

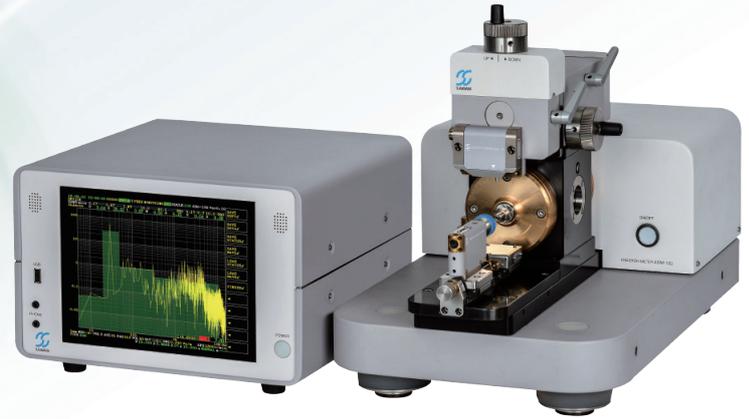
Anderon Meters

ADM-104 Drive Unit

For high-precision measurements of ball bearing vibrations

Rotating the inner ring of a ball bearing at 1,800 rpm, the Anderon meter measures the radial vibrations of the outer ring with a velocity sensor. The measurement result is divided into seven frequency bands including Low (50–300 Hz), Medium (300–1,800 Hz), and High band (1,800–10,000 Hz), and indicated for each band in a unit called Anderon.

The Anderon value can be used to not only grade bearings but also to identify defective components.



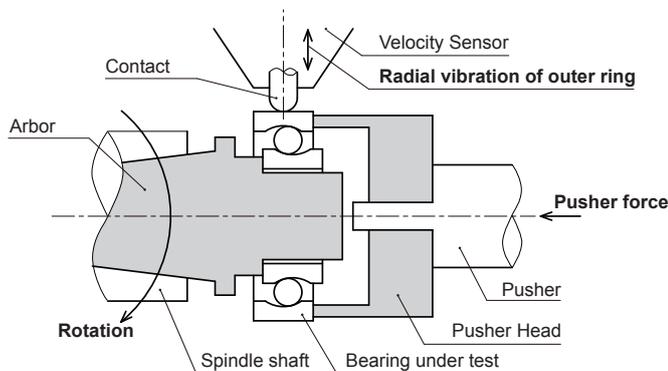
Features

- Achieves accurate and highly reproducible measurements owing to equipment background noise of only 0.1 Anderon ($\approx 0.77 \mu\text{m/s}$) or less, enabling efficient acquisition of highly reliable data
- By changing the Pusher, a single Anderon meter can measure bearings ranging from ultra-small with an Inner Diameter (ID) of 1 mm to medium-sized with an Outer Diameter (OD) of 100 mm.
- The compact design allows for a table-top set-up.

Vibration detection

An Arbor, whose tip is made to match the ID of the bearing, is fitted to the spindle, which is rotated at 1,800 r/min. The bearing inner ring is slipped into the Arbor tip, and is rotated at 1,800 r/min. A Pusher Head, made to match the OD of the bearing, is fitted to the Pusher. The outer ring is held from rotating, being pushed in the axial direction by the Pusher.

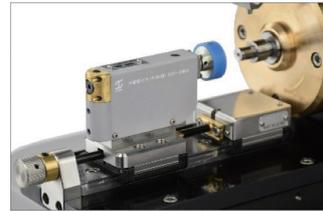
In this way, the inner ring rotates while the outer ring does not. By setting the Velocity Sensor Contact on the top of the non-rotating outer ring, the vibration in the radial direction of the outer ring is detected.



Vibration detection of Anderon Meter

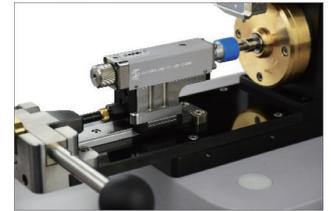
Supports measurement of bearings ranging from ultra-small to medium-sized

Selecting from either of two Pusher models enables measurement of bearings ranging from ultra-small with an inner diameter of 1 mm to medium-sized with an outer diameter of 100 mm.



ADP-20NX

Pusher force up to 20 N,
For bearings of OD up to 50 mm



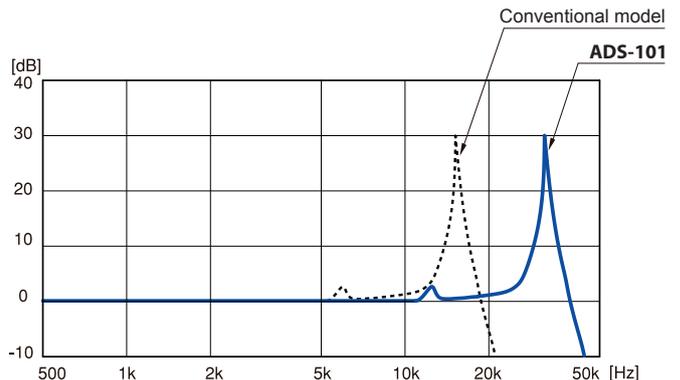
ADP-200NX

Pusher force up to 200 N,
For bearings of OD up to 100 mm

Contact velocity sensor with flat frequency characteristics

ADS-101 is a Sugawara-developed velocity sensor at the heart of Anderon measurement.

Most of conventional velocity sensors have had multiple inherent vibrations above 5 kHz making high-band measurements difficult. The Sugawara ADS-101 improves upon this, achieving measurements with flat characteristics up to 10 kHz.



Frequency characteristics of ADS-101

ADA-105 Analyzer

Real-time spectrum and waveform display of vibrations

The Anderson Analyzer ADA-105 is an equipment for analyzing detected bearing vibrations. Its spectrum display as well as Anderson value display of each band simplify and speed up analysis of bearing defects. In addition, bearing vibration quality can be standardized on the basis of raw waveforms using a vibration-sound recording and playback function. Measured vibration can be analyzed in terms of inner ring, outer ring, balls, and other components by inputting bearing specifications (ball P.C.D, ball diameter, number of balls, and contact angle).

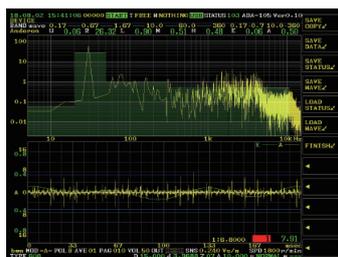
Features

- Real-time display of Anderson spectrum, a feature not provided by general-purpose FFT analyzers.
- Displays frequency and measurement values at any point in a spectrum by cursor pointing.
- Measurement units: Anderson, $\mu\text{inch}/\text{rad}$, $\mu\text{inch}/\text{sec}$, μinch , $\mu\text{m}/\text{rad}$, $\mu\text{m}/\text{sec}$, μm , nm/rad , nm/sec , nm , cm/s^2 , mG
- 30-second recording and playback of bearing vibration sound
- Sound data, measurement data, measurement conditions, and screen shots can be saved to a USB memory.
- Threshold values can be set for 7 bands and for "crest factor & frequency", enabling pass/fail judgements.
- Up to 1,000 sets of measurement conditions can be saved and searched from a list.

Graphic data displays



Real-time display of Anderson spectrum



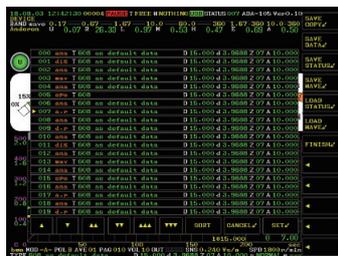
Anderson spectrum and oscilloscope waveform



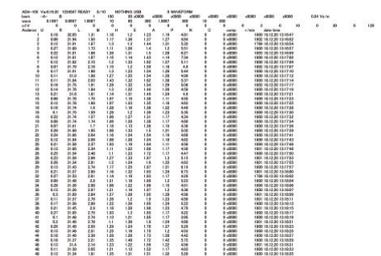
Analog meters and oscilloscope waveform



Digital meters and recorder



Measurement condition list (up to 1,000 sets)



CSV data saved in USB memory

Specifications

Anderson Meter Drive Unit ADM-104	
Spindle speed	1,800 r/min
Bearing size range	Bearing inner ring bore 1 mm to outer ring diameter 100 mm
Background noise	0.1 Anderson or less in L, M, and H bands
Spindle bearing type	Fluid dynamic bearing (oil)
Spindle drive system	Direct drive
Adapters	Arbor and Pusher Head
Power requirements	100 VAC, 50/60 Hz
Dimensions	300 (W) × 386 (H) × 486 (D) mm
Weight	80 kg

Pusher ADP-20NX	
Pusher force	20 N or less, adjustable
Bearing size range	Outer ring diameter 50 mm or less

Pusher ADP-200NX	
Pusher force	200 N or less, adjustable
Bearing size range	Outer ring diameter 100 mm or less

Anderson Analyzer ADA-105	
Measurement frequency bands	Seven standard bands (U, R, L, M, H, E, A Band) L band: 1.67–10.0 wave (50-300 Hz) M band: 10.0–60.0 wave (300-1,800 Hz) H band: 60.0–360 wave (1,800-10,000 Hz)
Numerical display	4 digits
Display accuracy	Up to $\pm 1.0\%$ of reading
Electrical noise	0.1 Anderson or less at 0.24 Vs/m sensor
Display module	10.4 inch, color LCD with back light
Dimensions	315 (W) × 218 (H) × 300 (D) mm
Weight	10 kg

Velocity Sensor ADS-101	
Sensitivity	0.24 Vs/m with the Contact pushed in 0.1 mm
Frequency characteristics	± 2 dB at 50 Hz–10 kHz
Resonance frequency	20 kHz or more with the Contact pushed in 0.1 mm
Contact force	0.275 N with the Contact pushed in 0.05 mm 0.400 N with the Contact pushed in 0.1 mm

Anderon Calibrator ADC-101

This single unit can be used to calibrate all the analyzers of Anderon meters and Waviness meters.

Periodic calibration is needed to obtain accurate values. The Anderon Calibrator ADC-101 is an instrument for calibrating bearing vibration testers. It can calibrate the analyzers of all of Sugawara's bearing vibration testers. It outputs electrical signals corresponding to the measured value to the analyzers of Anderon meters and Waviness/Roundness meters to calibrate them.



Features

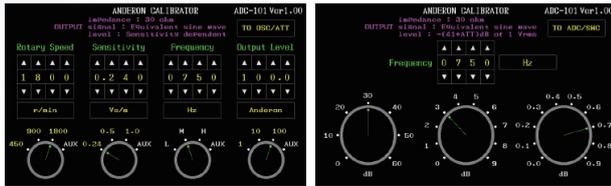
- Calibrates all of Sugawara's bearing vibration testers in two modes

ADC/SWC mode

Functions as the conventional Anderon Oscillator ADC-10 and the Synchro Wave Oscillator SWC-10

OSC/ATT mode

Functions as the conventional signal generator + Attenuator EBV-AN01, FOR-102, and DOM-101



ADC/SWC mode

OSC/ATT mode

- Playback function to reproduce vibration

ADC-101 has the PLAYER mode to reproduce the measured vibration data saved in the USB memory using the Analyzer ADA-105/SWA-106. The measured vibration data can be easily sent and reproduced without sending sample bearings.

*PLAYER mode is available only when the USB memory is connected.

How to calibrate

Basic set of Anderon meters and Waviness/Roundness meters, and their measurement principle is as follows.

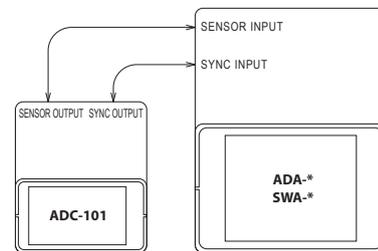
Drive Units: ADM/LWM/BWM-*

Sensors: ADS/LWS/BWS-*

Analyzers: ADA/SWA/LWA/BWA-*

The Drive Unit rotates the bearing, the inner/outer ring, and the steel ball under test, and outputs rotation pulse signals to the Analyzer. The Sensor detects their vibrations and outputs voltage signals to the Analyzer.

The Analyzer processes the rotation pulse signals and the vibration voltage signals, and displays the measurement result. For calibration, the Anderon Calibrator ADC-101 outputs rotation pulse signals and sine-wave signals corresponding to the set vibration value to the Analyzer, to check if it correctly displays the result.



Connection with the Analyzer

Specifications

Anderon Calibrator ADC-101

Products to be calibrated	Anderon Analyzer ADA- Synchro Wave Analyzer SWA- Race Wavimeter Indication Unit LWA- Ball Wavimeter Indication Unit BWA-*
Rotation speed setting	100–9,999 r/min
Sensor sensitivity setting	0–8,008 Vs/m
Oscillation frequency	0–20 kHz

Unit of measurement	Anderon, nm/sec, μm/sec, μinch/sec, cm/s ² , mG, nm, μm, μinch, nmWcla, μWcla, nmPC, μPC, nm/rad, μm/rad, μinch/rad
Output level	4.5 mVrms or less, with input impedance 30 Ω
Power supply	100–240 VAC, 50/60 Hz
Dimensions	215 (W) × 124 (H) × 250 (D) mm
weight	5 kg

Products: Xenon Flash, Torque Dynamometers, Bearing Inspection Systems, etc.

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