ONO SOKKI

DS-3000 series
DS-0342 Servo Analyzer

● Overview

DS-0342 Servo Analyzer (Frequency Characteristics Analyzer) is software that measures the transfer function (frequency response function) of control circuits and mechanical structures with high accuracy. It can measure characteristics (phase margin, gain margin) of the control circuit, resonance frequency of the structure, and impedance, etc.

Graph switching with just one click operation

Bode graph

Nyquist graph

Time waveform

Power spectrum

Monitoring is available while measuring the signal in real-time

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● Feature & Function

◆ Servo and sound/vibration analysis

Mechanical control characteristics measurement (Servo analysis software:DS-0342) and noise vibration measurement (FFT analysis software: DS-0321) are possible only by switching the measurement mode.
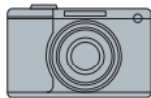

e.g.) Sound/vibration measurement (FFT Analysis)

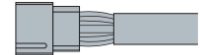**e.g.) Mechanical control characteristics measurement (Servo Analysis)**

● **Digital camera**
・Motor sound, vibration measurement
・Measurement of camera shake correction control

● **Electrical component**
・Vibration test using exciter
・Measuring sound/vibration generated in being loaded into a vehicle

◆ Two types of calculation modes

FRA mode: Enables to obtain the gain and phase for each single frequency.
Used for measurement requires high accuracy and high dynamic range.

FFT mode: Enables to obtain the gain and phase in high speed. Used when measuring wideband in a short time.
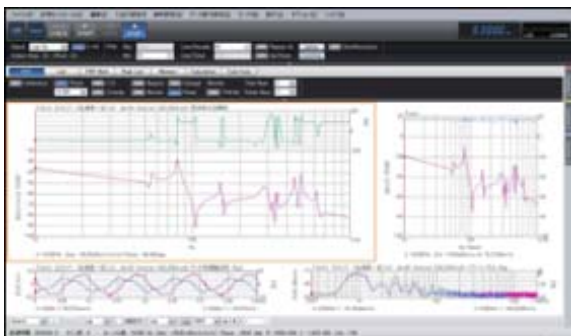
e.g.) FRA Log Sine sweep excitation (measurement time: 100 seconds)
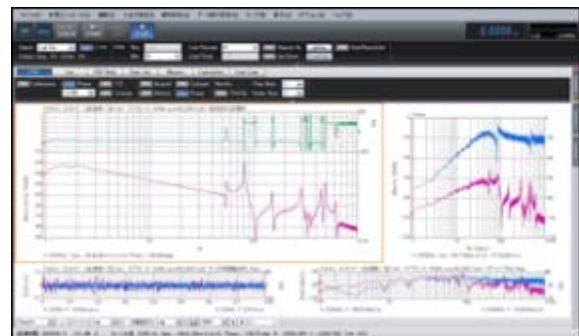
e.g.) FFT mode Random excitation (measurement time: 3 seconds)

◆ Useful functions

Auto resolution control function: The function to increase the frequency resolution near a sharp peak automatically. By getting results with high accuracy in a short time avoids the overlook of a peak.

-3 dB Auto-search function : The function to search the point of -3 dB automatically from the reference value selected by a cursor.

Specification

Servo Analysis System -Hardware-

Input function

Number of measurement channels	40 kHz unit	100 kHz unit
	2 to 32 ch: DS-3202, 3204, 3102, 3104 * Measurement condition is changed depending on the number of channels.	2 to 4 ch: DS-3200+DS-0366, DS-3100+DS-0366
Coupling	AC/DC selectable. With coupling auto selection function	
Voltage auto-range function	It is possible to measure while optimally selecting the voltage range of each channel according to the level of the input signal automatically.	
Dynamic range	140 dB (FRA mode, 100 kHz unit/40kHz unit), 90 dB (FFT mode, 100 kHz unit), 110 dB (FFT mode, 40 kHz unit)	

Signal output function *Signal output function is required for servo analysis system.

Number of output channels	1ch, DS-0371 module/ DS-0372 unit (40 kHz)/ DS-0373 unit (100 kHz) *100 kHz unit: Isolated between each channel.
Output signal	Sine sweep (log/ linear)/ Swept sine/ Random/ Pseudo-random/ Impulse
Output voltage	Combine the offset voltage and amplitude output voltage: Max. ±10 V, Min.±10 mV or less *Output OFF in the stop state
Offset voltage output function	Function that always outputs voltage even in the stop state
Amplitude output taper	Can be set upward and downward taper (1 ms to 10 ms)
Measurement start delay	Can be set delay time from signal output until measurement (1 ms to 10 s)
Addition function（DS-0374）	Function that outputs the signal added noise signal（for frequency response function measurement）to feedback signal. *Only for 1ch 100kHz unit DS-0373.

Servo Analysis System -Software-

Measurement function (Servo Analysis function DS-0342)

FRA mode

Measurement frequency range	10 mHz to 40 kHz (40 kHz unit), 10 mHz to 100 kHz (100 kHz unit)
Time frequency resolution (log sweep)	10, 20, 40, 50, 80, 100, 120, 160, 200, 250, 300, 320, 400, 500 / decade
Frequency resolution (linear sweep)	100, 200, 400, 500, 800, 1000, 2000, 2500, 4000, 5000/ entire band
Number of averaging	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 25, 30, 40, 50, 60, 80, 100, 120, 150, 180, 200 times and arbitrary number of times
Frequency range division setting mode	Measurement can be made by dividing the measurement frequency range up to 10, changing the number of additions and the signal output level.
Auto resolution control function	The function to automatically optimize the decade of each frequency band so that the characteristics of the entire frequency range can be observed with high accuracy.

FFT mode

Number of FFT sampling points	64. 128, 256, 512, 1024, 2048, 4096, 8192, 16384, (32768, 65536)	
Frequency range (single range)	40 kHz unit (Hz)	100 kHz unit (Hz)
	10, 20, 25, 40, 50, 80, 100, 160, 200, 400, 500, 800, 1k, 1.6k, 2k, 2.5k, 4k, 5k, 8k, 10k, 20k, 40k	10, 20, 25, 40, 50, 80, 100, 160, 200, 400, 500, 800, 1k, 2k, 2.5k, 4k, 5k, 10k, 20k, 25k 50k 100k
Frequency range (pair range)	・Hi range: same as a single range ・Low range: 1/5, 1/10, 1/20, 1/50, 1/100 of Hi range	
Number of averaging	2, 5, 10, 40, 50, 60, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800, 1000, 1200, 1500, 1800, 2000 times and any number of times	
Calculation function	Frequency axis differential calculus function (first/ second/ single/ double differentials) Four arithmetic function	

Servo Analysis System-Software-

Display function (Servo Analysis function DS-0342)

Display of frequency response function	Co-quad graph (Horizontal axis: frequency/ vertical axis: real part and imaginary part)
	Bode graph (Horizontal axis: frequency/ vertical axis: gain and phase)
	Nyquist graph (Horizontal axis: real part/ vertical axis: polar coordinates of imaginary part) (Logarithmic axis display of amplitude is available)
	Nicols graph (Horizontal axis: phase/ vertical axis: gain)
	Cole-cole plot
Display mode	Measurement mode (Triple screen display) 1.FRF (gain/phase), COH (ON/OFF of the display is available.) 2.Either of Nyquist, Nicols or SPEC (1, 2) 3.TIME, instantaneous spectrum (Overlapping display and selecting channel are possible.)
	List mode 1. List of all measurement data of No./ Frequency/ FRF gain/ FRF phase/ COH/ FRF real part/ FRF imaginary part/ SPEC 1/ SPEC 2/ Number of addition
	Peak list mode (Dual or triple screen display) 1. FRF (gain/phase), COH 2. Gain peak list of the waveform of 1. 3 .By double-clicking at any point of the waveform 1, red point is added on the screen 1 and the FRF level is listed. 4. Damping factor list up function
	Memory mode 1. FRF current condition 2. List of the stored waveform 3. Overlapping display of the waveform which selected in 2. (max. 20 screens)
	Calculation screen (Four screen display) 1. Current FRF
	2. Stored FRF 3. Waveform after four arithmetic operation/ calculus of 1, and 2. Waveform after open and close loop conversion of 1, and 2. *Display of the waveform after calculation is available. 4. Nyquist graph and Nicols graph after the calculation results of 3.
Display function	Phase unwrap display, Search delta function

Note: FRF(Frequency Response Function), COH (Coherence), SPED (Power Spectrum), TIME: (Time waveform)

Other function (Servo Analysis function DS-0342)

■ -3 dB auto-search function ■ Group delay ■ Cross conversion function for open loop to close loop
■ Automatic search function for gain margin and phase margin ■Frequency resolution enlargement function (20 times)

● Operating environment

	[DS-3200]:Required to be equipped with an USB 3.0 interface.	[DS-3100]: Required to be equipped with a slot for either one of PCI Express, CardBus, ExpressCard.
OS	Microsoft® Windows® 10 Pro/Enterprise/Education (64 bit) Microsoft® Windows® 7 Ultimate/Professional (32 bit/64 bit)	Microsoft® Windows® 7 Ultimate/Professional (32 bit)
Recommended	CPU: Intel® Core™ i5 or more Memory: 4 GB	

*Please note that the DS-3000 series does not work properly when it is used on the above OS by using compatible mode or Microsoft® Virtual PC etc.
*The PC environment may not be subject to certain constraints, depending on the type of application software or hardware used.
*The DS-3000 Series operates on Windows® 7 64 bit by means of a compatibility mode with 32 bit (WOW64).