OMRON

Motor Condition Monitoring Device
K6CM

Startup Guide

- Step0 Selection of sensor to use
- Step1 Confirmation of details
- Step2 Preparation of necessary items
- Step3 Installation of Motor condition monitoring Tool
- Step4 K6CM configuration in the Motor condition monitoring Tool
- Step5 Installation
- Step6 Connection
- Step7 Monitoring
- Step8 Pre-verification

Thank you for purchasing this product. This guide explains simple procedures for starting the product, and methods for its operation.
For more detailed explanations, please refer to the included Operation Manual and the User's Manual on the included CD-ROM.

⚠ Ensure you read and employ "Safety Precautions", "Precautions for Safe Use", and "Precautions for Correct Use" in the Operation Manual.

Step*0* Selection of sensor to use

Comprehensive current diagnosis

Use one CT per motor to detect current flowing into the motor. Select a CT that matches the motor capacity.

CT type		Measurement range	Applicable motor (200 VAC)	Applicable motor (400 VAC)
K6CM-CICB005	5 A	1.00 A to 5.25 A	0.75 kW	1.5 kW to 2.2 kW
K6CM-CICB025	25 A	5.00 A to 26.25 A	1.5 kW to 5.5 kW	3.7 kW to 11 kW
K6CM-CICB100	100 A	20 A to 105 A	7.5 kW to 22 kW	15 kW to 45 kW
K6CM-CICB200	200 A	40 A to 210 A	30 kW to 45 kW	55 kW to 90 kW
K6CM-CICB400	400 A	80 A to 420 A	55 kW to 90 kW	110 kW to 200 kW
K6CM-CICB600	600 A	120 A to 630 A	110 kW to 150 kW	250 kW to 300 kW

Note. At no load, the motor current is at approximately half rated load.
Select a CT that can cover the range of 50% to 100% of rated current.

Vibration & temperature

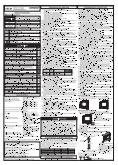
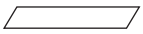
This uses a single sensor per motor that can detect vibration and temperature at the same time. One type of sensor can be used. (Sensor model: K6CM-VBS1)

Insulation resistance

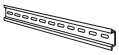
This uses one ZCT per motor to detect leakage current. One type of ZCT can be used. (ZCT model: K6CM-ISZBI52)

Step1 Confirmation of details

☐ K6CM unit	1	
☐ LAN port cover	1	
☐ Tool (Motor condition monitoring Tool) CD-ROM	1	

☐ Operation Manual (JP/EN, A4 size)	1	
☐ IP address label (for IP address input)	1	
☐ Push-in Plus Terminal Blocks erroneous insertion prevention label	1	

Step2 Preparation of necessary items

☐ PC (Requires CD-ROM drive, LAN port)*	
☐ LAN cable (Category 5 or above, straight type or cross type acceptable)	
☐ DIN rail or M3 screws	
☐ Push-in Plus Terminal Block wiring	

☐ Unit power supply 100 VAC to 240 VAC or 24 VAC/DC	
☐ Startup Guide (This Document) 1	

* Prepare a PC that meets the following conditions.

Item	Description
OS	Windows 7, Windows 8.1, Windows 10 (32 bit/64 bit) (JP/EN)
CPU	1 GHz or more, 32 bit or 64 bit processor
Memory	1 GB or more, or 2 GB or more (in the case of 64 bits)
Disk reserved area capacity	16 GB or more, or 20 GB or more (in the case of 64 bits)
Monitor resolution	1024 × 768 (XGA), High Color 16 bit or more
.NET Framework	.NET Framework 4 and .NET Framework 3.5 SP1
Others	CD-ROM drive: For installation LAN port: For network connection

Step3 Installation of Motor condition monitoring Tool

1 Installing .NET Framework 3.5 SP1

The Motor condition monitoring Tool requires Microsoft .NET Framework 3.5 SP1 to run the program.
If .NET Framework 3.5 SP1 is not installed on your PC, install it manually.

It is installed as a standard on Windows 7 PC. Follow steps (2) to (4) below.
It is not installed as a standard on Windows 8.1 and Windows 10 PC.
When using on a PC with Windows 8.1 or Windows 10, perform the steps (2) to (4) after installing the .NET Framework 3.5 SP1 shown in the following step (1).

(1) Install .NET Framework 3.5 SP1.

● Installing by connecting the PC to the network

[1] Install by "dotnetfx35.exe" in the Framework folder on the CD.

[2] If you use Japanese 32bitOS, install language pack by "dotnetfx35langpack _ x86ja.exe" in Framework folder on CD.
If you use Japanese 64bit OS, install language pack by "dotnetfx35langpack _ x64ja.exe" in Framework folder on CD.

● Installing without connecting the PC to the network

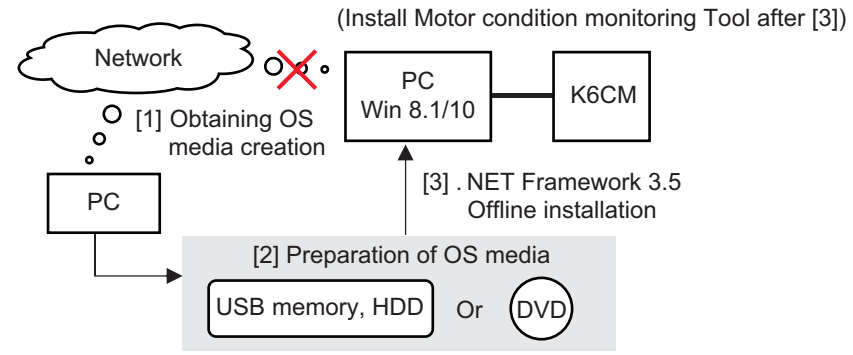
This procedure shows how to install the Motor condition monitoring Tool (and attached software) on PCs (Windows 8.1 or Windows 10 OS) that cannot connect to the network.
What are required to prepare :

- Network connected PC
- Empty recording medium (USB memory of 8GB or more, HDD or DVD)

This procedure also details the resolution technique published on the following Microsoft official website.
Microsoft official website URL :
https://msdn.microsoft.com/ja-jp/library/windows/hardware/dn898529(v=vs.85).aspx#nointerent

* In Windows version 8.1 or later OS version, the "Microsoft .NET Framework 3.5" required for installing the above mentioned attached software is not installed in advance. Therefore, if you are using a PC with the above OS version and cannot connect to the network, you cannot acquire the above. NET and you cannot install the software included with the Motor condition monitoring Tool.

Outline of this procedure



[1] Acquire OS media creation tool

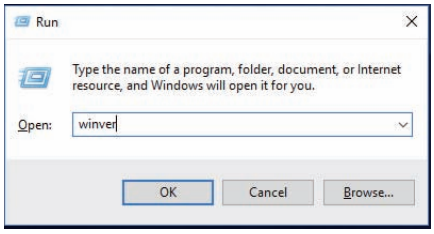
To create the OS media that matches the Windows version of the PC you want to install the Motor condition monitoring Tool, download the OS media creation tool "MediaCreationTool.exe" from the official Microsoft page at the following URL.

Windows 8.1 https://www.microsoft.com/en-us/software-download/windows8
Windows 10 https://www.microsoft.com/en-us/software-download/windows10

* If you do not know the Windows version of your PC, perform the following procedure.

1) Hold down the Windows key and press the R key.
Alternatively, click [Run] from the [Start] menu.

2) Enter “winver”and click [OK].Button.

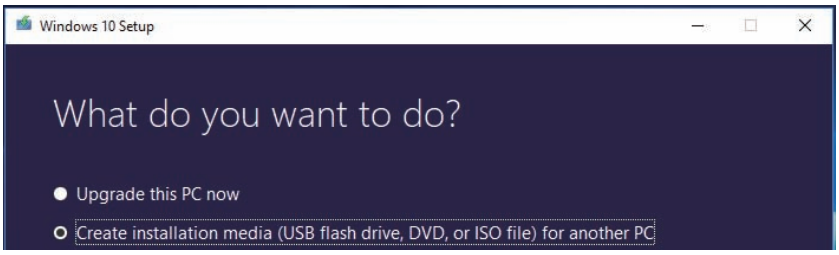


3) The Windows version is displayed, so confirm.

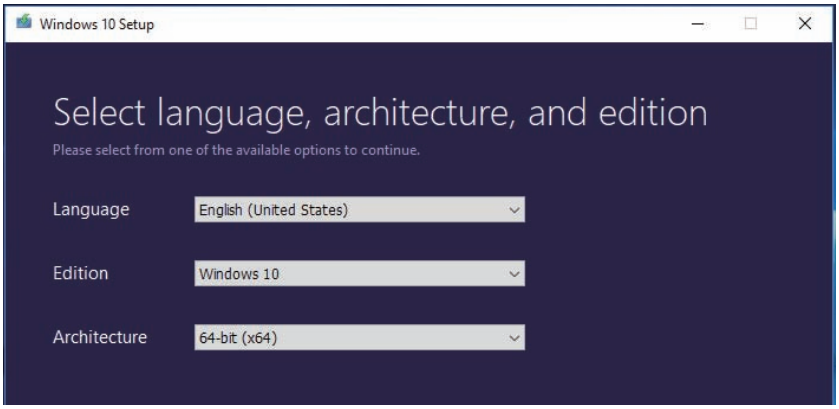
[2] OS media creation

Run the downloaded OS media creation tool.

Be sure to select "Create installation media of another PC" for the option after agreeing to the license terms

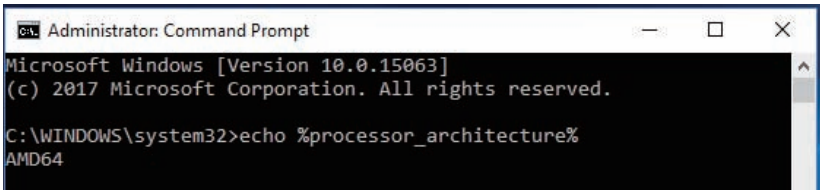


In the selection screen of language, architecture, and edition, uncheck the check box at the bottom and select the same one as the PC you want to install the Motor condition monitoring Tool.



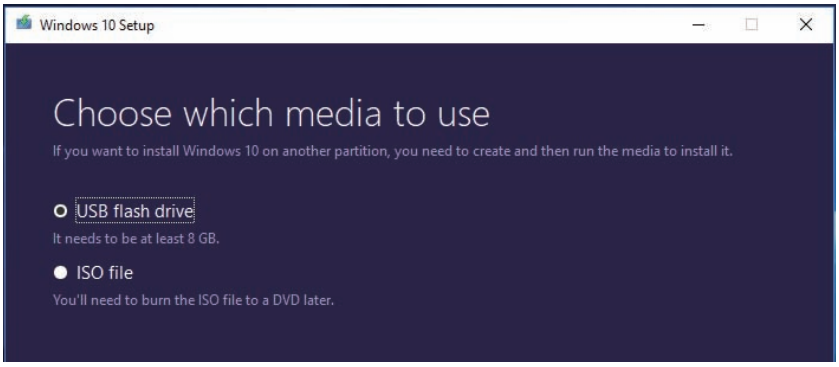
* If you do not know the architecture of your PC, perform the following procedure.

1) On the personal PC where you want to install the Motor condition monitoring Tool, hold down the Windows key and press the R key. Alternatively, click [Run] from the [Start] menu.
2) Enter “cmd” and click OK. A command prompt is launched.
3) Enter “echo %processor_architecture%”and press Enter key.

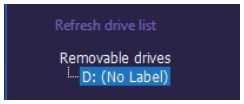


4) 32 bits are displayed as x86, 64 bits are displayed as x64, and so on.

Select the media type to use.
When selecting "USB flash drive", be sure to prepare an empty recording medium (USB memory of 8 GB or more, HDD or DVD) without data.



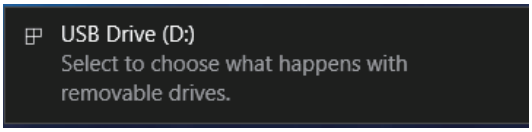
At this point, connect the USB memory to your PC and select "Next" on the installation screen. Confirm that the USB memory is normally recognized by the PC and displayed as a removable drive as below and proceed with creating OS media.



[3] .NET Framework 3.5 Offline installation

Make the Motor condition monitoring Tool recognize the created OS media on the PC you want to install (If you are using a USB memory or HDD, connect it to a PC, mount it on a PC if it is a DVD).

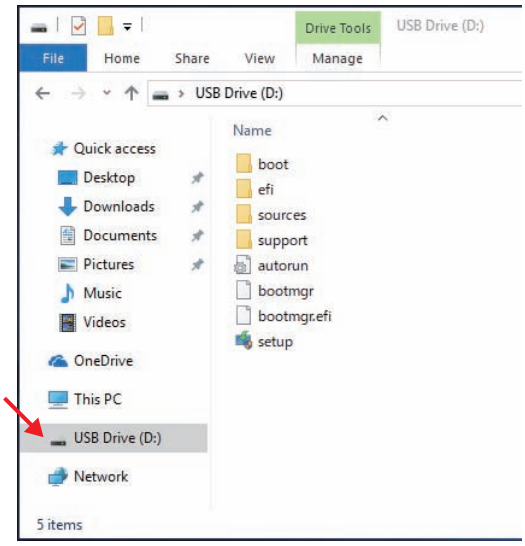
When the OS media is recognized correctly, the following popup will be displayed. In this example, you can see that the USB memory as the OS media has been assigned to D drive (D :).



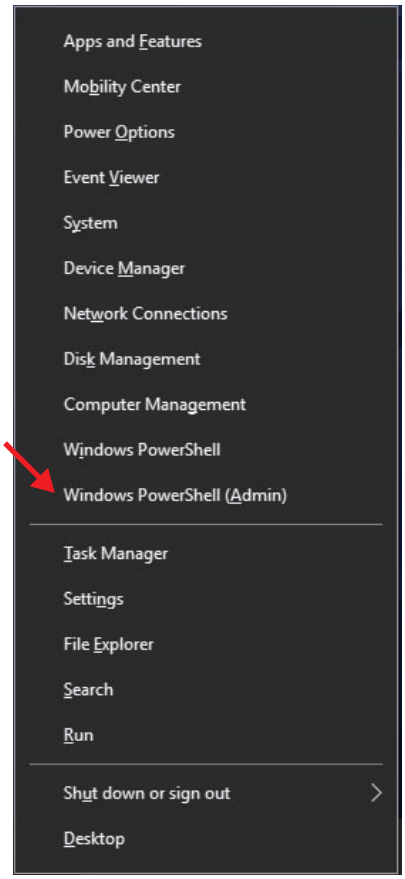
As we will use the drive information we have confirmed in the later operation, be sure to check which drive the OS media is assigned to.

* It is possible to check the media with other methods.
Click the Explorer icon located at the bottom of the desktop screen.(If there is no icon, hold down the Windows key and press the E key to start the explorer screen)

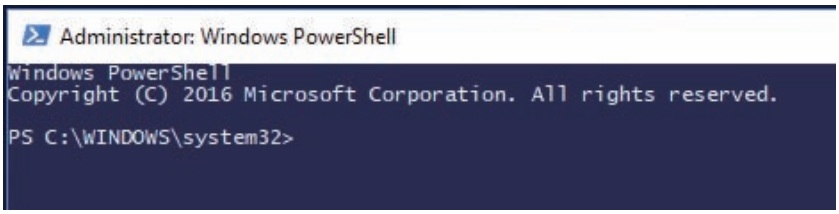
Since the Explorer screen starts, click the drive icon displayed on the left side of the screen that started up.If the OS media is recognized correctly, the drive containing the following data will be displayed.



Execute the command prompt (shell script) with administrator privileges after confirming that the OS media was recognized correctly. Hold down the Windows key while pressing the X key, the following screen will be displayed, so select Windows PowerShell (Administrator).

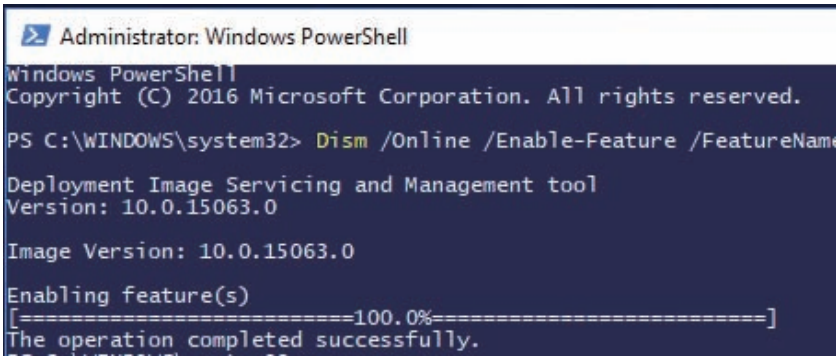


After that, confirm that the following command prompt screen is displayed.

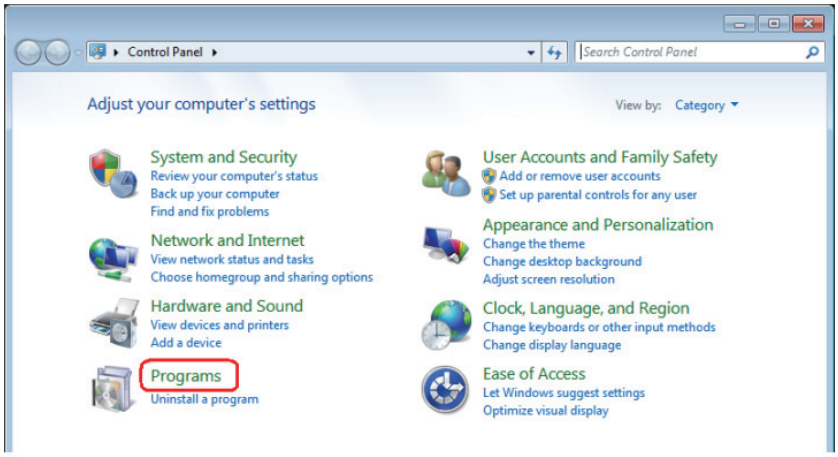


Enter the following command and press Enter to execute. In the command, "D:" is the drive to which the OS media checked earlier was assigned. Depending on the user environment used.
As you can see, be sure to modify the command according to the drive information you have confirmed.

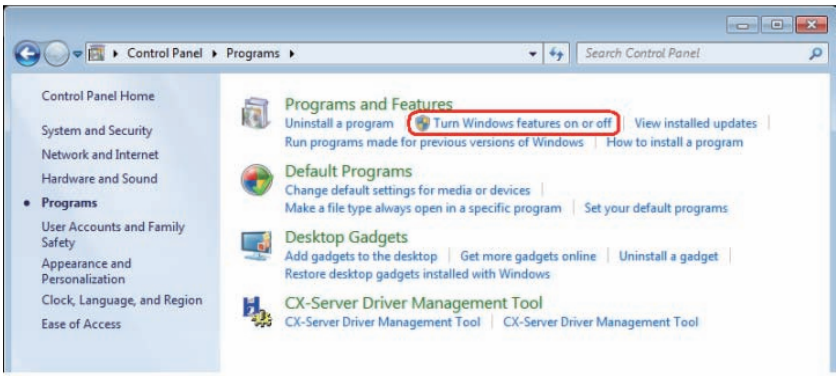
Command :
Dism /Online /Enable-Feature /FeatureName:NetFX3 /All/Source:D:¥Sources¥SxS /LimitAccess
* Enter the command on one line without line break. Insert a space between Dism and the set of words (/ ***) that compose the command.
Wait for a while until the completion screen as shown below. If this screen can be confirmed, the installation of .NET Framework 3.5 will be completed, continue installing the Motor condition monitoring Tool.



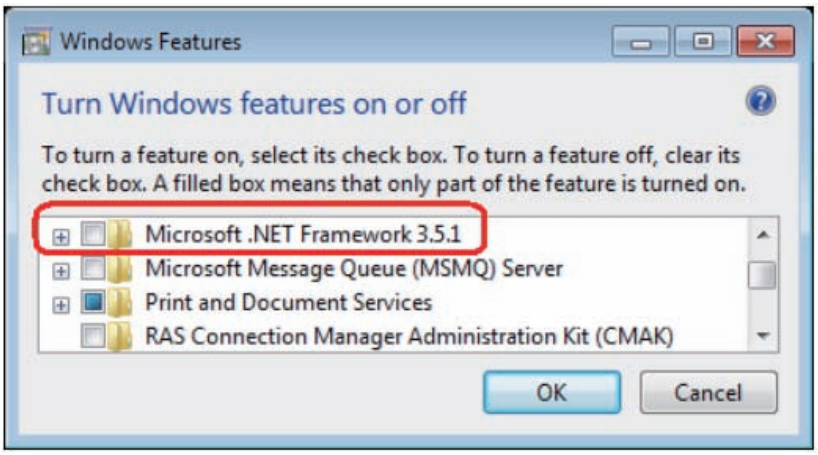
(2) Select "Programs" from the Control Panel.



(3) Select "Turn Windows features on or off".



(4) Check the check box of "Microsoft .NET Framework 3.5.1" and click "OK".



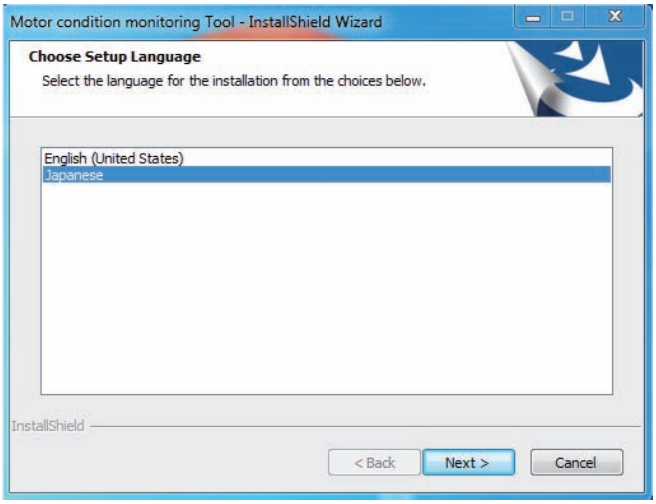
2 Installation Procedures

This section shows the procedure for installing a new Motor condition monitoring Tool.

Precautions for Correct Use

"User account control" may be displayed depending on PC settings during installation procedure. In that case, click "yes" if there is no problem.

(1) Insert the attached CD in the PC and select "setup.exe" from the autoplay screen.
If automatic playback was not done, double-click the "setup.exe" file under the CD drive.
The following [Select language setting] Dialog Box will be displayed.



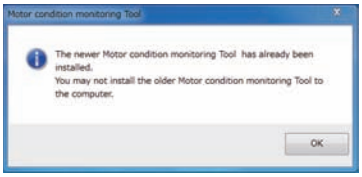
⚠ CAUTION

If the following message is displayed, the old version of CX-Compolet/SYSMAC Gateway has already been installed on the PC. In order to use Motor condition monitoring Tool, upgrade of CX-Compolet/SYSMAC Gateway is necessary.

Please read "3.5. Upgrade installation" of "CX-Compolet_SGW_InstallationGuide_E.pdf" in the Manual folder on the CD and uninstall the CX-Compolet/SYSMAC Gateway after backing up the data. Then re-perform step (1).

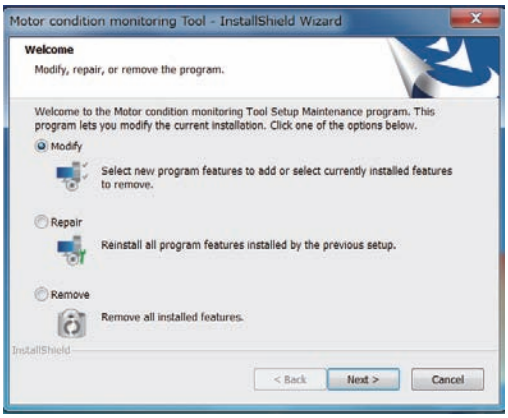
⚠ CAUTION

If the following message is displayed, a newer version of the software tool than the launched installer has already been installed on your PC. Therefore, installation is unnecessary.



⚠ CAUTION

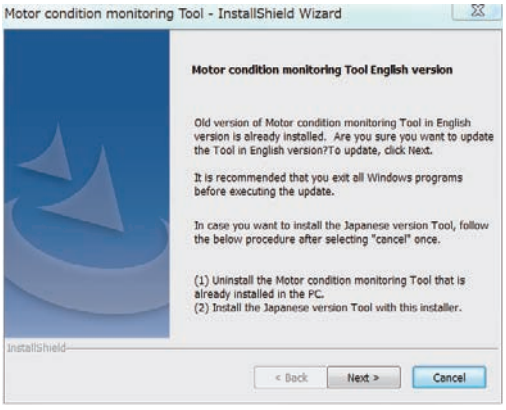
If the following message is displayed, a software tool of the same version as the launched installer has already been installed in your PC.



[Modify] is used to change the function to be installed. Do not use it now for future expansion.
[Repair] is used to reinstall the software tool.
[Remove] is used to uninstall the software tool.

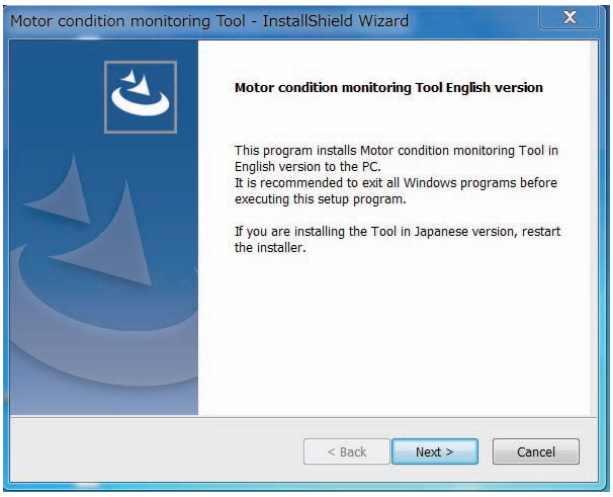
⚠ CAUTION

If the following message is displayed, a older version of the software tool than the launched installer is installed on your PC.



To update the software tool, click [Next] Button. Start updating after clicking. When the update is completed, a completion message is displayed.

(2) Select "Japanese" or "English" and click the [Next] Button.
The following Dialog Box will be displayed.
* After installation, you cannot change the language of the software tool. If you want to change the language, reinstall the software tool.
* If you select Japanese on your PC with other than Japanese OS, depending on the environment of your PC, the characters during installation may not be displayed correctly, or the software tool may not work properly.



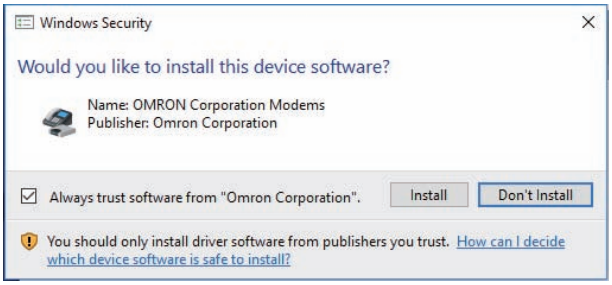
(3) Click the [Next] Button.
The License Agreement Dialog Box appears.

(4) Please read "License Agreement" carefully and check "I accept the terms of the license agreement" and click the [Next] Button if you can agree to all the terms.
The [User Information] Dialog Box appears.

(5) Click the "Install" Button.
Installation of the Motor condition monitoring Tool starts.

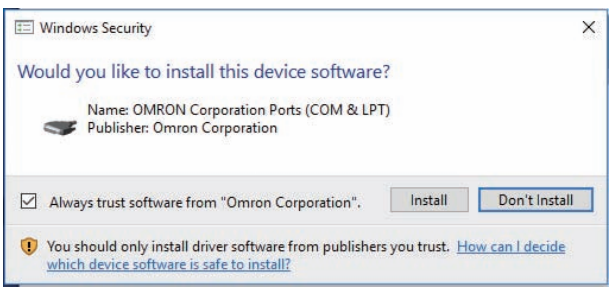
(6) Install the Communications Middleware. Select the language to display in the installation.
If an old version of the Communications Middlware is already installed, select whether to update Communications Middlware.
If a new version of the Communications Middlware is already installed, go to step (15).

(7) While the installation wizard is running, the [Windows Security] Dialog Box will be displayed.
Click the [Install] Button.



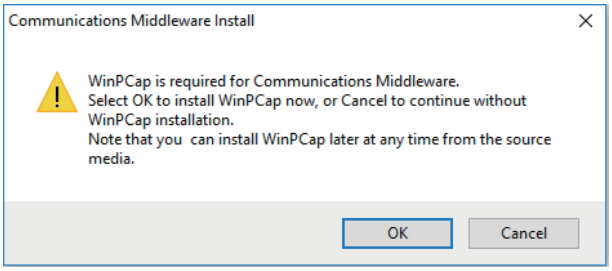
"OMRON Corporation Modems" is installed and the following [Windows Security] Dialog Box will be displayed.

(8) Click the [Install] Button.

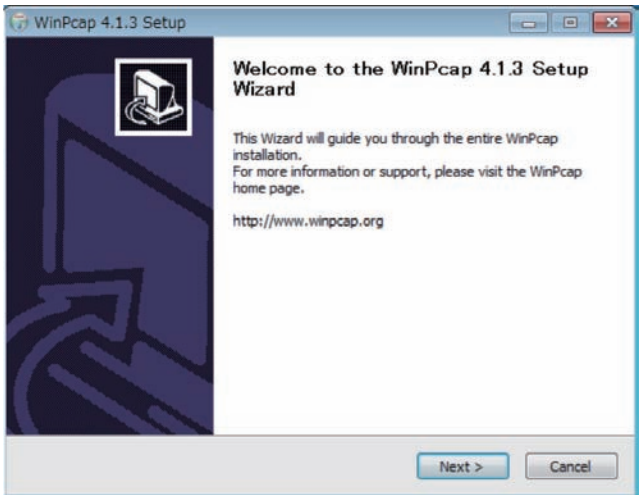


"OMRON Corporation Ports (COM & LPT)" is installed.

(9) Since a dialog box prompting you to install WinPcap which is a component of Communications Middleware is displayed, click the [OK] Button. If WinPcap is already installed, go to step (15).



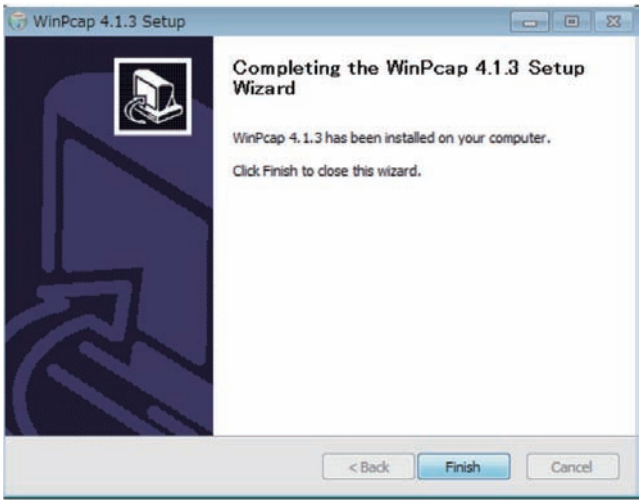
(10) Click the [Next] Button.



(11) Click the [I Agree] Button.
The Installation options Dialog Box appears.

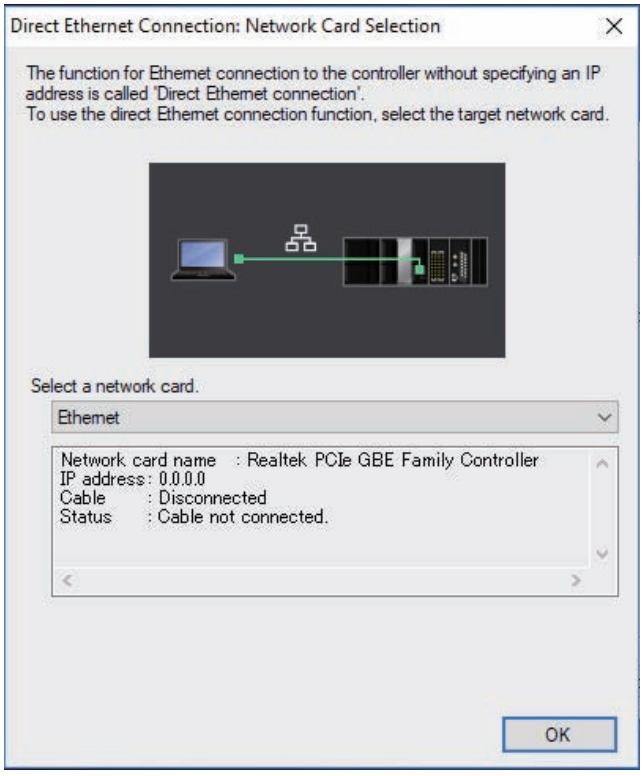
(12) Check "Automatically start the WinPcap driver at boot time" and click the [Install] Button.
Installation of WinPcap will start.

(13) Click the [Finish] Button.



Installation of WinPcap is completed.

(14) From the Motor condition monitoring Tool, select the network card to be used for automatic connection to the K6CM device with the Ethernet cable from the pull-down list and click the [OK] Button.
If Communications Middleware is already installed, go to step (15).



Network card configuration example
If there is only one wired LAN port of the PC and the Motor condition monitoring Tool communicates with the K6CM device with that wired LAN port, select the following.
(If the name of the network connection has been changed, select the one with the changed name.)

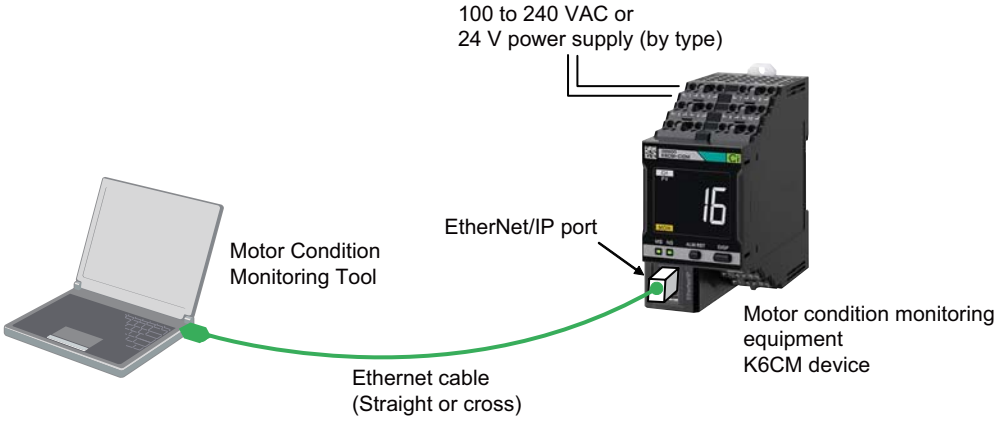
Windows 7
Select "Local Area Connection".
Windows 8.1/Windows 10
Select "Ethernet".

(15) Select the PC restart and click the [Finish] Button.

Step4 K6CM configuration in the Motor condition monitoring Tool

1 Directly connect PC and K6CM using an Ethernet cable

2 Turn ON K6CM



3 PC IP address setting

Windows 7

(1) Select [Start] | [Control Panel] | [Network and Sharing Center] | [Change Adapter Settings].
(2) Right-click [Loca Area Connection] and select [Properties].
(3) Select [Internet Protocol Version 4 (TCP / IPv4)] and click [Properties].
Check "Use next IP address" and manually set the IP address of the PC.

Windows 8.1

(1) Right-click [Start].
(2) Select [Network connection].
(3) Right-click [Ethernet], and click [Properties].
(4) Select [Internet Protocol Version 4 (TCP / IPv4)] and click [Properties].
Check "Use next IP address" and manually set the IP address of the PC.

Windows 10

(1) Click [Start] and select [Windows System Tools] | [Control Panel].
(2) Select [Network and Sharing Center] | [Change adapter settings].
(3) Right-click Ethernet and click Properties.
(4) Select [Internet Protocol Version 4 (TCP/IPv4)] and click [Properties].
Check "Use next IP address" and manually set the IP address of the PC.

IP Address Settings Example

When using Ethernet for the first time, if you set the IP address and subnet mask of the PC and K6CM device as below, it is possible to connect the Motor condition monitoring Tool to the K6CM device.

Device name	IP address	Sub-net mask	Default gateway
PC	192.168.250.100	255.255.255.0	Blank
K6CM device 1st Unit	192.168.250.1	255.255.255.0	No change required (0.0.0.0)
K6CM device 2nd Unit	192.168.250.2	255.255.255.0	No change required (0.0.0.0)
K6CM device 3rd Unit	192.168.250.3	255.255.255.0	No change required (0.0.0.0)
:	:	:	:
K6CM device 30th Unit	192.168.250.30	255.255.255.0	No change required (0.0.0.0)

When the subnet mask is "255.255.255.0", the range of IP addresses that can be set for the device is 192.168.250.1 to 192.168.250.254. Assign IP address in this range to each K6CM device.

The same IP address can not be assigned to more than one device.

The default value of the IP address of type K6CM device is "192.168.250.10" common to all models.

4 Motor condition monitoring Tool start-up

Windows 7

Select [All Programs] | [OMRON] | [Motor condition monitoring tool].

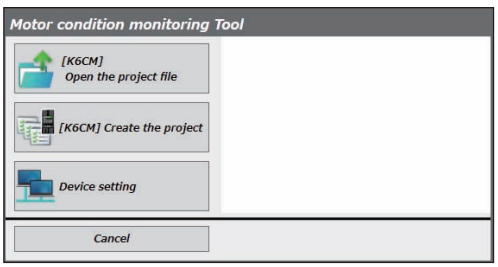
Windows 8.1

Select [Start] | [All Programs] | [OMRON] | [Motor condition monitoring tool].

Windows10

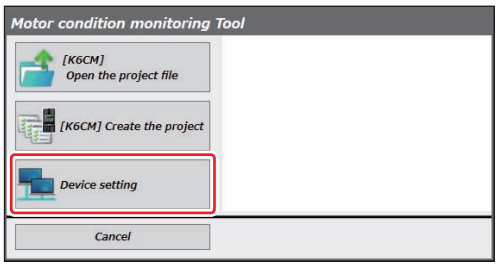
Select [Start] | [OMRON] | [Motor condition monitoring tool].

The Motor condition monitoring Tool starts and the following screen is displayed. This screen is called "start screen".

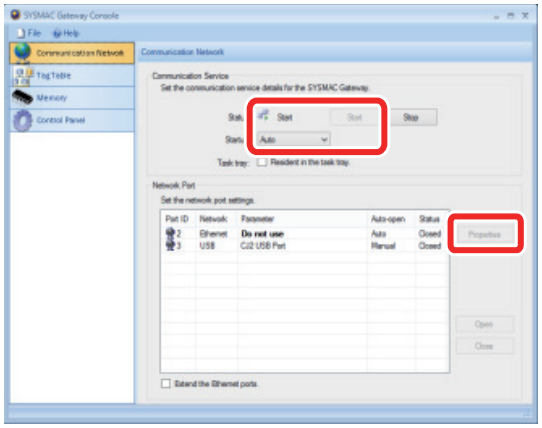


5 Select [Device setting]

This configures communications settings between the PC and the K6CM.
From the Motor condition monitoring Tool Startup screen, select [Device setting].

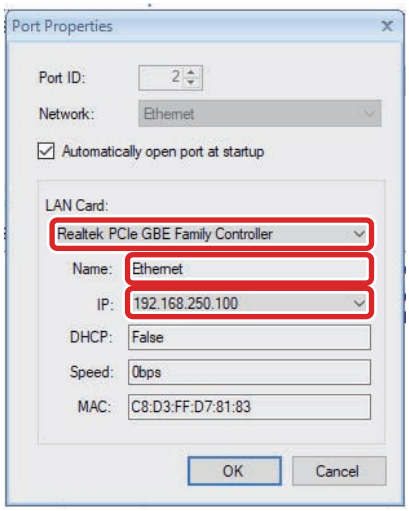


The following SYSMAC Gateway Console screen is displayed.
Confirm that [Status] is currently "Start" in the [Communication Service] field, and that [Startup] is "Auto".



Set the network port to which you want to connect in the [Network Port] field.

Settings example: select the port ID2 line and click the [Properties] button, and the following will be displayed.



Click the LAN card tab, and select the LAN card in the PC to use in communications with K6CM.

LAN card configuration example:

If there is only one wired LAN port of the PC and the Motor condition monitoring Tool communicates with the K6CM device with that wired LAN port, select the following.
(If the name of the network connection has been changed, select the one with the changed name.)

Windows 7

Select a LAN card in the "Name" field is "Local Area Connection" is displayed.

Windows 8.1/Windows 10

Select a LAN card that is displayed is "Ethernet" in the "Name" field.

Next, click the IP address tab, select the IP address to use in communications, then select [OK].

⚠ CAUTION

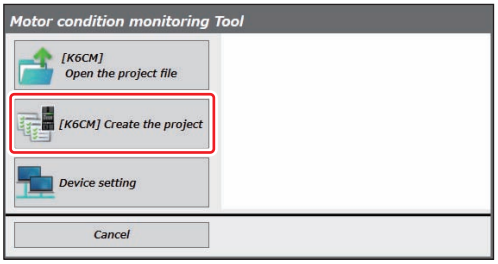
Do not select AutoIP address (169.254.xxx.xxx: x is an arbitrary number).
If IP addresses other than the AutoIP address are not displayed, the IP address of the PC is not set.

Next, select [File] | [End].

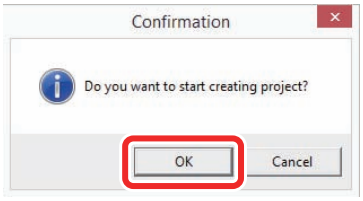
⇩

6 Select [[K6CM] Create the project].

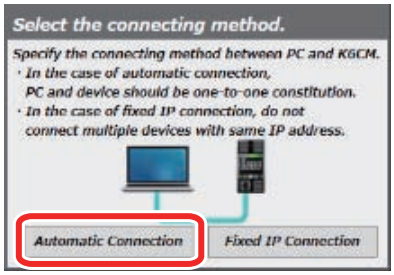
A file that incorporates settings and device configuration is called a "Project".
From the Motor condition monitoring Tool Startup screen, select [[K6CM] Create the project].



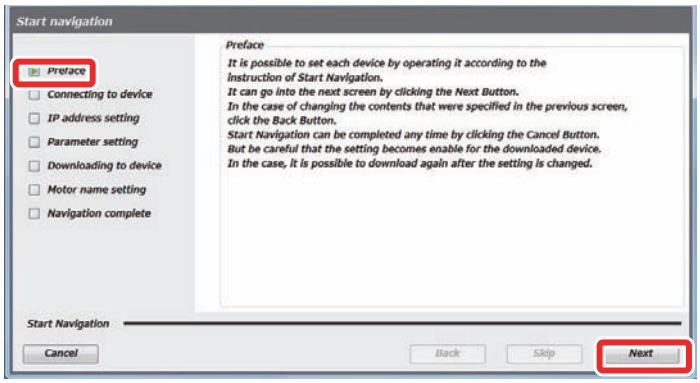
The following screen is displayed.
Click the [OK] Button.



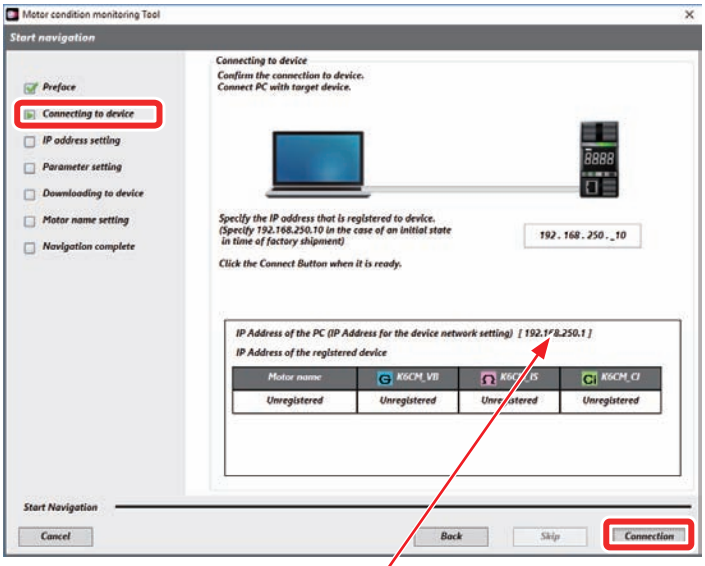
When connecting the PC and K6CM with a one-to-one connection, select [Automatic connection].
(When connecting the PC and K6CM with a one-to-many connection via a hub, select [Fixed IP connection].
For details, refer to the User's Manual (N219).)



The [Preface] wizard screen of the following [Start navigation] Dialog Box is displayed.
Click the [Next] Button.



The following [Connecting to device] wizard screen will be displayed.
Click the [connection] Button.

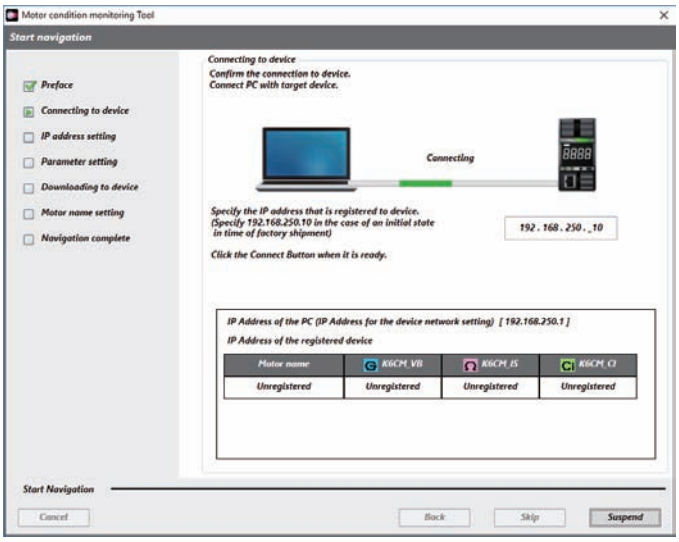


The IP address selected in the [Port Properties] Dialog Box is displayed on the screen displayed by selecting [Device setting] on the startup screen.
If IP address selection is incomplete (i.e., Network port parameter is "Do not use"), "0.0.0.0" is displayed. If "0.0.0.0" is displayed, you can connect to the device if you set the connection method to "Auto connection" in step 5, but if you set "Fixed IP connection" you cannot connect to the device.

Version Information

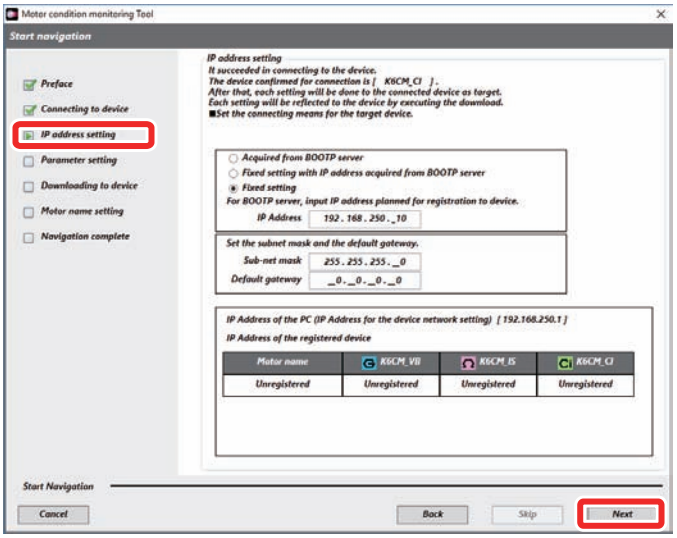
With software tool version 1.2.0.0 or later, the column for displaying the IP addresses of your PC and registered devices are displayed.

"Connecting" will be displayed on the line between the PC and the device on the following [Connecting to device] wizard screen.

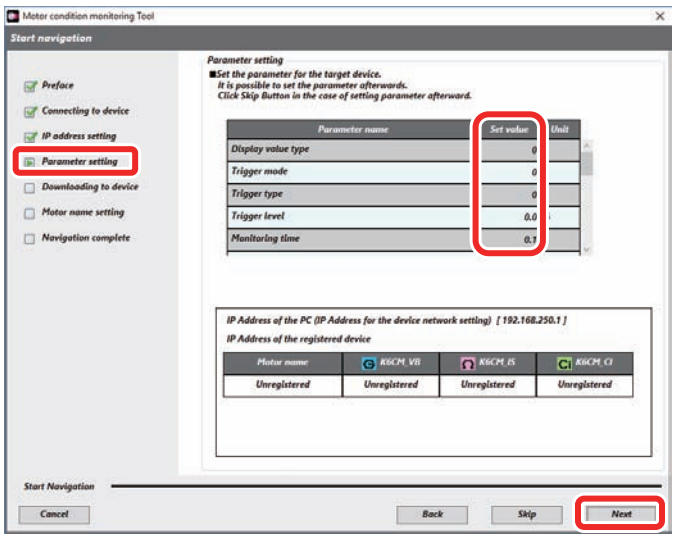


When the connection is successful, the following [IP address setting] wizard screen will be displayed.
Set the K6CM IP address in reference to the procedure in Step 4, No. 1.

Click the [Next] Button.



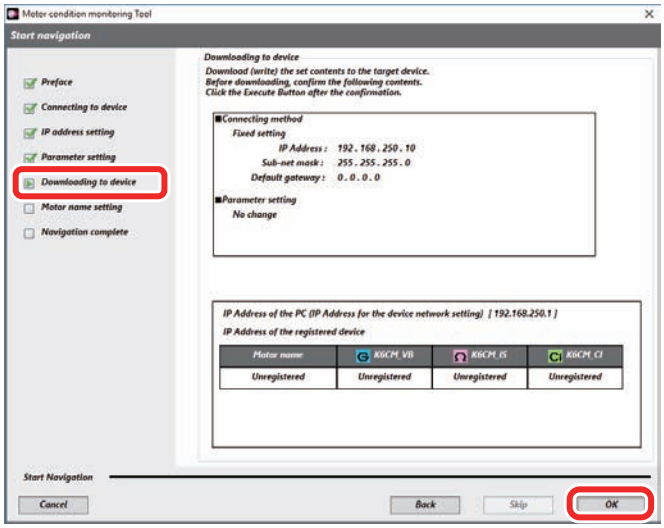
The following [Parameter setting] wizard screen will be displayed.



Input parameter settings values into the settings fields, and click the [Next] button.
Set in reference to the following table. Settings values may be changed at a later point, however ensure these are set prior to starting measurement and monitoring.

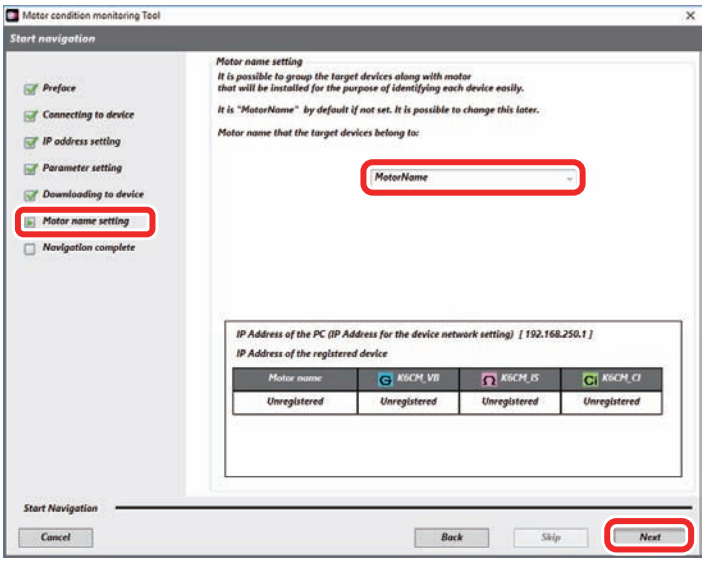
Model	Parameter name	Settings value
Comprehensive current diagnosis model	Current range	Input settings values in accordance with CT being used. 0: 5 A rated, CT connected (K6CM-CICB005) 1: 25 A rated, CT connected (K6CM-CICB025) 2: 100 A rated, CT connected (K6CM-CICB100) 3: 200 A rated, CT connected (K6CM-CICB200) 4: 400 A rated, CT connected (K6CM-CICB400) 5: 600A rated, CT connected (K6CM-CICB600)
	Current alarm (warning)/(critical)	Input the motor status warning/critical threshold levels.
Vibration & temperature model	Temperature units	Select temperature units to use for motor temperature and temperature gap. 0: °C 1: °F
	Acceleration alarm (warning)/(critical)	Input the motor status warning/critical threshold levels.
	Velocity alarm (warning)/(critical)	
	Motor temperature alarm (warning)/(critical)	
	Temperature gap alarm (warning)/(critical)	
Insulation resistance model	Applicable circuit	Input settings values depending on motor drive method. 0: Three-phase three-wire S-phase ground 1: Three-phase four-wire N-phase grounded load side delta connection * For details, refer to the User's Manual.
	Using inverter	Input settings values depending on the presence of an inverter. 0: No inverter 1: With inverter
	Inverter special measurement	Input settings values to match the inverter frequency. 0: When inverter frequency differs from the commercial frequency. 1: When inverter frequency and commercial frequency are close. * For details, refer to the User's Manual.
	Insulation resistance alarm (warning)/(critical)	Input the motor status warning/critical threshold levels.

The following [Downloading to device] wizard screen will be displayed.



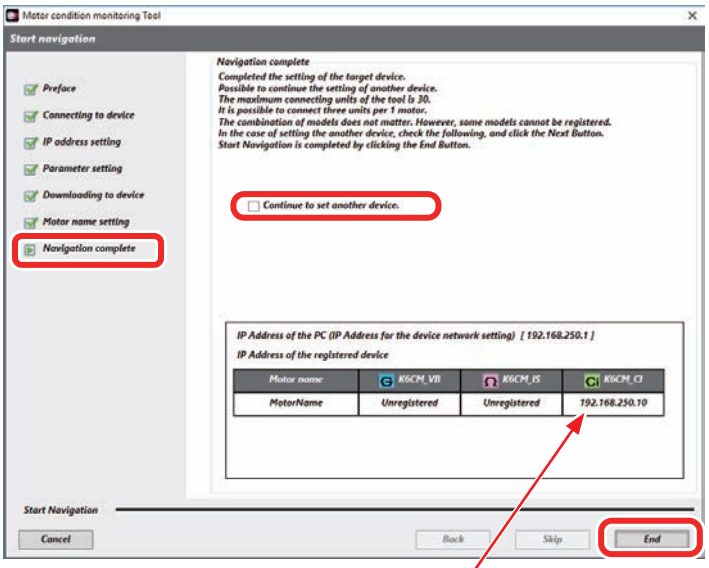
Confirm settings details, and if correct, click the [Execute] button.

The following [Motor name setting] wizard screen will be displayed.
Input the motor name that the set device is to monitor, then click the [Next] button.



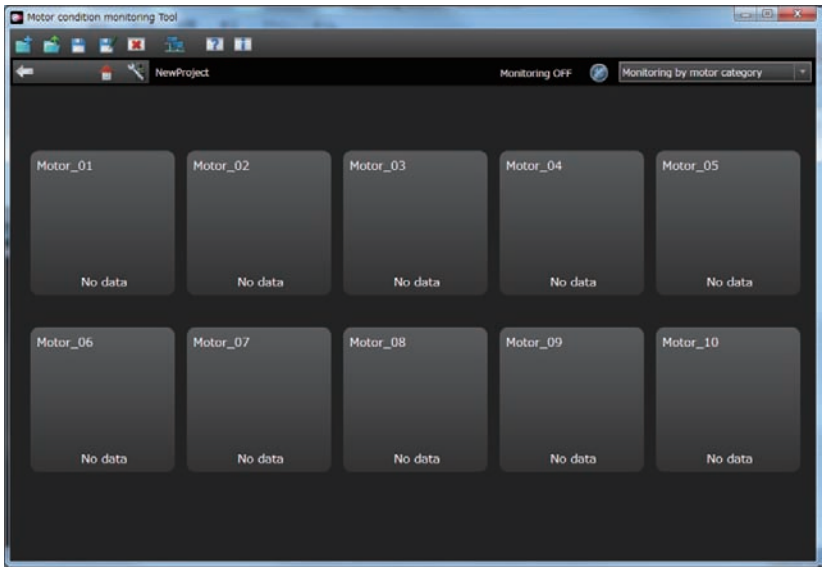
The following [Navigating is completed] wizard screen is displayed.
If registering a different device, select the check box, then click [End].
This opens the [Device Connection] wizard screen.

If registering a different device, deselect the check box, then click [End].



The IP address of the registered device is displayed.

This opens the following monitor screen for each motor unit.



Click the [Save the project file] button ( ) for the created project to save.

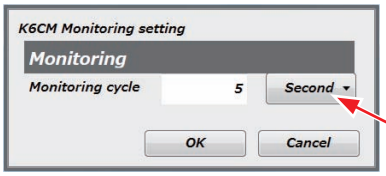
7 Confirm motor status can be monitored

The default settings for the monitoring cycle is 600 seconds. In this state, starting monitoring means that it will take 600 seconds to obtain initial data. Accordingly, it takes time to confirm whether or not the motor status is being monitored. Initially, temporarily set a short monitoring cycle (for example, 5 seconds) to confirm if the motor status is being measured. The procedure for this is as follows.

Click the ( ) device setting button, and click the ( ) [Option] button.

The following [K6CM Monitoring Settings] screen will be displayed.

Set the monitoring cycle to 5 seconds, then click the [OK] button.



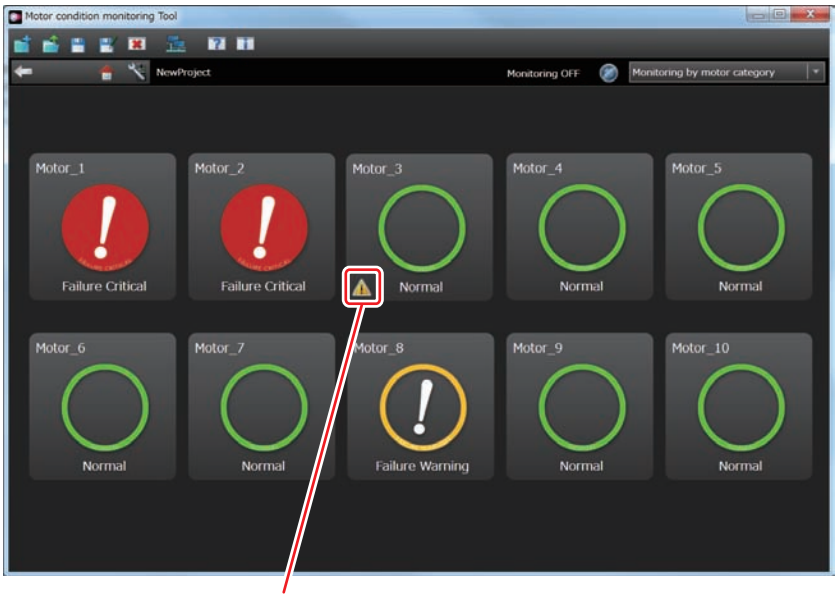
Using this pull down list allows you to change the unit of monitoring cycle.
Selectable units are seconds, minutes, hours, and days.

Version Information

With software tool version 1.2.0.0 or later, the unit of monitoring cycle can be set.

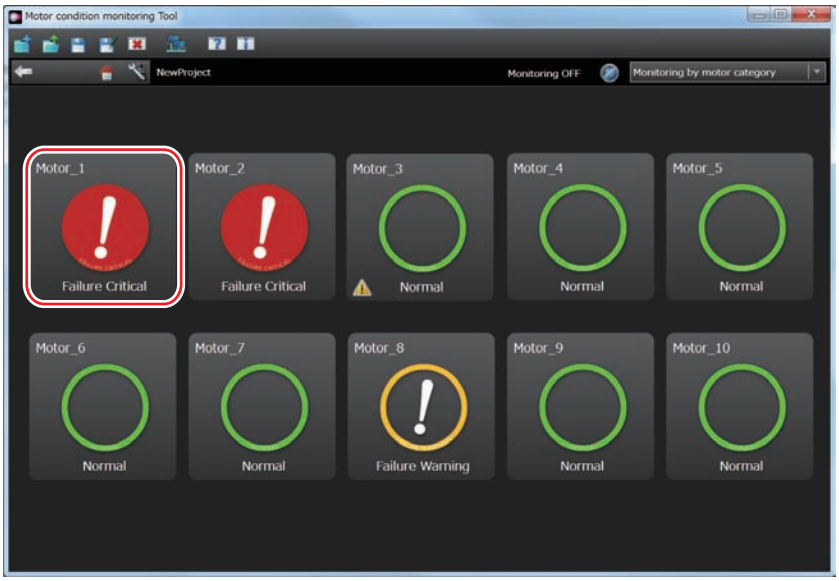
Click the ( ) [Start monitoring] button to start monitoring.
If communications between the PC and the K6CM are operating normally, then the monitoring status will be displayed.

Any devices unable to communicate normally will show a ( ) communications error mark.



If this communications error mark is shown, then review PC and K6CM wiring, as well as PC and K6CM IP address settings.

To check the [Each motor detailed information] screen, click the area outlined in red.



The following [Each motor detailed information] screen will be displayed.
To view the [Each device detailed status] screen, click the area outlined in red.

The [Each device detailed status] screen will be displayed.

If you confirm that the motor state can be monitored, we recommend setting the monitoring cycle to approximately one day, before you move to the actual operation.

Step5 Installation

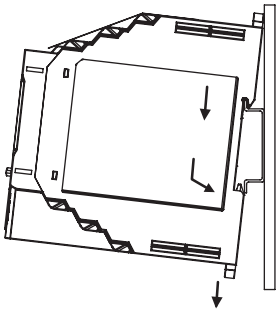
DIN Rail Mounting

There is no particular restriction on the mounting direction of the K6CM device, but install it securely in the horizontal or vertical direction as much as possible.

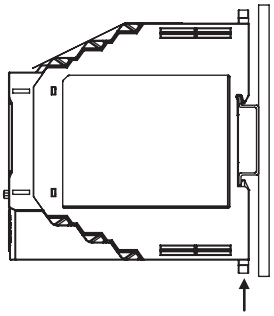
(1) On the rear surface of the unit, release the DIN rail mounting pins.

(2) To mount the K6CM device to a DIN Track, hook the device onto the DIN Track and press the device in the direction of the arrow until you hear it lock into place.

[1]



[2]



(3) Lock all DIN rail mounting pins.

Note1. Affix the DIN rail in three or more places using screws.

Note2. DIN rail: PFP-50N (500 mm)/PFP-100N (1000 mm)

Screw Mounting

When installing the product using screws, first drill screw holes using the dimensions in the figure below, then tighten using specified-size screws and flat washers to the correct torque. The product does not come with mounting screws. Use commercially available screws.

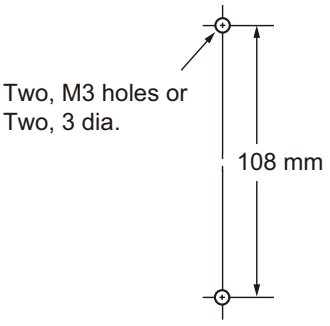
Screw types and lengths will differ depending on the mounting location materials and thickness, therefore ensure screws that meet these conditions are used.

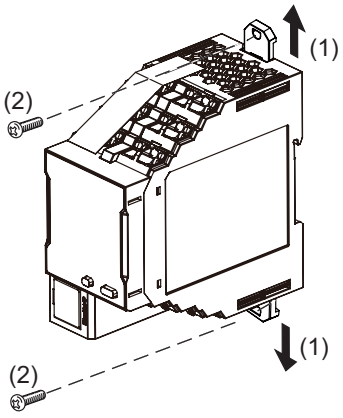
(1) Pull out 2 hooks in the K6CM device back outside until sound will be.

(2) Insert M3 screw in a hole of a hook and fix.

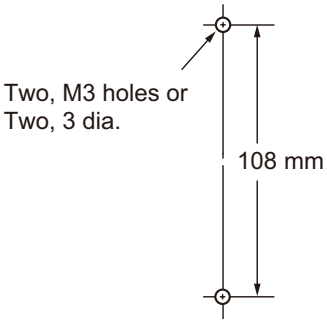
- Used screws: M3×2 locations
- Recommended tightening torque: 0.5 to 0.6 N•m

Screw
Mounting Hole Dimensions





Mounting Hole Dimensions



Step 6 Connection

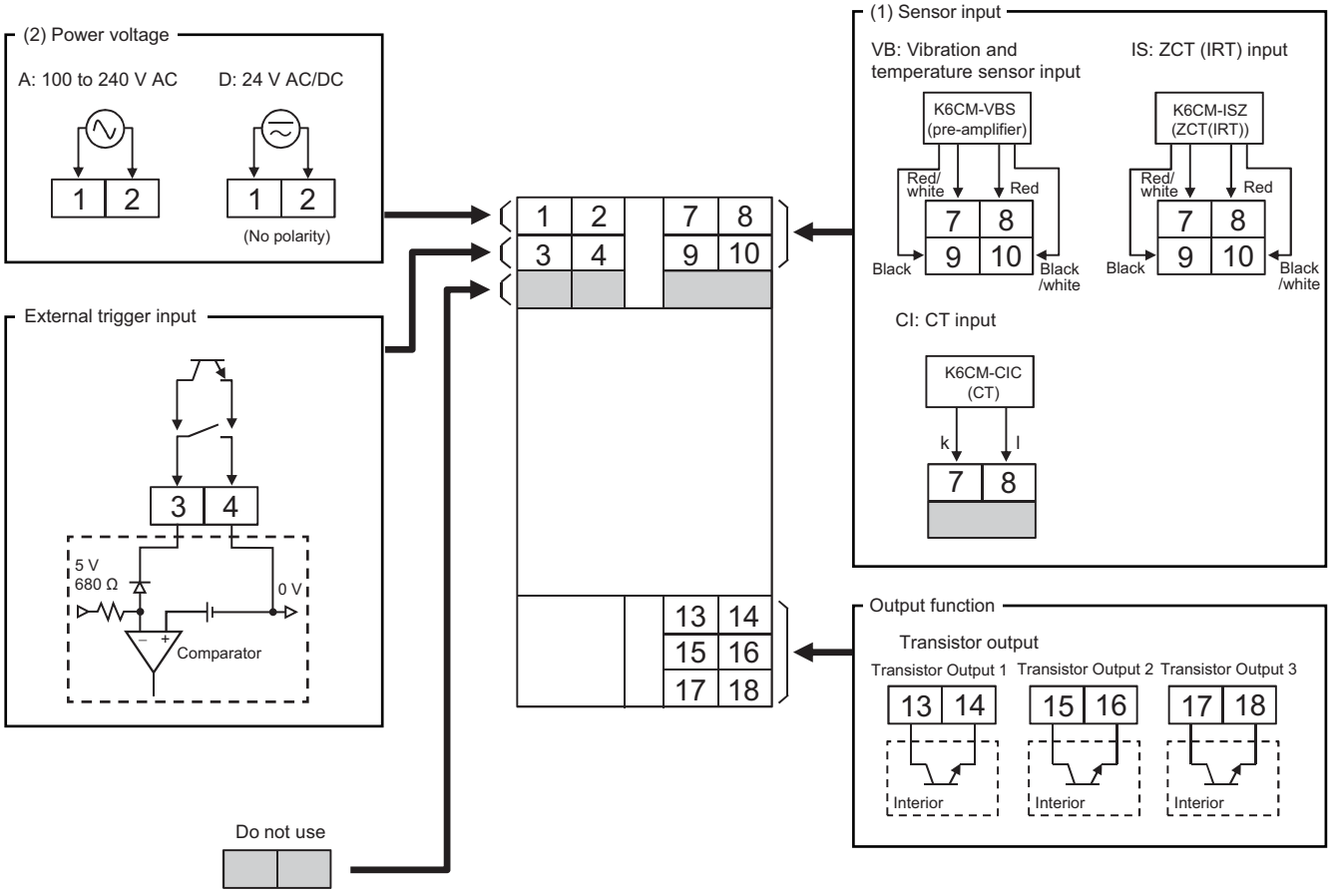
1 Power supply connection, external trigger (when required) connection, transistor output connection

Connect the unit to the power supply.

100 to 240 VAC or
24 V power supply (by type)

Motor condition monitoring equipment
K6CM device

Connection Diagram

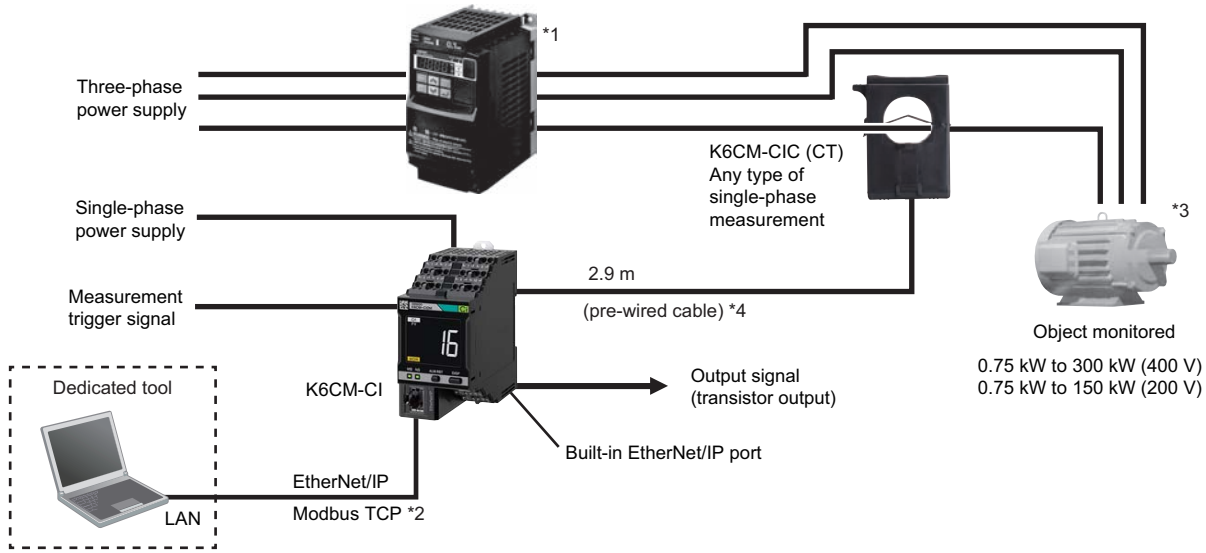


Connect all units to K6CM using Push-in Plus Terminal Blocks.

2 Sensor connection

Install sensors on the motor wiring.

Comprehensive current diagnosis type (K6CM-CI)



By keeping a PC or PLC continuously connected, you can monitor the state of a motor.

Note1. Even without a PC, the alarm bar of the main unit notifies you of changes of motor state.
Note2. There is a limit on CT open/close counts.
Note3. Measure one phase using CT.
Note4. CT that can be used will differ depending on motor capacity and voltage. Refer to the Datasheet (N218) for the formula to calculate the current value from the motor capacitance.

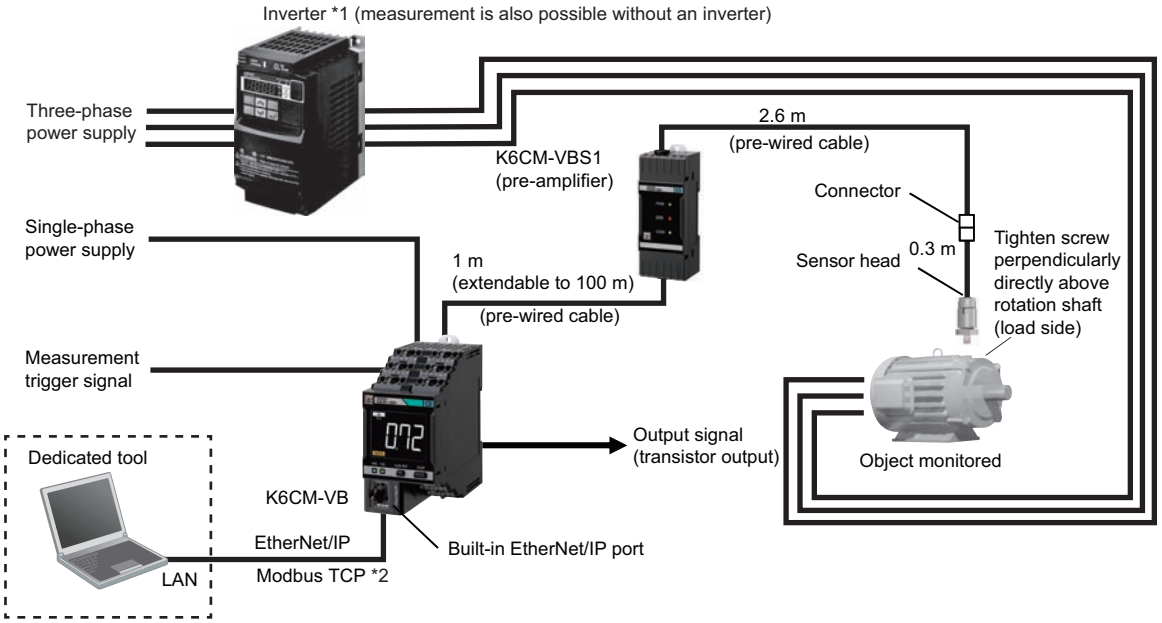
Using a K6CM-CIM

*1. When the motor is driven by an inverter, it may not be possible to monitor the motor or load abnormalities. Refer to the User's manual (N219) for details.
*2. Modbus TCP is not supported.
*4. The CT cable cannot be extended.

Using a K6CM-CI2M

*1. In an environment where the motor is driven by an inverter, if the degradation level 1 is used as the measurement value, it may not be possible to monitor the motor or load abnormalities. Therefore, it is recommended to use the degradation level 2. Refer to the User's manual (N219) for details.
*3. Since the frequency band of the harmonics of the drive frequency and the frequency band in which errors such as load imbalance and misalignment appear are the same frequency band for a 2-pole meter, sensitivity may be reduced with degradation level 2.
*4. The CT cable cannot be extended.

Vibration & temperature monitoring type (K6CM-VB)



By keeping a PC or PLC continuously connected, you can monitor the state of a motor.

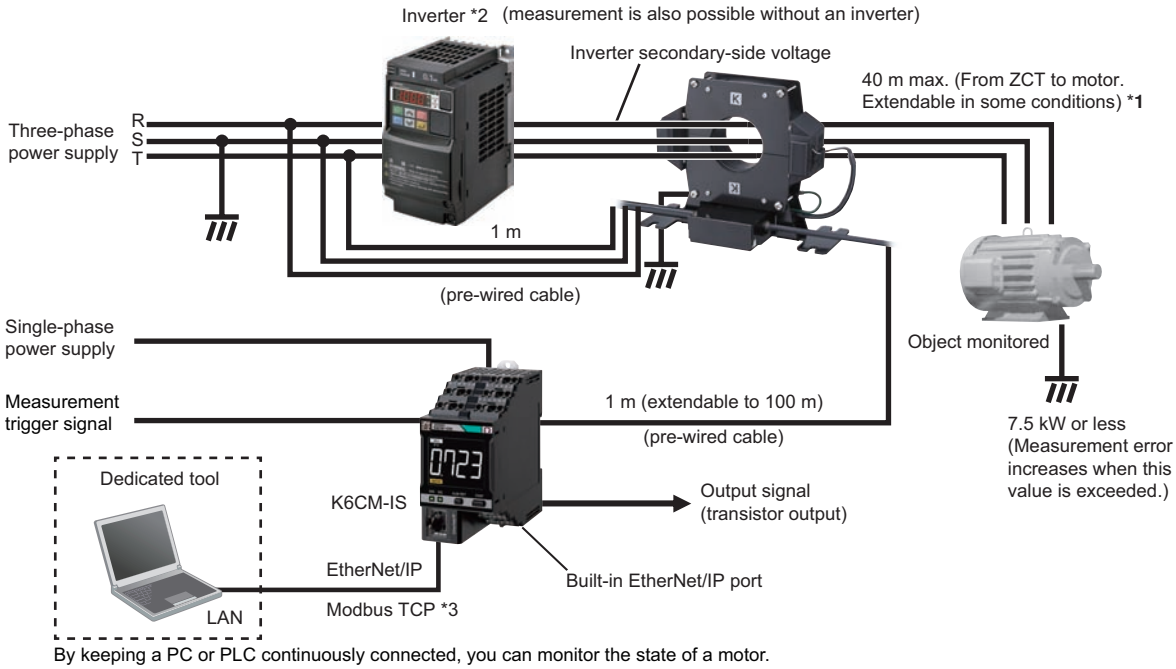
Note. Even without a PC, the alarm bar of the main unit notifies you of changes of motor state.

*1. When you use an inverter to drive the motor, you may not be able to check the degradation tendency of the motor. In the conditions below, acceleration fluctuations tend to occur more frequently.
- The frequency is stable at an inverter drive frequency of 50 Hz or higher.
- The inverter carrier frequency is stable at 12.5 KHz or higher.

Test in the actual installation environment before use.

*2. Can be used only with EIP CPU version 1.2 or higher.

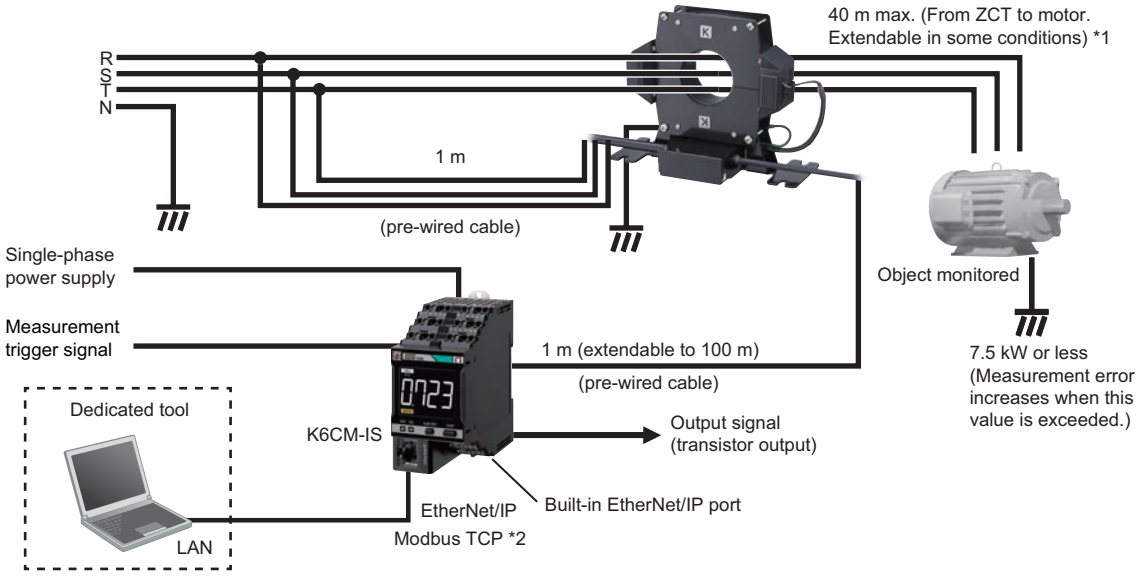
Insulation resistance monitoring type (K6CM-IS)
Three-phase, three-conductor, S-phase ground



By keeping a PC or PLC continuously connected, you can monitor the state of a motor.

Note. Even without a PC, the alarm bar of the main unit notifies you of changes of motor state.
*1. For details, refer to the technical data on DataSheet (N218).
*2. Measurement may not be possible depending on the drive frequency of the inverter. See the User's Manual (N219) for more information.
*3.Can be used only with EIP CPU version 1.2 or higher.

Three-phase, four-conductor, N-phase ground



By keeping a PC or PLC continuously connected, you can monitor the state of a motor.

Note1. Even without a PC, the alarm bar of the main unit notifies you of changes of motor state.
Note2. When an inverter is used with three-phase, four-conductor, N-phase ground, correct measurement is not possible.
*1.For details, refer to the technical data on DataSheet (N218).
*2.Can be used only with EIP CPU version 1.2 or higher.

Step7 Monitoring

Monitor the motor status using the Motor condition monitoring Tool.
For details, refer to the User's Manual (N219).

Step8 Pre-verification

0 Preface

The K6CM is more effective when multiple parameters are set appropriately. This section covers the particularly important settings.
Conduct the pre-verification as follows, and set the optimal parameters for the target equipment.

1. Specification of verification equipment
2. Recommended parameter settings during verification
3. Prior data collection and analysis
4. Collection of comparison data *
5. Threshold levels settings

* The absolute value of the threshold levels can be set for the K6CM-VB. See the User's manual (N219) for more information.

1 Specification of verification equipment

The K6CM is a product that quantifies the status of the motor and determines/discerns whether its status is Critical. Therefore, it can evaluate the validity of a motor's effectiveness through a comparison verification between a motor in a critical state and a motor in a normal state.
One of the method for conducting a comparison verification is as follows.

(1) Measurements before and after maintenance
The maintenance engineer determines that the status is Critical and conducts measurements before and after the maintenance (part replacement, overhaul, etc.) planned for the motor.

(2) Reproduction of critical state
Reproduce the critical state you want to detect in the target equipment and compare the normal state to the critical state.

(3) Measurement of old and new equipment
Some equipment operate under the same conditions. If the equipment has been operating for a different number of years, it is possible to conduct a new and old comparison. However, if the old equipment is not clearly in a critical state, the difference may not be detectable.

Comparison before and after routine inspection

Changes before and after conducting routine tasks such as cleaning, greasing, and tightening installation bolts may be too slight for the K6CM to detect. Note that there may be no change in the numerical value.

Overhaul

The K6CM-CI2M can detect abnormalities in the motor installation state. For this reason, if the motor is reinstalled with the motor and load revolution axle misaligned, the K6CM-C12M will detect the misalignment of the revolution axis as an error and the measured value may become larger. To perform correct verification, and to use the motor longer in the normal state, we recommend aligning the motor and revolution axis when reinstalling.

2 Recommended parameter settings during verification

The software tool is optimal for the pre-verification and makes it easier to set parameters and collect data. A sample data collection program that utilizes the NJ/NX-series is available in case a PC cannot be set up at the site.
URL of the [K6CM] Sample Program for the NJ/NX-series
http://www.ia.omron.com/product/tool/k6cm/index.html

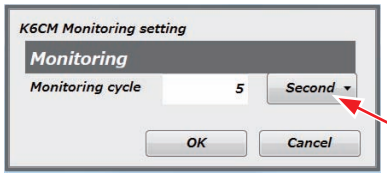
Depending on the stability of the load and periodic vibration of the equipment, the measured values may vary widely. Variations in the measured values may cause abnormalities that you want to detect to be missed. The trigger function and moving average times settings can be used to decrease the variations. However, setting the moving average times at the stage of advance verification and performing averaging may result in failure to notice the variation. To make the magnitude of the variation clear during advance verification, we recommend setting the moving average times as shown in the table below.

● Moving average times

Data name	Default	Recommended settings
Moving average times (Ci1)	3: 8 times	0: OFF
Moving average times (except Ci1)	0: OFF	0: OFF

Refer to: Monitoring cycle (dedicated tool)

Click the monitoring setting button ( ) in the software tool, set [Monitoring cycle] in the screen below to 5 seconds, and take the measurement. By monitoring at a short cycle, the magnitude of variations in the measured values can be made clear.



Using this pull down list allows you to change the unit of monitoring cycle.
Selectable units are seconds, minutes, hours, and days.

3 Prior data collection and analysis

When you have finished setting the recommended parameters for the pre-verification, click the start monitoring button ( ) in the software tool to begin monitoring.

When you have collected some data, click the monitoring OFF button ( ) to stop monitoring.

Analyze the data you collected, and readjust the verification parameters.

It is recommended that a day or more of data be collected to determine the optimal timing for collecting data during actual operation and to conduct a comparison verification.

4 Collection of comparison data

Collect data for comparison. Conduct this process under the same measurement conditions as the pre-verification.
It is recommended that a day or more of data be collected for comparison.

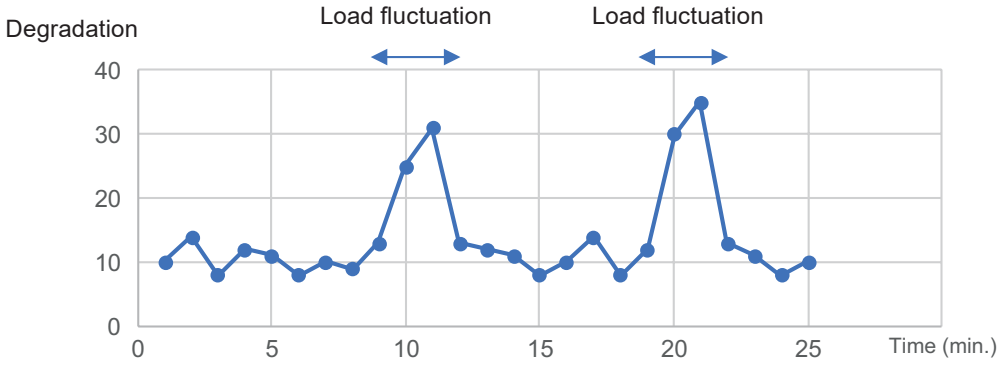
5 Threshold levels settings

Set the threshold levels using the before and after data collected.

■K6CM-CI (Comprehensive current diagnosis type)

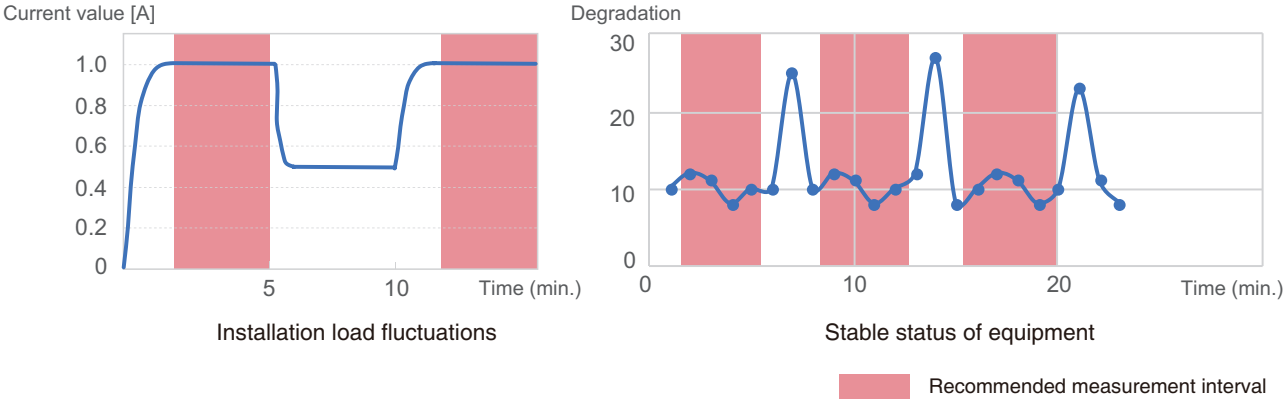
(1) Open the CSV file to graph the results.

(2) Set the trigger function, and perform measurement in a stable state
When load fluctuations occur at specific times, check the timing when the motor's load fluctuates and take the measurement when the motor is in a stable state.



● Trigger Function
The measured values may vary in conditions such as those in the table below. Perform measurement of a stable state using the trigger function.

	Example	Possible correction
Status change	• Change in rotational frequency • Work change	• Set a trigger so that measurements are taken at a set state
Load fluctuation	• Between a number of seconds after starting the equipment • Between a number of seconds after stopping the equipment	• Set power ON/OFF as a trigger, and set the number of seconds until stabilization as the monitoring delay time.



Measurements in a stable state

If the motor's load is fluctuating, the measurement results will vary greatly. In the worst case, use measurement data taken at a fixed load state (stable state) and maintained for some seconds (sampling time x 2). (The sampling time differs by model.) Use the trigger function and monitoring delay time. See the User's manual (N219).

(3) Set the moving average times, and suppress variations in measured values
If there is a great variation constantly, there may be a variation in measurement results due to noise and short-cycle vibration inherent to the equipment. Set the moving average times, and decrease variations.

● Moving average times

- If there is a lot of variation, simply create a moving average in the file and process the average.
  In the case of a moving average time of 2 (4 times), calculate it per the figure below.

	A	B	C	D	E	F	G	H
1	K6CM_CI	Degradation level						
2	Date and time	Degradation level (current value)	Degradation level alarm (Warning)	Degradation level alarm (Critical)	K6CM status	Degradation level status	Moving average	
3	#######	30	100	120	E200	0		
4	#######	42	100	120	E200	0		
5	#######	20	100	120	E200	0		
6	#######	32	100	120	E000	0	=SUM(B3:B6)/4	
7	#######	35	100	120	E000	0	32.25	
8	#######	41	100	120	E000	0	32	
9	#######	25	100	120	E000	0	33.25	
10	#######	29	100	120	E000	0	32.5	
11	#######	39	100	120	E000	0	33.5	
12	#######	29	100	120	E000	0	30.5	

In the case of 4 times,
go to the fourth cell down

- Check that the measurement results succeeding the moving average are stable enough.
  If the results are not stable, increase the moving average times.
  (Increasing the moving average times will increase the effect of old values apart from values measured at the current time.
  E.g. In the case of a comprehensive current diagnosis, a sampling time of 5 seconds and a moving average times of 5 (32 times) means that data from 160 seconds earlier will be effective.)

Moving average times

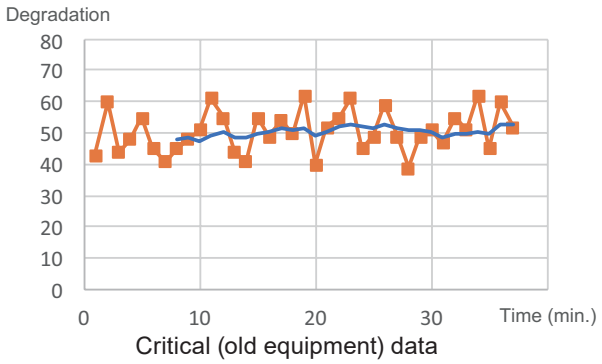
During actual operation, determine moving average times with more stable numbers while utilizing the data in the CSV file. Note that setting the moving average will result in a delay in the timing in which the critical state is detected. Set it while taking into consideration the balance between the severity of the variation and timing in which the critical state is detected.

Changing the inverter carrier frequency settings

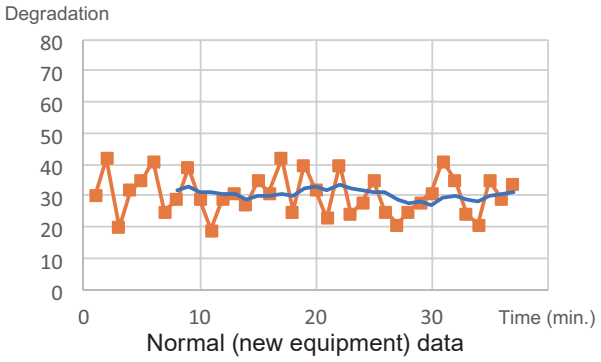
For the K6CM-CI2M, it is possible to reduce variation by setting the inverter carrier frequency to 5 kHz or more. Try changing this setting if it is possible to change the equipment's functional settings.

(4) Determine the threshold levels before and after comparison.
Before maintenance, if a skilled maintenance engineer deems it necessary to perform emergency maintenance, set the state before maintenance as a Critical threshold level. If it is deemed necessary to perform maintenance soon, set the state before maintenance as a Warning threshold level.
This also applies to old equipment and if a critical state is reproduced.

E.g. An average value of 50 means the warning threshold values is 47



Critical (old equipment) data



Normal (new equipment) data

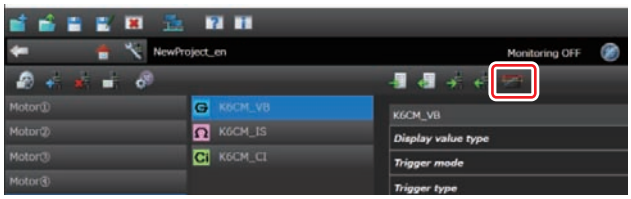
Quantification of skilled knowledge

It is possible to quantify skilled knowledge by considering measurements of a motor deemed Critical by a skilled maintenance engineer as K6CM measurements. Set the threshold levels to coincide with the Critical level sensed by a skilled engineer.

■ K6CM-VB (Vibration type)

The alarm threshold of acceleration and velocity can be set automatically by entering the motor information to be monitored in the software tool.

(1) Click the [Guide for Setting Alarm (K6CM_VB)] button ( ) on the device setting screen.

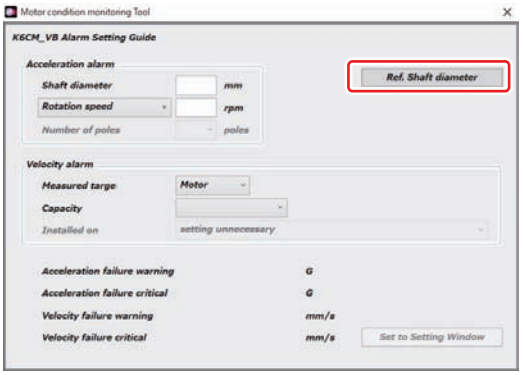


Enter the information of the motor to be monitored on the following screen.

● When setting acceleration alarm

[1] Enter the shaft diameter.

If the shaft diameter is unknown, click the [Ref. Shaft diameter] button.



Refer to the following table and enter the shaft diameter from the frame number.

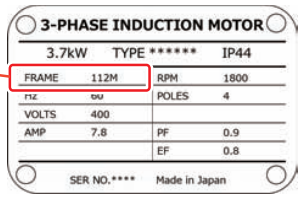
* Check the motor plate or motor manual for the frame number.
* The following table is taken from IEC 60072-1.

For frame numbers that are not listed in the table below, check the shaft diameter from the motor manual.

Ref. Shaft diameter [mm]

Capacity [kW]			Frame No. (Foot mounting)		Flange No. (Flange mounting)		Shaft diameter [mm]
2 poles	4 poles	6 poles	IP2X	IP4X	IP2X	IP4X	
0.75	0.75	-	80M		-	FF165	19
1.1	1.1	0.55	90L		-		24
1.5	1.5	0.75			FF165		
2.2	-	-	100L		FF215		28
-	2.2	1.1					
-	-	1.5	112M		FF265		38
3.7	3.7	2.2	132S				
5.5	5.5	3.7	132M				
7.5	-	-					42
-	7.5	5.5	160M				
11	-	-					
15	-	-	160L				
-	11	7.5					
18.5	-	-					
-	15	11					
22	18.5	-	160L	180M	FF350	FF350	48
-	22	15	-	-	-	-	
-	22	15	180M		FF350		55
30	-	-		180L		FF350	
-	30	18.5	-		-		
-	-	22		200L		FF400	
37	-	-	180L	-	FF400	-	
-	-	22				FF400	60
-	37	30		200L	-		
-	-	37					
-	-	37	200M	-	FF500	-	65

※Shaft diameters on the table is guide value referenced from IEC 60072-1.
Please check actual dimensions before monitoring from motor catalog.

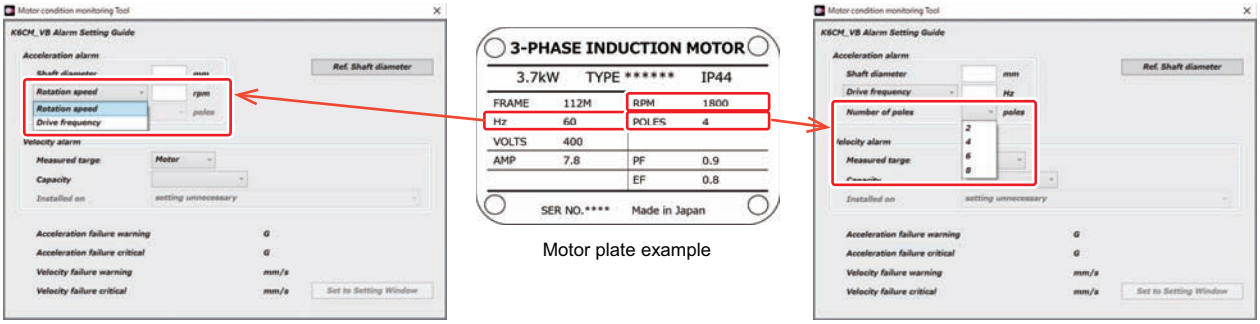


Motor plate example

[2] Enter the rotation speed (rpm) or drive frequency (Hz).

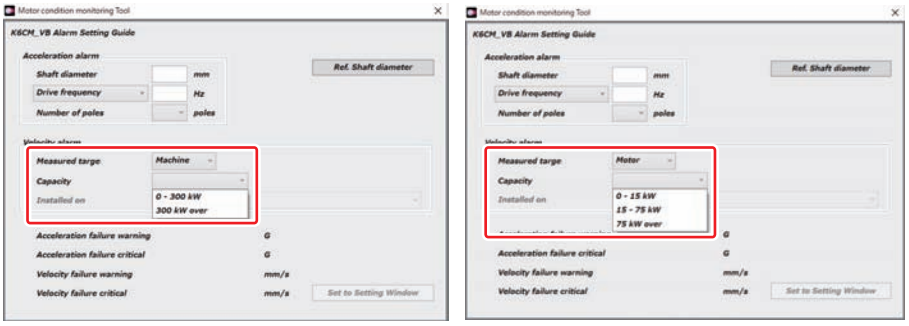
When entering the drive frequency, enter the number of poles as well.

* Check the motor plate or motor manual for the number of poles.

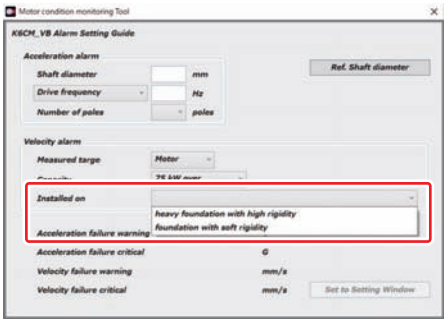


● When setting velocity alarm
Velocity monitoring of the K6CM is based on ISO 2372.

[1] Select the measured target and capacity.



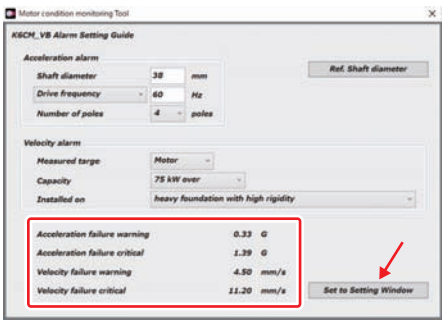
[2] For large-capacity motors (large-sized machines), select the installation status.

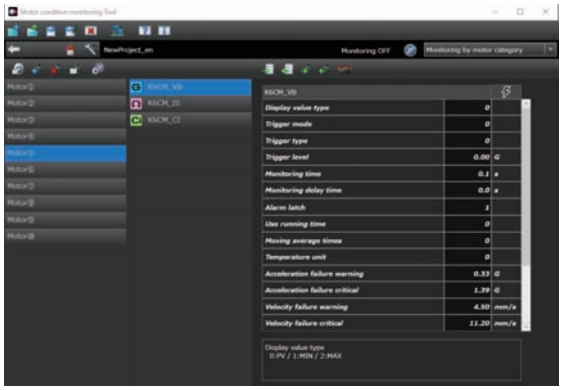


Equipment class	Definition
I	Small-sized machines (typical example: motor with output less than 15 kW)
II	Medium-sized machine (typical example: motor with output of 15 kW to 75 kW or less and machine with 300 kW or less)
III	Large-sized machines: machine installed on a heavy foundation with high rigidity.
IV	Large-sized machines: machine installed on a foundation with soft rigidity.

(2) After input is complete, the threshold levels of acceleration and velocity will be automatically calculated.

(3) Click the [Set to Setting Window] button.
Settings will be applied in the device setting screen.





Version Information

With software tool version 1.3.0.0 or later, the threshold level automatic settings can be set.

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