Motor Condition Monitoring Devices
K6CM series

K6CM takes the burden of monitoring off maintenance engineers.
Stay alert to signs of motor failure through monitoring conditions.

- K6CM's threshold setting keeps users informed of maintenance timing
- "Motor Condition Monitoring Tool" for PCs
- Clamp-type CT which is easy to install on existing equipment
No need for time-consuming patrol inspection or expertise.

K6CM informs you of the motor's maintenance timing.

It's difficult to prevent motor issues caused by degradation.

The conventional motor condition check had several check items. Therefore, a skilled maintenance engineer was required to judge the motor's maintenance timing. Additionally, inspection was time-consuming because there were many motors.

Example of patrol inspection items

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Vibration</th>
<th>Heat generation</th>
<th>Decreased electrical resistance</th>
<th>Overcurrent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bearing wear</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Insulation degradation</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Overload</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Open phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Motor failure mode

- Abnormality of rotary shaft
- Overload
- Cavitation (for pumps)
- Bearing wear
- Insulation degradation

AWARDS

K6CM Motor Condition Monitoring Devices

- Development Award of the TPM Award for Excellent Products 2018
- GOOD DESIGN AWARD 2018
K6CM (comprehensive current diagnosis type) can consistently monitor motor conditions by observing the current waveform of the motor. Additionally, you can understand the motor’s maintenance timing without depending on an engineer, because K6CM provides threshold value setting.

Motors can be maintained in advance of failure due to degradation.

<table>
<thead>
<tr>
<th>Degradation level</th>
<th>Threshold level</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Failure critical&quot;</td>
<td>&quot;Failure critical&quot;</td>
</tr>
<tr>
<td>&quot;Failure warning&quot;</td>
<td>&quot;Failure warning&quot;</td>
</tr>
<tr>
<td>&quot;Normal&quot;</td>
<td>&quot;Normal&quot;</td>
</tr>
</tbody>
</table>

What is comprehensive current diagnosis?

When an abnormality occurs in the load such as bearing, rotary shaft, or reducer, the motor does not rotate smoothly and a distortion occurs in its current waveform. K6CM measures its distortion as a degradation level.

* The screen is a sample image.

With a factory floor signal light

With an office PC

With the accessory software "Motor Condition Monitoring Tool", you can monitor motor conditions remotely.

Monitors the 3-phase induction motor which is the driving force of every facility.
Easy setup!

To perform monitoring, simply clamp the CT to the power line connected to the three-phase induction motor.

K6CM-CIM
Comprehensive current diagnosis type

Alarm bar display
- Green : Status normal
- Yellow : Failure warning
- Red : Failure critical

Switches the units of the measured value displayed
- [CIM] : Degradation level
- [A] : Current

CT
K6CM-CICB

Detects abnormalities of three-phase induction motors

When an abnormality occurs in a three-phase induction motor, a change occurs in the “stator” and “rotor” of the motor, which affects the current waveform. Comprehensive current diagnosis makes it possible to capture condition changes by comparing the normal current waveform (ideal sine wave) and abnormal current waveform.

Also detects load abnormalities

When a load abnormality occurs, the current waveform of the motor changes, which allows the load abnormality to be detected.

Note: Applicable motor type: three-phase induction motor
**type 02** Monitors bearing abnormalities through vibration and temperature

**K6CM-VBM**

**Vibration & temperature monitoring type**

- **Detects abnormalities in bearings**
  - By constantly monitoring for vibrations, it can detect signs of abnormalities in bearings and the like as soon as possible.

- **Constantly monitors temperature**
  - The surface temperature of the routinely inspected motor can be measured at the same time as vibrations.
  - This eliminates the need to measure the temperature on site.

Pre-amplifier and vibration & temperature sensor K6CM-VBS

**type 03** Constantly monitors the insulation resistance

**K6CM-ISM**

**Insulation resistance monitoring type**

- **Measures insulation resistance**
  - With conventional products, measurement with a Megger Tester was necessary to check for insulation degradation. K6CM-ISM can be used to perform this inspection during operation, making it possible to constantly monitor degradation trends while reducing the burden on the maintenance personnel.

- **Measures insulation resistance on secondary side of inverter**
  - The "insulation resistance" of the motor can be measured even if an inverter is used.

ZCT K6CM-ISZBI
Features  Three functions for monitoring motor condition

1. Visual inspection through alarm bar display and two-step output

**Alarm bar and output function**

The K6CM series is equipped with an "alarm bar display" on the front of the product. The condition of motor is displayed by color-coding as green, yellow, or red. This shows the degree of abnormality and is helpful for visual inspection near the motor. Accordingly "failure warning" and "failure critical" statuses are also output.

2. Monitors stable values even when load fluctuates

**Trigger input function**

Equipped with a "trigger input function" that measures the measurement timing according to the motor operation in order to accurately diagnose the condition of motors that are repeatedly started and stopped. The motor condition is determined from the operation signals (auxiliary output of the contactor and the PLC control signal), and measurement is only performed when the motor operation is stabilized, enabling fixed point observation on a daily or monthly basis under the same conditions.

3. Self-diagnosis function that improves system reliability

**Self-diagnosis function**

When constantly monitoring for a long period of time, unexpected failures and other problems of measuring devices must be taken into consideration. The K6CM series is equipped with a self-diagnosis function as standard. The reliability of the system is improved by monitoring the service life of the device to be measured.

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Our shared Value Design for Panel (herein after referred to as Value Design) concept for the specifications of products used in control panels will create new value for our customers’ control panels. Combining multiple products that share the Value Design concept will further increase the value provided to control panels.
Motor Condition Monitoring Tool

The setting and monitoring tool software "Motor Condition Monitoring Tool" and the K6CM series are linked. Both allow the motor condition to be monitored visually with green, yellow, and red color-coding.

Motor condition list display

The conditions of up to 10 motors are displayed as a list through the K6CM series connected to the network. The data of up to 30 K6CM units can be viewed. (Three types of K6CM can be installed to one motor)

Displays condition list at same time as device displays

Error history display

Displays the alarm statuses of multiple motors. Allows changes in the motor condition to be checked as a time series.

Trend graph display

Allows the measured value trends to be checked on graphs.

Initial setting

Initial settings of the K6CM series such as trigger input settings, motor information registration, network settings, and threshold adjustment can be made from a PC.

Data can be output as a CSV file

Measured and accumulated data can be output in CSV format. This is useful for creating reports and statistical materials.
Degradation progress/failure mode correspondence table

After installing a three-phase induction motor, performing proper maintenance by monitoring the motor condition will prolong its service life. Please select the optimal model for the type of abnormality you want to detect.

**Failure mode**

<table>
<thead>
<tr>
<th>Inside the motor</th>
<th>Outside the motor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insulation degradation</strong></td>
<td><strong>Load abnormality</strong></td>
</tr>
<tr>
<td><strong>Bearing abnormality</strong></td>
<td><strong>Abnormality of rotary shaft</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Setup period** | **Operation period**

**Early operation** | **Grease degradation**

**Adjustment** | **Early operation**

Faulty installation
Faulty centering etc.

Faulty mounting
Faulty operating condition
Faulty load part

**K6CM series**

After installing a three-phase induction motor, performing proper maintenance by monitoring the motor condition will prolong its service life. Please select the optimal model for the type of abnormality you want to detect.
The condition of three-phase induction motors changes due to aging degradation. Detecting these changes allows you to monitor for abnormalities.

### Motor and load condition

<table>
<thead>
<tr>
<th>Degradation progress period</th>
<th>Breakdown period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation degradation</td>
<td>Insulation breakdown</td>
</tr>
<tr>
<td>K6CM-ISM</td>
<td>(Insulation resistance monitoring type) [Insulation degradation]</td>
</tr>
<tr>
<td>Bearing damage</td>
<td>Bearing breakdown</td>
</tr>
<tr>
<td>K6CM-CIM</td>
<td>(Comprehensive current diagnosis type) [Degradation level]</td>
</tr>
<tr>
<td>K6CM-VBM</td>
<td>(Vibration &amp; temperature monitoring type) [Velocity/Acceleration]</td>
</tr>
<tr>
<td>Degradation progress of motor</td>
<td>[Degradation level]</td>
</tr>
<tr>
<td>K6CM-VBM</td>
<td>(Vibration &amp; temperature monitoring type) [Velocity]</td>
</tr>
<tr>
<td>Degradation progress of load</td>
<td>[Degradation level]</td>
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<tr>
<td>K6CM-VBM</td>
<td>(Vibration &amp; temperature monitoring type) [Velocity]</td>
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