GN-1200 series
Noise Testing Software

ONO SOKKI

Realizes higher grade judgment and analysis

Comparator software with excellent multi-function and expandability, supporting from one to multiple channels

It supports a wide range of channels from 1ch to multiple channels depending on your environment. The Pass/Fail judgment is equipped as standard, and in addition to analysis using this function alone, adding the options for expansion function allows simultaneous analysis/judgment by combining multiple analysis methods.

NVH-based product lineup for Pass/Fail judgment

GN-1200 series Noise Testing Software

- ・1 ch to 48 ch (Ver.4.0 or later)
- ・Tracking / FFT / Dent analysis, etc.
- ・Exporting Record File (ORF)
- ・Exclusive customization

Frequency analysis

CF-4700A FFT Comparator
- ・1ch
- ・FFT/Tracking…

Sound

LA-7000 Sound Level Meter
- ・1 ch for noise analysis
- ・judgment (FFT, 1/3 Octave, etc.)
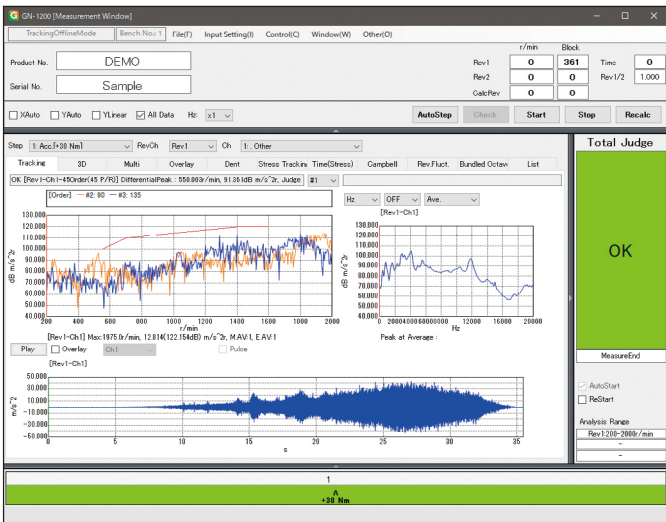
Vibration

VC-2200/3200 Vibration comparator
- ・1 ch for vibration analysis
- ・Time-series judgment

For DS-3200 and GN-1100 series users

This software is the successor to the GN-1100 series. By upgrading to GN-1200, new functions will become available. It can be connected to either DS-5000 or DS-3200.

Main functions

Main application included in GN-1200	Tracking analysis/judgment, Spectral analysis/judgment, Color map judgment, 1/3 bundled octave analysis/judgment, Auto step function, etc.
Recommended options for expansion functions for production lines and sampling inspections	Result File Viewer, GN Link communication function (LAN/RS-232C/DIO, etc.), 2 rotation/calculated rotation tracking, Offset tracking, Dent/envelope analysis, Real-time octave analysis, ORF input & recalculation/secondary processing/auto sequence, etc.
Options for expansion functions for material evaluation/verification assistance	Stress analysis, torsion calculation function, etc.

Useful in a variety of situations, including production lines

Sampling inspection/Development/Durability test bench
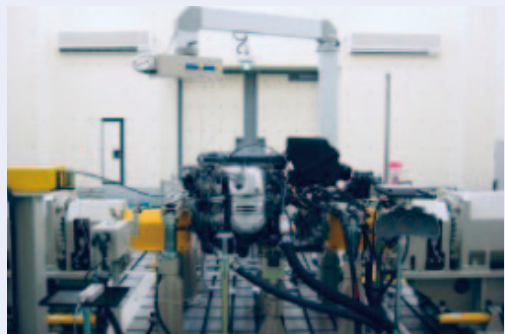
It can be used in a variety of measurement scenarios, including sampling inspection, product development, and durability testing. It is possible to measure and analyze multiple items and determine pass/fail. Furthermore, the inspection flow can be automated to improve work efficiency.

Final inspection machine on the production line

This is an NVH-based 100% quality inspection system. It is possible to generate optimal judgment levels, which helps reduce the man-hours required for judgment control and improve quality.

Abnormality diagnosis for continuously operating equipment

With a simple system configuration consisting of a PC and a compact measurement equipment, it can be incorporated into a variety of devices. Abnormal equipment behavior will not be overlooked.
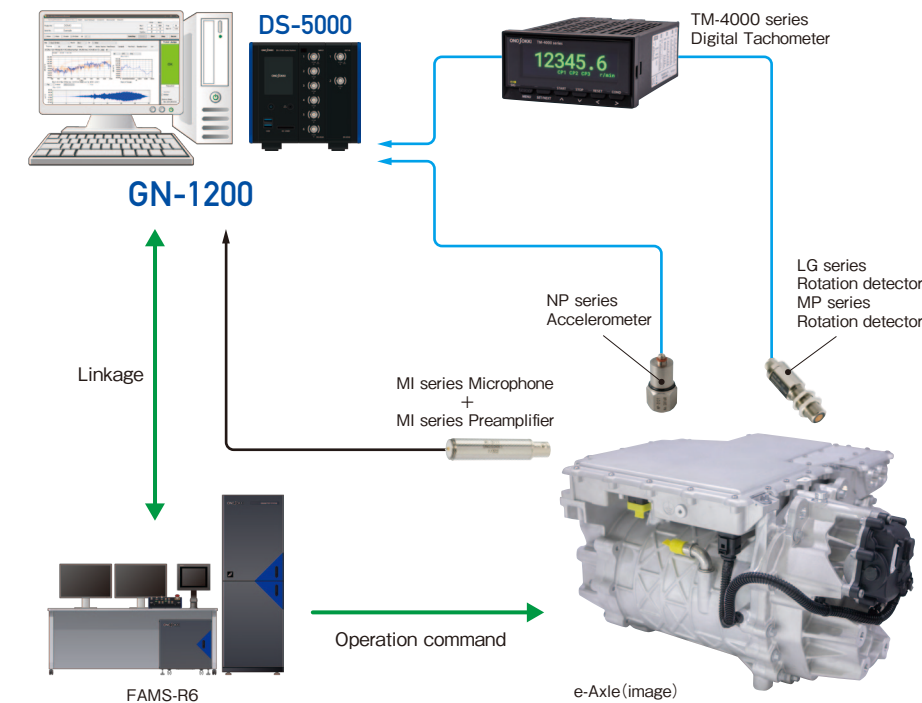
Application examples

e-Axle vibration and noise inspection system

It performs tracking analysis for vibration and noise signals that change with the rotation speed and quality control by setting arbitrary judgment lines.

System configurations

Tracking analysis is performed by receiving rotation pulse signals from the rotation control controller of the target e-Axle.

The vibrations that occur when the rotation speed is changed from idling to maximum output are detected by the NP series accelerometer, and the rotation tracking analysis of the meshing order is performed. Based on the analysis data, an arbitrary judgment line is set and the Pass/Fail judgment is made.

DS-5000

TM-4000 series
Digital Tachometer

12345.6

GN-1200

NP series
Accelerometer

LG series
Rotation detector
MP series
Rotation detector

MI series Microphone
+
MI series Preamplifier

Linkage

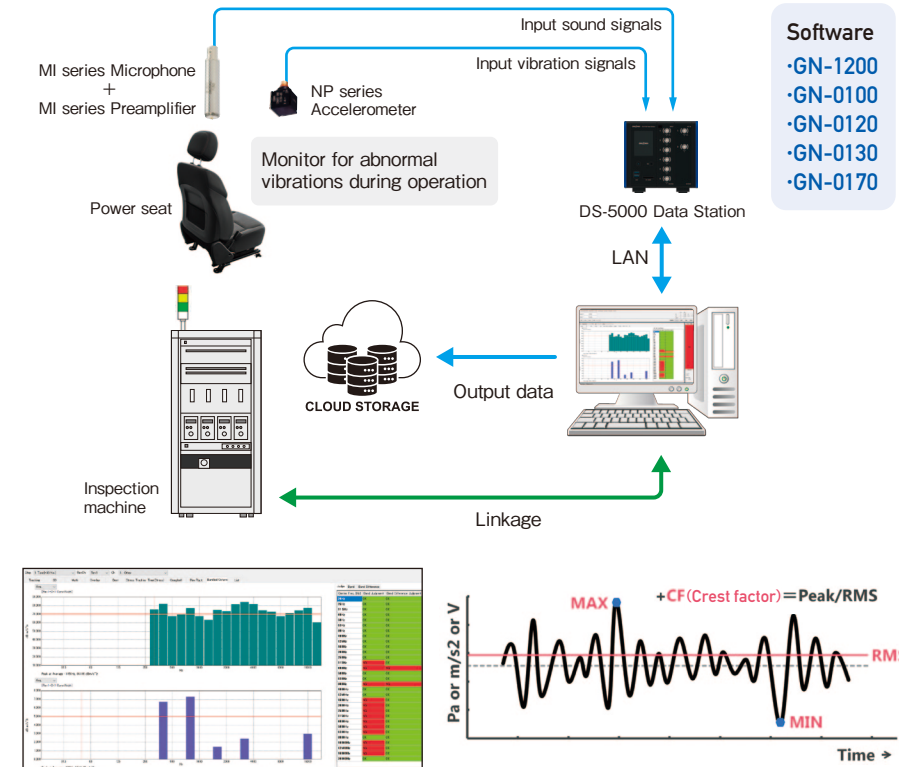Operation command

FAMS-R6

e-Axle (image)

Sound and vibration analysis system for final inspection of power seats

The sound and vibration generated when the power seat is in operation are measured and analyzed to monitor for abnormal noise and vibration.
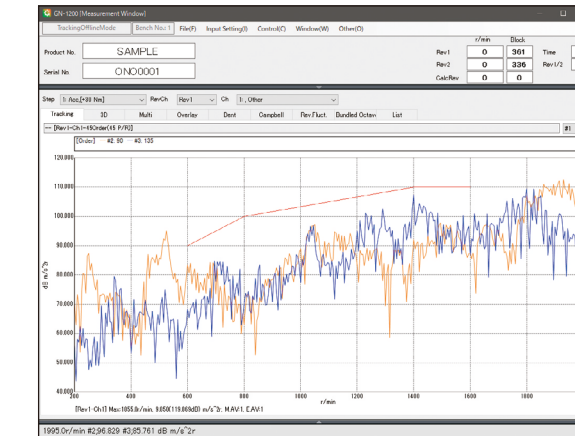
System configurations

This system measures operating sounds and vibrations when a power seat is in operation, performs frequency analysis and time-series analysis, and judges whether the data is passed or failed based on the registered tolerance line and judgment line. "1/3 bundled octave analysis" makes it possible to quantitatively judge whether a sound is passed or failed with a sense close to that of human hearing. In particular, judgment based on the difference in data between adjacent bands is effective in extracting harsh or muddy sounds.
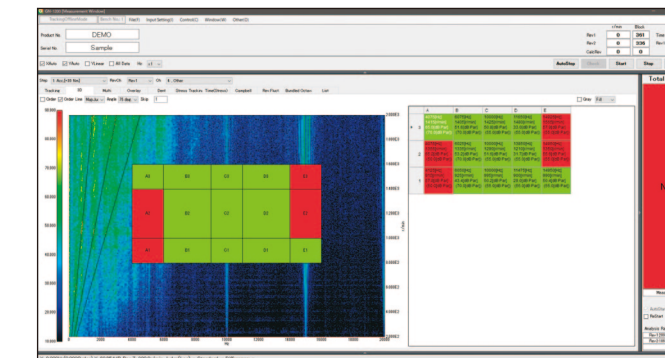
Input sound signals

Input vibration signals

MI series Microphone
+
MI series Preamplifier

NP series
Accelerometer

Monitor for abnormal vibrations during operation

Power seat

Software
· GN-1200
· GN-0100
· GN-0120
· GN-0130
· GN-0170

DS-5000 Data Station

LAN

CLOUD STORAGE

Output data

Inspection machine

Linkage

MAX

+CF (Crest factor) = Peak/RMS

RMS

MIN

Pa or m/s2 or V

Time →

Main application included in GN-1200
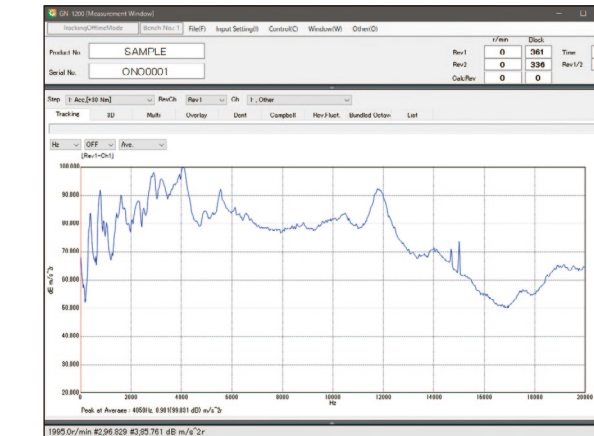
Tracking analysis/judgment

The results of tracing meshing order components for each rotation speed can be judged. Multi-judge function makes it possible to set up to four judgment lines.
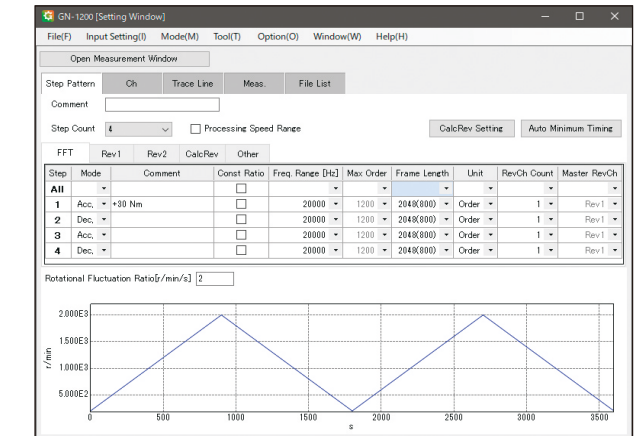
FFT analysis/judgment

Judgment is made based on the results of order ratio/frequency analysis obtained during time or rotation tracking.

Auto step function

Even without communication function, it will automatically measure up to 20 steps according to the set step schedule.

Color map judgment NEW

It sets standard values in a mesh pattern on the color map and judges each area.

1/3 bundled octave analysis/judgment NEW
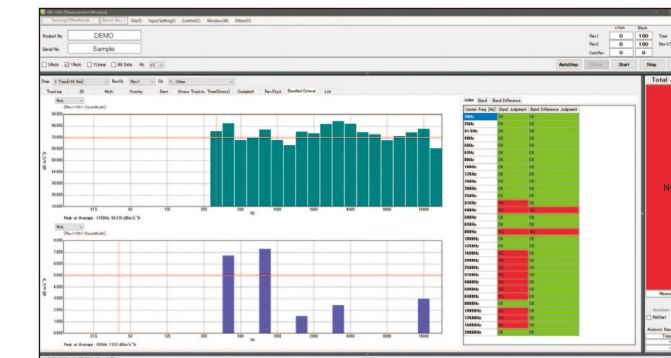
This function sets a threshold for each band of the bundled octave and judges pass/fail. It is also possible to judge the difference between adjacent bands.

Recommended options for expansion functions for production lines and sampling inspections (Auxiliary functions)
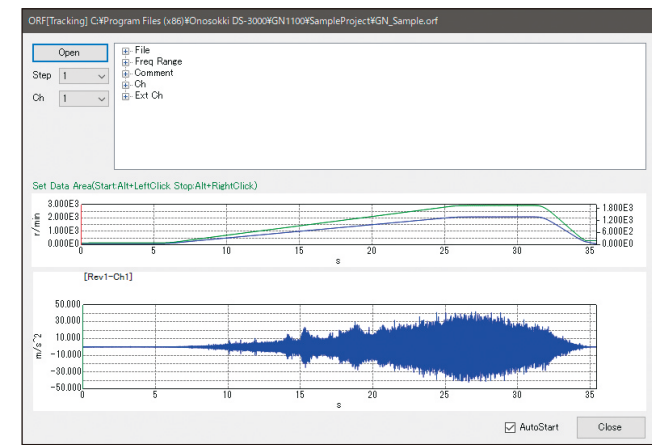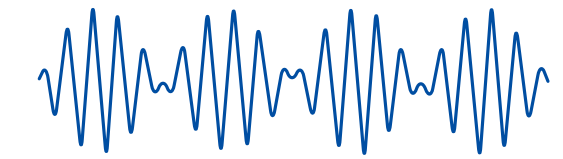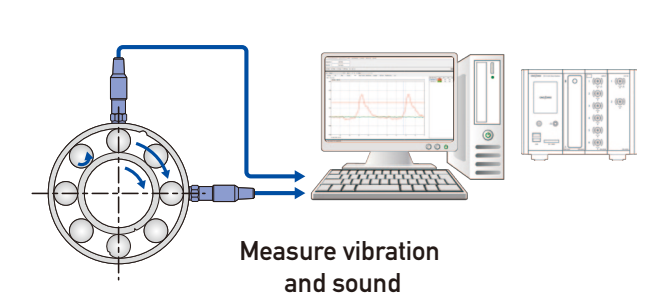
GN-0100 ORF Input and Re-calculation Function

The ORF files can be loaded and recalculated. Also, with this option, the time axis statistical analysis function can be expanded such as crest factor, etc.
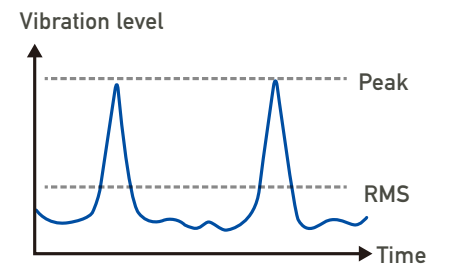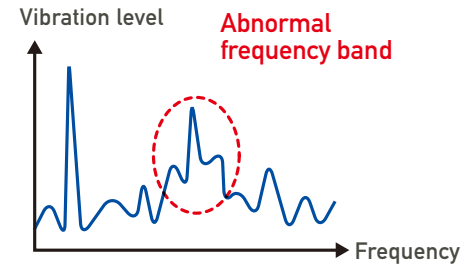
ORF → **Re-analysis**

It is ideal for diagnosing abnormalities such as bearing or gear dents.

Measure vibration and sound

Waveform containing abnormal components

Vibration level

Abnormal frequency band

→ Frequency

Vibration level

Peak

RMS

→ Time

Judgment by Spectrum P.O.A. (partial overall)

The peak becomes large when a bearing or a gear has damage. Focusing on the specific frequency bands and making judgment with power addition.

Judgment by Crest factor

Focusing on that the measurement waveform with the characteristic frequency components when damaged. Making judgment with Peak value/RMS (crest factor).

GN-0110 Secondary Processing Function

Functions for performing secondary processing such as multiple simultaneous display and overlaying tracking analysis data, Campbell diagram, and rotation fluctuation analysis.It is possible to check at a glance any resonance or abnormal behavior occurring in the work piece, which can be used to improve the work piece.
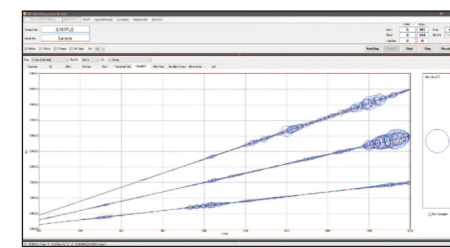
Measurement data
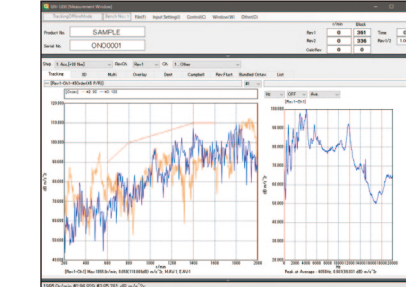
Import & re-calculation

Overlaying data

**Multiple simultaneous display**

Campbell diagram

A Campbell diagram shows the frequency on the vertical axis, the rotation speed on the horizontal axis, and the order on the diagonal, and the amplitude of the spectrum (represented by the peak height on the 3D display) by the size of the circle. It is used for compressor noise tests and turbine vibration tests.

Rotation fluctuation & Cross spectrum
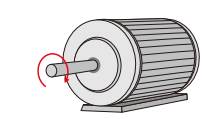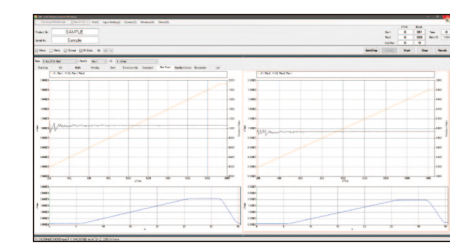
The rotation fluctuation is the increase or decrease (fluctuation) in the rotational angular velocity relative to the average angular velocity at a point on the axis of rotation. A high-resolution rotation sensor is used, and the output signal is converted into the voltage signal by a high-speed F/V converter to determine the rotational fluctuation per rotation.
The cross spectrum shows the relationship between the two signals input from the master and other channel. The cross spectrum is a coherence function that indicates the degree of signal delay (phase delay) of one signal relative to another. This function makes it possible to check the balance of a rotating body, such as the misalignment of the center of gravity during assembly or processing.

Bivariation analysis
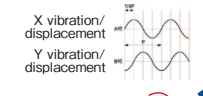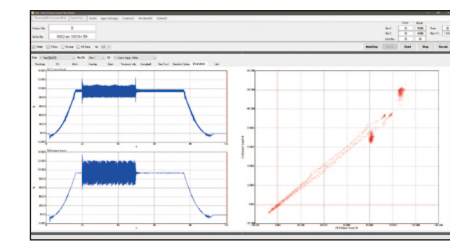
X vibration/ displacement
Y vibration/ displacement

Torque

Deformation amount

The bivariation analysis allows you to check the correlation between two input signals by plotting one signal on the X-axis and the other signal on the Y-axis.
By inputting the displacement amounts in each axial direction, you can verify the balance state of the object being measured, and by inputting the torque and deformation amount, you can verify the strength of the object being measured.

6

7

Recommended options for expansion functions for production lines and sampling inspections

GN-0130 File Viewer Function

This function is for data management of the large number of files which has been measured and made judgment by the GN-1200. It can be used for searching the workflow information of measured data, and enables to narrow down the multiple workflow data measured in similar condition to perform overlay comparison or averaging.

Items	Description
Search function	Maximum number of search data: 20000 Date, Product No., Serial No., Operator, Bench No., Total judge, etc.
Display function	Displaying graph (overlayable, color map) Displaying list (Date, Product No., Step, Order, Peak detection area, Channel, Judgment result)
Output	Printing, Image output, CSV output

Check results

Overlay Print/Output
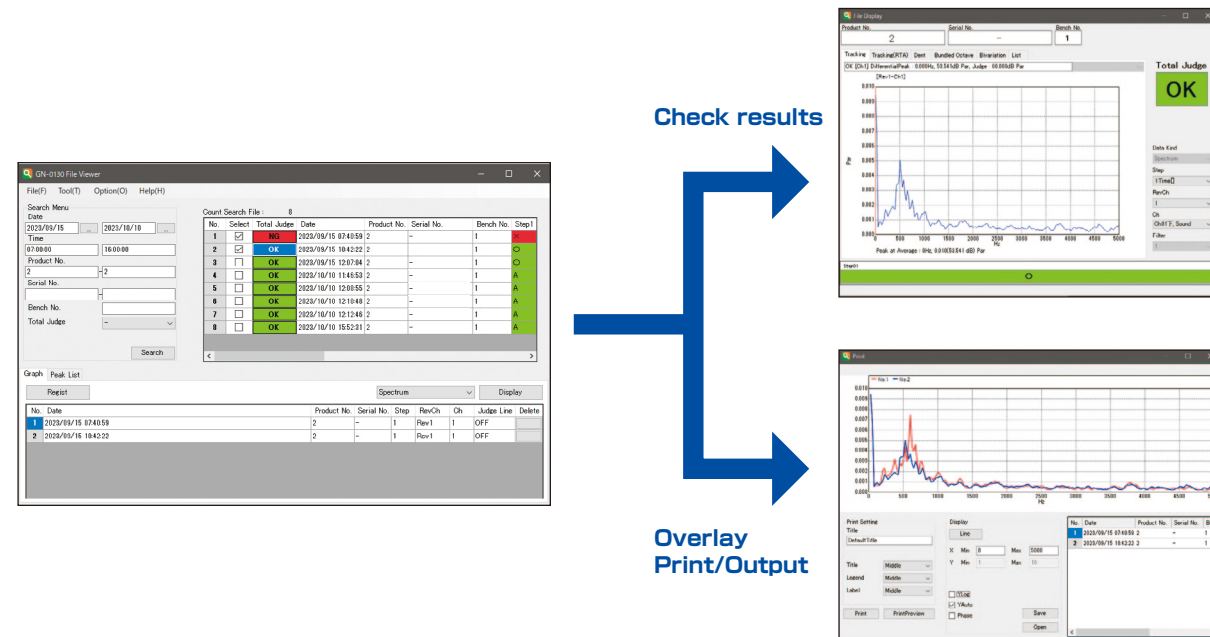
GN-0120 GN Link Function(LAN)
GN-0240 GN Link Function (LAN+DIO or RS+DIO)

By connecting the GN-1200 to equipment that performs performance tests on work pieces in the production line, it can output the sound/vibration measurement data of work pieces or equipment, as well as work piece pass/fail judgment results, to the equipment. There are three types of communication formats: LAN format (GN-0120)/LAN+DIO format (GN-0240)/RS-232C+DIO format (GN-0240).

*We also accept special orders for communication formats other than those listed above.
For details, please contact our sales office or your local distributors.
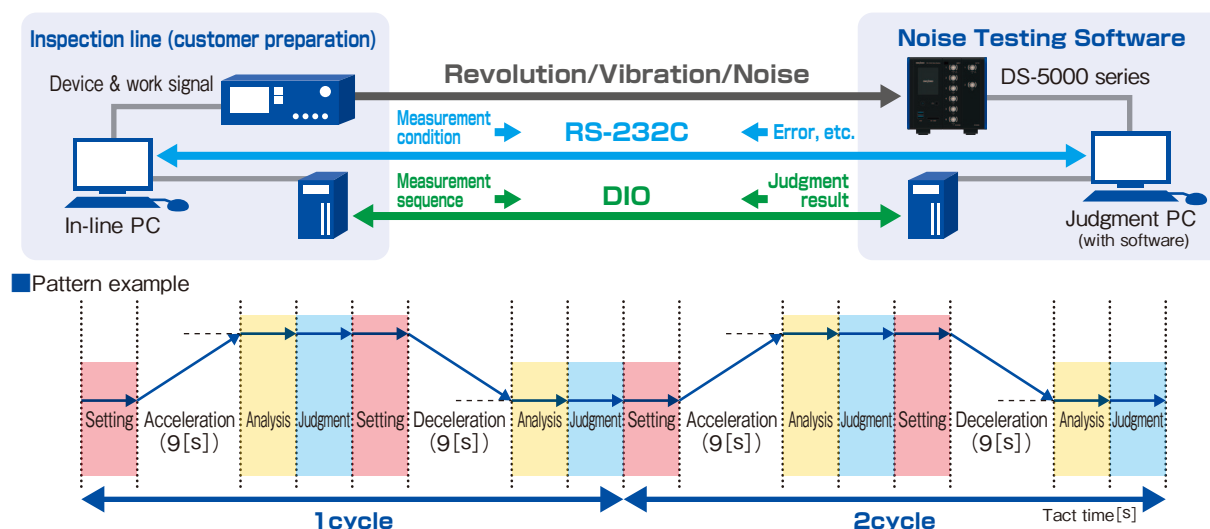
GN-0180 Auto Sequence Function

Describing commands from changing settings to outputting results enables automatic analysis. When recalculation repeatedly, this allows you to work more efficient and reduces operational errors.

Command description in text file

Particular sequence of workflow

Change of measurement condition
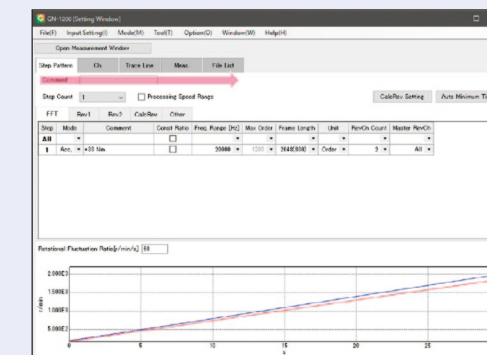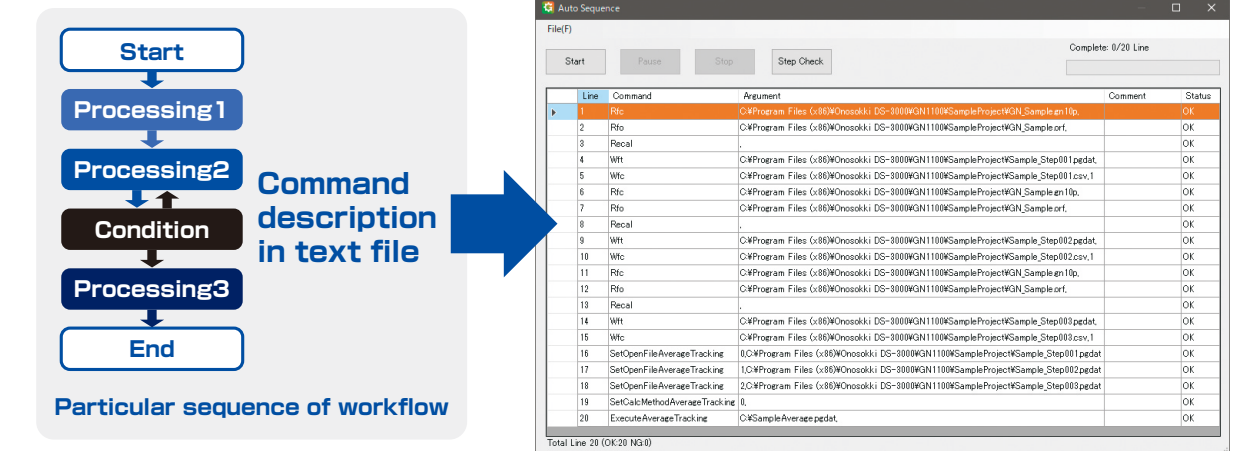
Read record data and perform reanalysis
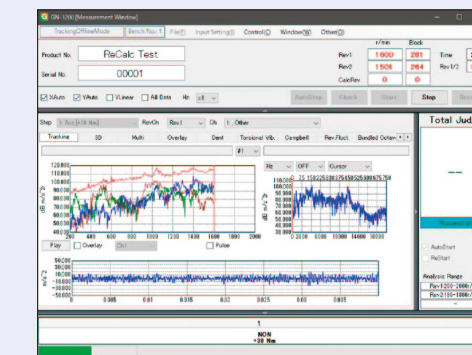
Save the target files
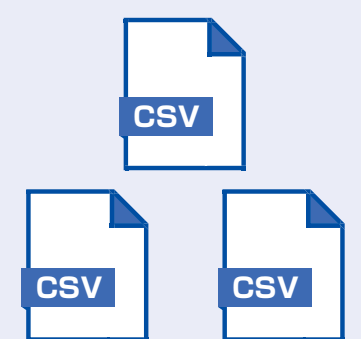
Automate operations from reanalysis to saving data by commands

Recommended options for expansion functions for production lines and sampling inspections (Analysis, Judgment)

GN-0140 Dual Rev Tracking Function / GN-0150 Calculation Rev Tracking Function

This function is for the simultaneous tracking measurement which is based on the Rev1/ Rev2/ Calculation revolution in each step. Based on Rev1 and Rev2, the calculation revolution can be set by the arithmetic operation, function and contact. To use this function, it is possible to perform tracking analysis which is based on the rotating input and output axes with no correlation or rotating axis which cannot be perform rotating measurement for more detailed workflow checking.

*GN-0140 is only available in the Rev1/ Rev2.

Application examples

(1) Inspection of abnormalities in transmissions and reducers
(2) Inspection of abnormalities in motors
(3) Inspection of abnormalities in engine accessories
(4) Inspection of chain and belt rotation differences

GN-0190 Offset Tracking Function

It is possible to perform tracking analysis of noise components (carrier noise) originating from switching signals (carrier signals) emitted by inverters, which are necessary for driving/controlling motors for hybrid vehicles, etc.

Application examples

Inspection of abnormalities in motor controlled by inverter or e-Axle

GN-0200 Grade Line Function

This function is a function that creates grade lines as an index for comparing and evaluating peak values measured with different measurement equipment. In order to manage a large amount of measureme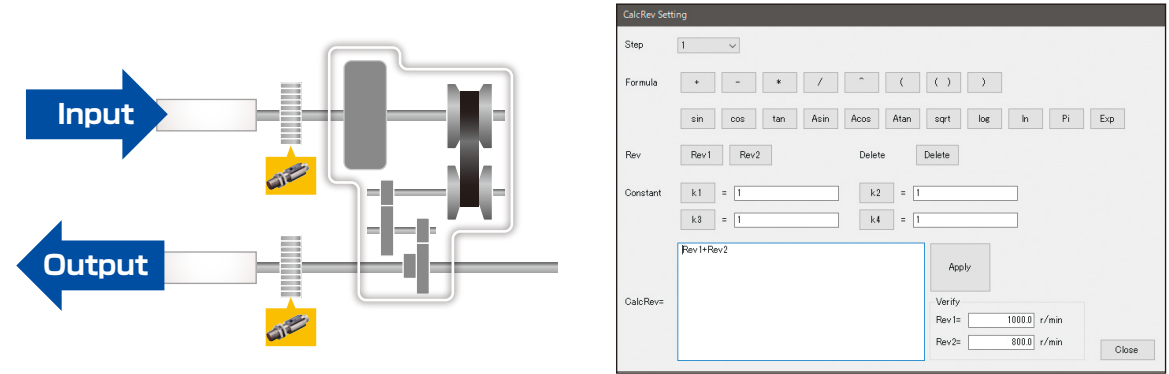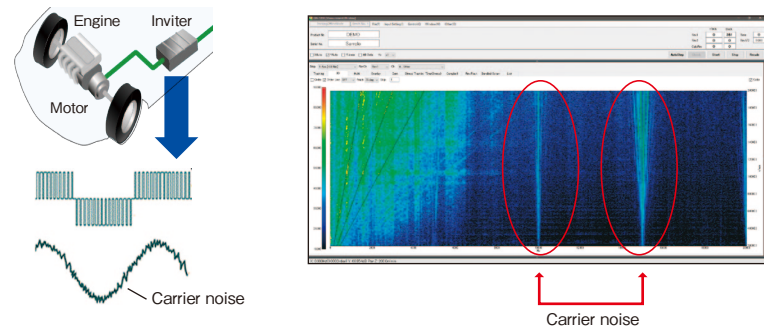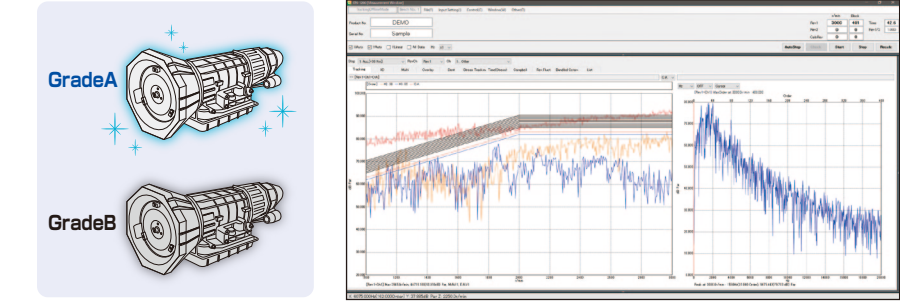nt data, arbitrary information such as operator/equipment name/measurement details can be added as specifications. This function can be used by factory quality control departments to manage work piece variations and visualize quality change points.

GN-0160 Dent Analysis Function / GN-0230 Envelop Analysis Function

GN-0160 Dent Analysis Function :
The envelope processing is applied to the time-axis waveforms of the measured vibration and sound pressure, and the magnitude at peak, the phase (period), the ratio for each period of the waveform are monitored. It is suitable for detecting abnormalities that occur in a specific period and effective for checking the presence of dents on gears and scratches on bearings. Further, it can be used for the measurement during not only constant rotation speed but also acceleration/deceleration.

GN-0230 Envelop Analysis Function :
This is a function that uses the same method as GN-0160 to judge periodic whining sounds which are caused by shaft vibration or uneven rotation based on the peak value.

Application examples

(1) Analysis of low frequency sounds
(2) Measurement of equipment noise and vibration
(3) Measurement of sound pressure of acoustic products
(4) Monitoring of bearing abnormalities

whining sounds caused by uneven rotation
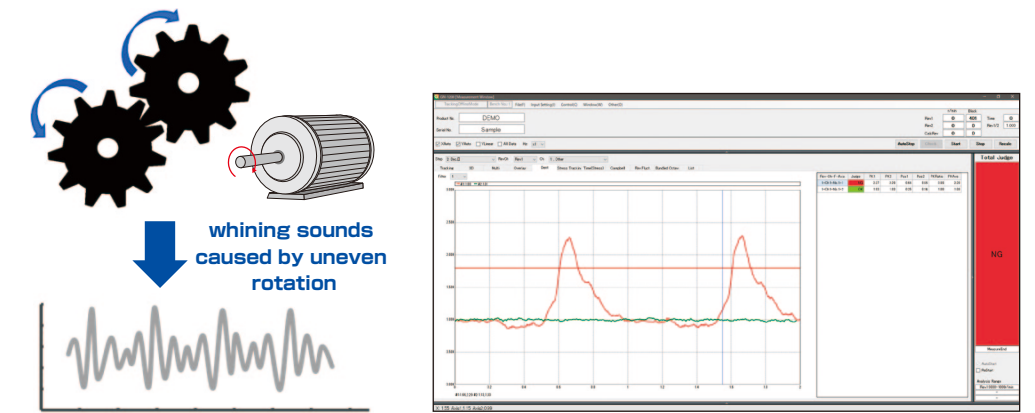
GN-0170 Real-time Octave Analysis Function

The GN-0170 can make pass/fail judgment of work and equipment by 1/3 octave analysis. This function makes it possible to quantitatively perform "judgment close to the auditory sensation of human" having a characteristic proportional to the frequency component, and supports to build up the human-independent test system.
Also, it can recalculate the optimum threshold using data group judged to be normal in the past, and automatically generate judgment lines.
This function contributes to reduce man-hours in standard management at the time of judgment.

*It will be compatible with the DS-5000 soon.

Application examples

(1) Abnormality inspection of transmission and speed reducer
(2) Abnormality inspection of a motor
(3) Abnormality inspection of an engine
(4) Analysis of low frequency sound
(5) Measurement of equipment noise/ vibration
(6) Measurement of sound pressure characteristics of various acoustic products

Measurement screen

Judgement line

Time-axis trend graph for each octave band (2D/3D)

Octave analysis graph (Display according to the cursor position on the trend graph)

Can be judged for each octave band

Integrated judgment by spectrum, tracking and octave band
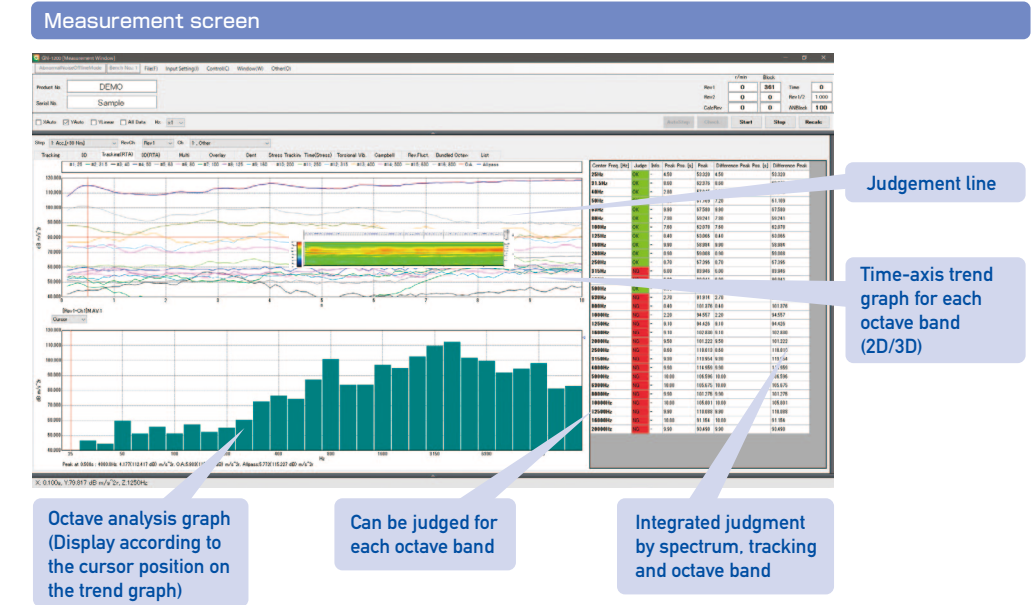
Options for expansion functions for material evaluation/verification assistance

GN-0210 Stress Tracking Analysis Function

This function analyzes in real time the repeated stress and load behaviors applied when the works are in operation by using detected signal of a strain gauge. Helpful to check the strength and safety.

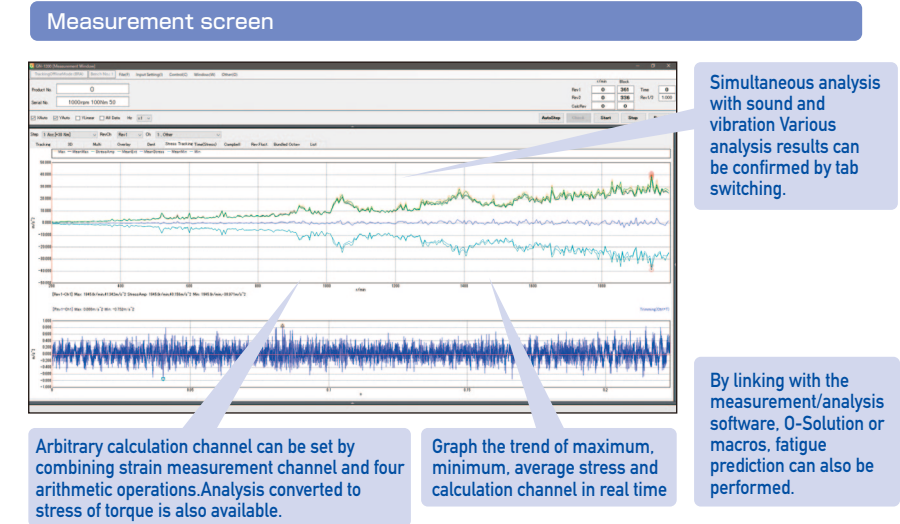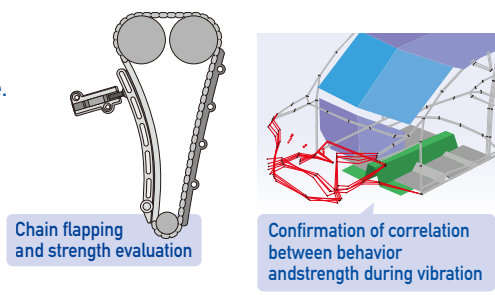### Application examples

(1) Production line quality inspection of unit, such as motor, transmission, and speed reducer.
(2) Abnormality inspection of prototype vehicles and parts incorporated in test equipment.
(3) Strength evaluation of new materials.
   It can be used in a variety of situations as above.

- Not only can you obtain test data on the strength of parts that have had their design changed (materials, dimensions, etc.), but you can also use it for quality assurance.
- By simultaneously analyzing sound and vibration, the phenomenon can be accurately captured. It helps improve the accuracy of test data and even reduce labor costs.

Chain flapping and strength evaluation

Confirmation of correlation between behavior andstrength during vibration

Measurement screen

Simultaneous analysis with sound and vibration Various analysis results can be confirmed by tab switching.

By linking with the measurement/analysis software, O-Solution or macros, fatigue prediction can also be performed.

Arbitrary calculation channel can be set by combining strain measurement channel and four arithmetic operations.Analysis converted to stress of torque is also available.

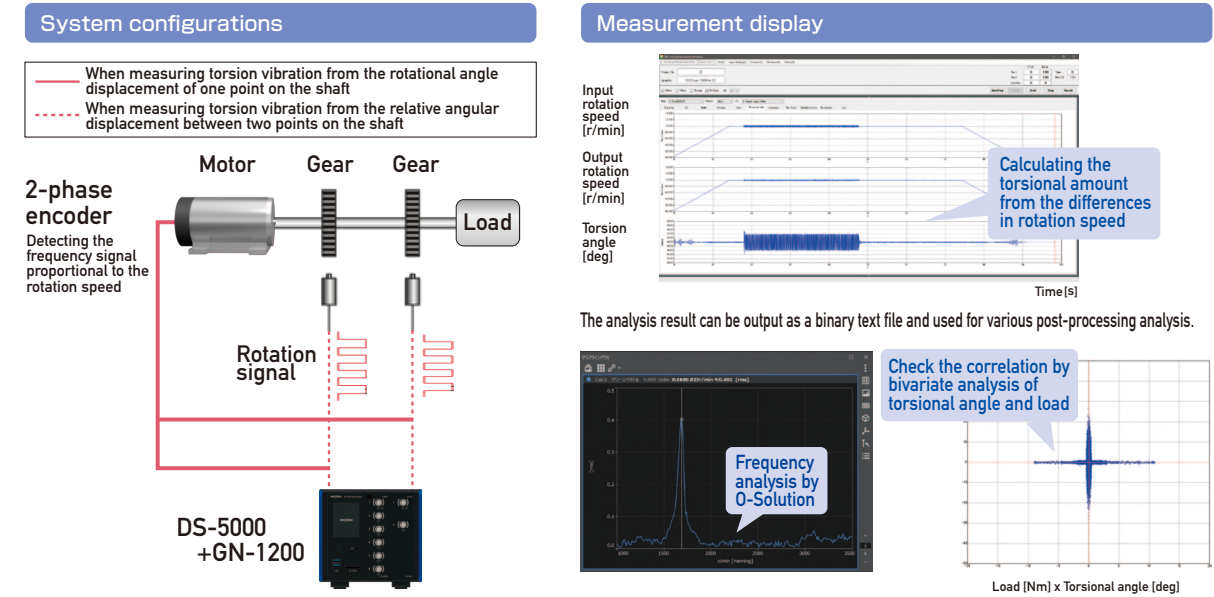Graph the trend of maximum, minimum, average stress and calculation channel in real time

GN-0220 Torsion Vibration Operation Function

This function calculates the rotation speed differences from the reference rotation speed (pulse) signal and the rotation speed signal used as comparison, and outputs the torsional amount.
Parts or units subject to high load or high torque in the direction of revolution may cause shaft damage or abnormal vibration due to this load. This function allows the acquisition of data for evaluating torsional amount, durability of parts, and whether or not abnormalities are present.

Application examples

(1) Inspection of motor shaft torsion and rotation fluctuations
(2) Torsion inspection of clutches and dampers
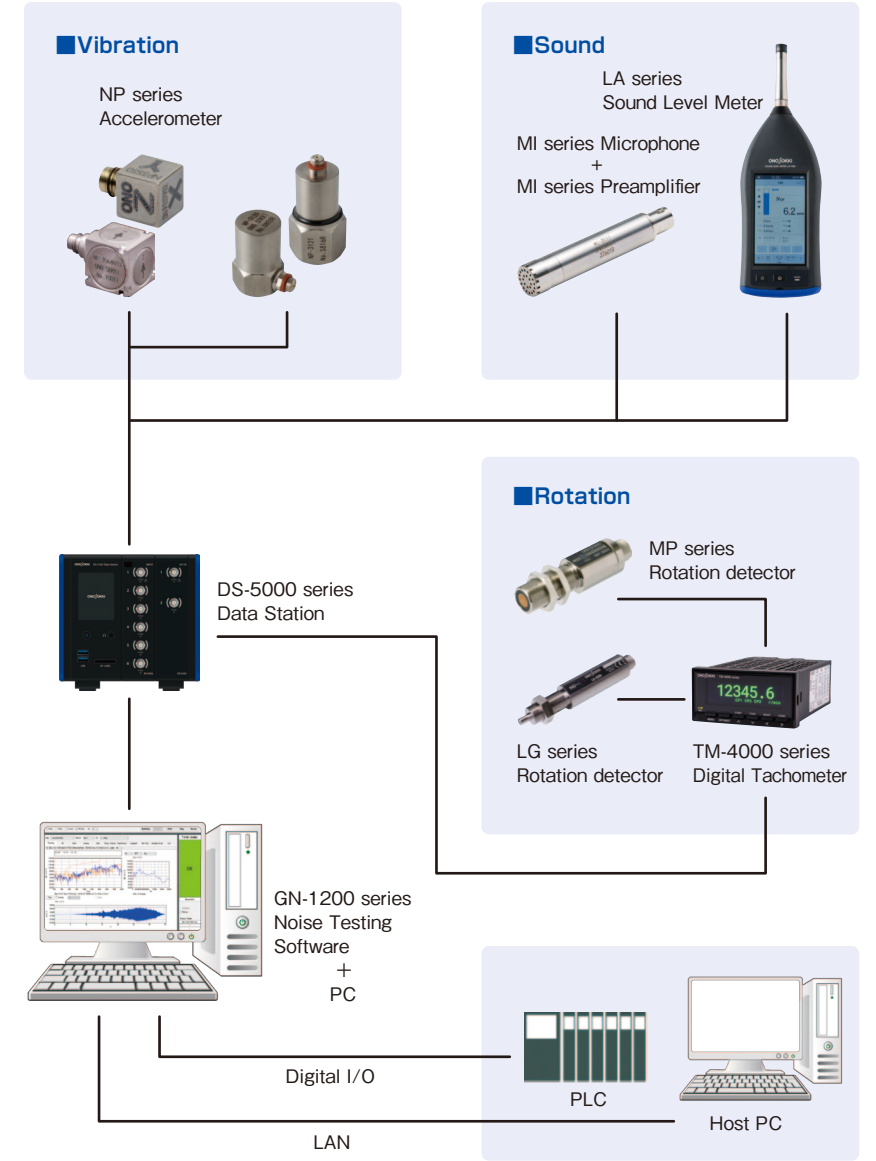(3) Rotation transmission measurement of drive unit, etc.

System configurations

When measuring torsion vibration from the rotational angle displacement of one point on the shaft
When measuring torsion vibration from the relative angular displacement between two points on the shaft

2-phase encoder
Detecting the frequency signal proportional to the rotation speed

Motor Gear Gear Load

Rotation signal

DS-5000 +GN-1200

Measurement display

Input rotation speed [r/min]
Output rotation speed [r/min]
Torsion angle [deg]

Calculating the torsional amount from the differences in rotation speed

Time[s]

The analysis result can be output as a binary text file and used for various post-processing analysis.

Check the correlation by bivariate analysis of torsional angle and load

Frequency analysis by O-Solution

Load [Nm] x Torsional angle [deg]

System configurations

Main/Sub Application

Model name	Product name	Overview
GN-1200	Noise Testing Software	Tracking analysis and judgment can be performed on rotation input channel 1., list display (main)
GN-0130	File Viewer Function	Data file search, overlay, peak list display (sub)

Expansion optional functions

Model name	Product name	Overview
GN-0100	ORF Input and Re-calculation Function	Reading and recalculating ORF files
GN-0110	Secondary Processing Function	In addition to the functions of GN-0100, multi-waveform display, cross spectrum, etc.
GN-0120	GN Link Function (LAN)	External communication via LAN (TCP/IP)
GN-0140	Dual Rev Tracking Function	It allows simultaneous tracking analysis and judgment of Revolution Input Ch1 and Ch2.
GN-0150	Calculation Revolution Speed Tracking Function	It allows simultaneous tracking analysis and judgment of Revolution Input Ch1 and Ch2 and CalcRev for three revolution channels. (including GN-0140)
GN-0160	Dent Analysis Function	It detects dents at meshing points during tracking measurement.
GN-0170	Real-time Octave Analysis Function	It judges normal/abnormal with the 1/3 real-time octave analysis results.
GN-0180	Auto Sequence Function	Automatic analysis using commands (including GN-0100)
GN-0190	Offset Tracking Analysis Function	Tracking analysis of high frequency noise such as inverter carrier signals
GN-0200	Grade Line Function	Creating grade line, specification setting, search function, peak list output
GN-0210	Stress Tracking Function	Tracking analysis of strain gauge signals and inter-channel calculation signals set using arbitrary arithmetic operation
GN-0220	Torsional Vibration Analysis Function	Calculating the torsional vibration from the difference in two the revolution speed
GN-0230	Envelope Analysis Function	Detecting abnormalities and judgment such as whining sounds using envelope processing
GN-0240	GN Link Function (LAN/RS + DIO)	External communication via LAN (TCP/IP)+DIO or RS-232C+DIO
—	User customization	It is possible to customize communication specifications, traceability files, special functions, etc. Please feel free to contact us.

■Vibration
NP series Accelerometer

■Sound
LA series Sound Level Meter
MI series Microphone + MI series Preamplifier

■Rotation
MP series Rotation detector
LG series Rotation detector
TM-4000 series Digital Tachometer
12345.6

DS-5000 series Data Station

GN-1200 series Noise Testing Software + PC

Digital I/O
PLC
LAN
Host PC

GN-1200 series Noise Testing Software Specifications

Input	Number of input channels*	Input: 42 ch/Revolution: 2 ch Input: 48 ch/Revolution: Nil
	Power addition channel	Sound: Max. 1 pattern, Vibrations: Max.10 patterns can be registered
	Base frequency range	200 / 500 / 1000 / 2000 / 2500 / 4000 / 5000 / 8000 / 10000 / 12500 /20000 / 40000
	Voltage range	Front end:DS-5000 44.7 mV / 1.41 V / 4.47 V Front end:DS-3200 14.1 mV / 44.7 mV / 0.141 V / 0.447 V / 1.41 V / 4.47 V / 14.1 V
	Coupling	AC / DC
	Offset	-50 to 50 dB (10 dB increments)
	Filter	Flat / A / C
	Others	Compatible with TEDS, unit setting, 0 dB reference value setting, save calibration history, auto range, CCLD, settings for revolution channels (P/R setting, coupling setting, slope, threshold value, hysteresis, hardware division)
Measurement/ analysis	Measurement step count	Max. 20 steps
	Mode	Acceleration (revolution tracking), Deceleration (revolution tracking), Constant speed (order ratio spectrum)
	Sampling method	Constant width analysis, Constant ratio analysis
	Frequency range*	200 / 500 / 1000 / 2000 / 2500 / 4000 / 5000 / 8000 / 10000 / 12500 / 20000 / 40000 Hz *Up to 20 ch: 102.4 kHz, up to 40 ch: 64.0 kHz, up to 48 ch: 51.2 kHz
	Analysis order	6.25 / 12.5 / 25 / 40 / 50 / 75 / 80 / 81.25 / 100 / 125 / 150 / 162.5 / 200 / 250 / 300 / 400 / 500 / 600 / 800 / 1000 / 1200 / 1600
	Frame length (FFT line count)	512(200) / 1024(400) / 2048(800) / 4096(1600) / 8192(3200) / 16384(6400) / 32768(12800)
	Window function	Hanning
	Analysis trace line setting	Max. 16 per channel, O.A Order (order tracking), Hz (frequency tracking), 1/3 oct. (bundled octave tracking), POA (partial overall tracking) **POA* is designated as a frequency. Includes peak search and batch setting functions for all channels/all steps
	Simultaneous measurement revolution standard	Revolution 1, Revolution 2, Calculated revolution (calculated from Revolution 1 and Revolution 2) GN-0140 or GN-0150 license is required to use "Revolution 2" or higher. *The number of revolution standards that can be measured simultaneously is three; Revolution 1, Revolution 2, and Calculated revolution.
	Sampling period	Revolution: Δ0.1 to 240,000 r/min, time: Δ0.1 to 30.0 s
	Maximum number of blocks for measurement*	500/2500/5000
	Smoothing	Exponential moving average (1.0 to 10.0, 0.5 increments), Moving average (1 to 21, 1 increment)
	Judgment segments	Up to 32
	Multi-judge	0-segment (1-line judgment), 2-segment, 4-segment
	Judgment criteria setting	dB, Linear value (non, addition average, peak hold), O.A value Tracking: revolution speed, frequency Spectrum: frequency, order, P.O.A. *Amplitude value is a fixed setting in dB. Lower limit judgment Dent/envelop judgment *GN-0160 or GN-0230 license is required. Time axis statistical analysis (max, min, crest factor) *GN-0100 or GN-0110 license is required. Color map
	Maximum number of saved measurement conditions	Up to 2000 files

* Version 4.0 or later

Measurement/ analysis	Measurement auxiliary function	Frequency calculus, Cross spectrum, Polarity inversion, Time axis pre-processing filter (HP/LP/BP) Calculation channel *GN-0210 license is required.
	Other functions	Automatic sampling calculation, noise cancellation, sensor signal error detection, NG cancellation, measurement target work piece specification setting, file backup, shortcut key setting
Display	Graph display	Tracking, Frequency spectrum, Order spectrum, Time axis graph, 3D color map *GN-0100 or GN-0110 license is required for data recalculation. Overwriting (max. 16 lines), Multi-graph (max. 8, tracking/frequency spectrum/time axis), Campbell diagram, Revolution variation graph, Tracking average (max. 20, average/maximum/minimum) *GN-0110 license is required. Dent envelope waveform (peak value/peak position/gear ratio) *GN-0160 or GN-0230 license is required. 1/3 Octave (RTA/Bundled) Stress tracking graph *GN-0210 license is required. Torsional vibration graph *GN-0220 license is required.
	Graph display type	1 channel/1 step at a time (display switches)
	Scale (vertical/horizontal)	Auto scale function available
	Measurement trigger auxiliary function	Auto start function, Restart function
	Judgment result display	Total result judgment result, Step judgment result, Result list
Data	File format	*.orf (time axis data file), *.pgdat (GN-1200 dedicated data file), *.csv (data file containing tracking analysis results), *.rgdat (data file for GN-0130 Result File Viewer), *Optional automatic save settings are possible. *Only .rgdat cannot be used when the GN-0130 license is not available. *.bra (All data files including soft conditions) *.wav(time axis data file) *.bmp(each graph image file)

Operating environment

Operating environment	Front end	DS-5000 / DS-3200
	OS	Microsoft Windows® 10 Pro (64-bit version) Microsoft Windows® 10 IoT enterprise 2019/2021 LTSC Microsoft Windows® 11 Pro (64-bit version)
	.NET Framework	Microsoft.NET Framework 4.8 installed
	CPU	Intel Core ™i7 3.0 GHz higher (turbo-state is also acceptable)
	Memory	16 GB or more is recommended
	Drive	DVD Drive
	USB port	For license key connection: USB3.0 port or USB2.0 port × 1 When connecting to the DS-3200: USB3.0 port × 1
	LAN port	When connected to the DS-5000: 1 port (TCP/IPv6 enabled)
	Display size	At least 800 × 600

DS-5000 Hardware Specifications

■ 6ch 40 kHz Input Unit DS-0526

Input coupling	DC or AC -3 dB at 0.5 Hz ±10 % , AC set automatically when using CCLD
Isolation	42. 4 Vpk (Between BNC ground and hardware, and between each BNC ground)
Input voltage range	-30 / 0 / +30 dBVrms(3 range)
Absolute maximum input voltage	50 Vpk (DC to 100 kHz)
Frequency range	DC to 40 kHz
Sampling frequency	2. 56 times of the frequency range
A/ D converter	24 bit ΔΣ type
Dynamic range	130 dB (40 kHz range, 0 dBVr range, analysis for 4096 points, 1 kHz or more)

■ 2ch External Input Unit DS-0542

Maximum input voltage	30 Vrms (42.4 Vpk)
Absolute maximum input voltage	50 Vpk
Number of input pulses/revolution	0.5 to 1024 P/R*
Input pulse division function	1 to 1024 division
Input coupling	AC or DC
Isolation	42. 4 Vpk (Between BNC ground and hardware, and between each BNC ground)
Input frequency	Max. 300 kHz (with out-of band filter)

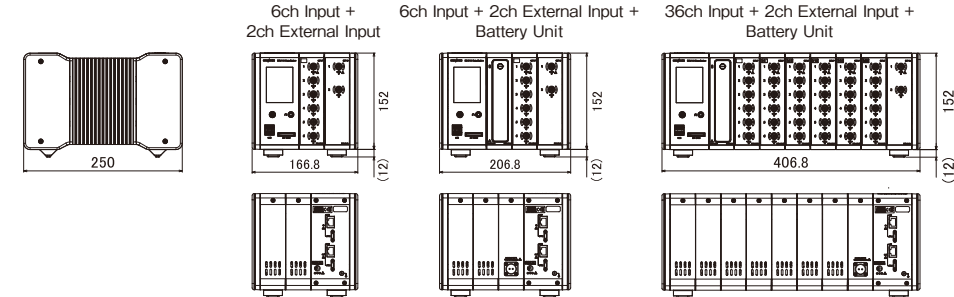*When using GN-1200 Noise Testing Software

■ Battery Unit(DS-0501)

External DC power input voltage	DC 10 to 28 V
Drive time	Approx. 4 hours · at outside temperature of 25 ℃ · when using DS-5100 + DS-0526
Charging time	Approx. 4 hours · main unit power off · at remaining amount of battery pack 0 %

■ General specifications (Min to Max configuration)

Operating temperature range	-10 ℃ to 50 ℃ (humidity 20 to 80 %RH, no dew condensation)
Storage temperature range	-20 ℃ to 60 ℃ (humidity 20 to 80 %RH, no dew condensation)
Cooling fan	Available (Silent fan) Sound power level: 38 dB or less when using DS-5000 48ch (Lw A-weighted) It operates when internal temperature rises.
Conforming to standards	Low Voltage Directive 2014/ 35/ EU standard EN61010-1 EMC Directive 2014/ 30/ EU standard EN61326-1 RoHS Directive 2011/ 65/ EU standard EN IEC 63000
AC adapter	Input voltage/ current AC 100 to 240 V, 50 to 60 Hz/1.2 MAX. Output voltage/ current DC19 V / 4.74 A
Other functions	Automatic sampling calculation, noise cancellation, sensor signal error detection, NG cancellation, measurement target work piece specification setting, file backup, shortcut key setting

*For the DS-5000 Hardware, a detailed brochure is available separately, so please refer to our website.

DS-5000 Outer dimensions

6ch Input +
2ch External Input

6ch Input + 2ch External Input +
Battery Unit

36ch Input + 2ch External Input +
Battery Unit

DS-3000 Hardware Specifications

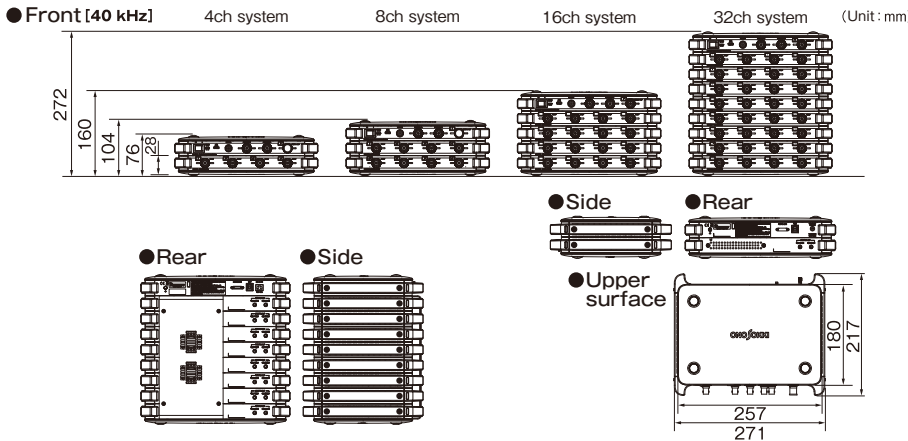■ Input main Unit DS-3200 + (40 kHz 2/4ch Input Unit)

Frequency range	DC to 40 kHz
Number of processing channels	2ch to 32ch
External trigger input	Input voltage range:±12 V, 0 to 300 kHz (with out-of-band filter) Detection level: -12 to 12 V in increments of 0.025 V Slope: + (rising) or - (falling), 0.5 to 1024 P/R, 1 to 1024 division function When rotation pulse is input (1 P/R), the detection speed range 60 to 192,000 r/min is available.
Monitor output	Output the standardized signal by voltage range from the rear panel of output unit. (max. 1 Vrms) *When an acoustic filter is used, the output is the signal which passed through the filter.
Monitor output terminal	φ3.5 stereo mini jack Number of terminals: 1 (DS-0362), 2 (DS-0364) /Input Unit
Power supply voltage/ Power consumption	AC100 to 240 V, DC 10.5 to 16.5 V, 25 to 95 VA (at DC 15 V)
Cooling fan	Provided as standard when 5 or more units are system
Operating temperature range	0 to 40 ℃ (no dew condensation)
Storage temperature range	-10 to 60 ℃ (no dew condensation)
Conforming to standards	CE marking

■ Input Unit DS-0362 / 0364

Number of input channels	2ch/ 4ch
Input coupling	DC or AC (-3dB at 0.55 Hz)
Isolation	Nil
Input voltage range	10 mVrms to 10 Vrms (7-range, 10 dB-step)
A/D convertor	24 bit ΔΣ type
Dynamic range	110 dB or more (40 kHz range, 0 dBVr range, analysis for 2048 points)

*For the DS-3200Hardware, a detailed brochure is available. Please contact us.

DS-3000 Outer dimensions

●Front [40 kHz]   4ch system   8ch system   16ch system   32ch system   (Unit : mm)

●Side   ●Rear

●Rear   ●Side   ●Upper surface

Related products

Measurement Microphone, Preamplifier MI series

Model name	MI-1235	MI-1433	MI-3111
Frequency range	10 Hz to 20 kHz	20 Hz to 8 kHz	10 Hz to 20 kHz(±1.0 dB、1 kHz reference)
Outer dimensions(mm)	ø13.2×13.7	ø13.2×13.5	ø12.7×63.5

Tri-axial Accelerometer NP series

Model name	NP-3550	NP-3564N10
Sensitivity	1.02 mV/(m/s²) ±20 %	10 mV/(m/s²) ±10 %
Frequency range	Xaxis: 2 Hz to 5 kHz±5 % Y・Zaxis: 2 Hz to 8 kHz±5 %	X・Yaxis: 2 Hz to 7 kHz±5 % Zaxis: 2 Hz to 10 kHz±5 % X・Yaxis: 0.5 Hz to 10 kHz±3 dB Zaxis: 0.5 Hz to 18 kHz±3 dB
Outer dimensions (mm)	6.35(W)×6.35(D)×6.35(H) (excluding protruded section)	10(W)×10(D)×10(H) (excluding protruded section)

Rotation detector MP series

Model name	MP-9100	MP-9820
Gear module	1 to 3(Tooth width 4 mm or more)	0.5 to 3(Tooth width 3 mm or more)
Frequency range	200 Hz to 35 kHz	1 Hz to 100 kHz
Outer dimensions (mm)	ø20×58.5 (excluding protruded section)	ø22×75 (excluding protruded section)

*Cable is sold separately.

Sound Level Meter LA-7000 series

Model name	LA-7500		LA-7200
Applicable standard	Class 1		Class 2
Measurement frequency range	10 Hz to 20 kHz	1Hz to 20kHz*	10 Hz to 8 kHz
Measurement level range (JIS、IEC)	A: 24 to 138 dB Z: 50 to 138 dB* C: 32 to 138 dB G: 35 to 138 dB* Z: 38 to 138 dB		A: 23 to 138 dB C: 30 to 138 dB Z: 36 to 138 dB
Memory function	Stored in an SD/SDHC card (SDHC card: up to 32 GB.)		

*Available with the Ultra low frequency sound measurement function

4.3-inch LCD with color backlight (touch panel type) Measuring while listening to sound by Listening function

Sound Calibrator SC-2500A/2120A

There are both Class 1 for the most accurate check and Class 2 for more general check available.

■ Overview

Model name	SC-2500A	SC-2120A
Applicable standard	Class1	Class 2
Method	Speaker	
Applicable products	1/2 inch Microphone　MI-1235 / 1271 /1433 1/4 inch Microphone　MI-1531 (1/4 inch adapter SC-0313 is required.) High performance Sound Level Meter LA-7000 series：LA-7200 / 7500 / 7700 Integrating-average Sound Level Meter：LA-1411 / 1441A / 4441A	1/2 inch Microphone：MI-1431 / 1432 / 1433
Sound pressure level	Nominal sound pressure level　：114 dB Deviation of sound pressure level：±0.20 dB or less*	Nominal sound pressure level　：94 dB Deviation of sound pressure level：±0.5 dB or less*

*Under the standard environment (reference environmental condition: air temperature: 23 ° C, static pressure: 101.325 kPa, relative humidity: 50 %)

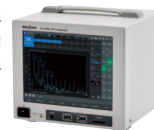## Sensitivity Calibrator for Accelerometers VX-1100A

■ Overview

Excitation frequency	159.2 Hz±1%
Excitation acceleration	10 m/s² (rms) ±3 %
Excitation velocity	10 mm/s (ms) ±4 %
Excitation displacement	10 μm (rms) ±5 %

Compact, lightweight sensitivity calibrator having three functions of an exciter, sensor amplifier and display

FFT Comparator CF-4700A

The FFT Comparator CF-4700A is an optimal pass/fail judgment device for precise quality inspection by analyzing sounds and vibrations from products. It enables pass/fail judgment by extracting specific frequency components.

■ Overview

Number of channels	1ch
Input connector type	C02 type (BNC)
Processing functions	Time-axis waveform, Power/Fourier spectrum, 1/1 octave (bundled), 1/3-octave (bundled), Amplitude probability density function, Amplitude probability distribution function
Frequency range	1 Hz to 40 kHz
Input voltage range	1 Vrms ， 31.62 Vrms (2 ranges)
Dynamic range	110 dB or more
Items sampled and analyzed	Max.16384/6400
Analog filter	High pass filter （HPF） 1 Hz, 3 Hz, 10 Hz Low pass filter （LPF） 1 kHz, 10 kHz The HPF 10 Hz and LPF 1 kHz conforms to the vibration severity standard. (third-order Butterworth filter, ISO 2954)

Vibration comparator VC-2200/3200

The VC-2200/3200 Vibration Comparator is a high-performance signal processor that receives signals from an accelerometer and is capable of detecting, measuring and judging such as machine abnormalities, confirmation of vibration levels and level judgment based on vibration values.

■ Overview （VC-2200）

Number of input channels	1ch
Analysis section	Band filter ； （Number of bands: 2) HPF/LPF: THR, 100, 300, 500, 1 k, 3 k, 5 k, 10 k (Hz)
Processing	Selectable from RMS, PEAK, PEAK/PRF, MAX HOLD, PEAK HOLD and PRF HOLD. Can display results respectively for each measured band.
Comparator output	Independent judgment for each band. Capable of making judgment of rms values, peak values and peak max rms values independently for each band.

Digital Tachometer TM-4000 series

The TM-4000 series can be customized by combining various functions such as BCD output, analog output, and comparator output to suit the external device to be connected.

■ Overview （TM-4100 series）

Number of Input channels		1ch
Input amplification format		Selectable from AC or DC
AC amplifier	Sine wave input	0.2 to 30 Vrms
	Square wave input	0.6 to 42 Vp-p
	Input frequency	1 Hz to 100 kHz
DC amplifier	Input signal	Square waveform having a pulse width of 4 μs or more
	Input voltage range	Hi: 4 to 30 V/Lo: -1 to 1 V
	Input frequency	0.05 Hz to 100 kHz
	Time measurement	10 ms to 3600 s