

TECHNICAL BULLETIN

[Issue No.] GOT-A-0026

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[Title] Recommendation of Preventive Maintenance and Inspection for the GOT

[Date of Issue] January 2010

[Relevant Models] GOT1000 Series

Thank you for your continued support of Mitsubishi Graphic Operation Terminals (GOT).

We summarized the concept on the life and preventive maintenance of the GOT for planned execution of preventive maintenance.

1. Useful life of the GOT

The standard useful life of the GOT, excluding limited life parts (aluminum electrolytic capacitor, battery, backlight, liquid crystal panel, touch panel, etc.) is ten years (rough guide).

Note that the useful life is a duration in which the GOT can perform proper functions and performance.

2. Necessity of preventive maintenance

The recommended replacement cycle as part of preventive maintenance is five years for units using aluminum electrolytic capacitor as an important part and from five to ten years for other units.

The GOT consists of various electronic components, and can perform the best functions and performance by operating them normally. To achieve it, finding a sign of GOT failure early by daily/periodic inspections and taking the corrective action are required. Especially, limited life parts cannot be used indefinitely. Using them exceeding the years specified according to each part type (useful life) may affect the characteristics of the GOT, resulting in a malfunction or a failure of the devices.

Particularly, when the aluminum electrolytic capacitor life ends, the noise immunity lowers due to capacity low or the printed-circuit board is damaged due to a liquid leak, resulting in erroneous input/output or a malfunction of the GOT.

The aim of preventive maintenance is to prevent a device failure as far as possible by replacing parts or units in every certain period.

3. Years of use and failure occurrence

Generally, the failure rate of electronic device such as the GOT is expressed by bathtub curve as Figure 1. The curve is divided into the three stages: initial failure, random failure, and wear-out failure.

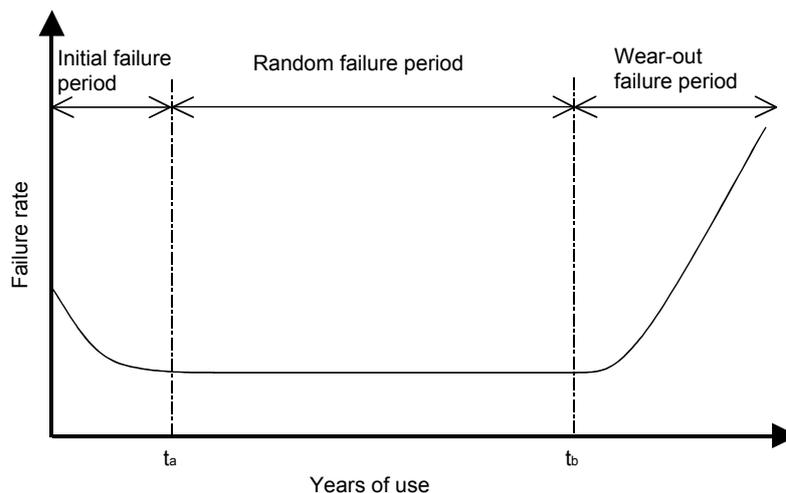


Figure 1 Relationship between years of use and failure rate

Initial failure occurs during the initial failure period and includes a faulty part or defect in manufacturing. We make every effort to prevent the initial failure by pre-shipment test.

Random failure is unexpected and accidental failure that occurs before deterioration or wear proceeds within useful life of the device. It is named after its eventuality from the viewpoint of statistics and genesis

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phenomenon. Handle the failure by corrective maintenance; that is, preparing spare parts.

Wear-out failure occurs at the end of useful life as a result of deterioration or wear, and failure rate in this period drastically increases as the elapse of the time. We recommend replacing our GOT within every ten years (rough guide), which corresponds to the point at t_b on Figure 1.

4. Limited life parts and preventive maintenance

(1) Aluminum electrolytic capacitor

An aluminum electrolysis capacitor is used with the GOT power circuit, communication unit, and option unit. Operating ambient temperature affects a life of the aluminum electrolytic capacitor. According to "Arrhenius law (10°C double rule)", when the temperature increases by 10°C , the life shortens to half. Meanwhile, when the temperature decreases by 10°C , the life lengthens to twice.

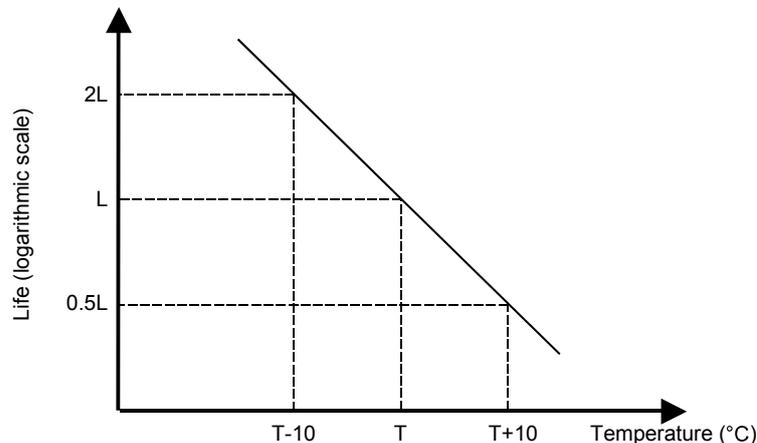


Figure 2 Arrhenius law

The aluminum electrolytic capacitor used with the GOT is designed to satisfy around 10-year life (rough guide) under an environment of average ambient temperature of 40°C .

However, the following preventive maintenance/maintenance and inspection are recommended, according to achievements in the market, operating environment, and application of the aluminum electrolytic capacitor.

1)GOT

Since the aluminum electrolytic capacitor is used for smoothing input power and output power of 3.3V, 5V or others, replace the GOT in every five years (rough guide) as part of periodic preventive maintenance.

When the aluminum electrolytic capacitor life ends, the power supply may become unstable, resulting in a malfunction of the GOT.

2)Communication unit and option unit

Since the aluminum electrolytic capacitor is used with certain communication units and option units, replace the unit in every five to ten years (rough guide) as part of periodic preventive maintenance.

When the aluminum electrolytic capacitor life ends, the noise immunity lowers due to capacity low or the printed-circuit board is damaged due to a liquid leak, resulting in erroneous input/output or a malfunction.

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(2) Battery

GOT built-in batteries are used to back up (power failure compensation) clock data, maintenance time notification data, system log data and other data in cases of power-off or power failure.

The battery life is approximately four years for the GT16 and five years for other models in an environment of 25°C. Replace the battery as necessary because the battery discharges on its own.

The GOT can output the low battery voltage alarm when battery capacity has decreased and the voltage is equal to or less than the specified value. Since there is a retention time of approximately 14 days to one month (differs depending on models) after the detection of low battery voltage, replace the battery within this time.

For how to set the low battery voltage alarm and replace batteries, refer to the User's Manual for the GOT used.

(3) Backlight

There are two types of backlights built in the GOT (a cold cathode fluorescent tube type or a LED type). The brightness of the both types of backlight is reduced over the course of time. The backlight life (when the brightness is reduced by half) differs according to a GOT. For the specific life of the backlight, check the brochure or the User's Manual for the GOT used.

The life of the backlight with the cold cathode fluorescent tube significantly decreases when the ambient temperature is below 0°C.

Replacement backlight parts are available for GOTs excluding certain models.

The GT16 and the GT15 include a function to output an alarm when the energization time reaches the set time.

Replace the backlight when the energization time almost reaches the end of life.

For how set the backlight maintenance time notification, or how to replace the backlight, check the User's Manual for the GOT used.

(4) Liquid crystal panel

Texts and other content displayed on the GOT screen with a liquid crystal panel become unclear over the course of time.

For the specific life of the liquid crystal panel, check the brochure or the User's Manual for the GOT used.

The GT16 and the GT15 include a function to output an alarm when the energization time reaches the set time.

When the energization time nears the end of life, replace the GOT or contact your local Mitsubishi sales office or representative.

For how to set the display section maintenance time notification, check the User's Manual for the GOT used.

(5) Touch panel

If the number of presses exceeds a million times, a touch panel on the GOT may not correctly recognize when the panel is pressed.

The GT16 and the GT15 include a function to output an alarm when the number of the presses reaches the set number of times. Replace the GOT when the number of the presses nears a million times.

For how to set the touch key maintenance time notification, check the User's Manual for the GOT used.

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5. When the GOT has not been used for a long period of time

To prevent accidents such as electric leakage due to the end of service life, deterioration, or insulation failure, be sure to turn off the power of the GOT if it will not be used for a long period of time.

6. GOT replacement before the end of service life

Before the expected service life is reached, consider replacing the GOT with a new one or the latest series GOT as preventive maintenance.

7. Other information

To shorten recovery time required for the GOT failure, preparing spare parts is recommended.

For inspection, contact your local Mitsubishi sales office or representative.

For items and descriptions of daily/periodic inspections, refer to the User's Manual for the GOT used.

Version	Print date	Revision
*	January 2010	• First edition