

Motor Condition Monitoring Devices

K6CM Series

Guard against motor failure with 24/7 condition monitoring

Load abnormality

CI Comprehensive current
diagnosis [Ver.UP] **NEW**

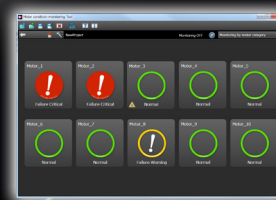
Bearing wear

VB Vibration & temperature
monitoring

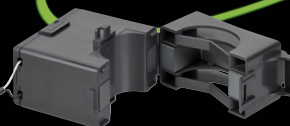
Insulation degradation

IS Insulation resistance
monitoring

- Perform predictive maintenance on motors
- Prioritize maintenance inspections
- Monitor up to 10 motors remotely using the included PC monitoring software
- Compatible with inverter motor control setups



EtherNet/IP[®]
Modbus



Perform predictive maintenance on motors with the K6CM

Reduce the amount of required manual inspections

[Problems]

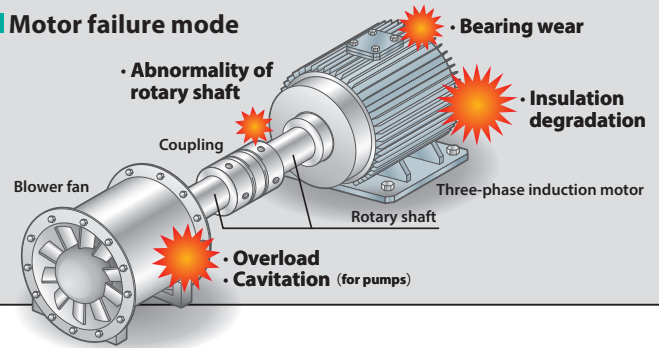
Motor failures are often difficult to detect.

The conventional three-phase motor has many different areas to check and often requires experienced maintenance engineers. Frequent inspections can be costly and time consuming.

Typical inspection items

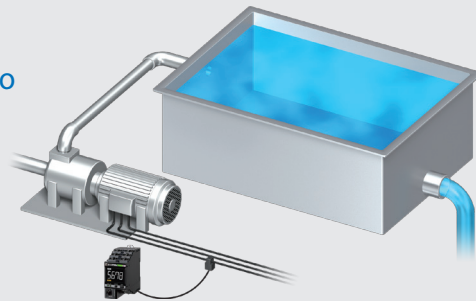
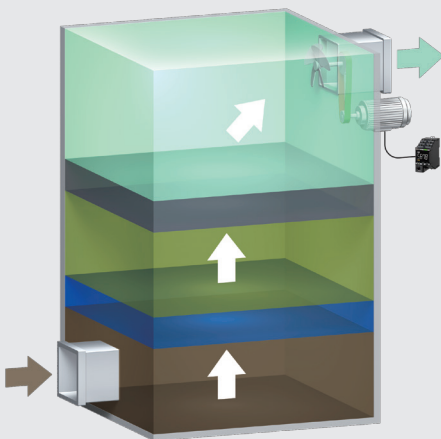
Phenomenon	Vibration	Heat generation	Decreased electrical resistance	Overcurrent
Bearing wear	✓	✓		✓
Insulation degradation			✓	
Overload	✓	✓		✓
Open phase		✓		

Motor failure mode

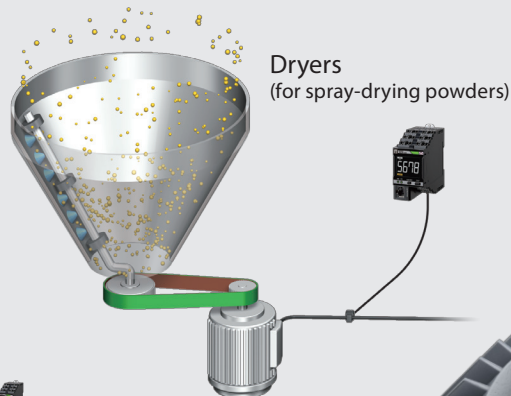


The K6CM monitors three-phase induction motors that are critical to facility operations.

Ventilation fans in odorous gas treatment facilities

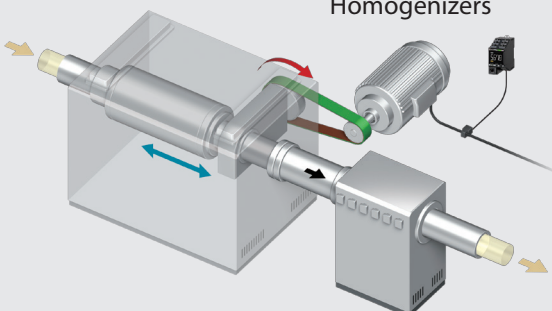


Washing pumps for automotive components



Dryers (for spray-drying powders)

Homogenizers



The monitor notifies the factory floor via a stack light.



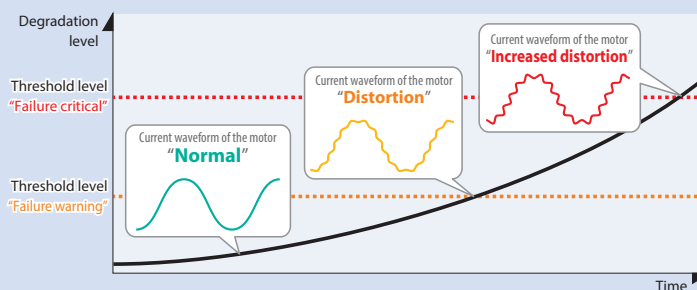
and reduce unplanned downtime

[Solution from OMRON]

Continuous monitoring of the motor condition allows faster response to issues.

The K6CM-CI is a comprehensive current monitor that can diagnose motor issues by monitoring the degradation of the current waveform. It takes all the guesswork out of a maintenance engineer and does all the analysis required.

What is comprehensive current diagnosis?



You can monitor up to ten motors with PC software.

The software's Motor Condition Monitoring Tool lets you keep tabs on motor conditions remotely.

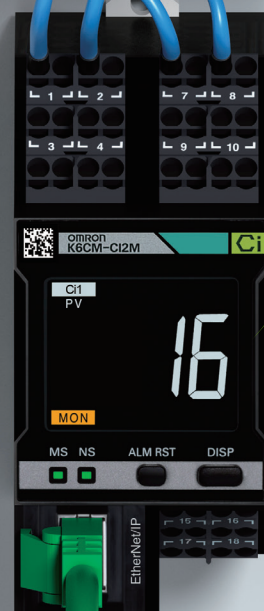
* The screen is a sample image.



K6CM Motor Condition Monitoring Devices

Development Award of the
TPM Award
for Excellent Products 2018

GOOD DESIGN AWARD 2018



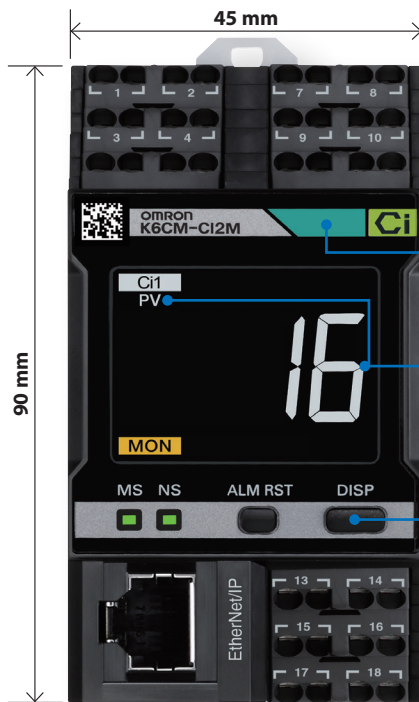
EtherNet/IP™
Modbus

Motor Condition Monitoring Device Lineup

Note. Applicable motor type: three-phase induction motor

type
01

Comprehensively monitors motor and load abnormalities through current monitoring



K6CM-CI

Comprehensive current diagnosis type



Load abnormality



Overload



Open phase

Alarm bar display

- Green : Status normal
- Yellow : Failure warning
- Red : Failure critical

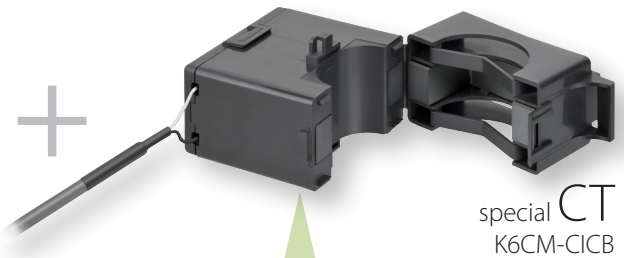
Display

- [PV] : Present value
- [MIN] : Minimum value
- [MAX] : Maximum value

Switches the units of the measured value displayed

- [Ci1] : Degradation level 1
- [Ci2] : Degradation level 2
- [A] : Current

<Actual size>

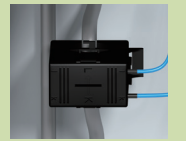


special CT
K6CM-CICB



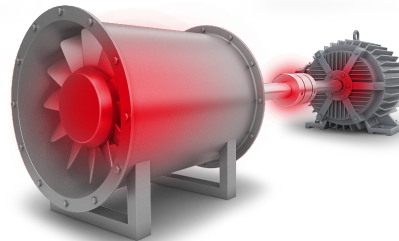
Easy setup!

To perform monitoring, simply clamp the CT to the power line connected to the three-phase induction motor.
The maximum of measurement range of 600A.



Also detects load abnormalities

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



Two current monitor versions are available to provide greater application flexibility.

Degradation level 1

Controller part number
K6CM-CIMA-EIP (AC model)
K6CM-CIMD-EIP (DC model)

Degradation level 1 is best for motors that are contactor driven (i.e. non inverter controlled motors) and will monitor any deviation of the entire current wave form off an ideal wave form for abnormalities.

Abnormality condition

Cavitation, Air contamination, etc.

Degradation level 2

NEW

Controller part number
K6CM-CI2MA-EIP (AC model)
K6CM-CI2MD-EIP (DC model)

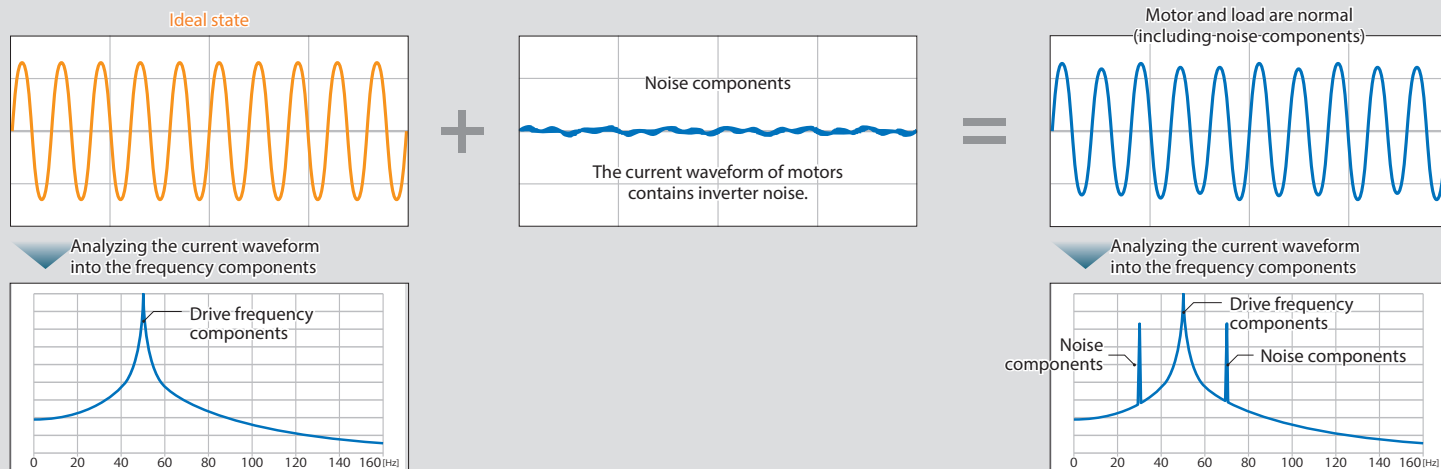
Degradation level 2 is best for motors with inverter control. It monitors Deviation level 1 with an additional algorithm to improve accuracy by monitoring the certain frequency components within the frequency components for abnormalities.

Abnormality condition

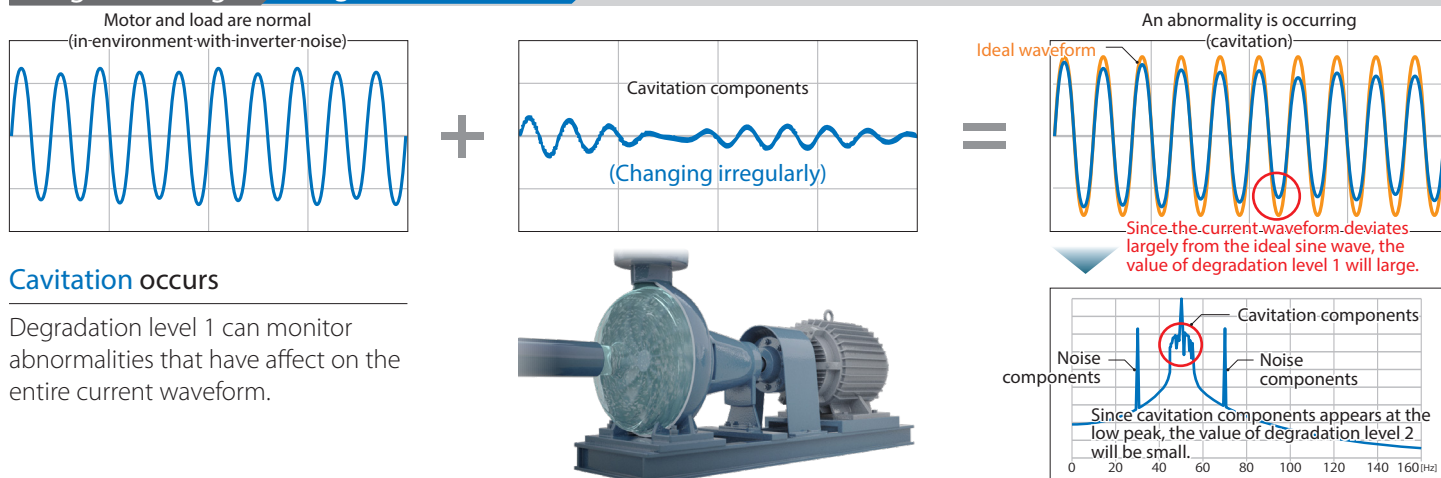
Misalignment, Load imbalance, Foreign matter adhesion, etc.

K6CM-CI monitors a wide range of motor abnormalities.

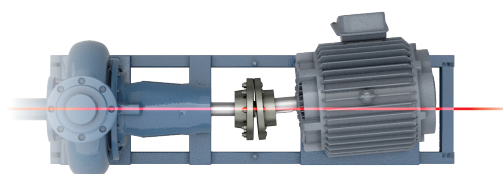
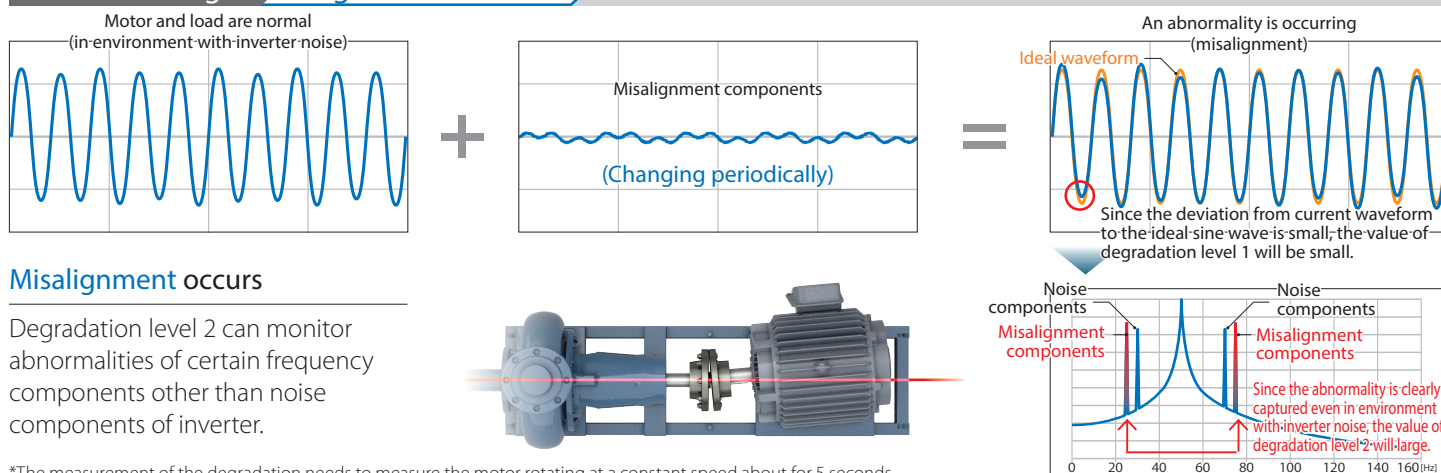
Normal state when inverters are used



Irregular change Degradation level 1



Periodic change Degradation level 2



*The measurement of the degradation needs to measure the motor rotating at a constant speed about for 5 seconds.

Motor Condition Monitoring Device Lineup

Note. Applicable motor type: three-phase induction motor

type
02

Monitors bearing abnormalities through vibration and temperature



Pre-amplifier and
Vibration & temperature sensor
K6CM-VBS

K6CM-VB

Vibration & temperature monitoring type

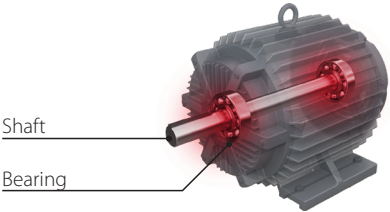

Bearing wear


Overload


Open phase

Detects abnormalities in bearings

By monitoring vibration, the K6CM can detect bearing abnormalities and alert the maintenance crew for service.



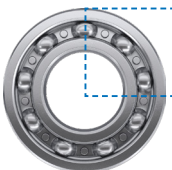


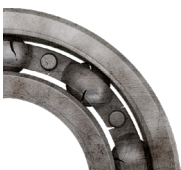




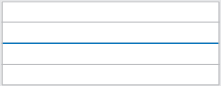

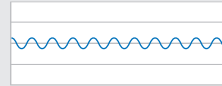
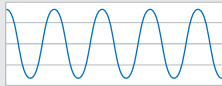
Constantly monitors temperature

Controller part number
K6CM-VBMA-EIP (AC model)
K6CM-VBMD-EIP (DC model)

This eliminates the need to measure the temperature on site.



Detects earlier stages of bearing wear by monitoring vibrations up to 10 kHz.

Bearing condition	 New	 Grease degraded	 Damages	 Breakdown
Motor condition	 Working smoothly	 Working smoothly	 Abnormal noise occurs	 Overheating/shaking
Motor vibration			 The values change shortly and rapidly when motors are shaking by damages. Monitored by acceleration.	 The values change largely and slowly when motors are shaking by breakdown. Monitored by velocity.
Measurement range by sensor	No vibration Out of range of measurement by sensor	High frequency Amplitude: small	Acceleration 1 to 10 kHz Amplitude: medium	Velocity 0.01 to 1 kHz Amplitude: large

type
03

Constantly monitors the insulation resistance



Insulation
degradation

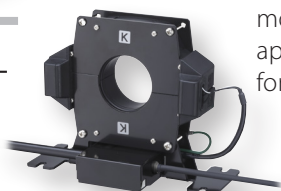
K6CM-IS

Insulation resistance monitoring type

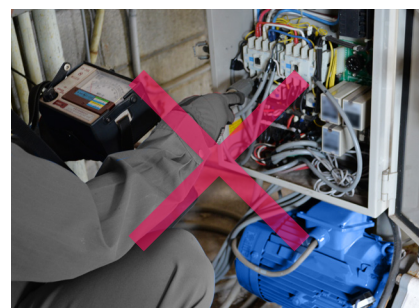
Measures insulation resistance

Conventional insulation resistance measurements require the motor to be disconnected. By installing the K6CM-IS, you can monitor the insulation resistance in real time and keep the motor running. This model is ideal for high dust and pumping applications where there is a high risk of foreign debris getting into the motor casing.

special ZCT
(IRT)
K6CM-ISZBI

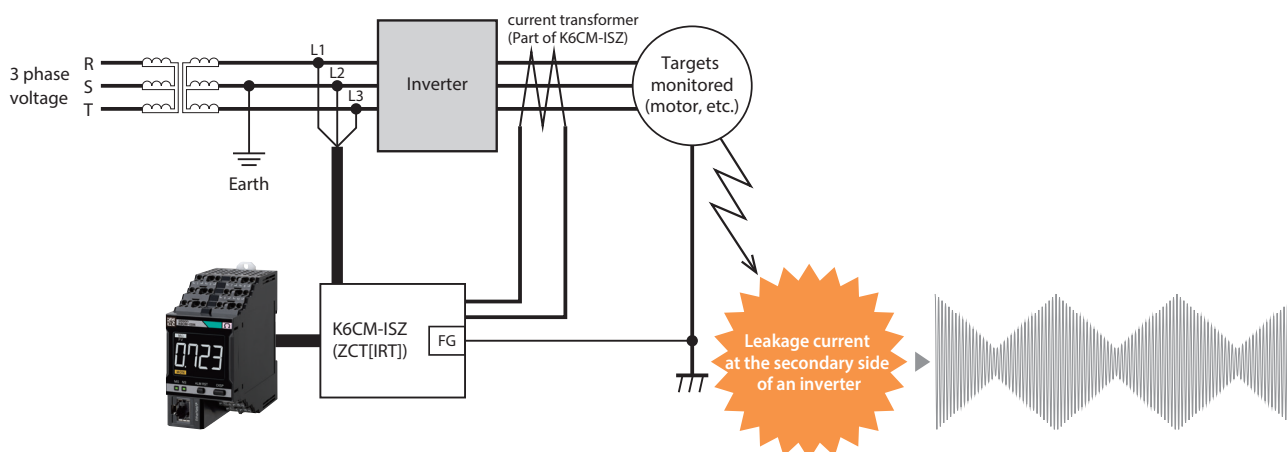


Controller part number
K6CM-ISMA-EIP (AC model)
K6CM-ISMD-EIP (DC model)



This eliminates the need for complicated insulation resistance measurements.

Monitors the secondary side of the inverter for improved monitoring.



*The measurement of insulation resistance needs about 10 seconds while driving the motor by direct connection to commercial power supply and about 60 seconds by the inverter.

The image of the leakage current waveform at the secondary side of an inverter.

The current value increase and decrease repeatedly.

Features

Three functions for monitoring motor condition

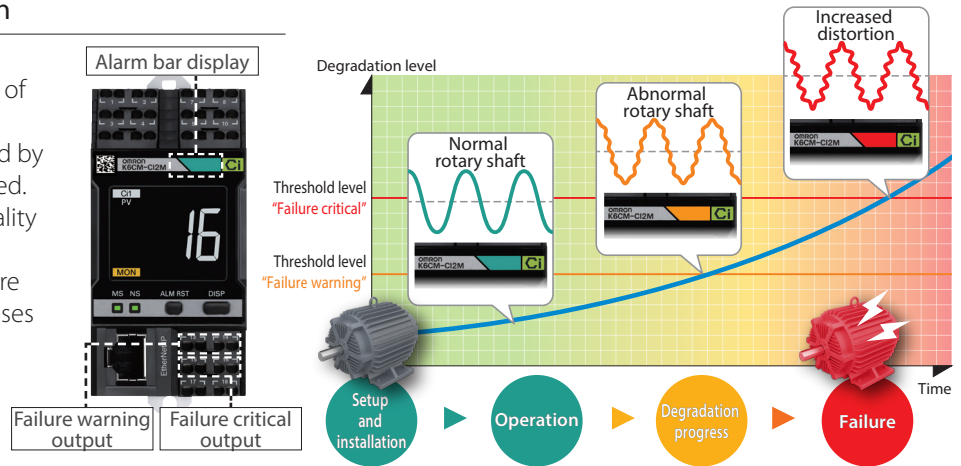
1 Motor condition status with built-in alarm bar

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.

In addition, by using the display auto switching mode, you can see the measurement value in each without operation.



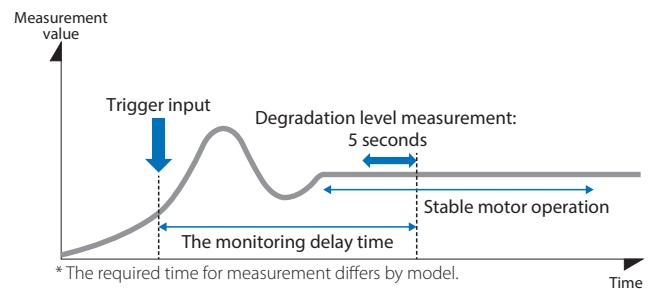
2 Adjust monitoring settings based on loads

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.

And the monitoring delay time function can be used to wait for the measurement values to stabilize. This function can delay the start of monitoring after the trigger input.



3 Self-diagnostic function alerts the user of K6CM issues

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.



Status display "AGE"

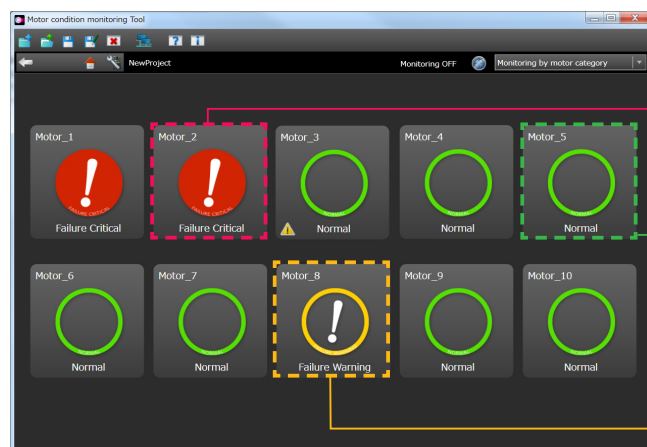
Lights up when the guideline for the replacement time is reached.

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 Monitoring Tool is stored on the CD shipped with the K6CM device.)

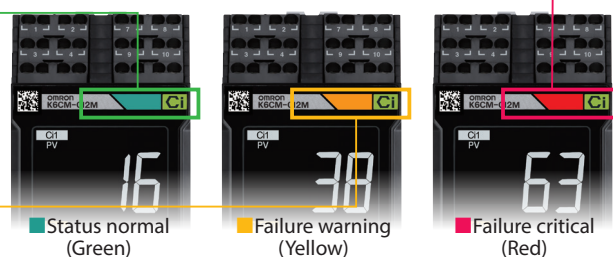


Motor condition list display



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

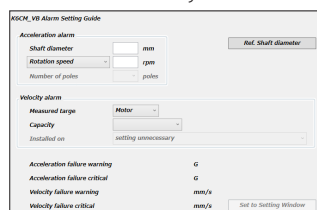


Vibration/temperature monitoring type
Insulation resistance monitoring type
Comprehensive current diagnosis type

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

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.



Enter the shaft diameter, rotation speed and capacity, and you can automatically set the K6CM-VB threshold.

Trend graph display

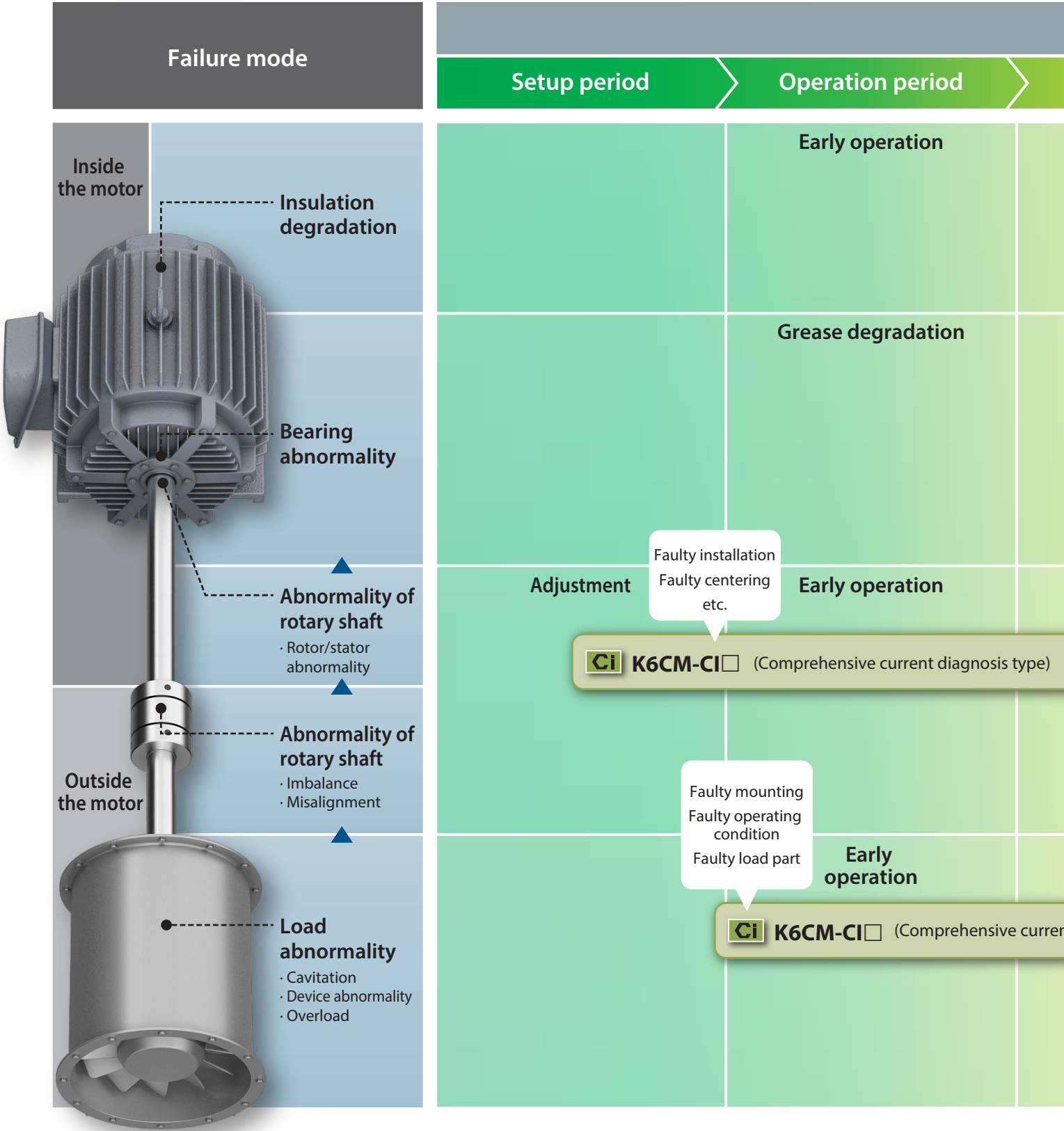


Allows the measured value trends to be checked on graphs.

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.

Motor failure modes





Motor and load condition


Degradation progress period

Breakdown period

Insulation degradation

Insulation breakdown





 **K6CM-IS** (Insulation resistance monitoring type) [Insulation degradation]

Bearing damage

Bearing breakdown




 **K6CM-CI** (Comprehensive current diagnosis type) [Degradation level]

 **K6CM-VB** (Vibration & temperature monitoring type) [Acceleration]


Degradation progress of motor

[Degradation level]

 **K6CM-VB** (Vibration & temperature monitoring type) [Velocity]

Degradation progress of load

[Comprehensive current diagnosis type] [Degradation level]

 **K6CM-VB** (Vibration & temperature monitoring type) [Velocity]

 **K6CM-VB** (Vibration/temperature monitoring type) [Temperature]
 **K6CM-CI** (Comprehensive current diagnosis type) [Overcurrent]

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