.5 to 16.5VDC	Outside dimensions (not including the handle and protruded sections)	328mm(W) x 246mm(D) x 88mm(H) (battery not mounted) / 328mm(W) x 246mm(D) x 120mm(H) (battery mounted) / Refer to outer dimensions for details
Power connector	DC jack (EIAJ TYPE5) Outer side: Negative electrode, Inner side: Positive electrode			
Power consumption	Approx. 60VA (AC adapter used)			
Operating temperature range	0 to +40			
Storage temperature range	-10 to +50 (including an external secondary battery)			
Functional grounding terminal	Grounding terminal for noise elimination			
Suspension of chassis	VESA standard 100 x 100 (mm) / Can be suspended by attaching a 5 adapter			
Stylus pen	Can be stored in the main unit (accessory)			
Carrying handle position	0 °(top level position) / 30 °/ 60 °/ 90 °/ 110 °/ 130 °/ 180 °(bottom level position)			
Main unit cooling	Forced-air cooling by an electric fan (can be turned ON or OFF. Can be turned OFF for up to 5 minutes.)			
	Operating noise	32.5dB(A) (reference value)		
Weight	Approx. 3.5kg / Approx. 4.8kg (battery pack mounted)			

## 12. AC Adapter (SQ60W15P-03)

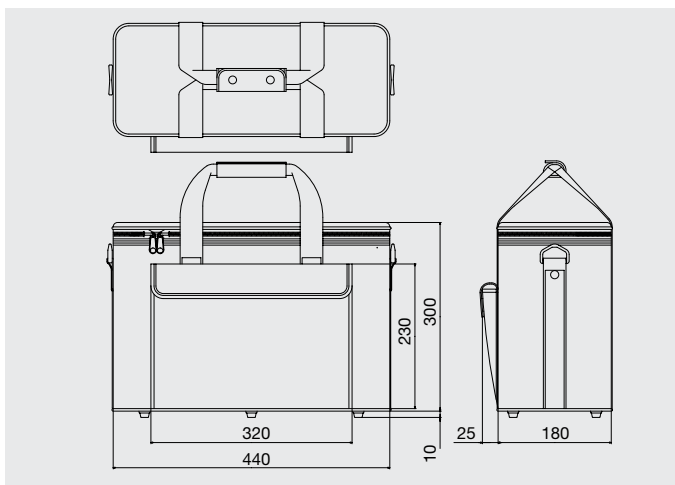
Input voltage	100 to 240VAC
Input frequency	50 / 60Hz
Output voltage	Rating 15VDC
Output current	Rating 4VAC
Safety standard	Electrical Safety Law / CE / UL

## 13. Battery Pack (CF-0792)

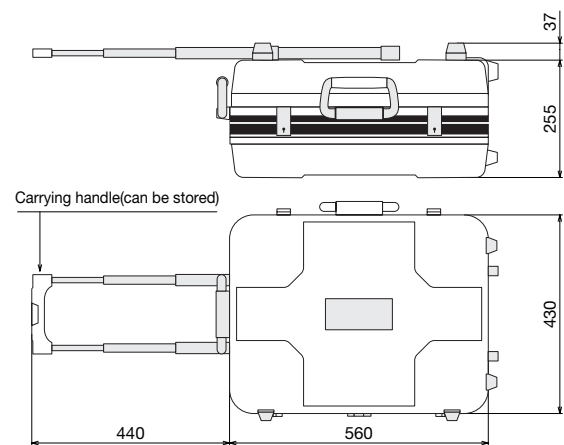
Battery	Lithium ion secondary battery
Shape	Fixed to the rear section of the main unit (detachable)
Operating time	Operates for 4 hours under standard operating conditions (2ch FFT analysis / Signal output option not mounted / 25 ° room temperature with a new battery)
Remaining battery level display	Displays the remaining battery level when operating on the secondary battery 4-level display
Minimum remaining battery level	Displays a warning message and shuts down automatically.
Charge	Charged by the AC adapter when the main unit power is OFF.
Charge time	Approx. 8 hours (power OFF)

## Outer Dimensions

### Soft Carrying Case CC-0025

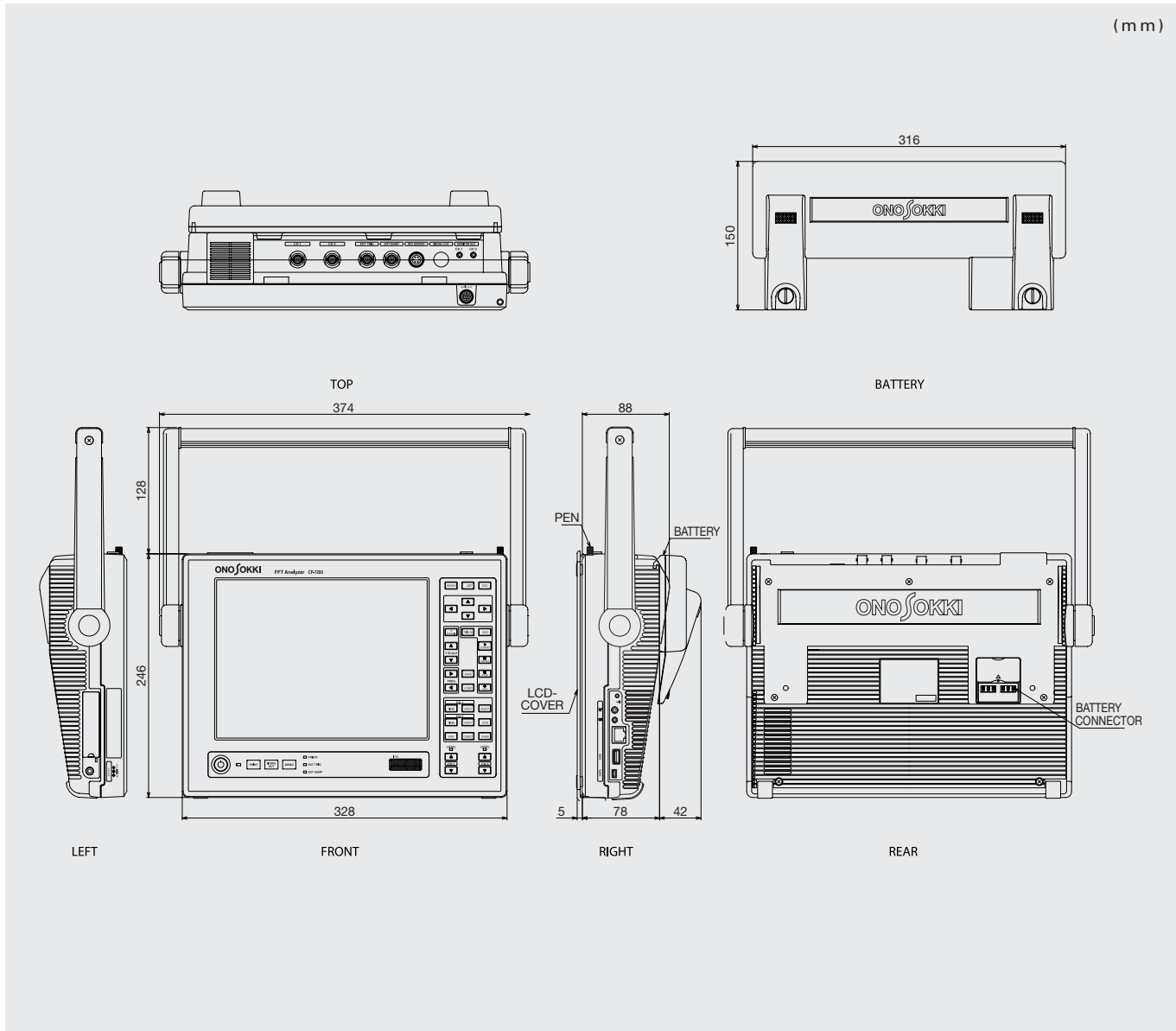


### Hard Carrying Case CC-0071A



# Outer Dimensions

## Main Unit



### Main Unit

Model Name	Product Name
CF-7200	Portable 2channel FFT Analyzer

### Standard Accessories

Model Name	Product Name
CF-0792	Battery Pack
CF-0701	Panel Protection Cover
CF-0702	Stylus Pen
CF-0703	USB Connection Cable
SQ60W15P-03	AC Adapter

### Options

Model Name	Product Name
CF-0722	Tracking Analysis Function (Order Ratio Analysis Function)
CF-0771	1ch Signal Output Module
CC-0025	Soft Carrying Case
CC-0071A	Hard Carrying Case
DS-0295	Remote Controller
—	Rack Mount Adapter

### Recommended Products

Model Name	Product Name
BL-112UI	Thermal printer
HM-131	Speaker microphone

# ONOSOKKI

\*Outer appearance and specifications are subject to change without prior notice.

URL: <http://www.onosokki.co.jp/English/english.htm>

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