

Machine Controller MP2500/MP2500M

安全上のご注意 SAFETY PRECAUTIONS

形式(Type): JEPMC-MP2500-□□□
JEPMC-MP2540-□□□

本書は、最終的に本製品をお使いになる方のお手元に確実に届けられるよう、お取り計らい願います。

Upon receipt of the product and prior to installing the product, read these safety precautions thoroughly and retain them for future reference.



YASKAWA

株式会社 安川電機

資料番号 (MANUAL NO.) TOBP C880752 00A

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1 INTRODUCTION

This safety precautions manual describes the MP2500/MP2500M Machine Controller. To properly use the MP2500/MP2500M Machine Controller, read this safety precautions manual and user's manual (see the table below) thoroughly, and retain for easy reference for inspections and maintenance etc. Make sure that these manuals reach the end user.

2 GENERAL PRECAUTIONS

The following describes general precautions. Note the following to ensure safe application.

- The drawings presented in this manual are sometimes shown without covers or protective guards. Always replace the cover or protective guard as specified first, and then operate the products in accordance with the manual.
- The drawings presented in this manual are typical examples and may not match the product you received.
- This manual is subject to change due to product improvement, specific modification, and manual improvement. When this manual is revised, the manual code is updated and the new manual is published as a next edition. The edition number appears on the front and back covers.
- If the manual must be ordered due to loss or damage, inform your nearest Yaskawa representative or one of the offices listed on the back of this manual.
- Yaskawa will not take responsibility for the results of unauthorized modifications of this product. Yaskawa shall not be liable for any damages or troubles resulting from unauthorized modification.

3 SAFETY INFORMATION

The following conventions are used to indicate precautions in this manual. Failure to heed precautions provided in this manual can result in serious or possibly even fatal injury or damage to the products or to related equipment and systems.




Indicates precautions that, if not heeded, could possibly result in loss of life or serious injury.




Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

In some situations, the precautions indicated could have serious consequences if not heeded.



Indicates prohibited actions that must not be performed. For example, this symbol would be used to indicate that fire is prohibited as follows: .



Indicates compulsory actions that must be performed. For example, this symbol would be used to indicate that grounding is compulsory as follows: .

4 SAFETY PRECAUTIONS

The following precautions are for checking products on delivery, storage, transportation, installation, wiring, operation, maintenance, inspection, and disposal. These precautions are important and must be observed.

WARNING

- Before starting operation in combination with the machine, ensure that an emergency stop procedure has been provided and is working correctly.

There is a risk of injury.

- Do not remove the cables while power is being supplied.

There is a risk of electrical shock.

- Observe all procedures and precautions given in this manual for trial operation.

Operating mistakes while the servomotor and machine are connected can cause damage to the machine or even accidents resulting in injury or death.

- Do not damage, pull on, apply excessive force to, place heavy objects on, or pinch cables.

There is a risk of electrical shock, operational failure or burning of the MP2500/MP2500M.

- Do not approach the machine when there is a momentary interruption to the power supply. When power is restored, MP2500/MP2500M or the machine combined with MP2500/MP2500M may start operation suddenly. Provide suitable safety measures to protect people when operation restarts.

There is a risk of injury.

- Do not add to the touch-screen panel any switches for operations that may cause injury or damage to equipment or personnel.

In case of failure in the MP2500/MP2500M, related units, or cables, unexpected output signals may be sent and cause a serious accident.

If the screen appears dark, it may be the backlight burnout protection function but it could also be a malfunction in the backlight. If the cause is assumed to be the backlight burnout protection function but is actually a malfunction, a serious accident may result if a button is pressed.

Install the switches that control important operations, on the equipment other than the MP2500/MP2500M.



- Do not attempt to modify the MP2500/MP2500M in any way.

There is a risk of injury or device damage.



- Do not allow installation, disassembly, or repairs to be performed by anyone other than specified personnel.

There is a risk of electrical shock or injury.



- Before opening the front cover always turn OFF the power supply.

Touching high-voltage sections inside the panel may cause damage to the equipment or injury.



- If foreign matter such as metal chips, water, or liquid enter the components, immediately disconnect the power supply cable from the MP2500/MP2500M, and then contact your Yaskawa representative.

WARNING



- The MP2500/MP2500M is not designed for applications that require extremely high reliability and safety, such as aircraft instruments, aerospace instruments, devices for main-line communications, nuclear control equipment, and medical devices. The MP2500/MP2500M must not be used in such applications that may directly affect or threaten human lives or death.
- Safety measures such as redundancy system settings and prevention settings are required for the entire system including the MP2500/MP2500M if using the MP2500/MP2500M in applications that require high-reliability and safety in functions and accuracy, such as transportation systems (train, automobiles, ships); electrical instruments, equipment, or systems used in the prevention of disaster or crime; safety equipment, and medical devices that would not result in damage to life or limb should they be misused or fail to function.

■ Storage and Transportation

CAUTION

- Do not store or install the product in the following places.
Failure to observe this caution may result in fire, electric shock, or damage to the product.
 - Locations subject to direct sunlight.
 - Locations subject to temperatures outside the range specified in the storage/installation temperature conditions.
 - Locations subject to humidity outside the range specified in the storage/installation humidity conditions.
 - Locations subject to condensation as the result of extreme changes in temperature.
 - Locations subject to corrosive or flammable gases.
 - Locations subject to dust, salts, or iron dust.
 - Locations subject to exposure to water, oil, or chemicals.
 - Locations subject to shock or vibration.
- Do not place any load exceeding the limit.
Failure to observe this caution may result in injury or malfunction.
- Do not apply excessive force or press with a hard material on the touch-screen panel.
Doing so may break the touch-screen panel.
- Do not touch the touch-screen panel with a sharp-pointed tool such as sharp pencil and screw driver.
Doing so may damage the touch-screen panel.
- Do not use thinner or organic solvent to clean the screen.
Wipe the screen with a soft cloth that are suck into diluted detergent and wrung.
- When replacing the MP2500/MP2500M, resume operation only after transferring the previous MP2500/MP2500M programs and parameters to the new MP2500/MP2500M.
Failure to observe this caution may result in damage to the product.

■ Wiring

⚠ CAUTION

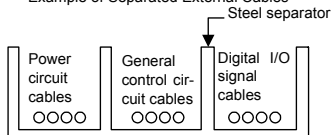
- Be sure to wire correctly and securely.
Failure to observe this caution may result in motor overrun, injury, or malfunction.
- Always use the specified power supply voltage.
An incorrect voltage may result in burning.
- Take appropriate measures to ensure that the input power supply is supplied within the specified voltage fluctuation range. Be particularly careful in places where the power supply is unstable.
An incorrect power supply may result in damage to the product.
- Install external breakers or other safety devices against short-circuiting in external wiring.
Failure to observe this caution may result in fire.
- Take appropriate and sufficient countermeasures for each when installing systems in the following locations.
Failure to observe this caution may result in damage to the product.
 - Locations subject to static electricity or other forms of noise.
 - Locations subject to strong electromagnetic fields and magnetic fields.
 - Locations subject to possible exposure to radioactivity.
 - Locations close to power supplies.
- Do not reverse the polarity of the battery when connecting it.
Failure to observe this caution may damage the battery or cause it to explode.

■ Selecting, Separating, and Laying External Cables

⚠ CAUTION

- Consider the following items when selecting the I/O signal lines (external cables) to connect the MP2500/MP2500M to external devices.
 - Mechanical strength
 - Noise interference
 - Wiring distance
 - Signal voltage, etc.
- Separate the I/O signal lines from the power lines both inside and outside the control box to reduce the influence of noise from the power lines.
If the I/O signal lines and power lines are not separated properly, malfunctioning may result.

Example of Separated External Cables



■ Compact Flash

CAUTION

- Yaskawa is not responsible for loss of the contents stored in the Compact Flash under any circumstances. It is strongly recommended to back up important data or software using an external storage device.
- Yaskawa is not responsible for any results of application of Compact Flash.
- Yaskawa is not responsible for any damages caused by software and hardware troubles.
- The life expectancy of Compact Flash is limited. Perform periodically back-up of stored data and maintenance of Compact Flash.
- Always stop the OS before turning OFF the power supply to the personal computer to prevent files from damage or loss.

■ Disposal

CAUTION

- When disposing of the products, treat them as general industrial waste.

■ Precautions on LCD Panels

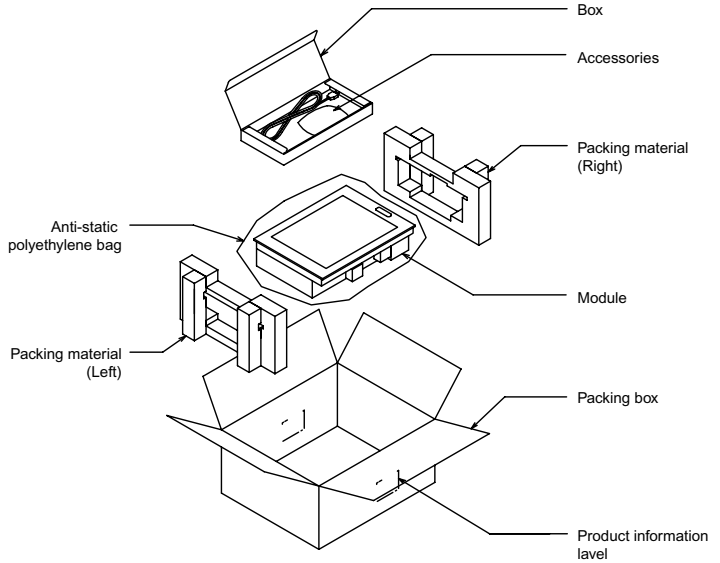
LCD (liquid crystal display) panels are very sensitive, so precautions must be taken during handling.

- The LCD panel contains irritant materials. If the LCD panel is damaged and contact occurs with irritant material, take the following first-aid measures.
Skin: Immediately wash the skin under running water for 15 minutes or more.
Eyes: Immediately wash the eye under running water for 15 minutes or more, and then consult a doctor.
- Some irregularities in brightness may occur depending on the content and contrast.
This is not a malfunction.
- Some micro spots such as black or bright spots may appear on the LCD elements.
This is not a malfunction.
- If viewing the LCD screen from outside the viewing angle, the displayed color may appear to be different. This is a basic characteristic of LCDs.
- If opening display after having kept one display on the screen for a long time, an afterimage of the previous display may remain. Turn OFF the power supply, and wait for a while to turn ON the power supply again. The afterimage will disappear. This is a basic characteristic of LCDs.
- To prevent afterimage
 - Use the DISPLAY OFF function when keeping one display on the screen for a long time.
 - Switch the displays on the screen periodically so that one display is not kept on the screen for a long time.

Contact your Yaskawa representative for information about specifications or characteristics not described here.

5 RECEIVING

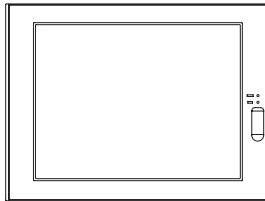
Remove the packing material, and then take the items out of the box.



■ Check Items

Confirm that the box contains all of the following items.

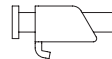
MP2500/MP2500M module



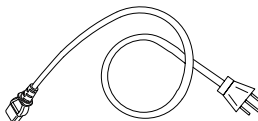
Drip-proof seal (1)



Metal fittings (4 × 2 sets)



Power-supply cable (1)



Clamp for USB cable (1)



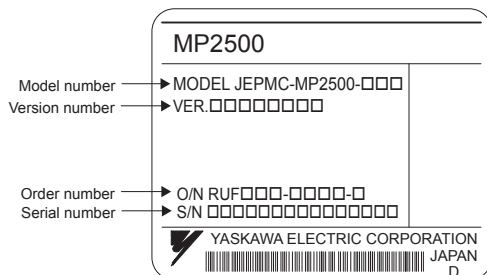
Clamp for power-supply cable (1)



■ Nameplates

The following illustrations show the nameplates on the back of the MP2500 and the MP2500M.

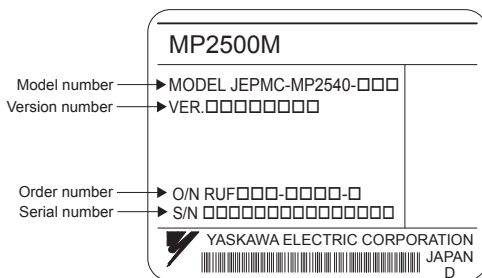
<MP2500>



Models with Eden™: JEPMC-MP2500-A□□

Models with Pentium®: JEPMC-MP2500-B□□, JEPMC-MP2500-C□□

<MP2500M>

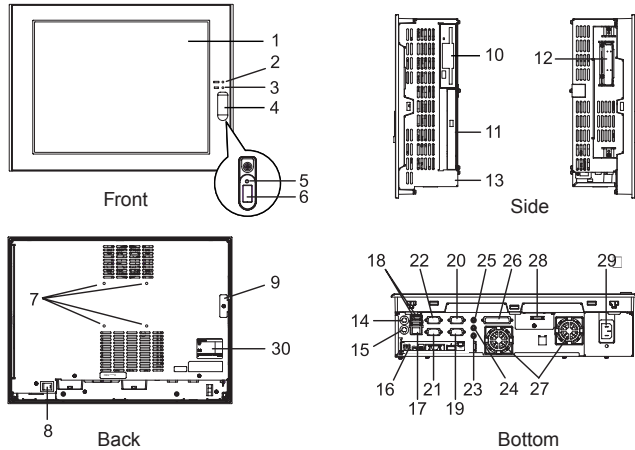


Models with Eden™: JEPMC-MP2540-A□□

Models with Pentium®: JEPMC-MP2540-B□□, JEPMC-MP2540-C□□

6 PART NAMES

The following illustrations show the parts and the names of the parts on the MP2500/MP2500M.



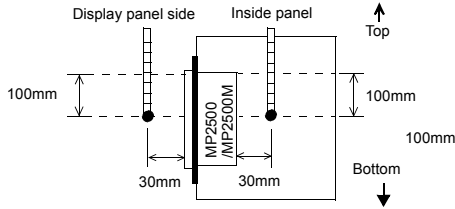
- | LED | MP2500/MP2500M Status |
|----------------------|--|
| Lit (green) | Normal (POWER ON) |
| Lit (orange) | System monitor error Touch screen panel self-test error |
| Flashes (orange/red) | Back light fault |
1. LCD/Touch screen panel
 2. Power supply status indicator LED lamp (POWER)
 3. IDE access lamp
 4. Front cap
 5. Hardware reset switch (RESET)
 6. USB connector (1 port: For use Ver. 1.1 only)
 7. Arm mounting holes (VESA 75 mm specifications)
 8. Power ON/OFF switch
 9. Motion board support
 10. FD drive
 11. CD-ROM drive
 12. PCMCIA connectors (PCMCIA) (2 ports)
 13. Rear cover
 14. Mouse connector (MOUSE)
 15. Keyboard connector (KEYBOARD)
 16. Motion board face panel
 17. LAN connector (LAN)
 18. USB connectors (2 ports) *
 19. Serial connector (COM1) (RI/+5V switchable)
 20. Serial connector (COM2) (RI/+5V switchable)
 21. Serial connector (COM3) (RS-232C/422/485 switchable)
 22. Serial connector (COM4)
 23. Line input connector (LINE IN)
 24. Speaker output connector (SPEAKER OUT)
 25. Microphone input connector (MIC IN)
 26. Printer connector (LPT1)
 27. Cooling fan
 28. Compact Flash slot
 29. AC inlet connector
 30. Nameplate

* If you use the CPU by Eden™, devices that are compatible to USB hub and USB Ver.2 cannot be connected to these ports.

7 INSTALLATION

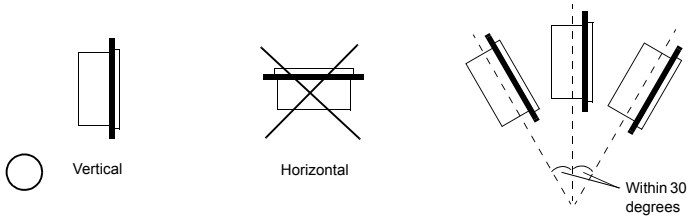
■ Ambient Operating Temperature

The MP2500/MP2500M is a vertical-mounted type controller with a cooling fan. Make sure that the ambient temperature at the positions shown in the figure below is between 0 to 50°C. Operating the MP2500/MP2500M at the ambient temperature out of the range of 0 to 50°C may cause a failure or malfunction of the MP2500/MP2500M.



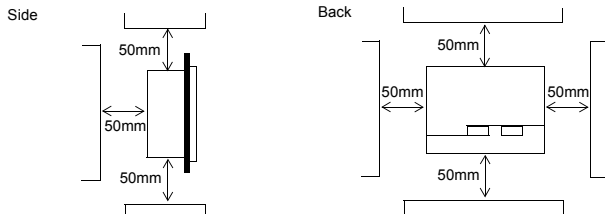
■ Mounting Angle

Install the MP2500/MP2500M vertically and as straight as possible at the ambient temperature within the specified range. When installing the MP2500/MP2500M with a tilt angle, the tilt angle must be kept within 30 degrees to minimize the temperature rise inside the MP2500/MP2500M.



■ Installation Site

- Do not install the MP2500/MP2500M close to devices that generate heat.
- Do not install the MP2500/MP2500M close to arc generating machines such as electromagnetic breaker and non-fuse breaker.
- Do not subject the MP2500/MP2500M to corrosive gas.
- Keep a space of 50 mm minimum around the MP2500/MP2500M to insert or remove cards and connectors.



■ Vibration and Shock

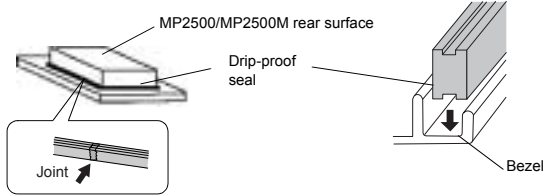
Do not apply excessive vibration or shock to the MP2500/MP2500M when opening the panel door, transferring a MP2500 in a rack with casters, or mounting the MP2500/MP2500M on a stand installed on the arm or on a wall.

MP2500/MP2500M vibration resistance: 9.8 m/s^2

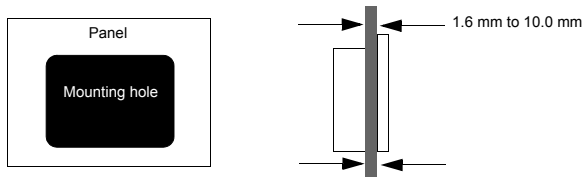
8 MOUNTING PROCEDURE

Mount the MP2500/MP2500M in the following procedure.

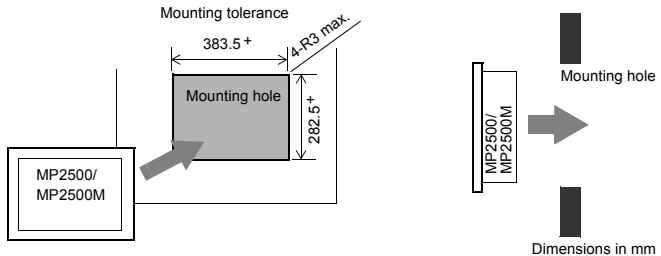
1. Insert a Drip-proof seal in the bezel on the rear surface of the MP2500/MP2500M.



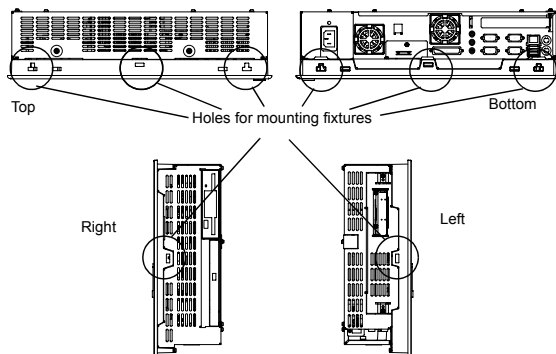
2. Drill a mounting hole as shown in the figure.



3. Insert the MP2500/MP2500M into the mounting hole from the panel's front, observing the tolerance indicated in the figure.



4. Insert the hooks of mounting fixtures at the eight positions shown in the figure, and then tighten the screws of the mounting fixtures with a screwdriver.



9 INSPECTION

■ Daily Inspection

Check the following items at daily inspection.

- Ambient temperature between 0 to +50°C
- Ambient humidity between 10 to 85%RH
- Atmosphere without corrosive gas
- Voltage between 85 to 265 VAC at 50/60 Hz
- The cable connectors are securely inserted.
- The mounting fixtures on the MP2500/MP2500M are securely tightened.
- No accumulated dirt or damage on the drip-proof seal
- The LCD screen is bright enough to view.
- No error indications on the LED indicators of the motion board.

LED Indicators of the Motion Board

| Indicators | Inspection Details | Criteria | Action |
|------------|--|--|----------------------|
| S1 | Check whether the indicator is lit green. | The indicator must be lit green. (It is abnormal if the indicator is lit red.) | - |
| S2 | Check whether the indicator is lit green while the system is in RUN state. | The indicator must be lit green. (It is abnormal if the indicator is lit red.) | |
| TX | Check whether the indicator lights during communication. | The indicator must be lit. (It is abnormal if the indicator is not lit.) | |
| BAT | Check whether the indicator is not lit. | The indicator must be not lit. (The battery voltage is too low if the indicator is lit.) | Replace the battery. |

■ Regular Inspections

This section explains inspection items that must be performed once or twice every six months to one year. Inspections must also be performed when the equipment is relocated or modified or when the wiring is changed.

| No. | Inspection Item | | Inspection Details | Criteria | Action |
|-----|-------------------------|--|---|---|--|
| 1 | Operating environment | Ambient temperature | Check the temperature and humidity with a thermometer and hygrometer, respectively. Check for corrosive gases. | 0 to 55°C | If the MP2500/MP2500M is used inside a panel, treat the temperature inside the panel as the ambient temperature. |
| | | Ambient humidity | | 30% to 95% | |
| | | Atmosphere | | There must be no corrosive gases. | |
| 2 | Installation conditions | Looseness and excess play | Attempt to move the MP2500/MP2500M. | The MP2500/MP2500M must be secured properly. | Retighten the screws. |
| | | Dust and other foreign matter | Visually check. | The MP2500/MP2500M must be free from dust and other foreign matter. | Clean. |
| 3 | Connection conditions | Check the terminal screws for looseness. | Check by retightening the screws. | The screws must be tight. | Retighten. |
| | | Gap between crimp terminals | Visually check. | There must be an appropriate gap between the terminals | Correct. |
| | | Looseness of connectors | Visually check. | The screws must be tight. | Retighten the connector set screws. |
| 4 | Battery | | Check the BAT indicator on the front panel of the MP2500/MP2500M. | The BAT indicator must be not lit. | If the BAT indicator is lit, replace the battery. |

10 EXCHANGE PARTS

The following spare parts for MP2500/MP2500M are available. Contact your Yaskawa representative to order spare parts, stating the models.

| Spare Parts | Model | Remarks |
|-------------------------|---------------|---|
| Backlight | CA3-BLU15-01 | — |
| Drip-proof seal | CA3-WPG15-01 | Refer to <i>Chapter 9 Mounting Procedure</i> for the replacement procedure. |
| Screen protective sheet | CA3-DFS15-01 | Set: 5 sheets |
| Mounting fixtures | CA3-ATFALL-01 | — |
| Battery kit | JEPMC-OP2500 | Set: Lithium battery *, cable, and clip |

* Replacement batteries can also be purchased individually.

11 SPECIFICATIONS

■ Electrical Conditions

| Item | Specifications |
|-------------------------------------|---|
| Rated Voltage | AC100 V/240 V |
| Allowable Voltage Range | 85 VAC to 265 VAC |
| Rated Frequency | 50/60 Hz |
| Allowable Momentary Power Loss Time | 1 cycle max. (intervals are 1s or more.) |
| Power Consumption | 120 VA max. |
| Dielectric Strength | 1500 VAC, 20 mA for one minute (between live part terminal and FG terminal) |
| Insulation Resistance | 500 VDC, 10 MΩ min. (between live part terminal and FG terminal) |

■ Environmental Conditions

| Item | Specifications |
|---|---|
| Ambient Operating Temperature | 0 to +50 °C |
| Ambient Storage Temperature | -10 to +60 °C |
| Ambient Operating Humidity | 30 to 85 %RH (with no condensation, wet-bulb 29 °C max.) |
| Ambient Storage Humidity | 30 to 85 %RH (with no condensation, wet-bulb 29 °C max.) |
| Dust | There must be no dust. |
| Pollution Level | Pollution level 2 |
| Corrosive Gas | There must be no corrosive gas. |
| Vibration Resistance | 9.8m/s ² (10 to 25Hz X,Y, and Z directions 30 min. each) |
| Noise Resistance | Voltage noise: 1500 V Pulse width: 50 ns, 500 ns, 1 μs Rise time: 1 ns (Noise simulator) Radiation noise (FT noise): 1000 V min., for one Electrostatic noise (contact discharge method): 4000 V min., 10 times |
| Noise Immunity (Fast Transient/Burst Noise) | Power supply line: 2 kV IEC 61000-4-4 COM port: 1 kV IEC 61000-4-4 |
| Electrostatic Resistance Discharging | 4 kV IEC 61000-4-2 |
| Operating Altitude | Altitude 2000 m max. |
| Standards | EN55011 (Class A), EN61000-6-2 |
| Others | There must be no corrosive gas. |
| Reliability | 500 fit |

Note: Confirm the specifications before using the options.

■ Installation Requirements

| Item | Specifications |
|----------------------|--|
| Ground | Protective ground: Ground to 100 Ω max. Functional ground: Ground to 100 Ω max. |
| Protective Structure | Protective Structure* : Equivalent for IP65f (front USB unused only) Configuration: Incorporated type Installation method: in-panel type, VESA arm |
| Cooling Method | Unit and CPU fan cooling |
| Mass | About 8 kg |
| Dimensions | W395 × H294 × D100 mm |

* These specifications are for the protective structure of the front when the MP2500/MP2500M is mounted on a panel. The MP2500/MP2500M have met the requirements of IP standards under the specified testing conditions, but this guarantee does not cover applications under all conditions. If the MP2500/MP2500M is exposed for a long time to oil mist used for tests or if the MP2500/MP2500M is exposed to cutting oil, the front sheet may come off and oil might enter the device. If so, additional protective measures are required. Oils other than those specified for tests may cause problems such as the separation of the protective sheet and deformation of plastic materials. Carefully check the conditions of the installation site of the MP2500/MP2500M, and take the necessary protective measures.
To ensure the seal will prevent moisture or liquids from entering, we recommend that it be periodically replaced.

■ Performance Specifications

| | | | | |
|----------------------------|---|--|---|--|
| Models with Eden™ CPU*1 | CPU | Eden™ ESP6000 667MHz (manufactured by VIA Technologies, Inc.) | | |
| | DRAM (SO DIMM) | DIMM socket × 1: 128 MB/256 MB | | |
| | BIOS | Phoenix-AwardBIOS manufactured by Phoenix Technologies Ltd. | | |
| | Video Memory | 4 MB (Upper Memory Area (UMA) Method) | | |
| | Heat Loss | 120W max. or 103 kcal/h when using a DRAM 256MB | | |
| Models with Pentium® CPU*2 | CPU | Pentium® 4M Processor-M 1.7 GHz (manufactured by Intel Corporation) | | |
| | DRAM (SO DIMM) | DIMM socket × 1: 256 MB/512 MB (512 MB max.) | | |
| | BIOS | FirstBIOS manufacture by Phoenix Technologies Ltd. | | |
| | Video Memory | 64 MB max. (Upper Memory Area (UMA)) | | |
| | Heat Loss | 150W max. or 129 kcal/h when using DRAM 256MB or 512 MB) | | |
| Graphics | | XGA (1024 × 768 dots) | | |
| Touch Screen Panel | Input Method | Analog resistive film input | | |
| | Resolution | 1024 × 1024 | | |
| | Interface | USB Fixed | | |
| Interfaces | Serial Ports (RS-232C) | COM1 | Dsub 9-pin male connector (R1/+5V switchable) | |
| | | COM2 | Dsub 9-pin male connector (R1/+5V switchable) | |
| | | COM3 | Dsub 9-pin, male connector (RS-485/RS-422 switchable) | |
| | | COM4 | Dsub 9-pin male connector | |
| | Printer | Conforming to Centronics Standards (ECP/SPP/EPP supported) (Dsub 25-pin female connector) | | |
| | Keyboard | PS/2 interface (Mini DIN 6-pin female connector) 1 port on the bottom | | |
| | Mouse | PS/2 interface (Mini DIN 6-pin female connector) 1 port on the bottom | | |
| | Disc Drive | IDE I/F | Slave: Compact Flash I/F | |
| | USB | Model with Eden™ CPU*1 | USB 1.1 supported 1 port on the front and 2 ports on the bottom | |
| | | Model with Pentium® CPU*2 | USB 1.1 supported 1 port on the front and USB 2.0 supported 2 ports on the bottom | |
| | LAN | Conforming to IEEE802.3 (10 Base-T/100 Base-TX automatic switching) 1 port on the bottom | | |
| | PCMCIA | 2 ports on the side surface of Type II | | |
| Sounds | LINE IN, SPEAKER OUT, MIC IN 3 ports on the bottom (With a mini jack connector on each port) | | | |
| PCI | Rev 2.2 supported PCI I/F (5V), 1 slot (without empty slots) | | | |
| Floppy Disk Drive | | 2-mode 3.5-inch floppy disc drive on the side | | |
| CD-ROM Drive | | CD-ROM drive (to be connected to secondary IDE) on the side | | |

* 1. MP2500/MP2500M models with Eden™ CPU:
JEPMC-MP2500-A□□, JEPMC-MP2540-A□□

* 2. MP2500/MP2500M models with Pentium® CPU:
JEPMC-MP2500-B□□, JEPMC-MP2540-B□□,
JEPMC-MP2500-C□□, JEPMC-MP2540-C□□

Machine Controller MP2500/MP2500M

安全上のご注意 SAFETY PRECAUTIONS

技術的なお問い合わせ相談窓口 (YASKAWAコールセンタ)

●サーボ、コントローラ

フリーダイヤル



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