

Recommendation of preventive maintenance for MELIPCs

■Date of Issue

January 2019 (Ver. B: April 2019)

■Relevant Models

MELIPC series

Thank you for your continued support of Mitsubishi Electric industrial PC MELIPC.

We summarized the concepts of the device service life and preventive maintenance of MELIPCs. Please perform preventive maintenance in a planned manner.

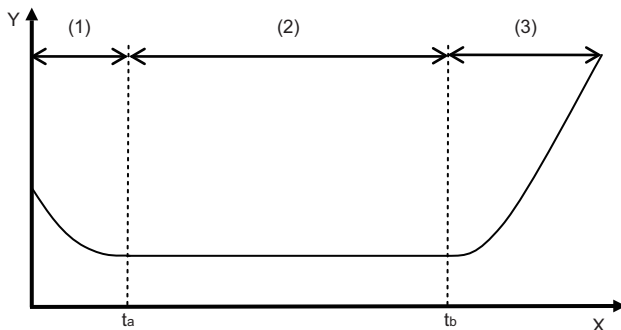
1 SERVICE LIFE OF MELIPCs

The service life indicates the duration of a product which can meet the prescribed functions and performance as a MELIPC. The approximate durability of a MELIPC, excluding limited-life components is ten years (five years for double brand products). For details of the service life of limited-life components, refer to the following section.

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2 YEARS OF USE AND FAILURE OCCURRENCE

Generally, the failure rate of electronic devices is shown by the bathtub curve as depicted below. The curve is divided into three stages: initial failure, random failure, and wear-out failure.



X Years of use

Y Failure rate

(1) Initial failure period

(2) Random failure period

(3) Wear-out failure period

Initial failure

Initial failure occurs during initial operation, which includes faulty components and a manufacturing defect found after the first use of a product.

We make an effort to prevent the initial failure by performing a pre-shipment test.

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Random failure

Random failure occurs unpredictably and suddenly during the service life of the device before deterioration or abrasion progresses.

It is so named because the failure occurs unexpectedly from the viewpoint of statistics and genesis phenomenon.

The failure can be prevented with corrective maintenance by preparing spare components.

Wear-out failure

Wear-out failure occurs as a result of the device deterioration or abrasion happens at around the end of a device service life.

The failure rate drastically increases over time.

It can be prevented with preventive maintenance.

Replacement of components or products is recommended before reaching to the point (t_b in the figure above) where the failure rate starts to increase.

The recommended replacement cycle for MELIPC as part of preventive maintenance is from five to ten years.

3 NECESSITY OF PREVENTIVE MAINTENANCE

MELIPC consist of various electronic components, and can perform the best functions and performance when all the product components operate normally.

By conducting daily and periodic inspections, a sign of device failure can be found at an early stage and adequate corrective action can be taken.

Especially, life-limited components cannot be used indefinitely. Exceeding the pre-determined usable years (the useful life of components) according to each component type may affect the characteristics of a MELIPC, resulting in malfunction or failure of the devices.

By replacing components or products in every certain period of time as preventive maintenance, a device failure can be prevented.

4 LIMITED LIFE COMPONENTS AND PREVENTIVE MAINTENANCE

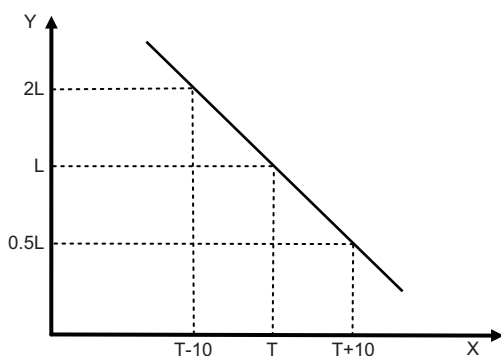
MELIPC contain limited life components such as aluminum electrolytic capacitor and switch.

Aluminum electrolytic capacitor

An aluminum electrolytic capacitor is used in each product including a power supply module.

When an aluminum electrolytic capacitor reaches the end of durability, a MELIPC may cause malfunction due to noise resistance deterioration or damage of a printed circuit board induced by capacity degradation and liquid leakage.

The service life of an aluminum electrolytic capacitor is affected by ambient operating temperature. In accordance with "Arrhenius law (10°C double rule)", when the ambient operating temperature increases by 10°C, the service life shortens to half. On the other hand, when the temperature decreases by 10°C, the service life is extended twice.



Arrhenius law

X Temperature(°C)

Y Life (logarithmic scale)

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■ Power supply module and AC adapter

An aluminum electrolytic capacitor is used for smoothing input and output of power supply.

When the durability of an aluminum electrolytic capacitor in a power supply module and an AC adapter ends, the stable power source cannot be supplied, resulting in malfunction of products.

Products should be replaced in approximately every five years as part of periodic preventable maintenance.

Switch

Contact components including a switch and a socket used in a MELIPC may cause contact failure depends on the operating environment.

A contact failure may occur in the following cases:

- Foreign material may attach to the contact surface under the environment where dust and oil mist can easily enter into the products.
- Chemical film may be generated on the contact surface under the environment with corrosive gas in the air.
- The internal mechanical accuracy may not be maintained under the environment where the structural components inside of a switch are under the stress due to temperature and humidity, vibration, and shock.

Products should be replaced in approximately every ten years as part of periodic preventable maintenance.

Battery

A battery of a MELIPC is used to back up (data retention during power failure) BIOS settings and the time data memories of an internal clock when the battery is powered-off or power failure occurs.

Battery replacement is required as the back up may not be executed when battery capacity reduces and voltage becomes equal to or less than the specified value.

For the approximate time or method of battery replacement, refer to the user's manual of each product.

Fuse

A fuse is used to protect the input side of a power supply module and an AC adapter.

When the power is turned on and off repeatedly in a short time, a large inrush current may be generated and that affect the fuse durability. Leave an interval of five to ten seconds when operating the power. For further details, refer to the user's manual of each product.

Products should be replaced in approximately every five years as part of periodic preventable maintenance, even if a fuse is not brown.

Fan module

A fan module is used to cool products.

The rotation failure and abnormal vibration of a fan may occur due to bearing abrasion and degradation of lubricant by use.

An error (fan module abnormality) may occur when the fan rotation speed is equal to or below the standard value.

In that case, replacement of the fan module is required. Failure to do so may cause the device failure because the products cannot be cooled sufficiently.

A fan module should be replaced in approximately every ten years as part of periodic preventable maintenance.

For the method of error checking and fan module replacement, refer to the user's manual of each product.

■ Storage limitation

The bearing lubricant may deteriorate over time even if a fan is not used.

A storage limitation of a non-energized fan module is one year.

If storing a fan module for more than a year after the manufacturing date, the fan module should be powered up on a yearly cycle.

When replacing a fan module, the fan module which has been kept non-energized for less than one year, and has been within ten years from the manufacturing date should be used. A fan module may not operate properly if the module which exceeds the storage limitation is used.

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LCD (Liquid crystal display)

The MI3000 adopts an LED backlight whose brightness decreases with use.
 The MI3000 or an LCD should be replaced when the energization time indicates that the backlight is near its end of life.
 For the replacement of the LCD, please contact your local Mitsubishi Electric sales office or representative.
 The backlight life (the time when the brightness decreases in half) differs depending on the models.
 For the backlight life, refer to the user's manual or catalog of the model to be used.

5 HANDLING MELIPC SYSTEMS HAVE NOT BEEN USED FOR A LONG PERIOD OF TIME

For MELIPC systems have not been used for a long time, ensure that the power supply is turned off to prevent problems such as electric leakage and insulation failure as a result of issues relating to service life or deterioration.
 A fan module should be replaced before turning on the power source when using the device which has been turned off for more than one year.

6 REMARKS

To minimize recovery time from the device failure of a MELIPC, preparing spare components is recommended.
 For inspection (overhaul), contact your local Mitsubishi representative.
 For items and descriptions of daily and periodic inspections, refer to the user's manual of each product.

REVISIONS

Version	Date of Issue	Revision
A	January 2019	First edition
B	April 2019	MI3321G-W and MI3315G-W have been added to the products. The description of "Battery" in "LIMITED LIFE COMPONENTS AND PREVENTIVE MAINTENANCE" has been modified. The description of "LCD (Liquid crystal display)" in "LIMITED LIFE COMPONENTS AND PREVENTIVE MAINTENANCE" has been added.

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