

Predictive Maintenance

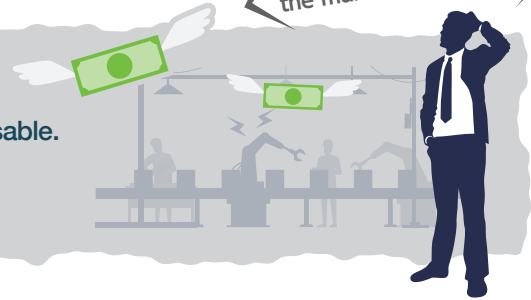
Would you like to determine an appropriate maintenance timing for you?

Someone, please tell me the maintenance timing!

Problems of maintenance

Wasteful

- Parts are periodically replaced even though they are still usable.
- A sudden failure of the device which was expected to be still operational.



This is the point that the maintenance differs from before! / enables **predictive maintenance!!**

Improvement

Use statistical analysis function block* for predictive maintenance!

* FB is designed to convert a ladder block, which is used repeatedly in a sequence program, into a component (FB) to be utilized in a sequence program.

System failure can be avoided by detecting small abnormalities!

The state of a device can be grasped by comparing output current in a normal operation with output current in a test operation before starting work by statistical analysis function block.

Here are advantages! /

- ✓ Reduction of wasteful replacement cost
- ✓ Reduction of human resource cost for maintenance
- ✓ Improving work efficiency by avoiding downtime
- ✓ Reduction of risk of unexpected parts damages

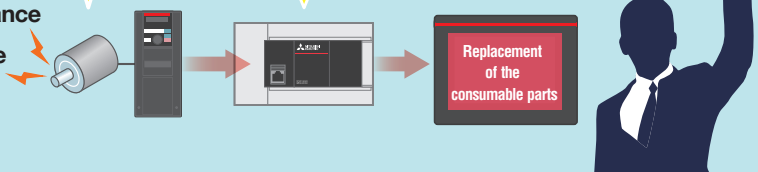
Abnormality detected

What is predictive maintenance?

Maintenance to perform replacement or repair at an appropriate timing by grasping the state of a device by continuous measurement and monitoring.

The replacement timing of the consumable parts can be determined by statistical analysis function block.

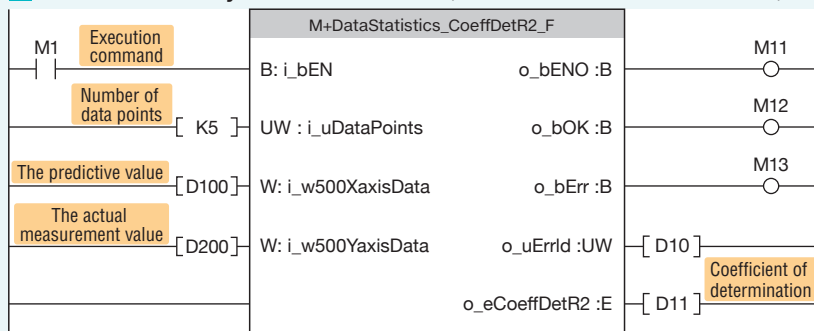
Maintenance can be performed at the optimal timing!



Utilization of statistical analysis function block

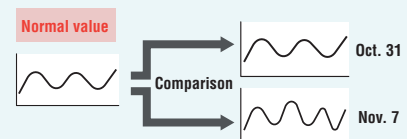
By using the FB, a program which can predict a maintenance (trouble) timing can be easily created.

1 [Statistical analysis function block (M+DataStatistics_CoeffDetR2_F)]



The output current is compared (2) in the FB (1), and the coefficient of determination is calculated (3). When the coefficient of determination falls below the threshold value set by the customer, it indicates that it is time to replace the consumable parts and perform maintenance.

2 Comparison of output current of a motor (image)

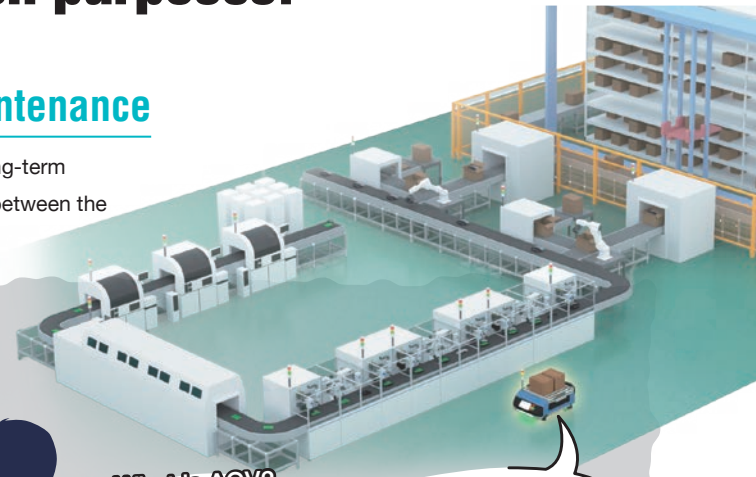


3 Coefficient of determination calculation (image)

Measurement date	Coefficient of determination	Status
Oct. 31	0.974599	Normal
Nov. 7	0.465249	Abnormal

▶ Predictive maintenance for AGV maintenance

Output current of the motor is collected for controlling AGV by FX. A long-term deterioration and trouble can be predicted by calculating a correlation between the actual measurement data and the normal value.



What is AGV?

An abbreviation of Automatic Guided Vehicle, and it is a device for automatic conveying on behalf of human workers. AGVs are used in distribution warehouses, liquid crystal factories, semiconductor factories, etc.

Wasteful Before Preventive maintenance

- Periodic inspection of a motor of AGV
- The motor is periodically replaced even if it has no abnormalities.
- Lowering an operation rate by sudden trouble
- Personnel cost for maintenance

Isn't there any way to make AGV maintenance more efficient?



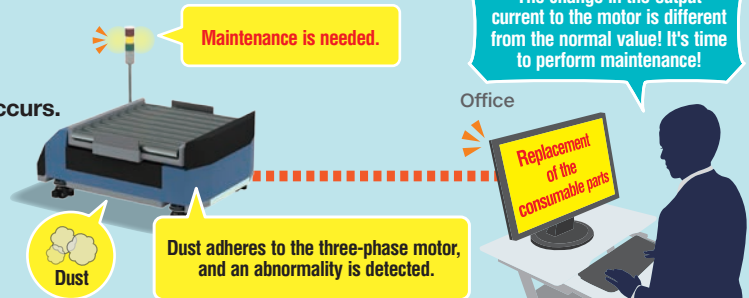
Improvement After

Predictive maintenance

FX5 × Wireless module × Statistical analysis Function Block = Predictive maintenance is realized!

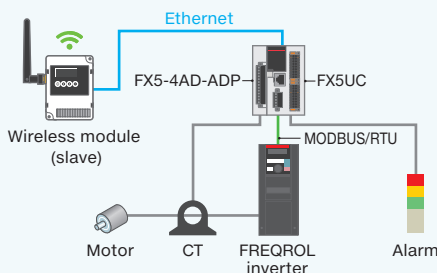
Cost reduction by predictive maintenance!

- ✓ Collecting information in real time.
- ✓ Detecting slight abnormalities before trouble occurs.
- ✓ Abnormalities can be visually recognized.
- ✓ Easy maintenance and management.
- ✓ Waste of device cost can be avoided by replacement after the detection of abnormality.

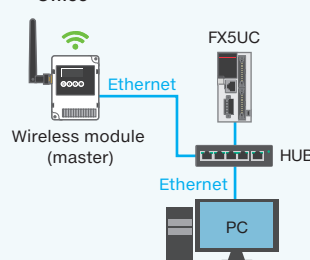


System configuration example

AGV (factory)



Office



"Predictive maintenance"

can be realized by MELSEC iQ-F!

Product configuration example

A wiring member is not included.

- Office
- FX5UC-32MT/D*1
 - Wireless module (master)

- AGV (factory)
- FX5UC-32MT/DS-TS*1
 - FX5-4AD-ADP
 - Wireless module (slave)
 - Statistical analysis function block

*1: GX Works3 is necessary for creating programs and various parameter settings.

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
<http://Global.MitsubishiElectric.com>

⚠ Safety Warning

To ensure proper use of the products in this document, please be sure to read the instruction manual prior to use.

Registration

- Ethernet is a registered trademark of Fuji Xerox Co., Ltd. in Japan.
- The company names, system names and product names mentioned in this document are either registered trademarks or trademarks of their respective companies.
- In some cases, trademark symbols such as "™" or "®" are not specified in this document.