Discontinued
(Reference only)

Portable FFT Analyzer

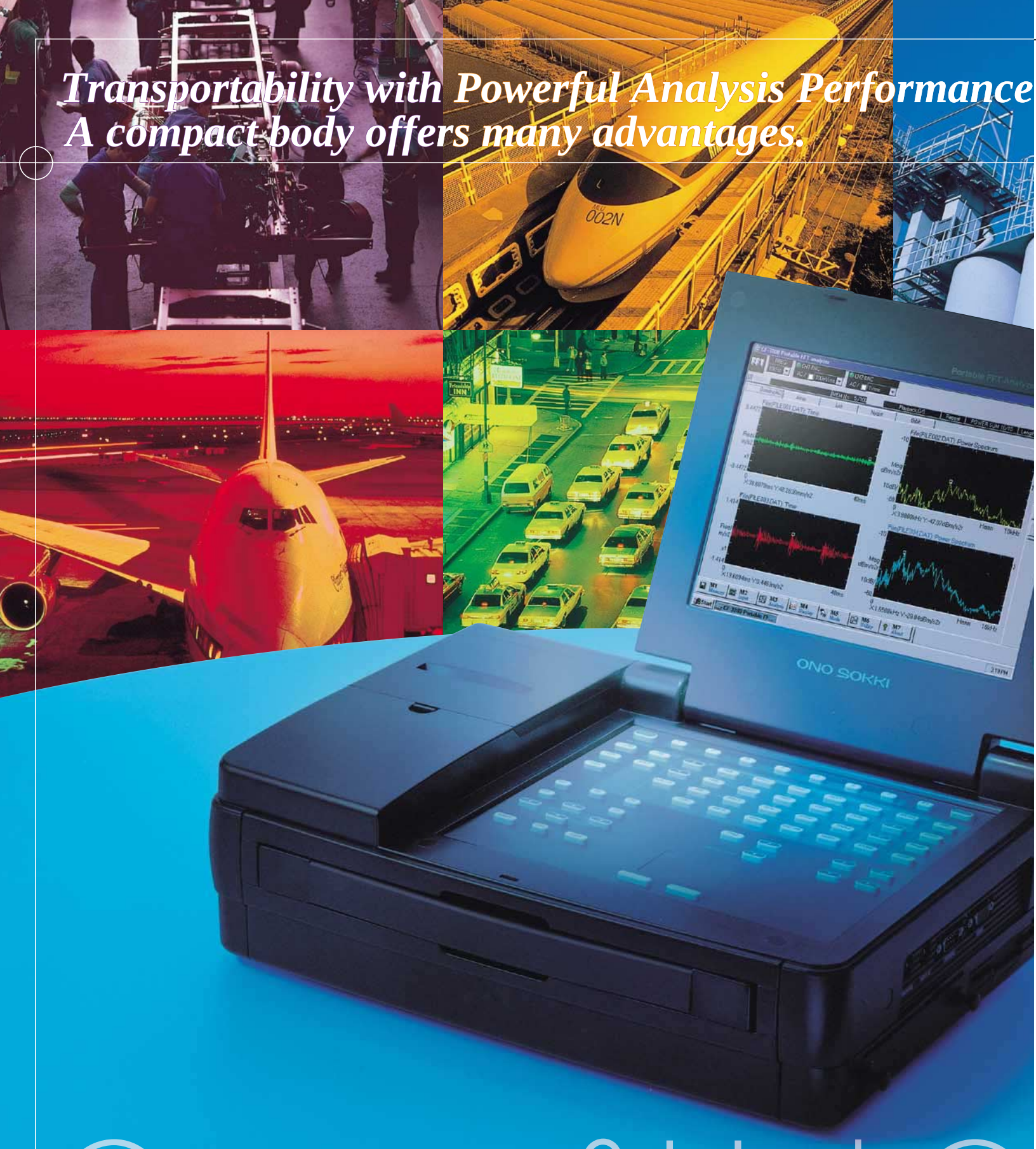
CF-3200(2ch)/CF-3400(4ch)

The CF-3200 and CF-3400 portable FFT analyzers from ONO SOKKI offer advanced measurement in the field despite a compact, lightweight body. No more lugging a heavy analyzer around a large plant, and being restricted by its limited measurement functions in the field!
Versatile applications, such as precise diagnosis of facilities and equipment, field balancing, tracking analysis for evaluating the dynamic characteristics of engines and rotating machines, and realtime octave analysis ideal for analyzing sounds, make these portable FFT analyzers the only ones you'll ever need for field measurement .

This unit expands the field of on-site mesurement.

ONO SOKKI

Transportability with Powerful Analysis Performance
A compact body offers many advantages.



Compact & High Q

ality.

Extensive Functions Packed in a Compact, Lightweight Body

6 kg weight, AC or battery power

Compact and light, the analyzer can be carried around a large plant or field site. The CF-3200 / 3400 even runs on batteries for those places where AC power is not available.

Built-in thermal printer

With the built-in thermal printer, you can print measurements immediately, or use the built-in parallel port to print out a hard copy on a PC printer.

10.4-inch color LCD screen
(800 x 600 dots)

The large display is extremely useful for viewing a multiple-split display and an overlaid display. Strong back-lighting ensures good readability even outdoors, and the viewing angle can be freely adjusted.

Built-in PCMCIA interface

Having a single PCMCIA slot, the CF-3200/
3400 is ready for future expansion with a variety of Windows95 applications.
*Contact Ono Sokki for recommendable PCMCIA cards.

Built-in sensor amplifier

Built-in amplifiers are provided for the acceleration sensor and microphone (constant current supply type), as well as a rotation sensor amplifier for diagnosis of rotating machines. No external amplifiers or wiring needed!

Built-in floppy disk drive and large-capacity flash memory

Windows95 (OEM) is used as the operating system. The OS and CF-3200/3400 application software are installed in flash memory, which is resistant to vibration and shock. And the built-in floppy disk drive lets you transfer data to a personal computer.

Thermal printer

Built-in sensor amplifier

Floppy disk drive

Integration of Versatile Measurement Functions

1. FFT analysis and frequency response function

Objectives: Measuring and analyzing the noise and vibration from products in order to reduce them

Household electrical appliances | Office automation equipment | Automobiles | Ships | Rotating machines | Building materials etc.

2. Tracking analysis

Objectives: Analyzing the noise and vibration of an engine or rotating machine according to the rotating speed

Automobiles | Auto parts | Rotating machines | Machine tools | Building machines | Ships etc.

3. Precise diagnosis of facilities and equipment

Objectives: Diagnosing facilities and equipment such as those in industrial factories and plants

Motors | Turbines | Blowers | Pumps | Machine tools etc.

4. Field balancing

Objectives: Correcting the unbalance in a rotating machine

Various rotating mechanisms | Motors | Blowers | Pumps | Centrifugal separators | Turbines etc.

5. Realtime octave analysis

Objectives: Sound evaluation

Environmental sounds | Audio components | Office automation equipment | Household electrical appliances | Building acoustics | Automobiles etc.

Portable 2ch FFT Analyzer
CF-3200

Portable 4ch FFT Analyzer
CF-3400

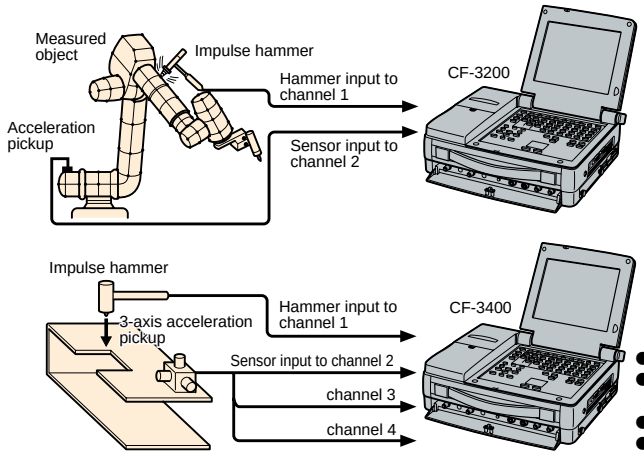
Precise Analysis by Versatile Applications

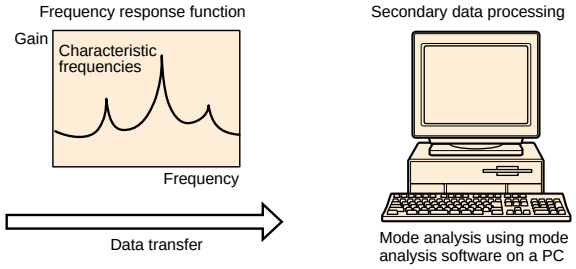
Extensive applications include precise diagnosis of facilities and equipment, field the dynamic characteristics of engines and rotating machines, and measurement

① Frequency Response Function Measurement

Resonance is one of the major causes of chattering vibration of robots and machine tools, as well as vibration and noise of airplanes and land vehicles. The most popular method of analyzing resonance is to measure the frequency response of the object by hitting it with an impulse hammer. Excitation by an impulse hammer does not require the object to be installed on a vibration exciter and measurement can be done quickly, making it suitable for field measurement including troubleshooting.

Example: Measurement of Vibration Excited by Impulse Hammer

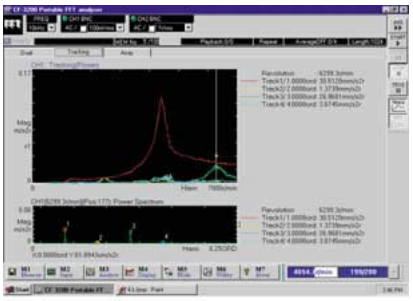




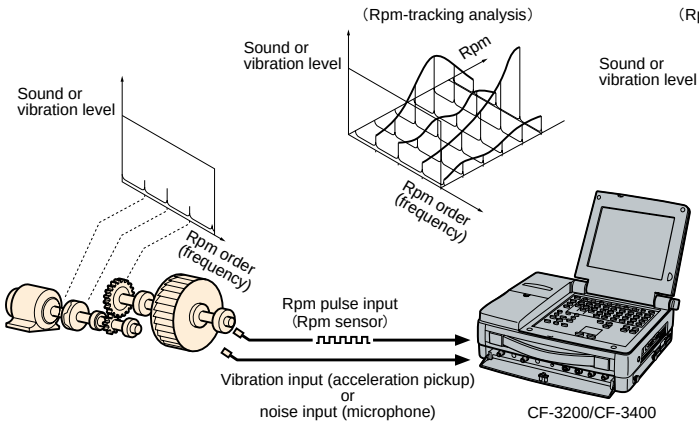
- Direct inputs of an impulse hammer and acceleration pickup
- CF-3400: 4-channel inputs can capture the frequency response data of 3 directions (X/Y/Z) using a 3-axis sensor
- Data transfer to a personal computer, and secondary data processing using mode analysis software
- Automatic setup of necessary conditions by simple setup mode

② Rpm-tracking Analysis

In rotating equipment such as an engine, turbine, or centrifuge that has a wide range of rotational speeds, the individual characteristic vibration frequencies of the various physical parts of the equipment resonate at different speeds, making it difficult to analyze the vibrations. The rpm tracking analysis function of the CF-3200 and CF-3400 displays a graph of the amplitude of the vibration or noise according to the varying speed, thus offering critical data for analyzing speeds at which resonance may occur (dangerous speeds).
As shown in the figure below, the three-dimensional rpm-spectrum plot provides a direct view of the frequency (rpm order) spectrum for varying rpm. In contrast, the two-dimensional rpm-tracking analysis graph indicates which order is resonating at each rpm.



Conceptual Diagram of Rpm-tracking Analysis



- Direct inputs of acceleration pickups, microphones (constant-current supply type), and rpm sensors
- Fast and high-resolution tracking
- Portable size for field and automobile-mounted measurements with dual power supply of battery and AC power

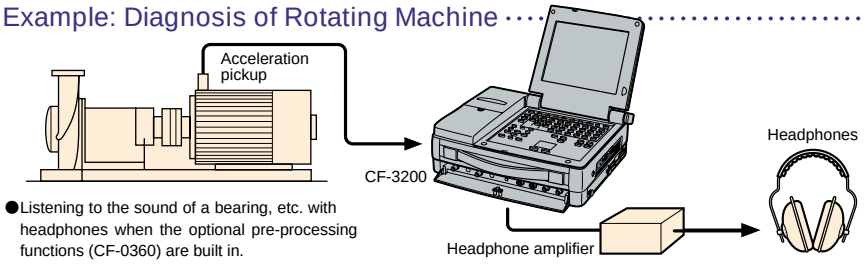
balancing, realtime octave analysis, tracking analysis for evaluating
of frequency response functions — bringing you exactly the data you want.

③ Diagnosis of Rotating Machines (CF-3200 only)

(Option:CF-0360 Pre-processing Functions)

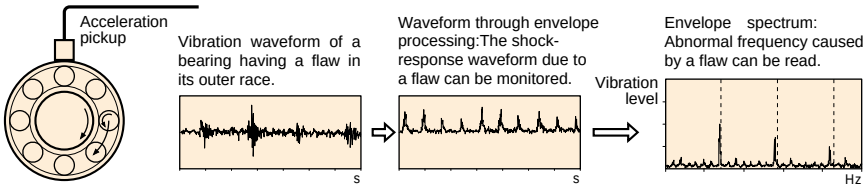
Industrial factories and plants contain various rotating machines such as motors, pumps, and blowers. To prevent an accident of a machine, facility and equipment conditions must be monitored, and if vibration increases, the cause must be analyzed and corrective action taken.
Mechanical parts that typically need to be diagnosed include bearings and gears, and for this diagnosis, pre-processing functions such as filtering and envelope functions are required. When checking for flaws in a bearing, the cycle of the vibration due to an actual flaw is difficult to detect, so that the envelope processing is used to detect a simple, periodic waveform from this vibration waveform, then by applying FFT analysis to the result, the frequency of the vibration due to the flaw can be obtained. As shown in the figure below, the envelope processing is applied to the vibrations caused by a flaw, then the obtained frequency is compared with the predicted frequency of vibration due to the flaw in the bearing. This diagnosis pinpoints the location of the flaw in the bearing (such as the outer race, inner race, or rolling element).

Example: Diagnosis of Rotating Machine



●Listening to the sound of a bearing, etc. with headphones when the optional pre-processing functions (CF-0360) are built in.

Example: Measurement of Bearing Vibration



Rotation Simulator

RS-1100

A simulator for diagnosing a rotating machine; Diagnoses for flaws in a bearing, gear, unbalance, and misalignment can be studied.

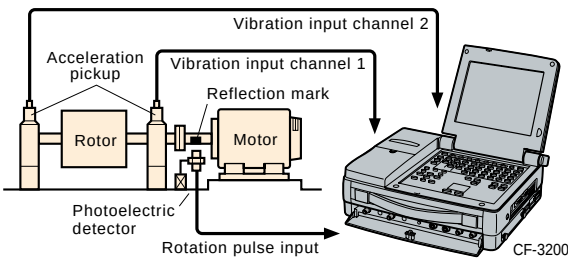
●Pre-processing functions (filtering, envelope, and integrator functions) are essential for diagnosing conditions of a rotating machine.
●Abnormal frequency calculation functions (for bearings, gears, and other rotating mechanisms) provided when the optional pre-processing functions (CF-0360) are built in.

④ Field Balancing

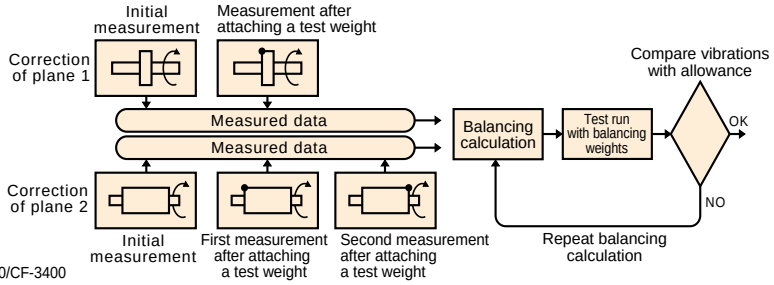
(Option:CF-0320 Field Balancing Functions)

The most likely cause of an abnormality in a rotating machine is unbalance, and hence any unbalance must always be corrected. However, the traditional method of drawing a vector graph and performing vector calculations is time-consuming, making it difficult to carry out balancing in the field. The optional field balancing function of the CF-3200 and CF-3400 performs such tiresome calculations internally and displays the result, thus allowing the machine to be balanced quickly even by non-skilled operators. Furthermore, by using two channels of signal inputs for measuring a point on each of two planes simultaneously, the two planes can be balanced quickly and easily.

Example: Field Balancing by Measuring Two Planes Simultaneously



Flow Chart of Balancing

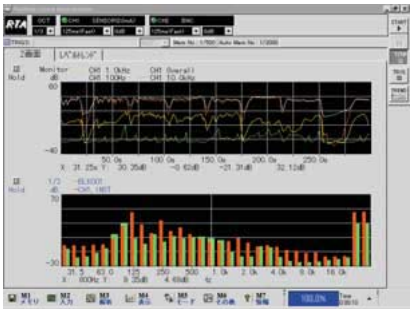


●Dual power supply by a portable battery or AC power - easy to carry about ●Direct input of acceleration pickups and an rpm sensor
●Quick field balancing of single or two planes by integrated balancing calculations and result display

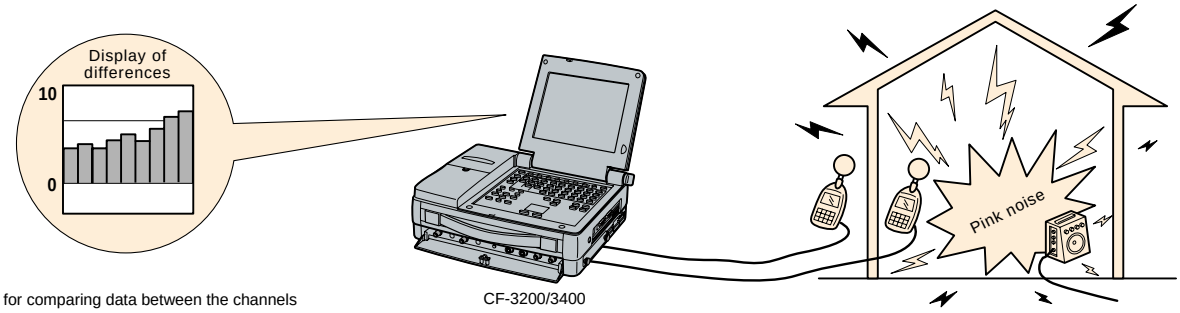
⑤Realtime Octave Analysis

(Option:CF-0321 Realtime Octave Analysis)

An FFT analyzer is optimum for high-resolution analysis of abnormal frequencies in sounds and vibrations; however, in order to evaluate how a sound is perceived by a person, a realtime analyzer is used. The optional realtime octave analysis allows the CF-3200 or CF-3400 to be used as a 2-channel realtime analyzer. (Note that the CF-3400 is a 4-channel FFT analyzer, but when used as a realtime analyzer, it functions as a 2-channel analyzer.) Using a digital filter, both models can display the realtime level of each octave or each 1/3 octave. With full use of two channels, two data can be measured simultaneously and compared to each other with ease.



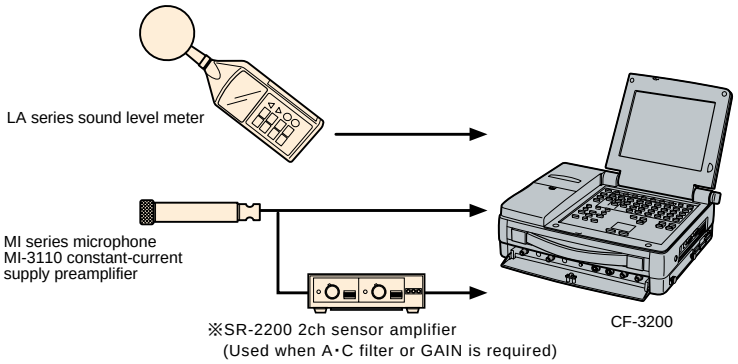
Example: Measurement of Noise Insulation Performance of Building Materials



●Suitable for comparing data between the channels

CF-3200/3400

Example of Sound Measurement



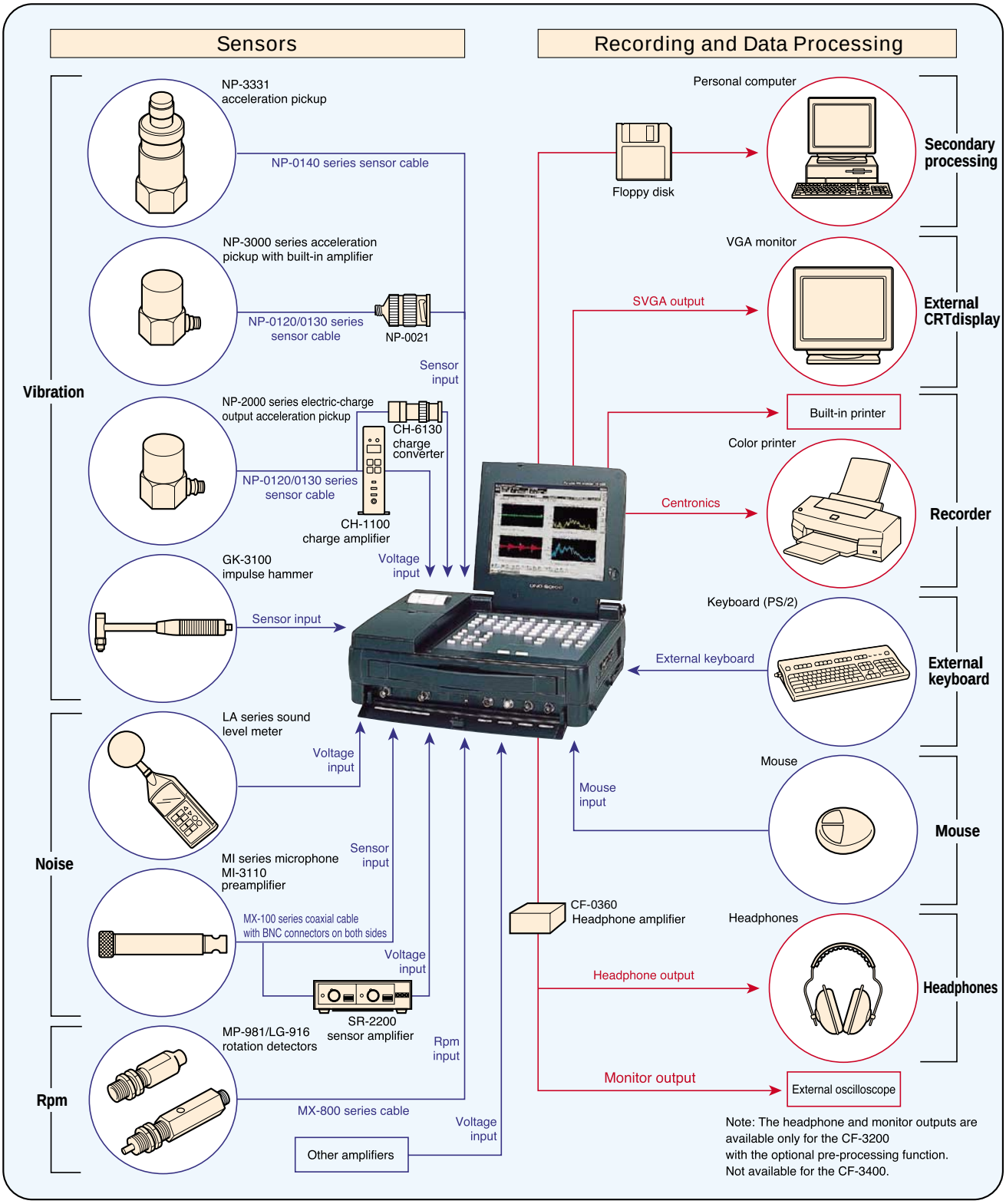
Option Selection Table

	CF-0360 Pre-processing Functions	CF-0361 Signal Output	CF-0320 Field Balancing Functions	CF-0321 Realtime Octave Analysis
CF-3200 (2-channel model)	Available*	Available*	Available	Available
CF-3400 (4-channel model)	Not Available	Available	Available (only for two channels)	Available (only for two channels)

*CF-0360 and CF-0361 cannot be installed together.

System Configuration

A wealth of options and peripherals expand the potential of your FFT analyzer.



Optional Carrying Case

①CC-0031 Soft Carrying Case

Carries the analyzer with a power cable and sensors, etc.

②CC-0032 Hand Carrying Case

Carries the analyzer with batteries, a battery charger, cables and sensors, etc.

Portable FFT Analyzer CF-3200(2 channel)/CF-3400(4 channel)

Specifications

■ Input section

Number of channels	2 (CF-3200) , 4 (CF-3400)	
Connectors Input sources are switched between the following two types.	**Voltage input**	BNC
	Sensor input	BNC (with current supply of 2 mA or 4 mA)
Configuration	Single-ended	
Impedance	1 MΩ , 100 pF or less	
Coupling	DC and AC (0.5 Hz, -3 dB)	
Amplitude range	-40 dBVr to 20 dBVr (10 mVr to 10.0 Vr) in 10-dB steps	
Level monitor	Excessive input (red LED)	
A/D converter	16 bits (successive comparison type)	
Dynamic range	75 dB or more	
Input noise level	-120 dBVr or less	
Harmonic distortion	-70 dB or less (20 k to 40 kHz) -75 dB or less (20 kHz or less)	
Aliasing	-70 dB or less	
Amplitude flatness	±0.2 dB	
Full scale accuracy	±0.1 dB (at 1kHz)	
Amplitude linearity	±0.015 % F.S	
Cross-talk	-100 dB or less	
Gain accuracy between channels	±0.1 dB (for the same voltage range)	
Phase accuracy between channels	±1.0 degree	
DC offset	-60 dB or less (Auto zero function always on)	
Trigger function	**Mode**	Free, repeat, single, and one-shot
	Source	Ch1, Ch2, and external trigger signal
	Position	±2048
	External trigger	±10 V (500 mV or more)
External sampling input	±10 V (AC/DC selectable); maximum input frequency: 25.6 kHz BNC or dedicated input terminal for LG916/MP981	
Sensor power supply output	±15 V, 30 mA	

■ Signal pre-processing (Optional,CF-0360)

High-pass filter	10, 1k, 10 kHz
Low-pass filter	100, 1k, 10 kHz
Envelope converter	Absolute value detection
Integrator	Single-integral, double-integral
Pre-processing gain	×1,×10, ×100 Pre-processing can be set for each channel.
Headphone output	Outputs the pre-processed analog signal of ch1.
Rotation diagnostic function	Calculation of rotation frequency, bearing flaw frequency, and gear mesh frequency

■ Signal output (Optional, CF-0361)

Signal types	Sine, swept sine, pseudo-random, random, periodic random, impulse, linear sine sweep

■ Analysis section

Frequency accuracy	±0.005% (±50 ppm) of the reading value	
Frequency analysis range	1 Hz to 40 kHz	
Sampling frequency	2.56 times the selected analysis range	
Frequency resolution	25, 50, 100, 200, 400, 800, and 1600 lines	
Overlap processing	Maximum, 50%, 0%	
Window functions	Rectangular, Hanning, flat-top, force, and exponential	
Time-domain waveform processing	Absolute value processing, polarity conversion, DC cancellation	
Averaging modes	**Realtime averaging**	20 kHz or more (CF-3200) 10 kHz or more (CF-3400)
	Time domain	Summation average, exponential average
	Frequency domain	Summation average, exponential average, peak hold, subtractive average, Fourier average
	Amplitude domain	Summation average, A/D overrange cancel function, double hammering cancel function
FFT processing	32-bit floating point (IEEE single-precision format)	

● Windows is a registered trademark of Microsoft Corporation , U.S.A in the United States and other countries.

■ Display section

Display	10.4-inch TFT color LCD
Resolution	800× 600 dots (256 colors)

■ Processing functions

Time domain	Time-axis waveform, orbit (Lissajous)
Amplitude domain	PDF, CDF
Frequency domain	Power spectrum, linear power spectrum, phase spectrum, cross spectrum, FRF, coherence function

■ Other display modes

●Single, dual, triple and quadruple screen display, overlaid display,●list display,●waterfall display

Vertical axis unit	rms, PEAK, P-P, V2, PSD, ESD
Horizontal axis unit	Hz, ORDER, s, EXT
Computing functions	Arithmetic operation, differentiation/integration, FRF equalization, calculation on time-axis waveform (maximum, minimum, average, RMS, crest factor, kurtosis, and skewness within a single frame), spectrum A/C-weighting

■ Memory functions

3.5inchFDD	1 drive
Built-in memory	Screen memory, panel condition memory
Time record	1M words/ch (CF-3200), 512k words/ch (CF-3400)

■ Tracking analysis function

Order analysis range	6.25th, 12.5th, 25th, 50th, 100th, 200th, 400th
Measured rpm ranges (at 1 P/R input)	6.25th 50 to 160,000 r/min 12.5th 50 to 80,000 r/min 25th 50 to 40,000 r/min 50th 50 to 20,000 r/min 100th 50 to 10,000 r/min 200th 50 to 5,000 r/min 400th 50 to 2,500 r/min
Number of tracking points	200 or 400
Processing functions	Rpm order ratio analysis, fixed ratio order tracking, rpm schedule, memory tracking

■ Realtime Octave Analysis Function (Optional,CF-0321)

1/1 and 1/3 octave

■ Field Balancing Function (Optional,CF-0320)

For one or two planes; simultaneous measurement of two planes

■ Output section

Built-in printer	70 mm width thermal printer
External printer interface	Centronics
SVGA output	(During SVGA output, LCD display is turned off.)

■ General specifications

Battery	Lithium-ion secondary cell, 4500 mAh
AC power supply	100 to 240 V AC
Power consumption	Approx. 50 VA
Operating temperature	0° to +40° C
Storage temperature	-10° to +60° C
External dimensions	408 (W) × 280 (D) ×125 (H) mm
Weight	Approx. 6 kg (CF-3200), Approx. 6.5 kg (CF-3400)
Accessories	battery, battery charger, recording paper×1 roll

※The CF-0360 optional preprocessing function cannot be specified for a CF-3400 four-channel FFT analyzer.

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

ONO SOKKI

HOME PAGE: http://www.onosokki.co.jp/English/english.htm

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