### VC-2200 / 3200 Series

**Display Section**
- **Display**: LCD with backlight
- **Measurement values display**: 4-digit digital display (update time: 0.5 seconds)
- **Bar chart indicator**: selectable from linear-logarithmic display (update time: 0.1 seconds)
- **Comparator level display**: Lights in red when input range over or calculation over occurs.
- **NG indicator**: Lights in red in the case of comparator NG output.
- **Comparator ON/OFF**: Lights in green when comparator is active.

#### Specification

<table>
<thead>
<tr>
<th>Over output</th>
<th>VC-2200</th>
<th>VC-3200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type range over and A/D over open collector output (positive logic)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. applied voltage 30 VDC between OVER OUT and NG</td>
<td>Max. applied voltage 30 VDC between ALARM OUT and ALARM COM</td>
<td></td>
</tr>
<tr>
<td>Max. sink current 25 mA</td>
<td>Max. sink current 25 mA</td>
<td></td>
</tr>
<tr>
<td>Insulation withstand voltage 42 VDC (between OVER OUT and NG)</td>
<td>Insulation withstand voltage 42 VDC (between ALARM OUT and ALARM COM)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NG output</th>
<th>VC-2200</th>
<th>VC-3200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outputs when input range over or set value or under</td>
<td>Outputs when input range over or set value or under</td>
<td></td>
</tr>
<tr>
<td>(Open collector output: Setup selectable from positive and negative logic)</td>
<td>(Open collector output: Setup selectable from positive and negative logic)</td>
<td></td>
</tr>
<tr>
<td>Max. applied voltage 30 VDC between A.COM-M.COM-C.COM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. sink current 25mA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Detector
- **Model**: VC-2201
- **Product name**: Low Frequency Bandpass Filter
- **Model**: VC-2221
- **Product name**: Intermediate Frequency Bandpass Filter
- **Model**: VC-2241
- **Product name**: High Frequency Bandpass Filter

#### Option
- **Model**: VC-2220
- **Product name**: Integration Software
- **Model**: VC-2221
- **Product name**: High Frequency Bandpass Filter

#### Signal Cable for NP-3313N/PNP-3311B
- **Model**: NC0143
- **Model**: NC0144
- **Length**: 5m
- **Length**: 10m
- **Length**: 20m
- **Length**: 30m

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ONO SOKKI caters to all your needs with respect to vibration detection, measurement, and judgment. There is a wide range of situations in which vibration-based judgments must be made, such as product quality judgment, machinery operation monitoring, facilities diagnosis, and damaged cutting tool detection.

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

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VC-2200 / 3200 Series

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CAT.NO.040-02E Printed in Japan 179 960 1K
VC-2200/3200 Series

The VC-2200 and VC-3200 Vibration Comparators are high-performance digital signal processors that offer three basic functions: detection, measurement, and judgment. The comparators accept signals from accelerometers to detect abnormalities in machines (detection), monitor vibration levels (measurement), and judge vibration levels based on measurements (judgment).

In contrast with conventional measurement devices such as vibrometers, the VC-2200 and VC-3200 can simultaneously process two frequency bands and thus quantify sensory inspection results, which has been difficult previously. Not only for continuous monitoring applications, the comparators can also be used as vibrometers.

Functions featured

**TEDS function**
- VC-2200/3200
  - No more sensor setting errors! Saves you time and effort of measurement preparation!

**Headphone volume MUTE function**
- VC-2200/3200
  - Ear protection from an impact noise when mounting a sensor

**Bar chart display function**
- VC-2200/3200
  - (linear/logarithmic selectable)

**Setting/reading of measurement conditions by one command**
- VC-2200/3200
  - You can change from one condition setting to another to inspect a different kind of product

Power Average Calculation/Judgment Function

**Feature analysis**
- Data collection of multiple good products and defective products

**Determining a frequency band for abnormality extraction**
- e.g. 30 Hz to 5 kHz

**Determining a threshold value for judgment**
- e.g. 1.00 m/s²

**Performance of the judgment**
- Judgment using the VC-3200

ISO 2954: 2012 conforming filter
- VC-3200
  - Conforms to ISO 2954: 2012 "Mechanical vibration of rotating and reciprocating machinery"
VC-2200/3200 Series

The VC-2200 and VC-3200 Vibration Comparators are high-performance digital signal processors that offer three basic functions: detection, measurement, and judgment. The comparators accept signals from accelerometers to detect abnormalities in machines (detection), monitor vibration levels (measurement), and judge vibration levels based on measurements (judgment).

In contrast with conventional measurement devices such as vibrometers, the VC-2200 and VC-3200 can simultaneously process two frequency bands and thus quantify sensory inspection results, which has been difficult previously. Not only for continuous monitoring applications, the comparators can also be used as vibrometers.

Extracting necessary information from entire vibration data

Condition memory and data memory function

Memory function (VC-3200 only)

Enables memorizing up to 9 judgment conditions depending on each product by means of the condition memory function. The data memory function contributes to store and check inspection data.

Judgment based on quantitative values

Judgment function (computer analog)

Quantitative judgment is based on measured values, and a judgment (defective) signal is output. This feature is useful in line inspection and for remote monitoring using PCs.

Look and judge

Digital display function

In addition to displaying the vibration values digitally, a bar chart presents a visual presentation of the vibration condition, enabling ease of reading, and an alarm lamp used in the past. This function allows numerical value management of vibration, and helps quality improvement.

Frequency band setting function

Band variable processing function

Extracting abnormalities specific to each product enables accurate level judgment. The different frequency bands can be set, and rms peak and values can be selected for each band. Simultaneous measurement and judgment is also possible.

Power Average Calculation/Judgment Function

VC-3200

Determining a judgment condition

Determining a frequency band for abnormality extraction
e.g. 30 Hz to 5 kHz

Determining a threshold value for judgment
e.g. 1.00 m/s²

Performance of the judgment

Judgment using the VC-3200

Feature analysis

Determining a judgment condition

Data collection of multiple good products and defective products

Judgment value

Value of defective product

Value of good product

Disregard value of products

Judgment using the VC-3200

ISO 2954: 2012 conforming filter

Conforms to ISO 2954: 2012 "Mechanical vibration of rotating and reciprocating machinery."
**Information About Vibration Measurement**

### Why bands?

The frequency band in which vibration occurs depends on the nature of the phenomenon that causes the vibration. The VC-2200/3200 uses digital filtering to set the frequency band in which particular types of vibration might occur, thereby enabling independent monitoring and diagnosis for each phenomenon.

### The relationship between band, parameter and mode

The relationship between vibration parameter and mode often used in equipment diagnosis:

- **Intermediate frequency**
  - Frequency range: 100 Hz to 1 kHz
  - The frequency band in which vibration occurs depends on the nature of the phenomenon causing vibration.

### Vibration and sense facilties

- **Vibration level**
  - Measured object: vibration from rotating machinery
  - Frequency distribution of abnormal vibration

- **Parameter**
  - Measured object: vibration

- **Mode**
  - Measured object: vibration

### What is “the peak/maximum rms value factor” (peak/maximum rms value)?

In order to judge the degree of bearing’s flaw, the peak/maximum rms value factor is effective. It is calculated with a peak value or rms value.

The peak/maximum rms value factor is effective in such cases.

### Frequency distribution of abnormal vibration from rotating machinery

**Vibration level**

**Parameter**

**Mode**

### Frequency bands A and B

Frequency bands A and B are established from 11 to 12 and from 13 to 14, respectively, by selecting frequencies 11 through 14. The ability to use a variety of combinations facilitates a detection and measurement strategy that suits the phenomenon being observed. It is also possible to select diagnosis based on either the rms value or the peak value in each band individually.
Information About Vibration Measurement

VC-2200/3200 Series

Why bands?
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The relationship between band, parameter, and mode often used in equipment diagnosis

Vibration and sensor faciltities

Frequency distribution of abnormal vibration from rotating machinery

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Measurement System

VC-2200/3200 Series

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Peripherals

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Signal Cable for NP-3313N0/NP-3313B

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Miniature/BNC Conversion Adapter

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Magnet Base

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Accelerometer (sold separately)

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Signal Cable (sold separately)

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Bearing 1
Good product

The vibration of bearing 1 has a large amplitude, but is stable (good product).

Bearing 2
Defective product

The vibration of bearing 2 has a small amplitude, but shock waves due to flaws or foreign matter are observed (defective product).
**Total Support for Detection, Measurement, and Diagnosis**

"Band variable processing function" detects bearing damage and wear in a single pass.

**Actual size**

---

**Compact size DIN 96x96 mm**
- 2-band judgment function is packed into this compact size body.

**RS-232C interface**
- Enables to connect to the PC and allows extension.

**Superb diagnosis capability using rms and peak values**
- The rms and peak values can be used for diagnosis in each band individually, enabling enhanced precision diagnosis of complex machine vibrations.

**TEDS key**
- Avoids errors of sensor sensitivity setting, and reduces labor during sensor replacement.

**Verification of vibration sound**
- By connecting commercially available headphones, it is possible to monitor the vibration sound. An output of the vibration sound for each band is provided enabling verification of particular vibration phenomena.

**Easy operation**
- Enables direct keys for frequent used functions to be directly set, enabling the optimum settings to be made while observing the vibration condition.
- Measurement mode selection: RMS, PEAK, MAX HOLD (maximum rms value hold), and PEAK HOLD (peak value hold)
- Measurement screen switching and band setting: Comparator level setting. Setting is possible to suit a diagnosis criterion.
- Other chart scale change: Input range setting; optimum range setting to suit the vibration condition.

**Digital and bar chart display of vibration values**
- High-accuracy analysis is performed in accordance with analysis conditions, and vibration values and vibration condition are displayed (bar chart display).
- By displaying measurement screens for each band separately, you can select the display screen that you want to see.

**Provides essential sophisticated features**
- Measurement and diagnosis of vibration is a complex process, and demands highly precise results. The VC-2200/3200 provide high-level precision and detailed conditions settings, to meet other tough measurement and diagnosis requirements.

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**Automated Data Collection Made Easier**

**Wiring diagram (VC-2200)**

**Recommended interface circuit**

**VC-2200/3200 Series**

---

**Over output RS-232C**
- A band comparator outputs (open collector output)

**Band and variable processing function**
- Detects bearing damage and wear in a single pass.

**Superb diagnosis capability using rms and peak values**
- Easy operation direct keys

**DIN 96×96 mm**
- Compact size
- Digital and bar chart display
- Provides essential sophisticated features

---

**Features**

**Compact size DIN 96x96 mm**
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  - The rms and peak values can be used for diagnosis in each band individually, enabling enhanced precision diagnosis of complex machine vibrations.
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**Automated Data Collection Made Easier**

**Wiring diagram (VC-2200)**

- **Power supply:** 24 VDC
- **Ground**
- **Terminal**

**Recommended interface circuit**

- **External signal input**
  - At non-voltage contact input
  - At open collector input

- **Comparator output**
  - VC-2200/3200 output

**VC-2200/3200 Series**

**VC-2200 Terminal diagram**

**VC-3200 Terminal diagram**

**VC-2200/3200 Series Features**

- **Compact size**
- **RS-232C interface**
- **TEDS key**
- **Verification of vibration sound**
- **Easy operation direct keys**
- **Superb diagnosis capability using rms and peak values**
- **Verification of vibration sound**
- **Digital and bar chart display of vibration values**
- **Provides essential sophisticated features**

**VC-2200/3200 Series Specifications**

- **Power supply:** 24 VDC
- **Ground**
- **Terminal**

**VC-2200/3200 Series Dimensions**

- **Compact size DIN 96 x 96 mm**
- **External size:** 96 x 96 x 25 mm

**VC-2200/3200 Series Accessories**

- **External signal inputs**
- **Comparator gate**
- **Reset input terminal**
- **Key protection input**

**VC-2200/3200 Series Features**

- **Total Support for Detection, Measurement, and Diagnosis**
- **Digital and bar chart display of vibration values**
- **Easy operation direct keys**
- **Superb diagnosis capability using rms and peak values**
- **Verification of vibration sound**
- **Provides essential sophisticated features**
Product inspection

In shipping inspection of products, sensory inspections by operators such as touching with hands and listening for abnormal sounds are often used for making judgments. However, these types of inspections suffer from variability in quality, higher labor costs, and lack of quantitative values, leading to different judgments among inspectors. As a result, the entire list must be repeated when a defect is found. The VC-2200 and VC-3200 enable quantitative judgment, thus improving product quality and reducing labor cost.

Inspection of motors before delivery (inspection of abnormality)
The VC-2200/3200 enable automatic inspection of products by replacing the sensory inspection (especially for the listening check) by operators. Can make Pass/Fail judgment by overall vibration value of motor as well as detecting the problem of internal bearings by specifying and taking measures of the frequency band which leads to the abnormality.

Inspection of pumps before delivery (inspection of rattling/abnormal sound)
As an inspection of pumps or the like before delivery, visual checking by stroboscope and listening check using stethoscope are popular. The VC-2200/3200 enable automatic inspection according to the numerical values. Also enable to make Pass-Fail judgment by overall vibration values (velocity and displacement) of the pump as well as inspection of the wrong assembly of internal bearings.

Inspection of compressors (inspection of abnormal sound)
As an inspection of abnormal sound from compressors, listening check by operator is popular. You could choose another method using sound level meter as it is an inspection of abnormal sound, but it requires enough space and much cost for an anechoic box in order to reduce the influence of the back ground noise. As an alternative to these methods, the inspection which is focused on the vibration is performed. Processing the band-limited frequency allows the detection of abnormal sound and automatic determination.

Inspection of chipped resin gear teeth
This example shows how to detect the damages (deformation, flaws) to resin gear teeth and foreign objects trapped inside the equipment which are used for audio visual systems and office automation apparatus. This system using the VC-2200/3200 vibration comparator allows quantification of the abnormalities and automatic determination, instead of the listening check by operators. Also, it ensures that all products are inspected for consistent quality on production line.

Inspection of engines before delivery (inspection of knocking / abnormal sound)
Detection of abnormal sound from actuators for side mirror

Detection of abnormal sound of steering pumps
Abnormal sound during steering wheel operation may be caused by the steering pump in vibration of rubbing parts. Inspection before delivery is normally performed by operators installing the pump on a jig and listening to the sound generated by turning the steering wheel. The VC-3200 detects abnormal sounds using vibrations from a sensor attached to the Workplace. Detecting the required vibration with band-pass filters as well as judgment allows automatic judgment, which helps to achieve stable product quality. Since there is a specific timing of abnormal sound due to the structure of the pump, the measurement timing is controlled using gate signals.

Detection of abnormal sound from actuators for side mirror

Inspection of a nick on gear boxes
Detecting nicks on a gear at the inspection before delivery

Inspection of a nick on gear boxes
As an inspection whether there is a nick or not on the gear box, sensory test by operators (touching with hand, listening the difference with stethoscope probe) is popular. This way of inspection cannot avoid human-error and variation in quality. The determination by quantitative value is necessary in order to improve the quality and stable supply of product. The VC-3200 can detect whether there is a nick or not on the product and make determination by quantitative value.

Detection of a nick on gear boxes

Inspection of rattling from washing machines

The vibration from washing machines greatly affects the product value. For an inspection of vibration, they use equipment such as sensors or accelerometers; however, the determination is made by operators with visual check. In this example, the VC-0423 Integration Software (option) enables direct reading of the amplitude value and automatic determination. It contributes to the cost reduction and stable quality.
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In shipping inspection of products, sensory inspections by operators such as touching with hands and listening for abnormal sounds are often used for making judgments. However, these types of inspections suffer from variability in quality, higher labor costs, and lack of quantitative values, leading to different judgments among inspectors. As a result, the entire lot must be rejected when a defect is found. The VC-2200 and VC-3200 enable quantitative judgment, thus improving product quality and reducing labor cost.

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Detecting nicks on a gear at the inspection before delivery.

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The vibration from washing machines greatly affects the product value. For an inspection of vibration, they use equipment such as sensors or vibrometers; however, the determination is made by operators with visual check. In this example, the VC-0423 Integration Software (option) enables direct reading of the amplitude value and automatic determination. It contributes to the cost reduction and stable quality.
Inspection of rice cookers before delivery

Abnormal sound from camcorders or digital cameras

Detection of abnormal sound from camcorders or digital cameras

Inspection of small fans before delivery

Detection of cracks in products during the press process

Inspection of small fans before delivery

Abnormal vibrations from machines during machining processes greatly affect the accuracy of finished products. If an abnormal vibration occurs in an endurance test of products, the testing equipment must be stopped immediately to prevent serious damage. It is therefore important to monitor the operation of the equipment and to stop it when an abnormal operation occurs.

The VC-2200 and 3200 allow monitoring of abnormal operation. They also enable the testing equipment to be emergency stopped by using comparator output in the event of abnormal operation.

VC-2200/3200 Series

Application Examples 2

Endurance test of engines

When an abnormal vibration is generated during a knocking test or an endurance test of engines, the operation must be stopped. In particular, an abnormal vibration in an unattended operation or unexpected abnormality might cause serious damage to the system. Therefore, monitoring vibrations is necessary to avoid this kind of accident. This application enables control of machinery by constantly monitoring vibrations in an unattended operation. For example, the VC-2200 outputs NG signal to bring an emergency stop of operation when abnormal vibration is generated.

Endurance test of hub unit (bearing)

The endurance test of a bearing is conducted by applying a load to the bearing which is rotated for a given period of time. Damage inspection is performed either by removing the bearing after a certain period of operation and visually checking for damage, or through judgment based on the sound and vibration during operation. However, these tests mostly consist of unattended operations, and the testing equipment may be damaged if an abnormality in the bearing is not noticed. The VC-2200 allows bearing vibrations to be monitored at all times. If an abnormal vibration occurs, it outputs an NG signal, enabling the testing equipment to be emergency stopped, for example.

Endurance test for a transmission (gear)

For a transmission, endurance test is necessary because of its hard usage. The endurance test is performed under high load over long operation. As damages of gear or bearing can lead to destruction of tester, abnormality must be detected to stop system urgently. The VC-2200 enables control of machinery such as an emergency stop by constantly monitoring vibration from bearing and outputs NG signal when abnormal vibration is generated.

Monitoring for abnormal vibrations during gear machining process

Abnormal vibrations generated during gear machining are a major cause of defects. The vibrations may be caused by worn or chipped cutters, or failure of the machine itself. Machined gears are inspected visually by operators or by using dedicated equipment. However, 100% inspection by these methods takes much time and effort. The VC-2200 can simultaneously monitor abnormalities in rotation of first order (rattling of the machine) and abnormalities due to damaged cutters (vibrations in the high frequency range) by using bandpass filters. This prevents defective products from being produced and going to the subsequent processes, and also facilitates 100% inspection, thus greatly improving quality and reducing labor cost.
Monitoring for abnormal machine operations

Abnormal vibrations (such as chattering of machines) during machining processes greatly affect the accuracy of finished products. If an abnormal vibration occurs in an endurance test of products, the testing equipment must be stopped immediately to prevent serious damage. It is therefore important to monitor the operation of the equipment and stop it when an abnormal operation occurs.

The VC-2200 and 3200 allow monitoring of abnormal operation. They also enable the testing equipment to be emergency-stopped by using comparator output in the event of abnormal operation.

Application Examples 2

Endurance test of engines

When an abnormal vibration is generated during a knocking test or an endurance test of engines, the operation must be stopped. In particular, an abnormal vibration in unattended operation or unexpected abnormality might cause serious damage of system etc. Therefore, monitoring vibrations is necessary to avoid that kind of accident. This application enables control of machinery by constantly monitoring vibrations in unattended operation. For example, the VC-2200 outputs NG signal to bring an emergency stop of operation when abnormal vibration is generated.

Endurance test of hub unit (bearing)

The endurance test of a bearing is conducted by applying a load to the bearing which is rotated for a single period of time. Damage inspection is performed either by removing the bearing after a certain period of operation and visually checking for damage, or through judgment based on the sound and vibration during operation. However, these tests mostly consist of unattended operation, and the testing equipment may be damaged if abnormality in the bearing is not reduced. The VC-2200 allows bearing vibrations to be monitored at all times. If an abnormal vibration occurs, it outputs an NG signal, enabling the testing equipment to be emergency-stopped, for example.

Endurance test for a transmission (gear)

For a transmission, endurance test is necessary because of its hard usage. The endurance test is performed under high load over long operation. As damages of gear or bearing can lead to destruction of tester, abnormality must be detected to stop system urgently. The VC-3200 enables control of machinery such as an emergency stop by constantly monitoring vibration from bearing and outputs NG signal when abnormal vibration is generated.

Monitoring for abnormal vibrations during gear machining process

Abnormal vibrations generated during gear machining are a major cause of defects. The vibrations may be caused by worn or chipped cutters or failure of the machine itself. Machined gears are inspected visually by operators or by using dedicated equipment. However, 100% inspection by these methods takes much time and effort. The VC-3200 can simultaneously monitor abnormalities in rotation of first order (rattling of the machine) and abnormalities due to damages in vibrations in the high frequency range (by using bandpass filters). This prevents defective products from being produced and going to the subsequent processes, and also facilitates 100% inspection, thus greatly improving quality and reducing labor cost.
Monitoring vibrations of bearings, gears and other parts of production facilities without attendance. Facility diagnosis is used to take a lot of work and time. Operators must measure and keep watching vibration from the facilities (bearing box, etc.) because the vibration change gives an indication to know the timing of parts' replacement or even abnormality. Moreover, unexpected abnormality may cause the serious breakage of the facilities. The VC-2200 and VC-3200 can continuously monitor vibrations to detect unusual movement, prevent them from serious breakage and save the labor. The frequency band can be specified that might indicate the abnormality.

Monitoring vibrations from broken runner vane/corn of water-wheel (dam)

When a water-wheel, which is a heart of hydropower generation, is broken, it causes decrease in power generation efficiency as well as breakage in other parts. Early detection of abnormality and maintenance are important. As abrasion or breakage appears in abnormal vibrations, monitoring vibrations is an effective way to detect abnormality. The VC-3200 vibration comparator can monitor vibrations periodically, detect abnormal vibrations and output alarm signal. This application is helpful for predictive maintenance such as prevention of an accident.

Monitoring for abnormality in main shaft of machine tool

Deterioration of a bearing that supports the main shaft of a machine tool significantly affects the accuracy of parts machining. Even if maintenance such as greasing the bearing is conducted periodically, the deterioration time largely depends on the frequency of use. By using the VC-3200 to monitor the vibration of the main shaft, failures in the bearing can be detected in the early stages. Since bearing failures may not be accurately detected during machining due to vibrations in cutting operation, monitoring is performed at specific timings when the machine is running at idle.
VC-2200/3200 Series

**Monitoring for abnormal vibrations during production process of a liquid crystal cell**

Liquid crystal cell is produced with delicate work from forming, soling to injection of liquid crystal. Vibrations during a production process affects on product quality. Though result rate greatly affects on production cost, you cannot know performance of product until you actually run it at the time of final inspection in many cases. The VC-2200/3200 detect and determine vibrations during a production process. This application helps to prevent NG product or its outflow and to contribute stable quality.

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**Monitoring a sieve operation (chemical plant)**

When powder is shifted through a sieve, the sieve vibrates at smaller amplitude if it is closed. However, a sieve vibrates at larger amplitude if there is any abnormality in a way of installing equipment or motor. With the VC-2200/3200, you can constantly monitor the sieve whether the vibrations are in normal range.

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**Monitoring for abnormal vibrations of a wafer carrier system**

At semiconductor plant, abnormal vibrations during carrying conveyance between processes or in-process lead to damage of wafer in the conveyance. This application including the VC-2200/3200 monitors vibrations which are generated during carrying a conveyance and enables control such as stopping the conveying. It also can be used for monitoring of vibrations other than conveying such as detecting crack of wafer in each process.

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**Detection of fin-breaking in a diffuser**

Diffuser is operated for 24 hours and used in a severe condition. In particular, fin-breaking will lead to a serious accident. In this example, the VC-3200 constantly monitors the equipment, and it is useful for predictive maintenance by detecting an abnormal vibration earlier than prevention from an accident caused for wear. This application is promising on early detection in emergency situation including unexpected fin-breaking.

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**Detection of a cracked material during torsional testing**

To evaluate tolerance of material against torsion, a torsion tester is used. This example shows how to detect cracks on material by vibration. The vibration sensor is mounted on around a bearing of chuck (stationary side). The difference of frequency band between vibration in motor rotation and vibration from cracked material can be used for monitoring of vibration by using the band variable processing function of the VC-3200.

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**Application Examples 3**

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**Facility Monitoring**

Monitoring vibration to detect abnormality of bearings, gears and other parts of production facilities without attendance. Facility diagnosis used to take a lot of work and time. Operators must measure and keep watching vibration from the facilities (bearing box, etc.) because the vibration changes gives an indication to know the timing of preventive maintenance. If in abnormality. However, if a vibration is detected, it can be set up externally and used in small/medium monitoring system.

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**VC-2200/3200 Series**

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**Monitoring for abnormality in main shaft of machine tool**

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Detection of broken or worn machine tools

Detects drill bit break, tool bit break etc. of operating machine tool without attendance. For the machines which process quite a large quantity of parts, such as NC machine, unattended operation is employed. If the drill bit or other tool is broken during unattended operation, it causes defective products. Re-processing, or disposal of these defective products is not only waste but also of great waste of money. The VC-2200-3200 detects vibrations when the drill bit is broken and make stop the operation if occurred, as a result, minimize producing defective. Worn drill bit also lowers processing accuracy. Monitoring vibration change and checking the operation help to improve the processing accuracy.

Detection of worn or broken drills

This example shows how to monitor a drill of machine tool constantly to detect breakage or chip etc.). This application can reduce defective products and improve product quality.

Detection of wear of grinding wheels

In parts grinding processes, wear of grinding wheels is one of the factors that reduces the accuracy of finished pieces. Currently, the management of grinding wheels is based on the number and period of machining operations, so even good cutters are subject to periodic inspection. On the other hand, if abnormal wear occurs for some unknown reason, defective parts may be produced. Users typically want to effectively use cutters until the end of their service life to reduce cost. The VC-2200-3200 can detect imbalance caused by wear on the wheel, which helps to improve product quality and reduce costs.

Detection of broken blades of textile cutting machines

If a cutter blade is broken, all textile of the lot should be thrown away because the broken cutter blade may be remained in a textile. Detecting a breakage of cutter blade is indispensable to prevent such a large loss. Today, metal detector or the like monitors whether a broken edge is mixed in textile or not. The VC-2200 detects abnormal vibration to find breakage of a cutter blade. This application gives an alert with signal tower when it detects the breakage.

Detection of chip during fillet roll processing

The engine’s crank shaft is the heart of an engine, and its strength depends on fillet roll processing. Chipping during the fillet roll processing has not only a big influence on the product’s quality (squeaking or other abnormal sounds etc.) but may also cause defects. The VC-2200-3200 detects abnormalities during fillet roll processing. The band variable processing function of the VC-2200-3200 is useful for detecting the impact vibration of chipping during processing.
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Detection of chip during fillet roll processing

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VC-2200/3200 Series

### Application Examples 4

#### Detection of broken or worn machine tools

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**VC-2200/3200 Series**

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**VC-2200/3200 Series**

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**VC-2200/3200 Series**

### Specification

**VC-2200/3200 Series**

#### Input Section

- **VC-2200/3200 Series**
  - **VC/2200**: Can display results respectively for each measured band.
  - **VC-3200**: Can display results respectively for each measured band.
  - **Input channels**: Selectable from before
  - **RMS (root mean square)**: Selectable from before
  - **Select**: RMS root mean square value
  - **Time constant**: 125 Ms/255 Ms/s 1 selectable
  - **Peak value**
  - **ABSOLUTE peak value of time waveforms**
  - **MAXhold**
  - **Hold maximum ms value**
  - **Peak hold**
  - **Hold maximum peak value**

**VC-2200/3200 Series**

**VC/2200**: Can display results respectively for each measured band.

**VC-3200**: Can display results respectively for each measured band.

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**VC-2200/3200 Series**

#### Processing Section

**VC/2200**: Can display results respectively for each measured band.

**VC-3200**: Can display results respectively for each measured band.

**Input channels**: Selectable from before

**RMS (root mean square)**: Selectable from before

**Select**: RMS root mean square value

**Time constant**: 125 Ms/255 Ms/s 1 selectable

**Peak value**

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**MAXhold**

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ONO SOKKI caters to all your needs with respect to vibration detection, measurement, and judgment.

There is a wide range of situations in which vibration-based judgments must be made, such as product quality judgment, machinery operation monitoring, facilities diagnosis, and damaged cutting tool detection.

URL: https://www.onosokki.co.jp/English/english.htm