Industrial PC Platform
NY-series
IPC Programmable Multi Axis Controller
Industrial Box PC

Hardware User’s Manual
NY512-A6001XX21391X
Introduction

Thank you for purchasing the IPC Programmable Multi Axis Controller. This manual contains information that is necessary to use the IPC Programmable Multi Axis Controller (hereafter also named as Box PC). Please read this manual and make sure you understand the functionality and performance of the Box PC before attempting to use it. Keep this manual in a safe place where it will be available for reference during operation.

Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

• Personnel in charge of introducing Factory Automation systems.
• Personnel in charge of designing Factory Automation systems.
• Personnel in charge of installing and maintaining Factory Automation systems.
• Personnel in charge of managing Factory Automation systems and facilities.

Applicable Products

This manual covers following IPC Programmable Multi Axis Controller product:

• NY512-A6001XX21391X

Additional Information

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Page Structure

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Note: This illustration is provided as a sample. It will not literally appear in this manual.

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<th>Explanation</th>
<th>Item</th>
<th>Explanation</th>
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<td>Special Information</td>
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<td>D</td>
<td>Step in a procedure</td>
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<td>Page number</td>
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Special information in this manual is classified as follows:

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<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tr>
<td><strong>Precautions for Safe Use</strong></td>
<td>Precautions on what to do and what not to do to ensure safe usage of the product.</td>
</tr>
<tr>
<td><strong>Precautions for Correct Use</strong></td>
<td>Precautions on what to do and what not to do to ensure proper operation and performance.</td>
</tr>
<tr>
<td><strong>Additional Information</strong></td>
<td>Additional information to read as required. This information is provided to increase understanding or make operation easier.</td>
</tr>
<tr>
<td><strong>Version Information</strong></td>
<td>Information on differences in specifications and functionality between different versions.</td>
</tr>
</tbody>
</table>
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NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

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Change in Specifications

Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron’s representative at any time to confirm actual specifications of purchased Product.
Errors and Omissions

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.
Safety Precautions

Definition of Precautionary Information

The following notation is used in this manual to provide precautions required to ensure safe usage of the IPC Programmable Multi Axis Controller. The safety precautions that are provided are extremely important to safety.

Always read and heed the information provided in all safety precautions. The following notation is used.

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>![WARNING]</td>
<td>Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage.</td>
</tr>
<tr>
<td>![Caution]</td>
<td>Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.</td>
</tr>
</tbody>
</table>

Symbols

- The circle and slash symbol indicates operations that you must not do. The specific operation is shown in the circle and explained in text. This example indicates prohibiting disassembly.
- The triangle symbol indicates precautions (including warnings). The specific operation is shown in the triangle and explained in text. This example indicates a precaution for electric shock.
- The triangle symbol indicates precautions (including warnings). The specific operation is shown in the triangle and explained in text. This example indicates a general precaution.
- The filled circle symbol indicates operations that you must do. The specific operation is shown in the circle and explained in text. This example shows a general precaution for something that you must do.
Disassembly and Dropping

Do not attempt to disassemble, repair, or modify the product in any way. Doing so may result in malfunction or fire. In particular, high-voltage parts are present in the Controller while power is supplied or immediately after power is turned OFF. Touching any of these parts may result in electric shock. There are also sharp internal parts that may cause injury.

Installation

Always connect to a ground of 100 Ω or less when installing the product.

Ensure that installation and post-installation checks of the product are performed by personnel in charge who possess a thorough understanding of the machinery to be installed.

Fail-safe Measures

Provide safety measures in external circuits to ensure safety in the system if an abnormality occurs due to malfunction of the product or due to other external factors affecting operation. Not doing so may result in serious accidents due to incorrect operation.

Emergency stop circuits, interlock circuit, limit circuits, and similar safety measures must be provided in external control circuits.

The product will turn OFF all outputs from Output Units in the following cases. The slaves will operate according to the settings in the slaves.

- If an error occurs in the power supply
- If a controller error occurs
- While the product is in Standby until EtherCAT communication is started after the power is turned ON

External safety measures must be provided to ensure safe operation of the system in such cases.

If external power supplies for slaves or other devices are overloaded or short-circuited, the voltage will drop, outputs will turn OFF, and the system may be unable to read inputs. Provide external safety measures in controls with monitoring of external power supply voltage as required so that the system operates safely in such a case.

Unintended behavior may occur when an error occurs in internal memory of the product. As a countermeasure for such problems, external safety measures must be provided to ensure safe operation of the system.
### Actual Operation

Check the user program, data, and parameter settings for proper execution before you use them for actual operation.

Security setting adjustments should only be performed by the engineer in charge that possesses a thorough understanding of the security settings.

Selecting non-recommended security settings can put your system at risk.

Changing BIOS information is only allowed for the engineer in charge that possesses a thorough understanding of the BIOS settings because it can change the behavior of the product.

### Transferring

Always confirm the safety status at the destination before you transfer a user program, configuration data, or setup data from POWER PMAC IDE.

The devices or machines may perform unexpected operations regardless of the operating mode of the Controller.

### Test Run

Before you start a Test Run, make sure that the operation parameters are set correctly.
Wiring

The product has an internal non-isolated DC power supply. Circuit ground (0 VDC) and frame ground are connected together. When connecting a non-isolated device or a non-isolated interface to the product, take appropriate actions to avoid communication failures or damage to the mentioned ports.

Never ground the 24 VDC side of the power supply. This may cause a short circuit.
Precautions for Safe Use

Disassembly, Dropping, Mounting, Installation and Storage

- Do not drop the product or subject it to abnormal vibration or shock. Doing so may result in product malfunction or burning.
- When unpacking, check carefully for any external scratches or other damages. Also, shake the product gently and check for any abnormal sound.
- Always use the devices specified in the relevant manual.
- The product must be installed in a control panel.
- Always install equipment that is included in the product specifications. Not doing so may result in failure or malfunction.
- In the case of an extended storage period, check the performance of the Fan Unit before production starts.
- Install the product in the correct orientation and temperature according to the specifications in the manual to prevent overheating. Not doing so may result in malfunction.
- When connecting peripheral devices to the product, ensure sufficient countermeasures against noise and static electricity during installation of the peripheral devices.

Wiring

- Follow the instructions in the manual to correctly perform connector wiring and insertion. Double-check all wiring and connector insertion before turning ON the power supply.
- Always ensure connectors, cables, PCIe Cards and Storage devices are completely locked in place to prevent accidental disconnection.
- Before you connect a computer to the product, disconnect the power supply plug of the computer from the AC outlet. Also, if the computer has an FG terminal, make the connections so that the FG terminal has the same electrical potential as the product. A difference in electrical potential between the computer and the product may cause failure or malfunction.
- Do not bend or pull the cables beyond normal limit. Do not place heavy objects on top of the cables or other wiring lines. Doing so may break the cables.
- Always use power supply wires with sufficient wire diameters to prevent voltage drop and burning. Make sure that the current capacity of the wire is sufficient. Otherwise, excessive heat may be generated. When cross-wiring terminals, the total current for all the terminals will flow in the wire. When wiring cross-overs, make sure that the current capacity of each of the wires is not exceeded.
- Be sure that all mounting bracket screws and cable connector screws are tightened to the torque specified in the relevant manuals. The loose screws may result in fire or malfunction.
- Use crimp terminals for wiring.

Power Supply Design and Turning ON/OFF the Power Supply

- Always use a power supply that provides power within the rated range.
- Do not perform a dielectric strength test.
- Always use the recommended uninterruptible power supply (UPS) to prevent data loss and other system file integrity issues caused by unexpected power interruption. Back up the system files in the
planned way to prevent data loss and other system file integrity issues caused by incorrect operation.

- Use an Omron S8BA UPS with the correct revision number to prevent improper system shutdown.
- Power ON after the DVI cable is connected between the product and an external monitor.
- Always check the power supply and power connections before applying power. Incorrect power connections can damage the product or cause burning.
- Always turn OFF the power supply to system before you attempt any of the following.
  - Inserting or removing PCIe Cards
  - Connecting cables
  - Connecting or disconnecting the connectors
  - Wiring the system
  - Replacing or removing the HDD/SSD
  - Replacing the Battery
  - Replacing the Fan Unit
- Do not turn off the power supply or remove the USB memory device while the Controller is accessing the USB memory device. Data may become corrupted, and the Controller will not operate correctly if it uses corrupted data.
- Always turn OFF the power supply before you attempt any of the following. Connecting cables or wiring the system Connecting or disconnecting the connectors.
- Do not disconnect the cable or turn OFF the power supply to the Controller when downloading data or programs from Support Software. Doing so interrupts the data transfer, and a malfunction may occur.

### Actual Operation

- Choose a OS password that is not obvious to prevent unauthorized access.
- Remember the OS user name and password. The product is inaccessible without it.
- Before operating the system, please make sure the appropriate software is installed and configured. Doing so may prevent unexpected operation.
- Install all updates and ensure the browser stays up-to-date.
- Install all updates and ensure the firewall stays up-to-date.
- Make sure that your OS environment is protected against malicious software and viruses.
- Install all updates and ensure virus definitions stay up-to-date.
- Do not remove the fan cover while the power is ON. Contact with a rotating fan may result in injury.
- Virtual memory settings can affect the performance of the system. Disable the paging file after installation of applications or updates.
- Correctly perform wiring and setting, and ensure that the shutdown by the UPS can be executed.
- The task execution times in the physical Controller depends on load of operating system applications. Before starting actual operation, you must test performance under all foreseeable conditions on the actual system.

### Operation

- Do not carry out the following operations when accessing a USB device or an SD Memory Card.
  - Turn OFF the power supply of the product.
  - Press the Power Button of the product.
  - Remove a USB device or SD memory card.
• Do not attempt to remove or touch the fan unit while the product is powered ON or immediately after the power supply is turned OFF. If you attempt to replace the fan unit then, there is a risk of personal injury due to hot or rotating parts.
• Press the power button for several seconds to force the product shutdown. Always back up files in the planned way to prevent data loss or system file corruption.
• Do not touch any product housing when power is being supplied or immediately after the power supply is turned OFF. Doing so may result in burn injury.
• Confirm that no adverse effects will occur in the system before you attempt any of the following.
  • Changing the operating mode of the Controller (including changing the setting of the Startup Mode)
  • Changing the user program or settings
  • Changing set values or present values

### General Communications

• Separate the machine network segment from the office network to avoid communication failures.

### Battery Replacement

• Dispose of any Battery that has been dropped on the floor or otherwise subjected to excessive shock. Batteries that have been subjected to shock may leak if they are used.
• UL standards require that only an experienced engineer replace the Battery. Make sure that an experienced engineer is in charge of Battery replacement.
• The Battery may leak, rupture, heat, or ignite. Never short-circuit, charge, disassemble, heat, or incinerate the Battery or subject it to strong shock.

### EtherCAT Communications

• Make sure that the communications distance, number of nodes connected, and method of connection for EtherCAT are within specifications. Do not connect EtherCAT communications to a standard in-house LAN, or other networks. An overload may cause the network to fail or malfunction.
• If noise occurs or an EtherCAT slave is disconnected from the network, any current communications frames may be lost. If frames are lost, slave I/O data is not communicated, and unintended operation may occur. The slave outputs will behave according to the slave specifications.
• EtherCAT communications are not always established immediately after the power supply is turned ON. Use the ECAT Network General Configuration Elements in the user program to confirm that communications are established before attempting control operations.
• When an EtherCAT slave is disconnected or disabled, communications will stop and control of the outputs will be lost not only for the disconnected slave, but for all slaves connected after it. Confirm that the system will not be adversely affected before you disconnect or disable a slave.
• You cannot use standard Ethernet hubs or repeater hubs with EtherCAT communications. If you use one of these, a major fault level error or other error may occur.
• If you need to disconnect the cable from an EtherCAT slave during operation, change to Init Status the EtherCAT slave and all of the EtherCAT slaves that are connected after it.
• For EtherCAT and EtherNet, use the connection methods and cables that are specified in this manual. Otherwise, communications may be faulty.
• It takes up to approximately 30 to 40 s to start EtherCAT communication after the power is turned ON. The outputs during this time behave according to the slave or Output Unit specifications. Implement fail-safe circuits so that external devices do not operate incorrectly.

**Motion Control**

• The motor is stopped if communications are interrupted between the Power PMAC IDE and the product during a Test Run. Connect the communications cable between the computer and product securely and confirm that the system will not be adversely affected before you perform a Test Run.
• Confirm the axis number carefully before you perform a Test Run.

**Product Replacement**

• Make sure that the required data, including the user program, configurations, settings and variables is transferred to a product that was replaced and to externally connected devices before restarting operation.

**Cleaning, Maintenance and Disposal**

• Do not use corrosive substances to clean the product. Doing so may result in the failure or malfunction.
• Dispose of the product and batteries according to local ordinances as they apply.

\[\text{Perchlorate Material - special handling may apply.} \]


• The following information must be displayed for all products that contain primary lithium batteries with a perchlorate content of 6 ppb or higher when shipped to or transported through the State of California, USA.

  Perchlorate Material - special handling may apply.


• The product contains a lithium battery with a perchlorate content of 6ppb or higher. When exporting an end product containing the product to or shipping through California, USA, label all packing and shipping containers appropriately.
Precautions for Correct Use

Storage, Installation and Mounting

- Do not operate or store the product in the following locations. Operation may stop or malfunctions may occur.
  - Locations subject to direct sunlight
  - Locations subject to temperatures or humidity outside the range specified in the specifications
  - Locations subject to condensation as the result of severe changes in temperature
  - Locations subject to corrosive or flammable gases
  - Locations subject to dust (especially iron dust) or salts
  - Locations subject to exposure to water, oil or chemicals
  - Locations subject to shock or vibration
  - Locations outdoors subject to direct wind and rain
  - Locations subject to strong ultraviolet light
- Always install the product with sufficient surrounding space to allow for adequate heat dissipation and cooling effect.
- Take appropriate and sufficient countermeasures when installing the product in the following locations
  - Locations subject to strong, high-frequency noise
  - Locations subject to static electricity or other forms of noise
  - Locations subject to strong electromagnetic fields
  - Locations subject to possible exposure to radioactivity
  - Locations close to power lines
- Always touch a grounded piece of metal to discharge static electricity from your body before starting an installation or maintenance procedure.
- Insert USB devices and PCIe devices correctly to avoid the burning, failure or malfunction.
- Execute a backup of the product before PCIe addition or replacement. Be sure that the PCIe device works correctly before you use them for actual operation. PCIe devices and their related software may cause an OS boot failure or crash.

Wiring

- Always ensure the rated supply voltage is connected to the product.
- Do not allow wire clippings, shavings, or other foreign material to enter the product. Otherwise, burning, failure, or malfunction may occur. Cover the product or take other suitable countermeasures, especially during wiring work.
- Do not use cables exceeding the maximum specified length. Doing so may cause malfunction.
- Do not connect an AC power supply to the DC power connector.
- Observe the following precautions to prevent broken wires.
  - When you remove the sheath, be careful not to damage the conductor.
  - Connect the conductor without twisting the wires.
  - Do not weld the conductors. Doing so may cause the wires to break with vibration.
Actual Operation and Operation

- After an OS update or a peripheral device driver update for the product is executed, the product behavior might be different. Confirm that operation is correct before you start actual operation.
- Always create a Windows System Repair Disk using Windows Backup and Restore to recover the HDD/SSD configuration if necessary.
- Ensure the fan is operational to provide adequate cooling while the power is turned ON.
- HDD and SSD storage devices, SD Memory Cards, power buttons, fan units and batteries have finite lives and if those are exceeded, the product may fail or malfunction.
- Always monitor the fan status. If a fan is used beyond its service life, the Low Revolution Speed warning message is displayed and the product overheating may occur.
- Always monitor the battery warning message. When a battery has low voltage, the system time will be lost.
- If the product experiences a sudden loss of power or disconnecting the cable while saving a setting or transfer of data is underway, the changes may not be stored and unexpected behavior may occur.
- Ensure that available software checks are performed by personnel in charge who possess a thorough understanding of the software.
- Do not disconnect the communications cable while the system is running. Doing so may result in a failure or malfunction of the system.
- Do not reset or power OFF the product while the password is being changed.
- If you fail to save the password there is a possibility that the project will not work.

Battery Replacement

- Turn ON the power after replacing the battery for a product that has been unused for an extended period of time. Leaving the product unused without turning ON the power even once after the battery is replaced may result in a shorter battery life.
- Make sure to use a battery of the correct type, install the battery properly.
- Apply power for at least five minutes before changing the battery. Mount a new battery within five minutes after turning OFF the power supply. If power is not supplied for at least five minutes, the clock data may be lost. Check the clock data after changing the battery.

SD Memory Cards

- Insert an SD Memory Card completely and ensure it is in place.

USB Flash Drives

- Always use USB memory devices that comply with the USB standards.

Motion Control

- Do not download motion control settings during a Test Run.

EtherCAT Communications

- Set the Servo Drives to stop operation if an error occurs in EtherCAT communications between the Controller and a Servo Drive.
• Always use the specified EtherCAT slave cables. If you use any other cable, the EtherCAT master or the EtherCAT slaves may detect an error and one of the following may occur.
  • Continuous refreshing of process data communications will not be possible.
  • Continuous refreshing of process data communications will not end during the set cycle
Regulations and Standards

Conformance to EU Directives

The IPC Programmable Multi Axis Controller complies with EU Directives. To ensure that the machine or device in which the IPC Programmable Multi Axis Controller is used complies with EU Directives, the following precautions must be observed:

• The IPC Programmable Multi Axis Controller must be installed within a control panel.
• The IPC Programmable Multi Axis Controller that complies with EU Directives also conforms to the Common Emission Standard. Radiated emission characteristics (10-m regulations) may vary depending on the configuration of the control panel used, other devices connected to the control panel, wiring, and other conditions. You must therefore confirm that the overall machine or equipment in which the IPC Programmable Multi Axis Controller is used complies with EU Directives.
• This is a Class A product (for industrial environments). In a residential environment, it may cause radio interference. If radio interference occurs, the user may be required to take appropriate measures.

Applicable Directive

EMC Directive

EMC Directive

OMRON devices that comply with EU Directives also conform to the related EMC standards so that they can be more easily built into other devices or the overall machine. The actual products have been checked for conformity to EMC standards.

Applicable EMC (Electromagnetic Compatibility) standards are as follows:

• EMS (Electromagnetic Susceptibility): EN 61131-2
• EMI (Electromagnetic Interference): EN 61131-2 (Radiated emission: 10-m regulations)

Whether the products conform to the standards in the system used by the customer, however, must be checked by the customer. EMC-related performance of the OMRON devices that comply with EU Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the OMRON devices are installed. The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards.
Conformance to KC Standards

Observe the following precaution if you use Industrial PC Platform products in Korea.

Class A Device (Broadcasting Communications Device for Office Use)
This device obtained EMC registration for office use (Class A), and it is intended to be used in places other than homes.
Sellers and/or users need to take note of this.

Conformance to UL and CSA Standards

Some Industrial PC Platform products comply with UL and CSA standards. If you use a product that complies with UL or CSA standards and must apply those standards to your machinery or devices, refer to this manual. This manual provides the application conditions for complying with the standards.
If the product is used in a manner not specified in the Instruction Sheet or in the product manuals then the protection provided by the equipment may be impaired.

Software Licenses and Copyrights

This product incorporates certain third party software. The license and copyright information associated with this software is available at http://www.fa.omron.co.jp/nj_info_e/.
Related Manuals

The following manuals are related. Use these manuals for reference.

**Related Products Manuals**

<table>
<thead>
<tr>
<th>Manual name</th>
<th>Cat. No.</th>
<th>Model numbers</th>
<th>Application</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPS S8BA User's Manual</td>
<td>U702</td>
<td>S8BA</td>
<td>Learning the information that is necessary to use the Uninterruptible Power Supply (UPS) Unit.</td>
<td>An introduction to the UPS is provided along with the following information:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Overview</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Preparation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Installation and Connection</td>
</tr>
<tr>
<td>Simple-Shutdown Instruction Manual</td>
<td>K1L-D</td>
<td>---</td>
<td>Learning the installation instructions, methods of use, and precautions for use for the Simple Shutdown Software. This manual is available for different operating systems. Refer to 1-5 Product Configuration on page 1 - 6 for operating system details.</td>
<td>An introduction to the Simple Shutdown Software is provided along with the following information:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Connection Method</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Installation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Shutdown Parameter Settings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Startup and Shutdown of the Agent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Shutdown Sequence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Uninstallation</td>
</tr>
</tbody>
</table>

**Industrial Monitor Manual**

This table contains the related manual of the Industrial Monitor.

<table>
<thead>
<tr>
<th>Manual name</th>
<th>Cat. No.</th>
<th>Model numbers</th>
<th>Application</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Monitor User's Manual</td>
<td>W554</td>
<td>NYM15W-C100□ NYM12W-C100□</td>
<td>Learning all basic information about the Industrial Monitor. This includes introductory information with features, hardware overview, specifications, mounting, wiring, connecting, operating and maintaining the Industrial Monitor.</td>
<td>An introduction to the Industrial Monitor is provided along with the following information:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Overview</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Hardware</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Specifications</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Installation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Operating Procedures</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Maintenance</td>
</tr>
</tbody>
</table>
## Terminology and Abbreviations

### Industrial PC Platform

<table>
<thead>
<tr>
<th>Term / Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial PC Platform</td>
<td>An integrated range of OMRON products designed for use in any industrial application that will benefit from advanced PC technology</td>
</tr>
<tr>
<td>Industrial Monitor</td>
<td>An industrial monitor with a touchscreen as the user interface designed to work in industrial environments</td>
</tr>
<tr>
<td>Industrial Panel PC</td>
<td>An industrial PC with an integrated touchscreen monitor designed to work in industrial environments</td>
</tr>
<tr>
<td>Industrial Box PC</td>
<td>A box-shaped industrial PC including an OS designed to work in industrial environments</td>
</tr>
<tr>
<td>IPC</td>
<td>Industrial PC</td>
</tr>
<tr>
<td>Sysmac</td>
<td>OMRON's brand name of the product family for the industrial automation equipment</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>Term / Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC</td>
<td>Board Management Controller</td>
</tr>
<tr>
<td>CPU</td>
<td>A Central Processing Unit is the hardware within a computer that executes the instructions of a computer program</td>
</tr>
<tr>
<td>DVI</td>
<td>Digital Visual Interface</td>
</tr>
<tr>
<td>DVI-D</td>
<td>A Digital Visual Interface with only Digital signals</td>
</tr>
<tr>
<td>DVI-I</td>
<td>A Digital Visual Interface with Analog and Digital signals</td>
</tr>
<tr>
<td>Ethernet</td>
<td>A network communication protocol used in TCP/IP network</td>
</tr>
<tr>
<td>HDD</td>
<td>A Hard Disk Drive storage device</td>
</tr>
<tr>
<td>HMI</td>
<td>A Human Machine Interface that facilitates machine operation and control</td>
</tr>
<tr>
<td>iMLC</td>
<td>Industrial Multi-Level Cell type of SSD storage device</td>
</tr>
<tr>
<td>PCIe</td>
<td>The PCI Express is a high-speed computer bus standard called Peripheral Component Interconnect Express</td>
</tr>
<tr>
<td>SATA</td>
<td>The Serial AT Attachment is a serial bus interface primarily used with mass storage devices such as hard disk drives</td>
</tr>
<tr>
<td>SLC</td>
<td>Single-Level Cell type of SSD storage device</td>
</tr>
<tr>
<td>SO-DIMM</td>
<td>Small Outline Dual Inline Memory Module</td>
</tr>
<tr>
<td>SSD</td>
<td>A Solid State Drive storage device</td>
</tr>
<tr>
<td>USB</td>
<td>Universal Serial Bus</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Term / Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>API</td>
<td>Application Programming Interface</td>
</tr>
<tr>
<td>BIOS</td>
<td>Basic Input Output System. The first software run by a PC when powered on.</td>
</tr>
<tr>
<td>Developer</td>
<td>Any person involved with the development of software</td>
</tr>
<tr>
<td>DST</td>
<td>Daylight Saving Time</td>
</tr>
<tr>
<td>EWF</td>
<td>Enhanced Write Filter</td>
</tr>
<tr>
<td>FBWF</td>
<td>File-Based Write Filter</td>
</tr>
<tr>
<td>Term / Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>IIoT</td>
<td>Industrial Internet of Things</td>
</tr>
<tr>
<td>Linux</td>
<td>An open source Operating System</td>
</tr>
<tr>
<td>MBR</td>
<td>Master Boot Record</td>
</tr>
<tr>
<td>Merge module</td>
<td>A module providing a standard method by which developers deliver shared Windows installer components and setup logic to their applications</td>
</tr>
<tr>
<td>MSDN</td>
<td>Microsoft Developer Network</td>
</tr>
<tr>
<td>NUI</td>
<td>Natural User Interface</td>
</tr>
<tr>
<td>OS</td>
<td>Operating System</td>
</tr>
<tr>
<td>PLC</td>
<td>Programmable Logic Controller</td>
</tr>
<tr>
<td>RTOS</td>
<td>Realtime Operating System</td>
</tr>
<tr>
<td>SDK</td>
<td>Software Development Kit</td>
</tr>
<tr>
<td>TCP/IP</td>
<td>Transmission Control Protocol / Internet Protocol, a core member of the Internet protocol suite</td>
</tr>
<tr>
<td>TPM</td>
<td>Trusted Platform Module</td>
</tr>
<tr>
<td>VxWorks</td>
<td>A Realtime Operating System designed by Wind River</td>
</tr>
<tr>
<td>Windows</td>
<td>An Operating System designed by Microsoft</td>
</tr>
</tbody>
</table>
A manual revision code appears as a suffix to the catalog number on the front and back covers of the manual.

## Revision History

<table>
<thead>
<tr>
<th>Revision code</th>
<th>Date</th>
<th>Revised content</th>
</tr>
</thead>
</table>
| 02            | December 2016 | • UL implementation  
                     • Minor modifications |
| 01            | August 2016  | Original production                     |
# Sections in this Manual

1. Overview
2. Hardware
3. Software
4. Specifications
5. Installation
6. Operating Procedures
7. Maintenance
A. Appendices
Overview

This section provides general information of the IPC Programmable Multi Axis Controller.

1-1 Intended Use........................................................................................................... 1 - 2
1-2 Hardware Features ................................................................................................. 1 - 3
1-3 Software Features .................................................................................................. 1 - 4
1-4 ID Information Label.............................................................................................. 1 - 5
   1-4-1 Label with Controller License .......................................................................... 1 - 5
1-5 Product Configuration ............................................................................................. 1 - 6
1-6 Industrial PC Platform Overview............................................................................. 1 - 7
   1-6-1 Industrial Monitor ............................................................................................ 1 - 7
   1-6-2 Industrial Box PC ............................................................................................. 1 - 8
1-1 Intended Use

The IPC Programmable Multi Axis Controller (also indicated as Box PC) is an industrial-grade PC intended for use within factory automation environments. This Box PC simultaneously uses the standard Windows operating system and Linux running the Programmable Multi Axis Controller kernel to serve as a powerful PC based motion control platform. The Programmable Multi Axis Controller kernel offers all of the intelligence and capabilities of the IPC Programmable Multi Axis Controller. With its built-in motion programs, software PLCs and basic I/O support, the Box PC offers complete machine logic control over EtherCAT.

The IPC Programmable Multi Axis Controller has a compact design that offers flexibility, expandability and easy maintenance for applications in factory automation environments.
1-2 Hardware Features

The IPC Programmable Multi Axis Controller provides the following hardware features:

- **Compact design with two mounting orientation options**
  The Box PC has a compact design to minimize panel space while allowing for two mounting orientations.

- **Powerful CPU**
  A powerful CPU provides high performance for various applications.

- **Parallel Execution of Tasks with a Multi-core Processor**
  With a multi-core processor, the IPC Programmable Multi Axis Controller can execute the task and system services in parallel. This enables high-speed control of even large-scale devices.

- **Easy access to storage devices and the PCI Express Card**
  Adding or changing storage devices (HDD, SSD) and the PCI Express Card is fast and simple.

- **DVI visual interface**
  The video interface for the Box PC is provided with a DVI connector for connection to a monitor.

- **3 Ethernet ports 1Gb/s**
  Three ports support EtherCAT, EtherNet/IP, and Ethernet (for Windows) for interfacing with multiple network types.

- **EtherCAT Control Network Support**
  The IPC Programmable Multi Axis Controller provides an EtherCAT master port for EtherCAT communications.
  EtherCAT is an advanced industrial network system that achieves faster, more-efficient communications. It is based on Ethernet. Each node achieves a short fixed communications cycle time by transmitting Ethernet frames at high speed.
  The standard-feature EtherCAT control network allows you to connect all of the devices required for machine control (e.g., I/O systems, Servo Drives, Inverters, and machine vision) to the same network.

- **Support for EtherCAT Slave Terminals**
  You can use EtherCAT Slave Terminals to save space. You can also flexibly build systems with the wide variety of NX Units.

- **Achieving a Safety Subsystem on EtherCAT**
  You can use NX-series Safety Control Units to integrate safety controls in a sequence and motion control system as a subsystem on EtherCAT.

- **Built-in I/O**
  Built-in I/O for UPS status and Box PC shutdown control are provided.

- **4 USB ports**
  2 USB2.0 ports and 2 USB3.0 ports are provided for connection to external USB devices such as keyboards, memory sticks, or other peripheral hardware.

- **Built-in SD Memory Card slot**
  An SD Memory Card slot is provided for removable memory.
1-3  Software Features

The IPC Programmable Multi Axis Controller provides the following software features:

• Fast Multi-Axis Control
  The Programmable Multi-Axis Controller is developed by Delta Tau Data Systems, Inc., a manufacturer specializing in motion controllers.
  It allows for multi-axis control of up to 64 axes per unit (when CK3E-1500 is used), and the fast control of 250 μs/8-axis and 500 μs/64-axis.

• CNC Function
  The Controller has CNC functionality and supports G-code. This allows for high precision machining on curved surfaces and lines.

• Constructing Systems with Greater Flexibility
  Programs can be written in G-code, C language, or PMAC script for the Controller. Such function design flexibility allows you to create functions that are optimized for your equipment.
  Various EtherCAT-compatible products such as vision sensors and I/O as well as motion controls can be connected, allowing you to construct custom systems for your equipment.
1-4 ID Information Label

The ID information label contains relevant information about the IPC Programmable Multi Axis Controller.

The following example will be different from your product label.

<table>
<thead>
<tr>
<th>Item</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Product name</td>
<td>IPC Programmable Multi Axis Controller</td>
</tr>
<tr>
<td>B</td>
<td>Model '*1'</td>
<td>Model and configuration details</td>
</tr>
<tr>
<td>C</td>
<td>Power rating</td>
<td>Power rating details</td>
</tr>
<tr>
<td>D</td>
<td>Standards and QR code</td>
<td>The applicable standards and a QR code for OMRON internal use</td>
</tr>
<tr>
<td>E</td>
<td>LOT No.</td>
<td>Production details. The lot number of the IPC Programmable Multi Axis Controller in the format DDMYY. DDMYY with Month number 1 to 9 for January to September, X for October, Y for November, and Z for December.</td>
</tr>
</tbody>
</table>
| F    | MAC ADDRESS '*2' | • PORT 1: the MAC address of Ethernet port 1  
• PORT 2: the MAC address of Ethernet port 2  
• PORT 3: the MAC address of Ethernet port 3 |

*1 Refer to 1-5 Product Configuration on page 1 - 6 for model details.
*2 Refer to 4-2-4 Ethernet Connector Specifications on page 4 - 15 for Ethernet specifications.

Additional Information

Refer to 2-2-2 Back of the Industrial Box PC on page 2 - 6 for the ID label location.

1-4-1 Label with Controller License

This license label contains the license key for the IPC Programmable Multi Axis Controller.

IPC Programmable Multi Axis Controller license number  

**** **** **** **** **** ****
1-5 Product Configuration

This section provides an overview of the product configurations available for the IPC Programmable Multi Axis Controller.

The product configuration is visible in the model-type that is mentioned on the ID information label of the product.

The structure of the model-type is: NY-££££-£££££££££.

Each item in the model-type has a specific meaning.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Option / Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Series name</td>
<td>NY: NY-series Industrial PC Platform</td>
</tr>
<tr>
<td>2</td>
<td>Controller specifications</td>
<td>5: &quot;5&quot; series: Large scale, high speed and high precision control application</td>
</tr>
<tr>
<td>3</td>
<td>Model type</td>
<td>1: Industrial Box PC</td>
</tr>
<tr>
<td>4</td>
<td>Sequential number</td>
<td>2: Latest edition</td>
</tr>
<tr>
<td>5</td>
<td>Function module</td>
<td>A: IPC Programmable Multi Axis Controller</td>
</tr>
<tr>
<td>6</td>
<td>Number of axes for motion control</td>
<td>6: 128 axes</td>
</tr>
<tr>
<td>7</td>
<td>Additional Function Software Module</td>
<td>0: ---</td>
</tr>
<tr>
<td>8</td>
<td>Reserved</td>
<td>0: ---</td>
</tr>
<tr>
<td>9</td>
<td>Expansion slots</td>
<td>1: 1 PCIe slot</td>
</tr>
<tr>
<td>10</td>
<td>Frame type</td>
<td>X: No display (Industrial Box PC)</td>
</tr>
<tr>
<td>11</td>
<td>Display size</td>
<td>X: No display (Industrial Box PC)</td>
</tr>
<tr>
<td>12</td>
<td>Operating system</td>
<td>2: Windows Embedded Standard 7 - 64 bit</td>
</tr>
<tr>
<td>13</td>
<td>Processor</td>
<td>1: Intel® Core™ i7-4700EQ Processor 4th generation CPU with Fan Unit for active cooling</td>
</tr>
<tr>
<td>14</td>
<td>Main memory</td>
<td>3: 8 GB Non-ECC</td>
</tr>
<tr>
<td>15</td>
<td>Storage</td>
<td>9: 64 GB, SSD SLC</td>
</tr>
<tr>
<td>16</td>
<td>Optional interface</td>
<td>1: RS-232C</td>
</tr>
<tr>
<td>17</td>
<td>Logo</td>
<td>X: No display (Industrial Box PC)</td>
</tr>
</tbody>
</table>
1-6 Industrial PC Platform Overview

The Industrial PC Platform is an integrated range of products designed for use in a variety of industrial applications that will benefit from advanced PC technology. The range is scalable, robust and reliable, and is suitable for use with both standard operating system software and proprietary programs for machine control and automation.

In line with OMRON’s established quality standards, each element in the Industrial PC Platform, ranging from the standalone Industrial Box PC to the touchscreen Industrial Monitor, is engineered with long-life components and built to the most advanced design standards.

The following sections introduce Industrial PC Platform products.

1-6-1 Industrial Monitor

The Industrial Monitor is of key importance at the interface between operator and system. The Industrial Monitor is efficient, effective and highly visible with an attractive design. Using smart algorithms, the touch controller determines the exact location of each touch for precise control as well as detecting abnormal or illegal actions to protect misuse or false touches.
1-6-2 Industrial Box PC

The Industrial Box PC is designed to meet the specific needs of the industrial environment. Design simplification and future-proof architecture minimize the risk of failure. In addition, new PC features can be seamlessly incorporated, without the need for wholesale redesign.

The Industrial Box PC can simultaneously use the standard operating system and programs, alongside other third-party software.
Hardware

This section provides an overview of the hardware of the IPC Programmable Multi Axis Controller.

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<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-10-10</td>
<td>UPS Communication Cable</td>
<td>23</td>
</tr>
<tr>
<td>2-10-11</td>
<td>Recommended EtherCAT Cables</td>
<td>24</td>
</tr>
</tbody>
</table>
The IPC Programmable Multi Axis Controller supports the following system configuration.

The Windows operating system has all interfaces an Industrial PC requires:
- 1 Ethernet port to connect with regular Ethernet networks and to be able to connect with databases, MES- and ERP systems and other IIoT applications.
- 4 USB ports to connect peripheral devices.
- 1 DVI port to connect a monitor
- 1 RS-232 port to connect (legacy) peripheral devices and factory automation devices
- 2 slots for HDD and/or SSD storage devices
- 1 SD Memory Card slot for removable storage
- 1 PCIe Card Slot to add support for other (industrial) networks or peripheral ports

The Programmable Multi Axis Controller kernel has 2 Ethernet ports assigned.
- 1 EtherCAT port for (real-time) communication with EtherCAT Slaves, like servo drives and I/O devices.
  By using the EtherCAT master communications port on the Programmable Multi-Axis Controller, EtherCAT slaves such as servo drives, frequency inverters, machine vision systems, digital and analog I/O, and other general-purpose slaves can be connected.
- 1 Modbus-TCP port for communication with other Modbus-TCP devices.
  The Ethernet communications port on the Programmable Multi-Axis Controller supports the Modbus-TCP protocol. It can be connected to devices such as a PLC or a programmable terminal that supports the Modbus-TCP protocol.
2-2 Component Names and Functions

This section shows views of the IPC Programmable Multi Axis Controller with information about all items.

2-2-1 Front and Top of the Industrial Box PC

This section shows the component names and functions for the front and top of the Box PC.

<table>
<thead>
<tr>
<th>Item</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cover</td>
<td>Provides access to the backup battery and to the fans for Box PCs that have active cooling.</td>
</tr>
</tbody>
</table>
| B    | Option port      | Interface connection options:  
• RS-232 connector (default)  
• DVI-D connector for additional monitor connection |
<p>| C    | SD Memory Card slot | SD Memory Card slot                                                        |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>PCIe bay</td>
<td>PCI Express mounting slot</td>
</tr>
<tr>
<td>E</td>
<td>DVI connector</td>
<td>Digital Visual Interface connector</td>
</tr>
<tr>
<td>F</td>
<td>10BASE-T/100BASE-TX/1000BASE-T Ethernet connectors</td>
<td>3 RJ45 Gb Ethernet interface connectors</td>
</tr>
<tr>
<td>G</td>
<td>USB 2.0 connectors</td>
<td>2 USB 2.0 interface connectors</td>
</tr>
<tr>
<td>H</td>
<td>USB 3.0 connectors</td>
<td>2 USB 3.0 interface connectors</td>
</tr>
<tr>
<td>I</td>
<td>Drive bay *1</td>
<td>Two 2.5 inch drive bays for HDD/SSD storage devices:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Slot A= Pre-installed operating system and main storage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Slot B= Optional drive for additional storage</td>
</tr>
<tr>
<td>J</td>
<td>I/O connector</td>
<td>2 inputs (Power ON/OFF Input and UPS Mode Input) and 1 output (Power Status Output)</td>
</tr>
<tr>
<td>K</td>
<td>LED indicators</td>
<td>Visual indicators for the operating state of the IPC Programmable Multi Axis Controller</td>
</tr>
<tr>
<td>L</td>
<td>Power button</td>
<td>Pushbutton to manually power ON/OFF the Box PC</td>
</tr>
<tr>
<td>M</td>
<td>Power connector</td>
<td>Lockable power connector</td>
</tr>
</tbody>
</table>

*1 Depending on the model one or two drives are supported. Refer to 4-1-4 CPU Specifications on page 4 - 5 for the number of supported drives.
2-2-2 Back of the Industrial Box PC

This section shows the component names and functions for the back of the Industrial Box PC.

<table>
<thead>
<tr>
<th>Item</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>ID information label</td>
<td>Label containing Model ID., LOT No. and other product specific information.</td>
</tr>
<tr>
<td>B</td>
<td>License label</td>
<td>Optional label containing the license number. Only available on IPC Programmable Multi Axis Controller models.</td>
</tr>
</tbody>
</table>

*1 Refer to 1-4 ID Information Label on page 1 - 5 for label details.
*2 Refer to 1-5 Product Configuration on page 1 - 6 for configuration details.
2-3 LED Indicators

The Industrial Box PC has two rows of four LED indicators that show the operating status of the product. Both rows have the same function. The following LED indicators are available:

<table>
<thead>
<tr>
<th>Item</th>
<th>LED Indicator</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>PWR</td>
<td>Power</td>
<td>Indicates the operating mode of the Industrial Box PC.</td>
</tr>
<tr>
<td>B</td>
<td>ERR</td>
<td>Error</td>
<td>Indicates the presence and type of an error.</td>
</tr>
<tr>
<td>C</td>
<td>HDD</td>
<td>Hard Disk Drive</td>
<td>Indicates HDD/SSD activity.</td>
</tr>
<tr>
<td>D</td>
<td>RUN</td>
<td>Run</td>
<td>Indicate the status of a user-defined function.*1</td>
</tr>
</tbody>
</table>

*1 Not for products NY512-A□□□. Refer to 1-5 Product Configuration on page 1 - 6 for configuration details.

2-3-1 PWR LED Indicator

The Power LED (PWR) indicates the operating mode of the Box PC.

<table>
<thead>
<tr>
<th>Color</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Not lit</td>
<td>There is no power supplied or the Box PC is OFF.</td>
</tr>
<tr>
<td></td>
<td>Blinking</td>
<td>Power is currently supplied and the Box PC is in stand-by mode.</td>
</tr>
<tr>
<td></td>
<td>Lit</td>
<td>Power is currently supplied and the Box PC is turned ON.</td>
</tr>
</tbody>
</table>
2-3-2 ERR LED Indicator

The Error LED (ERR) indicates the presence and type of an error within the IPC Programmable Multi Axis Controller.

<table>
<thead>
<tr>
<th>Color</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Not lit</td>
<td>• The 24 VDC power is not supplied&lt;br&gt;• No error is present</td>
</tr>
<tr>
<td></td>
<td>Blinking</td>
<td>• Fan Error&lt;br&gt;• Battery low</td>
</tr>
<tr>
<td></td>
<td>Lit</td>
<td>• Thermal shutdown&lt;br&gt;• Watchdog Error&lt;br&gt;• Power Supply under-voltage error&lt;br&gt;• Power Supply over-voltage error&lt;br&gt;• Power supply defective</td>
</tr>
</tbody>
</table>

Additional Information

Refer to 7-2 Corrective Maintenance on page 7 - 7 for actions to solve errors.

2-3-3 HDD LED Indicator

The Hard Disk Drive LED (HDD) indicates activity of the HDD or SSD.

<table>
<thead>
<tr>
<th>Color</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>Flickering</td>
<td>The HDD or SSD is active.</td>
</tr>
</tbody>
</table>

2-3-4 RUN LED Indicator

The RUN LED has no functionality and will not be lit.
2-4 Power Button

The power button is used to manually switch the Box PC ON and OFF.

Additional Information

- Refer to 6-1 Power ON on page 6 - 2 for ON details.
- Refer to 6-2 Power OFF on page 6 - 3 for OFF details.
2-5 Drive Bays

The drive bays in the IPC Programmable Multi Axis Controller accept 2.5 inch Hard Disk Drives (HDD) or Solid State Drives (SSD). Depending on the model one or two drives are supported.

Additional Information

- Refer to 4-1-4 CPU Specifications on page 4 - 5 for the number of supported drives.
- Refer to 4-1-6 Storage Devices on page 4 - 6 for storage device specifications.
- Refer to 5-2-1 Install an Additional Drive on page 5 - 6 for install information.
- Refer to 7-2-5 Replace a Drive on page 7 - 14 for maintenance information.
2-6 SD Memory Card Slot

The SD Memory Card slot on the IPC Programmable Multi Axis Controller accept SD Memory Cards with the following specifications.

- SDHC type (SD 2.0 specification)
- Up to 32 GB capacity

Additional Information

Refer to 2-10-2 SD Memory Cards on page 2 - 19 for SD Memory Card details.
The PCI Express (PCIe) Card slot of the IPC Programmable Multi Axis Controller accepts various PCIe Cards for specific hardware needs.

The PCIe Card connectors are available behind the cover A and the PCIe Card is mounted in the PCIe drawer B.

Additional Information

- Refer to 4-1-7 PCIe Card Slot Specifications on page 4 - 7 for specifications.
- Refer to 5-2-2 Install the PCIe Card on page 5 - 10 for install information.
- Refer to 7-2-6 Replace the PCIe Card on page 7 - 19 for maintenance information.
2-8 Connectors

This section gives an overview of the available connectors for the IPC Programmable Multi Axis Controller.

2-8-1 Power Connector

The power connector on the Box PC is used to supply 24 VDC power to the Box PC. The power connector is supplied with the Box PC.

Additional Information

- Refer to 4-1-2 General Electrical Specifications on page 4-3 for specifications.
- Refer to 5-4-3 Wire the Power Connector on page 5-35 for wiring details.
- Refer to 5-5-1 Connector Identification on page 5-42 for connection details.

2-8-2 I/O Connector

The I/O connector on the IPC Programmable Multi Axis Controller provides discrete signals with the following functions.

- Input signal to the Box PC when a connected UPS switches to battery power.
- Input signal to the Box PC to perform a shutdown or power ON when the signal turns ON.
- Output signal from the Box PC to indicate the power status of the Box PC.

The I/O connector is supplied with the Box PC.
2-8-3 USB Connectors

The USB connectors support USB 2.0 and USB 3.0 specifications. All USB interfaces are protected against overcurrent and all ports support Wake-on-USB.

Additional Information

- Refer to 4-2-3 USB Connector Specifications on page 4 - 14 for specifications.
- Refer to 5-5-1 Connector Identification on page 5 - 42 for connection details.
2-8-4 Ethernet Connectors

The Ethernet connectors provide 3 individual Ethernet ports on the IPC Programmable Multi Axis Controller.
Each port offers 10BASE-T/100BASE-TX/1000BASE-T Ethernet speeds.

Additional Information

• Refer to 4-2-4 Ethernet Connector Specifications on page 4 - 15 for specifications.
• Refer to 5-5-1 Connector Identification on page 5 - 42 for connection details.

2-8-5 DVI Connector

The DVI interfaces supported on this connector are dependent on the configuration of the IPC Programmable Multi Axis Controller.

Additional Information

• Refer to 1-5 Product Configuration on page 1 - 6 for configuration details.
• Refer to 4-2-5 DVI Connector Specifications on page 4 - 18 for specifications.
• Refer to 5-5-1 Connector Identification on page 5 - 42 for connection details.
2-8-6 RS-232 Connector (Optional)

Depending on the product configuration an optional RS-232 connector is available.

Additional Information

- Refer to 1-5 Product Configuration on page 1 - 6 for configuration details.
- Refer to 4-2-6 RS-232 Connector Specifications on page 4 - 19 for specifications.
- Refer to 5-5-1 Connector Identification on page 5 - 42 for connection details.
2-9  Spare Parts

The following spare parts for the IPC Programmable Multi Axis Controller are available.

2-9-1  Battery

One battery is supplied with the Box PC. The battery supplies power to the real-time clock. The battery is located inside the Box PC.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>CJ1W-BAT01</td>
<td>![Battery Image]</td>
<td>Service life: 5 years at 25°C</td>
</tr>
</tbody>
</table>

Additional Information

Refer to 7-2-4 Replace the Battery on page 7 - 12 for the replacement procedure.

2-9-2  Fan Unit

The Fan Unit is available for the Box PC that has active cooling.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Specifications</th>
</tr>
</thead>
</table>
| NY000-AF00 | ![Fan Unit Image] | • Service life: 70,000 hours of continuous operation at 40°C with 15% to 65% relative humidity  
• Shelf life: 6 months  
This is the storage limitation with no power supplied. |

Additional Information

Refer to 7-2-3 Replace the Fan Unit on page 7 - 10 for the replacement procedure.
## 2-9-3 Accessory Kit

The accessory kit for the Box PC.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Specifications</th>
</tr>
</thead>
</table>
| NY000-AK00 | ![Accessory Kit](image) | Accessory Kit containing all accessories supplied with the Box PC.  
  - Power connector  
  - I/O connector  
  - Drive bracket for drive installation  
  - 4 mounting screws for drive installation  
  - PCIe Card support for PCIe Card installation  
  - PCIe Card clip for PCIe Card installation |
2-10 Optional Hardware

The following optional hardware is available for the IPC Programmable Multi Axis Controller.

2-10-1 Mounting Brackets

Mounting brackets details are provided below.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Bracket type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY000-AB00</td>
<td>![Book mount image]</td>
<td>Book mount</td>
</tr>
<tr>
<td>NY000-AB01</td>
<td>![Wall mount image]</td>
<td>Wall mount</td>
</tr>
</tbody>
</table>

2-10-2 SD Memory Cards

SD Memory Card details are provided below. OMRON is not responsible for the operation, performance or write life of any other brand of SD Memory Card.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Card type</th>
<th>Capacity</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC-SD291</td>
<td>![SD Card image]</td>
<td>SD Card</td>
<td>2 GB</td>
<td>FAT16</td>
</tr>
<tr>
<td>HMC-SD491</td>
<td>![SDHC Card image]</td>
<td>SDHC Card</td>
<td>4 GB</td>
<td>FAT32</td>
</tr>
</tbody>
</table>
## 2-10-3 USB Flash Drives

USB Flash Drive details are provided below.
OMRON is not responsible for the operation, performance, or write life of any other brand of USB Flash Drives.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>FZ-MEM2G</td>
<td></td>
<td>2 GB</td>
</tr>
<tr>
<td>FZ-MEM8G</td>
<td></td>
<td>8 GB</td>
</tr>
</tbody>
</table>

## 2-10-4 Storage Devices

Storage device details are provided below.
OMRON is not responsible for the operation, performance, or write life of any other storage device.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Storage type</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY000-AH00</td>
<td></td>
<td>HDD</td>
<td>320 GB</td>
</tr>
<tr>
<td>NY000-AS00</td>
<td></td>
<td>SSD SLC</td>
<td>32 GB</td>
</tr>
<tr>
<td>NY000-AS01</td>
<td></td>
<td>SSD iMLC</td>
<td>64 GB</td>
</tr>
<tr>
<td>NY000-AS02</td>
<td></td>
<td>SSD iMLC</td>
<td>128 GB</td>
</tr>
</tbody>
</table>

### Additional Information

Refer to 4-1-6 Storage Devices on page 4 - 6 for storage device specifications.
2-10-5 DVI Cables

DVI cable details are provided below.
OMRON is not responsible for the operation or performance of any other brand of DVI cable.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Cable length</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY000-AC00 2M</td>
<td></td>
<td>2 m</td>
<td>• Supports DVI-D</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Minimum bend radius: 36 mm</td>
</tr>
<tr>
<td>NY000-AC00 5M</td>
<td></td>
<td>5 m</td>
<td></td>
</tr>
</tbody>
</table>

DVI Cable Clearance

The DVI cable requires a minimum clearance of 90 mm from the connector entry to prevent excessive strain on the connector and cable assembly.

2-10-6 USB Type-A to USB Type-B Cables

USB Type-A to USB Type-B cable details are provided below.
OMRON is not responsible for the operation or performance of any other brand of USB Type-A to USB Type-B cable.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Cable length</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>FH-VUAB 2M</td>
<td></td>
<td>2 m</td>
<td>• USB 2.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Minimum bend radius: 25 mm</td>
</tr>
<tr>
<td>FH-VUAB 5M</td>
<td></td>
<td>5 m</td>
<td></td>
</tr>
</tbody>
</table>

USB Type-A to USB Type-B Cable Clearance

The USB Type-A to USB Type-B cable requires a minimum clearance of 60 mm from the connector entry to prevent excessive strain on the connector and cable assembly.
### 2-10-7 Industrial Monitor

Details for the recommended monitor are provided below.
OMRON is not responsible for the operation or performance of any other monitor.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYM15W-C100</td>
<td></td>
<td>• LCD touchscreen</td>
</tr>
<tr>
<td>NYM12W-C100</td>
<td></td>
<td>• Multi-touch functionality</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Supply voltage: 24 VDC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Up to 1,280 x 800 pixels at 60 Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 2 USB Type-A Connectors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Programmable brightness control</td>
</tr>
</tbody>
</table>

**Additional Information**

Refer to the OMRON website for specifications and manuals.

### 2-10-8 Power Supply

Details for the recommended power supply are provided below.
OMRON is not responsible for the operation or performance of any other power supply.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>S8VK-G24</td>
<td></td>
<td>Output voltage: 24 VDC</td>
</tr>
</tbody>
</table>

**Additional Information**

- Refer to 4-1-3 Power Consumption Specifications on page 4 - 4 for power consumption details.
- Refer to the OMRON website for specifications and manuals of the S8VK-G.
Note that the power consumption details of the Box PC determine the minimum power rating of your power supply.
Details for the recommended UPS are provided below.
OMRON is not responsible for the operation or performance of any other UPS.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>S8BA with revision number 04 or higher. *1</td>
<td><img src="image.png" alt="Image" /></td>
<td>Output voltage during backup operation: 24 VDC±5%</td>
</tr>
</tbody>
</table>

*1 The revision number of the UPS can be retrieved from the serial number label on the product and the product packaging.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Product code</td>
</tr>
<tr>
<td>2</td>
<td>Product period and sequential number</td>
</tr>
<tr>
<td>3</td>
<td>Revision number</td>
</tr>
<tr>
<td>4</td>
<td>RoHS status</td>
</tr>
</tbody>
</table>

**Precautions for Safe Use**
Use an Omron S8BA UPS with the correct revision number to prevent improper system shutdown.

**Additional Information**
- Refer to 2-10-8 Power Supply on page 2 - 22 for power supply details.
- Refer to 4-1-3 Power Consumption Specifications on page 4 - 4 for power consumption details.
- Refer to the OMRON website for S8BA specifications or to the UPS S8BA User's Manual (Cat. No. U702) for the UPS manual.
  Note that the power consumption details determine the output current/capacity of your UPS.

## 2-10-10 UPS Communication Cable
Communication cable details are provided below.
OMRON is not responsible for the operation or performance of any other brand of communication cable.

<table>
<thead>
<tr>
<th>Model</th>
<th>Appearance</th>
<th>Cable length</th>
<th>Specifications</th>
</tr>
</thead>
</table>
| S8BW-C02 | ![Image](image.png) | 2 m | Signals for:
  - Signal output (BL, TR, BU, WB)
  - Remote ON/OFF input
  - UPS Stop Signal input (BS) |
**2-10-11 Recommended EtherCAT Cables**

For EtherCAT, use Straight STP (shielded twisted-pair) cable of category 5 or higher with double shielding (braiding and aluminum foil tape).

The following table lists wiring materials used for the EtherCAT communications cables.

<table>
<thead>
<tr>
<th>Product</th>
<th>Manufacturer</th>
<th>Cable length [m]</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cables with connectors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size and number of pairs: AWG27 × 4P. Cable color : Yellow *1 *2</td>
<td>OMRON</td>
<td>0.3</td>
<td>XS6W-6LSZH8SS 30CM-Y</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5</td>
<td>XS6W-6LSZH8SS 50CM-Y</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>XS6W-6LSZH8SS 100CM-Y</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>XS6W-6LSZH8SS 200CM-Y</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>XS6W-6LSZH8SS 300CM-Y</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>XS6W-6LSZH8SS 500CM-Y</td>
</tr>
<tr>
<td>Size and number of pairs: AWG22 × 2P. Cable color : Blue *1</td>
<td>OMRON</td>
<td>0.3</td>
<td>XS5W-T421-AMD-K</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5</td>
<td>XS5W-T421-BMD-K</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>XS5W-T421-CMD-K</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>XS5W-T421-DMC-SS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>XS5W-T421-GMC-SS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>XS5W-T421-JMC-SS</td>
</tr>
<tr>
<td>Size and number of pairs: AWG22 × 2P. Cable color : Black *3</td>
<td>OMRON</td>
<td>0.5</td>
<td>XS5W-T421-BM2-SS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>XS5W-T421-CM2-SS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>XS5W-T421-DM2-SS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>XS5W-T421-EM2-SS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>XS5W-T421-GM2-SS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>XS5W-T421-JM2-S</td>
</tr>
<tr>
<td>Product</td>
<td>Manufacturer</td>
<td>Cable length [m]</td>
<td>Model</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>---------------------------------------</td>
<td>------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Cables with connectors</td>
<td>OMRON</td>
<td>0.5</td>
<td>XS5W-T421-BMC-SS</td>
</tr>
<tr>
<td>Size and number of pairs: AWG22 × 2P. Cable</td>
<td></td>
<td>1</td>
<td>XS5W-T421-CMC-SS</td>
</tr>
<tr>
<td>color: Black</td>
<td></td>
<td>2</td>
<td>XS5W-T421-DMC-SS</td>
</tr>
<tr>
<td>Size and number of pairs: AWG22 × 2P. Cable</td>
<td></td>
<td>3</td>
<td>XS5W-T421-EMC-SS</td>
</tr>
<tr>
<td>color: Black</td>
<td></td>
<td>5</td>
<td>XS5W-T421-GMC-SS</td>
</tr>
<tr>
<td>Size and number of pairs: AWG22 × 2P. Cable</td>
<td></td>
<td>10</td>
<td>XS5W-T421-JMC-SS</td>
</tr>
<tr>
<td>Cables / Connectors *4</td>
<td>Tonichi Kyosan Cable, Ltd.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size and number of pairs: AWG24 × 4P</td>
<td>Kuramo Electric Co.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cables</td>
<td>SWCC Showa Cable Systems Co.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RJ45 Connectors</td>
<td>Panduit Corporation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size and number of pairs: AWG22 × 2P</td>
<td>Kuramo Electric Co., Ltd.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cables</td>
<td>Nihon Electric Wire&amp;Cable Co., Ltd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RJ45 Assembly Connectors</td>
<td>OMRON Corporation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 Cables are available in the following lengths: 0.2, 0.3, 0.5, 1, 1.5, 2, 3, 5, 7.5, 10, 15, and 20 m. Refer to the XS5/XS6 Industrial Ethernet Connectors Catalog (Cat. No. G019) for details.

*2 Cable material LSZH. The lineup features Low Smoke Zero Halogen cables for in-cabinet use and PUR cables for out-of-cabinet use. Although the LSZH cable is single shielded, its communications and noise characteristics meet the standards. Cable colors available are blue, yellow and green.

*3 For details contact your local OMRON representative.

*4 We recommend to use the above cables and connectors together.

**Additional Information**

When making cables, connect the shield to the connectors at both ends.
Software

This section provides software information for the IPC Programmable Multi Axis Controller.

3-1 Support Software

3-1-1 Available IPC Programmable Multi Axis Controller Support Software

3-1-2 Available Industrial PC Support Software

3-1-3 Power PMAC Support Utility

3-1-4 Industrial PC Support Utility

3-1-5 Industrial PC Tray Utility

3-2 Windows Operating System

3-2-1 Determine Your Version of the Windows Operating Systems

3-3 Software for Developers

3-3-1 Overview Developer Software

3-3-2 Industrial PC System API
3-1 Support Software

This section provides an overview of the support software available for your IPC Programmable Multi Axis Controller.

3-1-1 Available IPC Programmable Multi Axis Controller Support Software

This section gives an overview of the software utilities available for the IPC Programmable Multi Axis Controller.

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power PMAC Support Utility</td>
<td>This computer software is used to shutdown and re-boot the system.</td>
<td>This is pre-installed free software.</td>
</tr>
<tr>
<td>Power PMAC IDE</td>
<td>This computer software is used to configure the Controller, create user programs, and debug the programs.</td>
<td>This is pre-installed free software that can also be downloaded from the website of Delta Tau Data Systems, Inc.</td>
</tr>
<tr>
<td>Power PMAC NC16</td>
<td>This computer software is used to control working machines and other CNC machines with the Controller. Use this software when you do not customize the HMI screen.</td>
<td>This is non-free software. Contact your OMRON representative for information on how to procure.</td>
</tr>
<tr>
<td>Power PMAC-NC16 Runtime</td>
<td>This computer software is used to control working machines and other CNC machines with the Controller. Use this software when you want to customize the HMI screen. The product contains extension source codes used for customization.</td>
<td>This is non-free software. Contact your OMRON representative for information on how to procure.</td>
</tr>
<tr>
<td>Acontis EC Engineer</td>
<td>This computer software is used to configure and monitor the EtherCAT network by using the Controller as the EtherCAT master.</td>
<td>This is pre-installed non-free software that can also be downloaded from the website of Delta Tau Data Systems, Inc.</td>
</tr>
</tbody>
</table>

Select and download the utilities required from the mentioned websites.
3-1-2 Available Industrial PC Support Software

This section gives an overview of the software utilities available for all Industrial PC Platform products.

<table>
<thead>
<tr>
<th>Product</th>
<th>Software utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Monitor</td>
<td>Industrial Monitor Utility</td>
</tr>
<tr>
<td></td>
<td>Industrial Monitor Brightness Utility</td>
</tr>
<tr>
<td></td>
<td>Industrial PC Tray Utility</td>
</tr>
<tr>
<td>Industrial Box PC</td>
<td>Industrial PC Support Utility</td>
</tr>
<tr>
<td></td>
<td>Industrial PC Tray Utility</td>
</tr>
<tr>
<td>Industrial Panel PC</td>
<td>Industrial Monitor Utility</td>
</tr>
<tr>
<td></td>
<td>Industrial Monitor Brightness Utility</td>
</tr>
<tr>
<td></td>
<td>Industrial PC Support Utility</td>
</tr>
<tr>
<td></td>
<td>Industrial PC Tray Utility</td>
</tr>
</tbody>
</table>

Select and download the utilities required from the OMRON download website.

3-1-3 Power PMAC Support Utility

This section provides an overview of the Power PMAC Support Utility.

Power PMAC Support Utility Overview

The Power PMAC Support Utility is a software utility to shutdown and reboot the system when using a IPC Programmable Multi Axis Controller.

The Power PMAC Support Utility is located in the system tray.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Reboot Complete System</td>
<td>Select to reboot both Windows and the IPC Programmable Multi Axis Controller.</td>
</tr>
<tr>
<td>B</td>
<td>Shutdown Complete System</td>
<td>Select to shutdown both Windows and the IPC Programmable Multi Axis Controller.</td>
</tr>
<tr>
<td>C</td>
<td>Reboot Motion Core</td>
<td>Select to reboot only the IPC Programmable Multi Axis Controller. Windows stays operational.</td>
</tr>
<tr>
<td>D</td>
<td>Reboot Motion Core Firmware</td>
<td>Only use when instructed by authorized support users. Select to upgrade the IPC Programmable Multi Axis Controller.</td>
</tr>
<tr>
<td>E</td>
<td>Active EtherCAT License</td>
<td>Only use when instructed by authorized support users. The license is pre-installed. Select to (re)activate the license for the IPC Programmable Multi Axis Controller.</td>
</tr>
<tr>
<td>F</td>
<td>Power PMAC Support Utility Icon</td>
<td>In the system tray select this icon to display the Power PMAC Support Utility menu.</td>
</tr>
</tbody>
</table>
3-1-4 Industrial PC Support Utility

This section provides an overview of the Industrial PC Support Utility.

Industrial PC Support Utility Overview

The Industrial PC Support Utility is a software utility to assist in diagnosing and resolving problems of the IPC Programmable Multi Axis Controller.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Production Data Tab</td>
<td>Select to display Production Data details in the Tab details area. Refer to Production Data Tab on page 3-5 for details.</td>
</tr>
<tr>
<td>B</td>
<td>System Status Tab</td>
<td>Select to display System Status details in the Tab details area. Refer to System Status Tab on page 3-6 for details.</td>
</tr>
<tr>
<td>C</td>
<td>Tab details</td>
<td>Details of the selected Tab page.</td>
</tr>
<tr>
<td>D</td>
<td>Language Selector</td>
<td>Select to display and choose the UI language of the Industrial PC Support Utility.</td>
</tr>
<tr>
<td>E</td>
<td>Close Button</td>
<td>Close the Industrial PC Support Utility.</td>
</tr>
<tr>
<td>F</td>
<td>Update Screen Button</td>
<td>Use this button to retrieve updated values from the IPC Programmable Multi Axis Controller.</td>
</tr>
</tbody>
</table>
Production Data Tab

The Production Data tab displays generic IPC Programmable Multi Axis Controller information. These are e.g. Model name, Lot number, Serial number, Hardware version, BIOS version, BMC version, and software versions (Industrial PC Support Utility and Industrial PC System API).

- Model Name is the configuration code of this model. Refer to 1-5 Product Configuration on page 1 - 6 for details.
- BMC Version is the firmware version of the Board Management Controller.

Values are not updated automatically. Select the Update Screen Button to display the latest values.
System Status Tab

The System Status tab displays actual states and diagnostic information like internal temperature, fan revolution, battery and power supply status.

A status that requires attention is indicated with a red bar.

### Item Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Temperature</td>
<td>The average CPU temperature.</td>
</tr>
<tr>
<td>Fan Revolution</td>
<td>The actual rotation speed for each fan in revolutions per minute (r/min).</td>
</tr>
<tr>
<td></td>
<td>• First number = rotation speed of fan located closest to Power button.</td>
</tr>
<tr>
<td></td>
<td>• Second number = rotation speed of fan located closest to battery.</td>
</tr>
<tr>
<td>Fan Status</td>
<td>The target speed for the fans is dynamically set based on the CPU temperature. The target speed is compared with the actual fan speed.</td>
</tr>
<tr>
<td></td>
<td>• OK indicates both fans are running on the target speed.</td>
</tr>
<tr>
<td></td>
<td>• Low revolution speed indicates one or both fans do not reach the target speed.</td>
</tr>
<tr>
<td></td>
<td>Clean the fans and replace the Fan Unit if the problem persists.</td>
</tr>
<tr>
<td></td>
<td>Refer to 7-2-3 Replace the Fan Unit on page 7 - 10 for replacement details.</td>
</tr>
<tr>
<td>Battery Status</td>
<td>The battery status.</td>
</tr>
<tr>
<td></td>
<td>• OK indicates the battery is full.</td>
</tr>
<tr>
<td></td>
<td>• Low indicates the battery voltage is low. Replace the battery.</td>
</tr>
<tr>
<td></td>
<td>Refer to 7-2-4 Replace the Battery on page 7 - 12 for replacement details.</td>
</tr>
<tr>
<td>Power Supply</td>
<td>The power supply status is determined by the UPS and reported to the Box PC via the I/O connector.</td>
</tr>
<tr>
<td></td>
<td>• NormalPowerSupply indicates the Box PC is powered by the 24V power supply.</td>
</tr>
<tr>
<td></td>
<td>• UPS Power Supply indicates that there is no power from the 24V power supply and the Box PC runs on battery power from the UPS.</td>
</tr>
</tbody>
</table>

*1 Not for products NY512-A□.

Refer to 1-5 Product Configuration on page 1 - 6 for configuration details.

*2 The Fan Revolution will always show 0 (r/min) / 0 (r/min) for fanless models.
Refer to 1-5 Product Configuration on page 1 - 6 for fan details.

*3 The Fan Status will always show OK for fanless models
Refer to 1-5 Product Configuration on page 1 - 6 for fan details.

Values are not updated automatically. Select the Update Screen Button to display the latest values.

### Installation

The Industrial PC Support Utility is pre-installed on the Industrial Box PC and Industrial Panel PC. 
Download the Industrial PC Support Utility from the OMRON download website if reinstallation is required.

### Startup

The Industrial PC Support Utility can be started from:
- Windows Start Menu
  Select OMRON and then Industrial PC Support Utility.
- Industrial PC Tray Utility
- Windows desktop shortcut

### Messages

The Industrial PC Support Utility does not display messages in the Industrial PC Tray Utility.
A battery warning and a fan warning are not displayed in the Industrial PC Tray Utility.

### Logging

The Industrial Monitor Utility and the Industrial PC Support Utility record the operation history in the Windows event log.
Refer to 7-2-9 Windows Event Viewer on page 7 - 29 for the logged messages.
3-1-5 Industrial PC Tray Utility

This section provides an overview of the Industrial PC Tray Utility.

Industrial PC Tray Utility Overview

The Industrial PC Tray Utility is a software utility that provides information about the current state of the Industrial PC, its related devices, and associated software.

When running, the Industrial PC Tray Utility is always present as a status icon in the system tray area of Windows.

Features

The Industrial PC Tray Utility provides the following features:

• Display the overall state of all installed OMRON utilities in the icon in the system tray area.
• Display a menu that can start all installed utilities and show the state of each installed utility.
• Display notification messages in popup windows that inform the user about the state of applications or hardware. The Industrial PC Tray Utility displays the messages provided by installed OMRON utilities. Refer to the OMRON utilities information for the messages that can be displayed.

Menu

Select the Industrial PC Tray Utility icon to display the menu.

• The application displays the available utilities.
• Select an entry to launch the associated utility, if applicable.
• The icons of menu items in the Industrial PC Tray Utility menu will have a warning or error symbol when applicable.
• The Industrial PC Support Utility is available in the menu when installed.
• The Industrial Monitor Utility is available in the menu when installed.
• The Industrial Monitor Brightness Utility is available in the menu when installed.
• The application area can be configured to show and launch both OMRON and third party utilities.
• The About entry shows details of the Industrial PC Tray Utility. Refer to About the Industrial PC Tray Utility on page 3 - 9 for details.
• The Exit entry closes the utility.

### About the Industrial PC Tray Utility

The About window shows the version of the Industrial PC Tray Utility and copyright information.

### Status Indicators on Icons

The following table provides the indicator details of the Industrial PC Tray Utility.

<table>
<thead>
<tr>
<th>Overlay type</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td><img src="image" alt="Icon" /></td>
<td>No OMRON utility has issued warning or error notifications.</td>
</tr>
<tr>
<td>Warning sign</td>
<td><img src="image" alt="Icon" /></td>
<td>At least one OMRON utility has issued a warning notification.</td>
</tr>
<tr>
<td>Error sign</td>
<td><img src="image" alt="Icon" /></td>
<td>At least one OMRON utility has issued an error notification.</td>
</tr>
</tbody>
</table>

### Installation

The Industrial PC Tray Utility is pre-installed on an Industrial Box PC and an Industrial Panel PC. The Industrial PC Tray Utility is included in the installers of the Industrial PC Support Utility and Industrial Monitor Utility. Install the Industrial PC Support Utility or Industrial Monitor Utility to install the Industrial PC Tray Utility.
### Compatibility

The Industrial PC Tray Utility can be used on PCs with Windows 7.

### Startup

By default the Industrial PC Tray Utility is configured to start automatically at Windows startup. To manually (re)start the Industrial PC Tray Utility, open the software from the Windows start menu, select **OMRON**, and then **Omron Tray Application Framework**.
3-2 Windows Operating System

This section provides an overview of Windows Operating System information.

3-2-1 Determine Your Version of the Windows Operating Systems

This section provides methods to find version details of your Windows Operating System.

Windows Embedded Standard 7

To determine your version of the Windows Operating System:

1. Select the Start Button.
2. Enter System Information in the search box.
3. Select System Information in the pop-up that appears. An overview of your System Information will appear, including the Windows Operating System details.
3-3 Software for Developers

This section provides information on the software that is available for developers.

3-3-1 Overview Developer Software

This section gives an overview of the software available for developers for all Industrial PC Platform products.

<table>
<thead>
<tr>
<th>Product</th>
<th>Developer software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Monitor</td>
<td>Industrial Monitor SDK</td>
</tr>
<tr>
<td></td>
<td>Industrial Monitor API</td>
</tr>
<tr>
<td>Industrial Box PC</td>
<td>Industrial PC System SDK</td>
</tr>
<tr>
<td></td>
<td>Industrial PC System API</td>
</tr>
<tr>
<td>Industrial Panel PC</td>
<td>Industrial Monitor SDK</td>
</tr>
<tr>
<td></td>
<td>Industrial Monitor API</td>
</tr>
<tr>
<td></td>
<td>Industrial PC System SDK</td>
</tr>
<tr>
<td></td>
<td>Industrial PC System API</td>
</tr>
</tbody>
</table>

Select and download the software required from the OMRON download website.

3-3-2 Industrial PC System API

This section describes some of the Industrial PC System API functions.

The Industrial PC System API allows programmers to create programs that can retrieve information or set an indicator status of the product.

The API makes use of the included OMRON IPC System Service to manage the hardware.

### Features

The Industrial PC System API can:

- Retrieve system information
- Retrieve system flags
- Retrieve maintenance information
- Configure and program the Watchdog *1
- Set the status of the Run LED Indicator and the ERR LED Indicator *1

*1 Only for
- NYB-□□□□-□□□
- NYB-□□□□-□□□
- NYP-□□□□□□□□-□□□□

### Installation

The Industrial PC System API is part of the SDK download.

The Industrial PC System API is pre-installed on the Industrial Panel PC and the Industrial Box PC.

Install the Industrial PC System SDK to use the Industrial PC System API on development PCs.

Use the Merge Module to include the Industrial PC System API in the installer for custom applications.
To use the Industrial PC System API the API needs to be referenced in your development project.
Specifications

This section provides specifications of the IPC Programmable Multi Axis Controller.

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  4-1-2 General Electrical Specifications .......................................... 4 - 3
  4-1-3 Power Consumption Specifications ....................................... 4 - 4
  4-1-4 CPU Specifications ............................................................... 4 - 5
  4-1-5 Memory Specifications .......................................................... 4 - 5
  4-1-6 Storage Devices ................................................................. 4 - 6
  4-1-7 PCIe Card Slot Specifications .............................................. 4 - 7
  4-1-8 Bracket Specifications .......................................................... 4 - 8

4-2 Connector Specifications .............................................................. 4 - 9
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  4-3-2 Supported Languages .......................................................... 4 - 20

4-4 Environmental Specifications ..................................................... 4 - 21
  4-4-1 Operation Environment Specifications ................................. 4 - 21
  4-4-2 Temperature and Humidity Specifications ............................. 4 - 22
  4-4-3 Recycling Specifications ...................................................... 4 - 24
4-1 General Specifications

This section provides general specifications of the IPC Programmable Multi Axis Controller.

4-1-1 Dimensions and Weight

The following table provides specification details on dimensions and weights.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>Width X = 282 mm</td>
</tr>
<tr>
<td></td>
<td>Depth Y = 195 mm, Y = 200 mm including the DVI connectors</td>
</tr>
<tr>
<td></td>
<td>Height Z = 88.75 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>3.8 kg</td>
</tr>
</tbody>
</table>
## 4-1-2 General Electrical Specifications

The following table provides the general electrical specifications.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power supply voltage</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Allowable power supply voltage range</td>
<td>20.4 to 28.8 VDC</td>
</tr>
<tr>
<td>Power supply standard</td>
<td>SELV</td>
</tr>
<tr>
<td>Grounding method</td>
<td>Ground to less than 100 Ω</td>
</tr>
<tr>
<td>Inrush current</td>
<td>At 24 VDC: 12 A / 6 ms max. for cold start at room temperature</td>
</tr>
<tr>
<td>Overvoltage category</td>
<td>JIS B3502 and IEC 61131-2: Category II</td>
</tr>
<tr>
<td>EMC immunity level</td>
<td>IEC 61132-2: Zone B</td>
</tr>
<tr>
<td>RTC accuracy</td>
<td>At ambient temperature of 55°C: −3.5 to +0.5 min error per month</td>
</tr>
<tr>
<td></td>
<td>At ambient temperature of 25°C: −1.5 to +1.5 min error per month</td>
</tr>
<tr>
<td></td>
<td>At ambient temperature of 0°C: −3 to +1 min error per month</td>
</tr>
<tr>
<td>Power button life</td>
<td>100,000 operations</td>
</tr>
<tr>
<td>Fan life</td>
<td>8 years of continuous operation at 40°C</td>
</tr>
<tr>
<td>Battery life</td>
<td>5 years at 25°C (for battery CJ1W-BAT01)</td>
</tr>
</tbody>
</table>
### 4-1-3 Power Consumption Specifications

The following tables provide details on the power consumption of the IPC Programmable Multi Axis Controller.
The total power consumption is the sum of the power consumption of all items that are installed in your Box PC.
Refer to 1-5 Product Configuration on page 1 - 6 for details.

#### Power Consumption with an Intel® Core™ i7-4700EQ CPU

Power consumption specifications for IPC Programmable Multi Axis Controllers with an Intel® Core™ i7-4700EQ CPU.

<table>
<thead>
<tr>
<th>Item</th>
<th>Power consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Box PC with Intel® Core™ i7-4700EQ excluding Drives and Expansions</td>
<td>81 W</td>
</tr>
<tr>
<td>Drives *1</td>
<td></td>
</tr>
<tr>
<td>HDD 320 GB</td>
<td>2 W</td>
</tr>
<tr>
<td>SSD SLC 32 GB</td>
<td></td>
</tr>
<tr>
<td>SSD SLC 64 GB</td>
<td></td>
</tr>
<tr>
<td>SSD iMLC 128 GB</td>
<td></td>
</tr>
<tr>
<td>Expansions *2</td>
<td></td>
</tr>
<tr>
<td>USB</td>
<td>14 W max. (2 x 500 mA at 5 V) + (2 x 900 mA at 5 V)</td>
</tr>
<tr>
<td>PCIe</td>
<td>15 W max.</td>
</tr>
</tbody>
</table>

*1 Refer to 1-5 Product Configuration on page 1 - 6 for product configuration details.
*2 Refer to the documentation of your expansions for their power consumption details.

The total power consumption is the sum of the power consumption of all items that are installed in your IPC Programmable Multi Axis Controller.

The required supply specifications for an IPC Programmable Multi Axis Controller with an Intel® Core™ i7-4700EQ CPU.

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum power requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>Refer to 2-10-8 Power Supply on page 2 - 22 for power supply products.</td>
</tr>
<tr>
<td></td>
<td>240 W</td>
</tr>
<tr>
<td>UPS</td>
<td>Refer to 2-10-9 UPS on page 2 - 23 for UPS products.</td>
</tr>
<tr>
<td></td>
<td>120 W</td>
</tr>
</tbody>
</table>
4-1-4 CPU Specifications

This section gives the specifications of the CPUs that are available for the IPC Programmable Multi Axis Controller.
Refer to 1-5 Product Configuration on page 1 - 6 for product configuration details.

Intel® Core™ i7-4700EQ CPU Specifications

CPU specifications for IPC Programmable Multi Axis Controllers with an Intel® Core™ i7-4700EQ CPU.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cores / Threads</td>
<td>4 *1 / 8</td>
</tr>
<tr>
<td>CPU base frequency</td>
<td>2.4 GHz</td>
</tr>
<tr>
<td>Cache</td>
<td>6 MB</td>
</tr>
<tr>
<td>Cooling details</td>
<td>Requires active cooling (fan)</td>
</tr>
<tr>
<td>Drive slots (HDD/SSD)</td>
<td>2</td>
</tr>
</tbody>
</table>

*1 Only two cores are available for Windows.

4-1-5 Memory Specifications

The following table provides specification details of the memory.

<table>
<thead>
<tr>
<th>Item</th>
<th>Model Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 GB *1</td>
</tr>
<tr>
<td>Memory type</td>
<td>DDR3L</td>
</tr>
<tr>
<td>Package memory format</td>
<td>SO-DIMM</td>
</tr>
<tr>
<td>Serial Presence Detect (SPD)</td>
<td>Speed grade 1600 Mbps</td>
</tr>
<tr>
<td></td>
<td>CAS Latency</td>
</tr>
</tbody>
</table>

*1 Refer to 1-5 Product Configuration on page 1 - 6 for product configuration details.

Additional Information

The small outline dual in-line memory modules (SO-DIMM) cannot be added or replaced by users.
4-1-6 Storage Devices

This section provides the specifications of the storage devices.

### Solid State Drive Specifications

Specifications for the Solid State Drive (SSD) are provided in the table below.

<table>
<thead>
<tr>
<th>Item</th>
<th>32 GB &quot;1&quot;</th>
<th>64 GB &quot;1&quot;</th>
<th>128 GB &quot;1&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>NY000-AS00</td>
<td>NY000-AS01</td>
<td>NY000-AS02</td>
</tr>
<tr>
<td>Type</td>
<td>SLC</td>
<td>SLC</td>
<td>iMLC</td>
</tr>
<tr>
<td>S.M.A.R.T. support</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>Serial ATA 3.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sustained read speed</td>
<td>Up to 160 MB/s</td>
<td>Up to 430 MB/s</td>
<td></td>
</tr>
<tr>
<td>Sustained write speed</td>
<td>Up to 150 MB/s</td>
<td>Up to 190 MB/s</td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0 to 70°C &quot;2&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating humidity</td>
<td>10% to 95% (with no condensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40 to 100°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage humidity</td>
<td>10% to 95% (with no condensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life</td>
<td>1500 TB/11 years at a daily workload of 350 GB</td>
<td>3000 TB/23 years at a daily workload of 350 GB</td>
<td>114 TB/3 years at a daily workload of 100 GB</td>
</tr>
</tbody>
</table>

"1" Refer to 1-5 Product Configuration on page 1 - 6 for product configuration details.

"2" Refer to 4-4-1 Operation Environment Specifications on page 4 - 21 for the temperature specifications of the complete Box PC.
4-1-7 PCIe Card Slot Specifications

The PCI Express (PCIe) Card slot of the IPC Programmable Multi Axis Controller accepts various cards for specific hardware needs.

Ensure that, according to the PCIe hardware specifications, the indent A is present in the PCIe Card.

The following tables provide PCIe Card Slot details per CPU type.

PCIe Card Slot Specifications with an Intel® Core™ i7-4700EQ CPU

The table below provides PCIe Card slot details for IPC Programmable Multi Axis Controllers with an Intel® Core™ i7-4700EQ CPU.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>X4 (4 lanes) up to Gen 3</td>
</tr>
<tr>
<td>Card height</td>
<td>Standard height cards, 4.20 inches (106.7 mm)*1</td>
</tr>
<tr>
<td>Card length</td>
<td>Half-length cards, 6.6 inches (167.65 mm)</td>
</tr>
<tr>
<td>Power consumption</td>
<td>Refer to Power Consumption with an Intel® Core™ i7-4700EQ CPU on page 4 - 4 for the maximum power consumption</td>
</tr>
</tbody>
</table>

*1 Low profile cards, 2.536 inches (64.4 mm) are not supported.
**4-1-8 Bracket Specifications**

The metal mounting brackets mount your Box PC and they are the connection for the functional ground.

Use metal screws with a diameter of 4 mm or 5 mm to mount the brackets.

Mounting screw locations for book mount and wall mount orientation:

---

**Additional Information**

- Refer to 5-3-8 Book Mount Procedure on page 5 - 25 for book mount details.
- Refer to 5-3-9 Wall Mount Procedure on page 5 - 26 for wall mount details.
4-2 Connector Specifications

This section provides the Connector Specifications of the IPC Programmable Multi Axis Controller.

4-2-1 Power Connector Specifications

The power supply connector can be locked to prevent unintentional disconnection. The connector can only be inserted the correct way. The connector is a Phoenix Contact type SPC5/2-STCL-7.62 BK (1711708). The Box PC provides protection against reverse polarity.

The pin layout represents the power connector on the Box PC.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24 VDC</td>
</tr>
<tr>
<td>2</td>
<td>0 VDC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor isolation rating</td>
<td>90°C</td>
</tr>
<tr>
<td>Termination rating</td>
<td>90°C</td>
</tr>
</tbody>
</table>

Additional Information

- Refer to 5-4-3 Wire the Power Connector on page 5 - 35 for wiring details.
- Refer to 5-4-2 Ground on page 5 - 28 for grounding details.
Locking and Removing the Power Connector

The power connector automatically locks into place when the black part of the connector is held and pushed in. Pushing both orange sliders towards the end of the connector will release the lock when removing the connector.

4-2-2 I/O Connector Specifications

Details of the I/O connector are provided below.
The I/O connector can be locked to prevent unintentional disconnection.
The connector can only be inserted in the correct way.
The Lock-and-Release Latch connector is a Phoenix Contact type DFMC 1,5/ 3-ST-3,5-LR BK (1711658).

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor isolation rating</td>
<td>90°C</td>
</tr>
<tr>
<td>Termination rating</td>
<td>90°C</td>
</tr>
</tbody>
</table>
# I/O Connector Pin Details

The pin details of the I/O connector.

![I/O Connector Diagram](image)

The pin layout represents the I/O connector on the Box PC. The I/O signals connected must be powered from a power supply which conforms to the SELV standards.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Type</th>
<th>Electrical Specifications</th>
<th>Details</th>
</tr>
</thead>
</table>
| 1   | Power Status Output *1 | Contact output | • SPST-NO contact configuration  
• 24 VDC at 2A switching capacity (resistive load)  
• Operation lifetime 150,000 cycles at 2A max.  
• Connect to SELV | • Open: The Power Status Output is OFF when the Box PC is OFF or has been disconnected from the power supply.  
• Closed: The Power Status Output is ON when the Box PC has shutdown successfully and is connected to the power supply and has not been disconnected from that power supply since power OFF. Refer to I/O Connector Power Status Output Details on page 4 - 12 for details. |
| 2   | Power ON/OFF Input *2 | Isolated transistor input (sinking or sourcing) | • ON: 8.8 VDC min./5 mA min.  
• OFF: 1.1 VDC max./0.5 mA max.  
• Connect to SELV | If the signal changes from inactive to active, the Box PC will perform one of the following operations.  
• When powered ON, the Box PC will shut down and power OFF.  
• When powered OFF, the Box PC will power ON.  
This input is provided to allow monitoring the state of an external UPS unit that provides a compatible power state output signal. |
| 3   | UPS Mode Input | | | Refer to I/O Connector Power Status Output Details on page 4 - 12 for Power Status Output details. |
| 4   | | | | Refer to 6-1 Power ON on page 6 - 2 and 6-2 Power OFF on page 6 - 3 for Power ON/OFF Input details. |

*1 Refer to I/O Connector Power Status Output Details on page 4 - 12 for Power Status Output details.
*2 Refer to 6-1 Power ON on page 6 - 2 and 6-2 Power OFF on page 6 - 3 for Power ON/OFF Input details.

## Additional Information

Refer to 5-4-4 Wire the I/O Connector on page 5 - 38 for I/O connector wiring details.
I/O Connector Power Status Output Details

This section provides details of the Power Status Output relay. The Power Status Output is a relay between pin 1 and 2 of the I/O Connector.

**Power ON Power Status Output Operation**

This section provides power ON details of the Power Status Output operation. The Power Status Output turns ON to indicate that the system has been shut down and the power supply to the Box PC can be turned OFF. If power is not turned OFF, the Power Status output will turn OFF when the Box PC is turned ON.

The Power Status Output is ON \( \text{A} \) when the Box PC has been used and has not been disconnected from the power supply.

The Power Status Output is OFF \( \text{B} \) when the Box PC has been disconnected from the power supply.

![Product ON/Off Diagram]

**Additional Information**

Refer to 5-4-4 Wire the I/O Connector on page 5-38 for I/O connector wiring details.

**Power OFF Power Status Output Operation**

This section provides power OFF details of the Power Status Output operation. The Power Status Output turns ON to indicate that the system has been shut down and the power supply to the Box PC can be turned OFF.

If power is not turned OFF, the Power Status output will stay ON \( \text{A} \). It will turn OFF when the Box PC is turned ON.

If power is turned OFF, the Power Status Output will turn OFF \( \text{B} \).
Additional Information

Refer to 5-4-4 Wire the I/O Connector on page 5 - 38 for I/O connector wiring details.

Lock and Remove the I/O Connector

The I/O connector locks into place when the black part of the connector is held and pushed in.

Tilting both levers \( B \) will release the I/O connector \( A \) from the Box PC.
### 4-2-3 USB Connector Specifications

The IPC Programmable Multi Axis Controller includes four USB connectors. Two connectors provide version 2.0 performance and two connectors provide version 3.0 performance. Details of the USB interface connectors are provided below.

![USB Connector Diagram]

<table>
<thead>
<tr>
<th>Interface Connector</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• USB 3.0</td>
</tr>
<tr>
<td></td>
<td>• 900 mA maximum current</td>
</tr>
<tr>
<td></td>
<td>• 3 m maximum cable length</td>
</tr>
<tr>
<td></td>
<td>• Blue color</td>
</tr>
<tr>
<td>2</td>
<td>• USB 2.0</td>
</tr>
<tr>
<td>3</td>
<td>• 500 mA maximum current</td>
</tr>
<tr>
<td>4</td>
<td>• 5 m maximum cable length</td>
</tr>
<tr>
<td></td>
<td>• Black color</td>
</tr>
</tbody>
</table>

The connector layout represents the USB connectors on the Box PC.

Additional Information

Refer to 5-4-2 Ground on page 5 - 28 for grounding details.
4-2-4 Ethernet Connector Specifications

Details of the RJ45 Ethernet connectors are provided below. There are three Ethernet ports, each with a specific function. The Ethernet connectors are designated in the following manner.

- Connector number 1: EtherCAT.
  This port is available for the Programmable Multi Axis Controller.
- Connector number 2: Ethernet.
  This port is available for the Programmable Multi Axis Controller and supports Modbus-TCP.
- Connector number 3: Ethernet.
  This port is available for Windows.

Additional Information

Refer to 2-10-11 Recommended EtherCAT Cables on page 2-24 for cable details.

The Ethernet connector locks automatically to prevent unintentional disconnection.

The view represents the Ethernet connector on the Box PC.
Ethernet Connector LED Indicators

Each connector has LED indicators for speed, link and activity.

<table>
<thead>
<tr>
<th>Item</th>
<th>Indicator</th>
<th>Color</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Link/Act</td>
<td>Yellow</td>
<td>Not lit</td>
<td>No link</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lit</td>
<td>Link</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flashing</td>
<td>Link and activity</td>
</tr>
<tr>
<td>B</td>
<td>Speed</td>
<td>Not lit</td>
<td>Not lit</td>
<td>10 Mbps or no link</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green</td>
<td>Lit</td>
<td>100 Mbps link</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Orange</td>
<td>Lit</td>
<td>1 Gbps link</td>
</tr>
</tbody>
</table>

EtherCAT Connector Specifications

The EtherCAT connector is assigned to the Machine Controller Software. This port can be used for communication between the Machine Controller Software and EtherCAT Slaves. This port acts as an EtherCAT master.

Specifications for Units with Machine Controller Software.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet connector number</td>
<td>1</td>
</tr>
<tr>
<td>Communications standard</td>
<td>IEC 61158 Type 12</td>
</tr>
<tr>
<td>EtherCAT master specifications</td>
<td>Class B (Feature Pack Motion Control compliant)</td>
</tr>
<tr>
<td>Physical layer</td>
<td>100BASE-TX</td>
</tr>
<tr>
<td>Modulation</td>
<td>Baseband</td>
</tr>
<tr>
<td>Baud rate</td>
<td>100 Mbps (100BASE-TX)</td>
</tr>
<tr>
<td>Duplex mode</td>
<td>Auto</td>
</tr>
<tr>
<td>Topology</td>
<td>Line, daisy, chain and branching</td>
</tr>
<tr>
<td>Transmission media</td>
<td>Twisted pair cable of category 5 or higher (double-shielded straight cable with aluminum tape and braiding)</td>
</tr>
</tbody>
</table>
### Modbus-TCP Connector Specifications

This Modbus-TCP connector acts as a regular Ethernet port.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet connector number</td>
<td>2</td>
</tr>
<tr>
<td>Physical layer</td>
<td>10BASE-T, 100BASE-TX or 1000BASE-T</td>
</tr>
<tr>
<td>Frame length</td>
<td>1,514 bytes max.</td>
</tr>
<tr>
<td>Media access method</td>
<td>CSMA/CD</td>
</tr>
<tr>
<td>Modulation</td>
<td>Baseband</td>
</tr>
<tr>
<td>Topology</td>
<td>Star</td>
</tr>
<tr>
<td>Transmission media</td>
<td>STP (shielded, twisted pair) cable of Ethernet category 5,5e or higher</td>
</tr>
<tr>
<td>Maximum transmission distance</td>
<td>100 m</td>
</tr>
<tr>
<td>between Ethernet switch and node</td>
<td></td>
</tr>
<tr>
<td>Maximum number of cascade</td>
<td>There are no restrictions if an Ethernet switch is used</td>
</tr>
<tr>
<td>connections</td>
<td></td>
</tr>
</tbody>
</table>

### Ethernet Connector Specifications

This Ethernet connector is available in Windows and acts as regular Ethernet port.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet connector number</td>
<td>3</td>
</tr>
<tr>
<td>Physical layer</td>
<td>10BASE-T, 100BASE-TX or 1000BASE-T</td>
</tr>
<tr>
<td>Frame length</td>
<td>1,514 bytes max.</td>
</tr>
<tr>
<td>Media access method</td>
<td>CSMA/CD</td>
</tr>
<tr>
<td>Modulation</td>
<td>Baseband</td>
</tr>
<tr>
<td>Topology</td>
<td>Star</td>
</tr>
<tr>
<td>Transmission media</td>
<td>STP (shielded, twisted pair) cable of Ethernet category 5,5e or higher</td>
</tr>
<tr>
<td>Maximum transmission distance</td>
<td>100 m</td>
</tr>
<tr>
<td>between Ethernet switch and node</td>
<td></td>
</tr>
<tr>
<td>Maximum number of cascade</td>
<td>There are no restrictions if an Ethernet switch is used</td>
</tr>
<tr>
<td>connections</td>
<td></td>
</tr>
</tbody>
</table>
4-2-5  DVI Connector Specifications

DVI is the standard video interface for the Box PC. The video interface depends on the model of the Box PC as specified below:

Additional Information

- Refer to 4-1-4 CPU Specifications on page 4 - 5 for graphics controller details.
- Refer to 5-4-2 Ground on page 5 - 28 for grounding details.
- Refer to A-3 DVI-I Connector Pin Details on page A - 14 for pin details.

The following tables provide DVI details per CPU type.

DVI-I Connector Specifications with an Intel® Core™ i7-4700EQ CPU

DVI-I connector specifications for IPC Programmable Multi Axis Controllers with an Intel® Core™ i7-4700EQ CPU.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video interface</td>
<td>Digital or Analog</td>
</tr>
<tr>
<td>Resolution</td>
<td>Up to 1920 x 1200 pixels at 60 Hz</td>
</tr>
<tr>
<td>Type</td>
<td>Dual link</td>
</tr>
<tr>
<td>Maximum DVI cable length</td>
<td>Dependent upon connected monitor type and resolution</td>
</tr>
</tbody>
</table>
The optional RS-232 interface on the Box PC uses a standard SUBD9 connector. The RS-232 interface is not isolated from the internal Box PC's components.

Additional Information

- Refer to 5-4-2 Ground on page 5 - 28 for grounding details.
- Refer to A-4 RS-232 Connector Pin Details on page A - 16 for pin details.
4-3 Software Specifications

This section provides the Software Specifications of the IPC Programmable Multi Axis Controller.

4-3-1 Available Windows Operating Systems

The available Windows Operating System is Windows Embedded Standard 7 SP1 - 64 bits

4-3-2 Supported Languages

Languages supported by the Windows Operating System are:

- EN
- CN Simplified (zh-cn)
- CN Traditional (zh-tw)
- DE
- ES
- FR
- IT
- JA
# Environmental Specifications

This section provides environmental specifications of the IPC Programmable Multi Axis Controller.

## 4-4-1 Operation Environment Specifications

The following table provides the general environmental specifications for the Industrial Box PC.

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient operating temperature</td>
<td>0 to 55°C *1</td>
</tr>
<tr>
<td>Ambient storage temperature</td>
<td>-20 to 70°C *1</td>
</tr>
<tr>
<td>Ambient operating humidity</td>
<td>10% to 90% with no condensation</td>
</tr>
<tr>
<td>Ambient storage humidity</td>
<td>10% to 90% with no condensation</td>
</tr>
<tr>
<td>Operating atmosphere</td>
<td>No corrosive gases</td>
</tr>
<tr>
<td>Altitude</td>
<td>2,000 m max.</td>
</tr>
<tr>
<td>Noise resistance (during operation)</td>
<td>Conforms to IEC61000-4-4, 2kV (power lines)</td>
</tr>
<tr>
<td>Vibration resistance (during opera-</td>
<td>Conforms to IEC 60068-2-6.</td>
</tr>
<tr>
<td>tion)</td>
<td>For a Box PC with an SSD: 5 to 8.4 Hz with 3.5 mm single amplitude and 8.4 to 150 Hz with 9.8 m/s² for 10 times each in X, Y and Z directions. For a Box PC with a HDD the vibration resistance depends on the mounting orientation *2.</td>
</tr>
<tr>
<td>Shock resistance (during operation)</td>
<td>Conforms to IEC 60028-2-27.</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>JIS B3502 and IEC 61131-2: 2 or less</td>
</tr>
<tr>
<td>RTC accuracy</td>
<td>At ambient temperature of 55°C: −3.5 to +0.5 min error per month</td>
</tr>
<tr>
<td></td>
<td>At ambient temperature of 25°C: −1.5 to +1.5 min error per month</td>
</tr>
<tr>
<td></td>
<td>At ambient temperature of 0°C: −3 to +1 min error per month</td>
</tr>
</tbody>
</table>

*1 Refer to 4-4-2 Temperature and Humidity Specifications on page 4 - 22 for ambient operating temperature details per CPU type.

*2 Vibration resistance depends on the Box PC’s mounting orientation and storage device type:

<table>
<thead>
<tr>
<th>Mounting Orientation</th>
<th>SSD</th>
<th>HDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Book</td>
<td>9.8 m/s²</td>
<td>2.5 m/s²</td>
</tr>
<tr>
<td>Wall</td>
<td>4.9 m/s²</td>
<td></td>
</tr>
</tbody>
</table>
4-4-2 Temperature and Humidity Specifications

The allowed ambient operating temperature and ambient humidity depend on product type, CPU type, mounting orientation, and storage device type. The following sections provide temperature and humidity details per CPU type.

Temperature and Humidity Graphs

The maximum ambient operating temperature and ambient humidity are specified per CPU type, mounting orientation and storage device type. The following graphs provide ambient temperature and humidity details per storage device type and the conditions for storage.

- Operate the Box PC with a SSD within the general environmental specifications.
- Operate the Box PC with a HDD within the ambient temperature and humidity ranges as shown in following graph.

![Temperature-Humidity Graph](image)

Additional Information

Refer to the ambient temperature and humidity specifications per CPU type for specific limitations.
• Store the Box PC with a SSD within the general environmental specifications.
• Store the Box PC with a HDD within the ambient temperature and humidity ranges as shown in the following graph.

### Temperature Specifications with an Intel® Core™ i7-4700EQ CPU

Ambient operating temperature specifications for a Box PC with an Intel® Core™ i7-4700EQ CPU.

<table>
<thead>
<tr>
<th>Mounting Orientation</th>
<th>Storage device type *1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 x SSD</td>
</tr>
<tr>
<td>Book</td>
<td>0 to 55°C</td>
</tr>
<tr>
<td>Wall</td>
<td>0 to 55°C</td>
</tr>
</tbody>
</table>

*1 Refer to 1-5 Product Configuration on page 1 - 6 for model details.

### Additional Information

Refer to Temperature and Humidity Graphs on page 4 - 22 for graph details.
### 4-4-3 Recycling Specifications

The following table provides recycling information for the IPC Programmable Multi Axis Controller.

<table>
<thead>
<tr>
<th>Part</th>
<th>Recycle specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery</td>
<td>Chemical waste</td>
</tr>
<tr>
<td>PCIe Card and other electrical components</td>
<td>Electrical waste</td>
</tr>
</tbody>
</table>

**Precautions for Safe Use**

Dispose of the product and batteries according to local ordinances as they apply.
Installation

This section provides all installation details for the IPC Programmable Multi Axis Controller.

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<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-8-1</td>
<td>Connect UPS Using the USB Connector</td>
<td>5-52</td>
</tr>
<tr>
<td>5-8-2</td>
<td>Connect UPS Using the I/O Connector</td>
<td>5-54</td>
</tr>
<tr>
<td>5-9</td>
<td>Create a Windows System Repair Disk and a Windows Backup</td>
<td>5-56</td>
</tr>
<tr>
<td>5-9-1</td>
<td>IPC Programmable Multi Axis Controller Backup</td>
<td>5-56</td>
</tr>
<tr>
<td>5-9-2</td>
<td>Create a Windows System Repair Disk</td>
<td>5-56</td>
</tr>
</tbody>
</table>
5-1  Unpack

This section provides details on how to unpack the IPC Programmable Multi Axis Controller.

5-1-1  Unpack Procedure

1. Check the package for damage.
   If there is any visible damage:
   • Take photos of the package and save them.
   • Inform your supplier immediately.

2. Open the package.
   Ensure not to damage the contents.

3. Ensure that all items are present.

Additional Information
Refer to 5-1-2 Items Supplied on page 5 - 3 for the items supplied.

5-1-2  Items Supplied

The Industrial Box PC is supplied with several items.

Additional Information
• Refer to Items Supplied with the Industrial Box PC on page 5 - 4 for more details.
• Refer to Items Supplied with the Brackets on page 5 - 5 for more details.
Items Supplied with the Industrial Box PC

This section describes the items supplied with your Industrial Box PC.

• Industrial Box PC
• Instruction sheet
• Bag with:
  • Power connector
  • I/O connector
  • Drive bracket for drive installation
  • 4 Mounting screws for drive installation
  • PCIe Card support for PCIe Card installation
Items Supplied with the Brackets

This section describes the items supplied with the brackets for your Industrial Box PC.

Additional Information

- Refer to 2-10-1 Mounting Brackets on page 2 - 19 for bracket details.
- Refer to 5-3-8 Book Mount Procedure on page 5 - 25 for book mount installation.
- Refer to 5-3-9 Wall Mount Procedure on page 5 - 26 for wall mount installation.

- **Book Mount**
  
  Check if the content is complete.
  
  Supplied items:
  - 1 Book mount bracket
  - 6 Mounting screws
  - 1 Nut for the functional ground terminal connection
  - 2 Washers for the functional ground terminal connection

- **Wall Mount**
  
  Check if the content is complete.
  
  Supplied items:
  - 2 Wall mount brackets
  - 6 Mounting screws
  - 1 Nut for the functional ground terminal connection
  - 2 Washers for the functional ground terminal connection
5-2 Install Options

This section describes the installable options for the IPC Programmable Multi Axis Controller.

5-2-1 Install an Additional Drive

A drive is a storage device for the IPC Programmable Multi Axis Controller. Depending on the model one or two drives are supported. Refer to 4-1-4 CPU Specifications on page 4 - 5 for the number of supported drives.

Prepare the following items:

• The additional drive
  An additional drive is not supplied with the Box PC.
  Refer to 2-10-4 Storage Devices on page 2 - 20 for the model.
  Refer to 4-1-6 Storage Devices on page 4 - 6 for drive specifications.

• The drive bracket with mounting screws
  These are supplied with the Box PC.

To install a drive:

1. Ensure the Box PC is OFF.

2. Remove the drive cover.

   (1) Push the lock lever 1.

   (2) Tilt the drive cover 2.

   (3) Remove the drive cover 3.
3 Pull the metal shielding cover out of the Box PC.

4 Align the connectors of the drive as shown A on the bracket. Then insert the replacement drive ① in the bracket and insert the 4 mounting screws ②. Tighten these screws with a torque of 0.35 N·m.
5 Insert the bracket with the drive into slot B of the Box PC. Ensure the bracket is completely in the Box PC with an extra push.

The drive bracket will lock into place when it is fully inserted.

6 Insert the metal shielding cover.
7 Mount the drive cover.
The lock lever will click when closed correctly.

8 Ensure the drive is functional and confirm normal operation.
If the Box PC has a Windows operating system and the drive is not visible in Windows: Refer to the allocation procedure available in the section Corrective Maintenance in this manual.

The drive is installed.
5-2-2 Install the PCIe Card

Prepare the following items:

- The PCIe Card.
  A PCIe Card is not supplied with the Box PC.

**Additional Information**

Refer to 4-1-7 PCIe Card Slot Specifications on page 4 - 7 for PCIe specifications.

- The PCIe Card mounting material: Card Support.
  This item is supplied with the Box PC.

To install the PCIe Card:

1. Ensure the Box PC is OFF.

2. Remove the two crosshead screws indicated with "open" and then pull up the PCIe Drawer.
   The indent at the side of the drawer will help you to pull the drawer from the Box PC.
3 Pull the middle of the Card Clip to unlock it and remove it from the PCIe Drawer.

4 Remove the slot cover from the PCIe Drawer. The thin sheet metal frame should stay in the PCIe Drawer.

The slot cover is now removed.
5. Place the PCIe Card in the PCIe Drawer.

Ensure to insert the PCIe Card in the correct opening. Ensure the thin sheet metal frame is positioned between the PCIe Card and the PCIe Drawer to ensure a good conductive contact.

6. Place the Card Clip in the PCIe Card and PCIe Drawer and then rotate the Clip to lock it in place.
7 Slide the Card Support 1 so that it supports the side of the PCIe Card. The card should be in small groove so there is support below and above the card. Rotate the Card Support 2 to lock it in place.

8 Insert the PCIe Drawer in the Box PC and then insert the two crosshead screws that hold the PCIe Drawer in place.
9 Remove the PCIe cover if the PCIe Card has external connectors.

(1) Push the lock lever ①.
(2) Tilt the PCIe cover ②.
(3) Remove the PCIe cover ③.

The PCIe Card is installed.
5-3 Mount

This section describes how to mount the Box PC in either a book or wall orientation inside a control panel.

**WARNING**

Ensure that installation and post-installation checks of the product are performed by personnel in charge who possess a thorough understanding of the machinery to be installed.

### 5-3-1 Installation Method in Control Panels

The IPC Programmable Multi Axis Controller must be mounted in a cabinet or a control panel. Consider the orientation, cooling distance, noise resistance, ducts and Box PC replacement when determining the space between the Box PC and other devices.

**Precautions for Safe Use**

Install the product in the correct orientation and temperature according to the specifications in the manual to prevent overheating. Not doing so may result in malfunction.

**Precautions for Correct Use**

Do not operate or store the product in the following locations. Operation may stop or malfunctions may occur.

- Locations subject to direct sunlight
- Locations subject to temperatures or humidity outside the range specified in the specifications
- Locations subject to condensation as the result of severe changes in temperature
- Locations subject to corrosive or flammable gases
- Locations subject to dust (especially iron dust) or salts
- Locations subject to exposure to water, oil or chemicals
- Locations subject to shock or vibration

**Additional Information**

- Ensure you have installed the options before you mount the product. Refer to 5-2 Install Options on page 5 - 6 for option details.
- Refer to 5-3-8 Book Mount Procedure on page 5 - 25 or 5-3-9 Wall Mount Procedure on page 5 - 26 for orientation details.
- Refer to 4-4 Environmental Specifications on page 4 - 21 for temperature details.
- Refer to 5-3-4 Humidity on page 5 - 19 for humidity details.
- Refer to 5-4 Wire on page 5 - 27 for wiring details.
5-3-2 Product Orientation

The Box PC can be mounted in a book or wall orientation.

- For book mount there is one allowed orientation.
- For wall mount there are two allowed orientations, horizontally mounted and vertically mounted.

Do not install the Box PC in other orientations.

5-3-3 Temperature

The temperature inside a control panel may be at least 10 to 15°C higher than outside the panel. Implement the following measures against overheating at the installation site and in the control panel, and allow a sufficient margin for the temperature.

### Distance for Cooling

Adequate airflow around the Industrial Box PC is required.

### Additional Information

- The ambient temperature must be within the operating range. Refer to 4-4-1 Operation Environment Specifications on page 4 - 21 for temperature specifications.
- Allow space to accommodate for the bending radius of the cables. Refer to 2-10-5 DVI Cables on page 2 - 21 and 2-10-6 USB Type-A to USB Type-B Cables on page 2 - 21 for cable bending radius information.
Provide enough space for good air flow and ensure the following minimum distances are observed around the sides of the Box PC.

- **Book Mount**

- **Wall Mount** in landscape A or portrait B orientation

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum distance *1</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>50 mm</td>
</tr>
<tr>
<td>Y</td>
<td>100 mm</td>
</tr>
<tr>
<td>Z</td>
<td>50 mm</td>
</tr>
</tbody>
</table>

*1 Measure the minimum distances X and Y at the air openings in the sides of the Box PC.
High Temperatures

Use the following cooling methods as required, taking into account the ambient temperature and the amount of heating inside the panel.

- **Natural Cooling**
  
  Natural cooling relies on natural ventilation through slits in the panel, rather than using cooling devices such as fans or coolers. When using this method, observe the following points.
  
  - Do not install the Box PC at the top of the panel, where hot air tends to stagnate.
  - To provide ventilation space above and below the Box PC, leave sufficient distance from other devices, wiring ducts, etc.
  - Do not mount the Box PC in the wrong direction (e.g., vertically or upside down). Doing so may cause abnormal heating in the Box PC.
  - Do not install the Box PC directly above any heat-generating equipment, such as heaters or transformers.
  - Do not install the Box PC in a location exposed to direct sunlight.

- **Forced Ventilation**
  
  Forced ventilation with a fan in the top of the control cabinet.

- **Forced Air Circulation**
  
  Forced circulation with a fan inside the closed control cabinet.
5 Installation

5-3-4 Humidity

Rapid temperature changes can cause condensation to occur, resulting in malfunctioning due to short-circuiting.

When there is a possibility of this occurring, take measures against condensation, such as leaving the Box PC power ON at night or installing a heater in the control panel to keep it warmer.

5-3-5 Vibration and Shock

The Box PC is tested for conformity with the sine wave vibration test method (IEC 60068-2-6) and the shock test method (IEC 60068-2-27) of the Environmental Testing for Electrotechnical Products. It is
designed so that malfunctioning will not occur within the specifications for vibration and shock. If, however, the Box PC is to be used in a location in which it will be directly subjected to regular vibration or shock, then implement the following countermeasures:

- Separate the Box PC control panel from the source of the vibration or shock. Or secure the Box PC and the control panel with rubber padding to prevent vibration.
- Make the building or the floor vibration-resistant.
- Prevent shocks when other devices in the panel, such as electromagnetic contactors, operate. Secure either the source of the shock or the Box PC with rubber padding.

### 5-3-6 Atmosphere

Using the Box PC in any of the following locations can cause defective contact with connectors and corrosion of components. Implement countermeasures such as purging the air as required.

- In locations exposed to dust, dirt, salt, metal powder, soot, or organic solvents, use a panel with an airtight structure. Be careful of temperature increases inside the panel.
- In locations exposed to corrosive gas, purge the air inside the panel to clear the gas and then pressurize the inside of the panel to prevent gas from entering from outside.
- In locations where flammable gas is present, either use an explosion-protected construction or do not use the Box PC.

### 5-3-7 Electrical Environment

When installing or wiring devices, make sure that there will be no danger to people and that noise will not interfere with electrical signals.

## Installation Location

Install the Box PC as far away as possible from high-voltage (600 V or higher) and power devices to ensure safe operation and maintenance.
## Hardware Arrangement

The coils and contacts in electromagnetic contacts and relays in an external circuit are sources of noise. Do not install them close to the Box PC. Locate them at least 100 mm away from the Box PC.

![Example of Arrangement in Panel](image)

## Wire Layout for the Power Supply

Observe the following points when wiring the power supply system.

- Separate the Box PC power supply from the I/O device power supply and install a noise filter near the Box PC power supply feed section.
- Use an isolating transformer to significantly reduce noise between the Box PC and the ground. Install the isolating transformer between the Box PC power supply and the noise filter, and do not ground the secondary coil of the transformer.
- Keep the wiring between the transformer and the Box PC as short as possible, twist the wires well, and keep the wiring separate from high-voltage and power lines.

![Power Supply System Diagram](image)
Wire External I/O Signal Lines

Observe the following points when wiring the external I/O signal lines.

- To absorb reverse electromotive force when an inductive load is connected to an output signal, connect a surge suppressor near the inductive load in an AC circuit, or connect a diode near the inductive load in a DC circuit.

- Never bundle output signal lines with high-voltage or power lines, and do not route them in close proximity or parallel to such lines. If output signal lines must be routed in close proximity to such lines, place them in separate ducts or conduits. Be sure to ground the ducts or conduits.

- If the signal lines and power lines cannot be routed in separate ducts, use shielded cable. Connect the shield to the ground terminal at the Box PC, and leave it unconnected at the input device.

- Wire the lines so that common impedance does not occur. Such wiring will increase the number of wires, so use common return circuits. Use thick wires with sufficient allowance for the return circuits, and bundle them with lines of the same signal level.

- For long I/O lines, wire the input and output signal lines separately.

- Use twisted-pair wires for pilot lamps (and particularly lamps with filaments).

- Use countermeasures, such as CR surge absorbers and diodes, for input device and output load device noise sources, as required.

External Wiring

Wiring, and noise countermeasures in particular, are based on experience, and it is necessary to closely manage wiring based on experience and information in the manuals.

Wiring Routes

Each of the following combinations includes different signal types, properties, or levels. They will cause the signal-to-noise ratio to drop due to factors such as electrical induction. As a general rule when wiring, either use separate cables or separate wiring routes for these items. Future maintenance operations and changes to the system will also be made easier by carefully organizing the wiring from the start.
- Power lines and signal lines
- Input signals and output signals
- Analog signals and digital signals
- High-level signals and low-level signals
- Communications lines and power lines
- DC signals and AC signals
- High-frequency devices (such as Inverters) and signal lines (communications)

**Routing of Wiring**

Observe the following points when wiring power supply and signal cables.

- When routing signal cables with differing characteristics through the same duct, always keep them separated.
- As much as possible, avoid routing multiple power supply lines through the same duct. If it cannot be avoided, then construct a partition between them in the duct and ground the partition.

Partitioning Methods for Signal and Power Supply Cables

- To avoid overheating the conduits when using conduits for wiring, do not place wires for a single circuit in separate conduits.
- Power cables and signal cables adversely affect each other. Do not wire them in parallel.
- Noise induction may occur if the Box PC is installed in a panel that includes high-voltage devices. Wire and install them as far apart as possible.
- Either install the Box PC a minimum of 200 mm away from high-voltage lines or power lines, or place the high-voltage lines or power lines in metal tubing and completely ground the metal tubing to 100 Ω or less.

**Wiring Ducts**

Whenever possible, route the cables and wires through wiring ducts. Install the wiring ducts so that it is easy to route the wires from the IPC Programmable Multi Axis Controller directly into the duct.

**Additional Information**

Refer to *Distance for Cooling* on page 5 - 16 for the minimum required distances.

It is convenient to use wiring ducts that have the same depth as the IPC Programmable Multi Axis Controller.

**Other Precautions**

Basic I/O Units have both plus and minus commons, so pay attention to the polarity when wiring.
5-3-8 Book Mount Procedure

Use the following procedure to mount the IPC Programmable Multi Axis Controller in the book orientation.

Additional Information

- Refer to Ground Connection Details on page 5 - 33 for grounding methods.
- Refer to 2-10-1 Mounting Brackets on page 2 - 19 for the bracket model.

To mount the Box PC:

1. Mount the Bracket A to the Industrial Box PC C with the 6 Phillips screws B supplied with the brackets. Tighten these screws with a torque of 0.5 N·m.

2. Mount the Box PC with the bracket in position.
   - Drill the four holes at the location where the Box PC with bracket will be mounted. Refer to 4-1-8 Bracket Specifications on page 4 - 8 for details.
• Position the Industrial Box PC with bracket in the mounting location.
• Insert screws through the bracket into the mounting surface.
  Note that these screws are not in the scope of delivery.
• Tighten all four screws with a torque of 0.5 N·m.

The Box PC is mounted.

5-3-9 Wall Mount Procedure

Use the following procedure to mount the Box PC in the wall orientation.

Additional Information

• Refer to Ground Connection Details on page 5 - 33 for grounding methods.
• Refer to 2-10-1 Mounting Brackets on page 2 - 19 for the bracket model.

To mount the Box PC:

1. Mount the Brackets A to the Industrial Box PC C with the 6 Phillips screws B supplied with the brackets.
  Tighten these screws with a torque of 0.5 N·m.

2. Mount the Industrial Box PC with the brackets in position.
  • Drill the four holes at the location where the Box PC with brackets will be mounted.
    Refer to 4-1-8 Bracket Specifications on page 4 - 8 for details.
  • Position the Industrial Box PC with bracket in the mounting location.
  • Insert screws through the bracket into the mounting surface.
    Note that these screws are not in the scope of delivery.
  • Tighten all four screws with a torque of 0.5 N·m.

The Box PC is mounted.
5-4 Wire

This section describes how to wire the IPC Programmable Multi Axis Controller.

5-4-1 Wiring Warnings and Cautions

This section describes the Warnings and Cautions when wiring the IPC Programmable Multi Axis Controller.

**WARNING**

Provide safety measures in external circuits to ensure safety in the system if an abnormality occurs due to malfunction of the product or due to other external factors affecting operation. Not doing so may result in serious accidents due to incorrect operation.

**WARNING**

Emergency stop circuits, interlock circuit, limit circuits, and similar safety measures must be provided in external control circuits.

**WARNING**

Unintended behavior may occur when an error occurs in internal memory of the product. As a countermeasure for such problems, external safety measures must be provided to ensure safe operation of the system.

---

**Precautions for Safe Use**

Do not let metal particles enter the product when preparing the panel. Do not allow wire clipplings, shavings, or other foreign material to enter any product. Otherwise, the product burning, failure, or malfunction may occur. Cover the product or take other suitable countermeasures, especially during wiring work.
This section describes how to ground the IPC Programmable Multi Axis Controller.

**WARNING**
Always connect to a ground of 100 Ω or less when installing the product.

**Caution**
The product has an internal non-isolated DC power supply. Circuit ground (0 VDC) and frame ground are connected together. When connecting a non-isolated device or a non-isolated interface to the product, take appropriate actions to avoid communication failures or damage to the mentioned ports.

![Diagram of ground connections](image)

**Caution**
Never ground the 24 VDC side of the power supply. This may cause a short circuit.

The shielding of the communication connectors are directly bonded to the case and to the functional ground of the Box PC.
The shield of a communication cable should be terminated to ground at both ends of the cable with a low impedance connection. A large surface area surrounding the entire cable shield ensures a low impedance connection, avoid the use of pigtails.
Potential differences between the two connected communicating devices might cause an equipotential current to flow through the shielding connected at both ends.
To avoid equipotential currents on the cable shields, an additional equipotential bonding conductor must be installed.
Refer to IEC 61918 for guidelines regarding conductor sizing and length to prevent a voltage offset between two communicating devices exceeding 1 V.
Make sure to run the bonding conductor in close proximity to the communication cable.
Considerations for Earthing Methods

Local potential fluctuations due to lightning or noise occurred by power devices will cause potential fluctuations between ground terminals of devices. This potential fluctuation may result in device malfunction or damage. To prevent this, it is necessary to suppress the occurrence of a difference in electrical potential between ground terminals of devices. You need to consider the earthing methods to achieve this objective.

The recommended earthing methods for each usage condition are given in the following table.

<table>
<thead>
<tr>
<th>Specification of communications cables</th>
<th>Earthing methods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Equipotential bonding system</td>
</tr>
<tr>
<td>The cable shield connected to the connector hood at both ends of the communications cable</td>
<td>Recommended</td>
</tr>
</tbody>
</table>

Additional Information

- In a country or region where the earthing method is regulated, you must comply with the regulations. Refer to the applicable local and national ordinances of the place where you install the system, or other international laws and regulations.
- Ethernet switches are used with the EtherNet/IP. For information on the environmental resistance of the Ethernet switch to use, the grounding between Ethernet switches, or the specifications of cables, ask the Ethernet switch manufacturer.

Each of these earthing methods is given below.
Equipotential Bonding System

Equipotential bonding is an earthing method in which steel frames and building structures, metal ducts and pipes, and metal structures in floors are connected together and make connections to the earth trunk line to achieve a uniform potential everywhere across the entire building. We recommend this earthing method.

The following figure shows an example of an equipotential bonding system. Connect the main earthing terminal and building structures together with equipotential bonding conductors and embed the mesh ground line in each floor. Connect the ground line of each control panel to the equipotential bonding system.
**Star Earthing**

If the earthing method used for the building is not equipotential bonding or the earthing system is unknown, choose (a) from among the earthing methods given below.

(a) Connecting devices and noise sources to separate earth electrodes

This is an earthing method to separately ground an earth electrode of the device that is connected with a communications cable or other devices and an earth electrode of a high-power device that could be a noise source, such as a motor or inverter.

Each earth electrode must be grounded to 100 $\Omega$ or less.

Connect the ground lines of the device that is connected with a communications cable and other devices as a bundle to a single earth electrode. Be sure that the earth electrode is separated by a minimum of 10 m from any other earth electrode of a device that could be a noise source.

(b) Connecting devices and noise sources to a common earth electrode

This is an earthing method to connect the device that is connected with a communications cable, other devices, and a device that could be a noise source, to a common earth electrode.

This earthing method is not recommended because the device that could be a noise source may interfere electromagnetically with other devices.
### Daisy Chain

This is an earthing method to connect the device that is connected with a communications cable, other devices, and a device that could be a noise source using a daisy-chain topology to a common earth electrode.

This earthing method is not recommended because the device that could be a noise source may interfere electromagnetically with other devices.
Ground Connection Details

This section provides details about the ground connection. Use the functional ground terminal on the mounting bracket(s) to ground your Industrial Box PC.

The washers and nut are supplied with the bracket(s). Refer to Items Supplied with the Brackets on page 5 - 5 for details.

**Book Mount**

Mount the ground connection wire to the functional ground terminal using the washers and nut. Tighten the nut with a torque of 1.2 N·m max. Refer to 5-3-8 Book Mount Procedure on page 5 - 25 for book mounting details.

**Wall Mount**

Mount the ground connection wire to the functional ground terminal using the washers and nut. Tighten the nut with a torque of 1.2 N·m max. Refer to 5-3-9 Wall Mount Procedure on page 5 - 26 for wall mounting details.
● **Crimp terminals**

Use crimp terminals with dimensions $X = M4$ and $Y = 8\,\text{mm}$ max.
5-4-3 Wire the Power Connector

This section describes how to wire the power connector.

Precautions for Safe Use

• Do not perform a dielectric strength test.
• Always use the recommended uninterruptible power supply (UPS) to prevent data loss and other system file integrity issues caused by unexpected power interruption. Back up the system files in the planned way to prevent data loss and other system file integrity issues caused by incorrect operation.

Additional Information

• The selected conductor size must match with the used maximum power supply capacity or an overcurrent protection device must be used.
• The used wires and the overcurrent protection device must meet the applicable national standards.
  Standards are:
  • NEC (National Electric Code)
  • CEC (Canadian Electrical Code)
  • international applicable standards
• Refer to 4-1-2 General Electrical Specifications on page 4 - 3 for electrical specifications.
• Refer to 4-1-3 Power Consumption Specifications on page 4 - 4 for power consumption specifications.
• Refer to 2-10-9 UPS on page 2 - 23 for UPS information.
### Power Connector Wiring Materials

Use the power supply connector that was supplied to connect the power supply to the IPC Programmable Multi Axis Controller.

- Select power supply conductors with consideration to the voltage drop and heat generation for the cable length at the installation environment.
- Always use twisted wires to minimize the occurrence of electrical disturbance.
- Recommended power supply conductor sizes are provided in the table.

<table>
<thead>
<tr>
<th>Wire type</th>
<th>Conductor cross-section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid conductor</td>
<td>0.5 to 10 mm(^2)</td>
</tr>
<tr>
<td>Flexible conductor</td>
<td>0.5 to 6 mm(^2)</td>
</tr>
<tr>
<td>Flexible conductor, with ferrule and no plastic sleeve</td>
<td>0.5 to 6 mm(^2)</td>
</tr>
<tr>
<td>Flexible conductor, with ferrule and plastic sleeve</td>
<td>0.5 to 4 mm(^2)</td>
</tr>
</tbody>
</table>

- Minimum AWG according to UL/CUL: 20
- Maximum AWG according to UL/CUL: 8

### DC Power Supply

The OMRON S8VK-series power supply is recommended for use with the IPC Programmable Multi Axis Controller.

#### Additional Information

- Refer to 2-10-8 Power Supply on page 2 - 22 for more information.
- Refer to 4-1-3 Power Consumption Specifications on page 4 - 4 for power consumption details.
Power Connector Wiring Procedure

Use the following procedure to wire the power connector.

1. Remove the sheath from the power supply wires.

Precautions for Safe Use

Observe the following precautions to prevent broken wires.
• When you remove the sheath, be careful not to damage the conductor.
• Connect the conductor without twisting the wires.
• Do not weld the conductors. Doing so may cause the wires to break with vibration.

2. Insert a screwdriver in the small opening above the cable opening 1 to unlock the cable entry and then push the wire all the way to the back of the cable opening 2.

3. Remove the screwdriver.

Do not apply stress to the cable after you have connected the wires.

---

### Pin Description

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24 VDC</td>
</tr>
<tr>
<td>2</td>
<td>0 VDC</td>
</tr>
</tbody>
</table>

---

NY-series IPC Programmable Multi Axis Controller Hardware User’s Manual (W580)
5-4-4  Wire the I/O Connector

This section describes how to wire the I/O connector.

I/O Connector Wiring Materials

Use the supplied I/O connector to connect the inputs and outputs to the IPC Programmable Multi Axis Controller.

Recommended I/O conductor sizes for the connector are provided in the table.

<table>
<thead>
<tr>
<th>Wire type</th>
<th>Conductor cross-section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid conductor</td>
<td>0.2 to 1.5 mm²</td>
</tr>
<tr>
<td>Flexible conductor</td>
<td></td>
</tr>
<tr>
<td>Flexible conductor, with ferrule and no plastic sleeve</td>
<td>0.25 to 1.5 mm²</td>
</tr>
<tr>
<td>Flexible conductor, with ferrule and plastic sleeve</td>
<td>0.25 to 0.75 mm²</td>
</tr>
<tr>
<td>Minimum AWG according to UL/CUL</td>
<td>24</td>
</tr>
<tr>
<td>Maximum AWG according to UL/CUL</td>
<td>16</td>
</tr>
</tbody>
</table>

I/O Connections

This section describes I/O connection details.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Internal Circuit Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power Status Output</td>
<td>The Power Status Output has an internal relay. Wire this according to the input device connected to the Power Status Output.</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Diagram of I/O connector connections]
### Pin Description Internal Circuit Details

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Internal Circuit Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Power ON Input</td>
<td>The Power ON Input and the Battery Mode Input are bi-directional and isolated. Each input can be wired as sinking (NPN) or sourcing (PNP). Wire these according to the output device connected to the inputs.</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Battery Mode Input</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Additional Information

- Refer to 4-2-2 I/O Connector Specifications on page 4 - 10 for I/O connector specifications.
- Refer to I/O Connector Power Status Output Details on page 4 - 12 for power status output details.
- Refer to 2-10-9 UPS on page 2 - 23 for UPS connection details.
I/O Connector Wiring Procedure

Use the following procedure to wire the I/O connector.

1. Remove the sheath from the wires.

Precautions for Safe Use

Observe the following precautions to prevent broken wires.
• When you remove the sheath, be careful not to damage the conductor.
• Connect the conductor without twisting the wires.
• Do not weld the conductors. Doing so may cause the wires to break with vibration.

2. Remove the I/O connector from the Box PC.

3. Insert a screwdriver in the small groove above the cable entry 1 to unlock the cable entry and then push the wire all the way to the back of the cable opening 2.

4. Remove the screwdriver.

Do not apply stress to the cable after you have connected the wires.
5-5 Connect

This section describes how to connect the IPC Programmable Multi Axis Controller.
5-5-1 Connector Identification

The Industrial Box PC connectors are shown below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Power connector</td>
<td>Lockable power connector</td>
</tr>
<tr>
<td>B</td>
<td>I/O connector</td>
<td>2 inputs (UPS signal and power OFF control) and 1 output (Industrial Box PC power state)</td>
</tr>
<tr>
<td>C</td>
<td>USB 3.0 connector</td>
<td>2 USB 3.0 connectors</td>
</tr>
<tr>
<td>D</td>
<td>USB 2.0 connector</td>
<td>2 USB 2.0 connectors</td>
</tr>
<tr>
<td>E</td>
<td>10BASE-T/100BASE-TX/1000BASE-T Ethernet connectors</td>
<td>3 RJ45 Gb Ethernet connectors</td>
</tr>
<tr>
<td>F</td>
<td>DVI connector</td>
<td>Digital Visual Interface connector</td>
</tr>
<tr>
<td>G</td>
<td>Option port</td>
<td>Interface connection options:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RS-232 connector (default)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• DVI-D connector for additional monitor connection</td>
</tr>
</tbody>
</table>
5-5-2 Connection Procedure

Use the following procedure to connect the IPC Programmable Multi Axis Controller.
Ensure the Box PC is securely fastened to the mounting surface.
Ensure the mounted Box PC can be connected to power and peripheral devices. Remove dust covers where applicable and store them in a safe place.

Additional Information

- Refer to 5-3 Mount on page 5 - 15 for mounting details.
- Refer to 2-10-5 DVI Cables on page 2 - 21 for the DVI cable bending radius.
- Refer to 2-10-6 USB Type-A to USB Type-B Cables on page 2 - 21 for the USB cable bending radius.
- Refer to individual cable specifications for acceptable bending radius and connector clearance.

Use the following procedure to connect the Box PC:

1. Ensure the functional ground terminal is connected. Refer to 5-4-2 Ground on page 5 - 28 for grounding details.

2. Connect the power connector A. Hold the black part to enable the auto-locking mechanism.

![Diagram of connector](image)

Do not push the orange sliders B in the direction of the Box PC because this will unlock the connector.
3 Connect the I/O connector.
   Hold the black part A when inserting the connector, this enables the auto-locking mechanism.

   A

Do not tilt the orange levers B because this will unlock the connector.

4 Connect the DVI connector to an external monitor such as the Industrial Monitor and tighten the fastening screws.
   For an Industrial Panel PC this is optional because a monitor is integrated.

5 Connect a device to the optional interface (DVI or RS-232) if applicable and tighten the fastening screws.

6 Connect the USB ports to peripheral devices.

7 Connect the Box PC to the required Ethernet interface connector(s).
   Refer to 4-2-4 Ethernet Connector Specifications on page 4 - 15 for Ethernet port details.

The Box PC is connected.

5-5-3 Ethernet Connection Procedure

Use the following procedure to connect the Ethernet connectors of the IPC Programmable Multi Axis Controller.

1 Remove the dust caps from the Ethernet ports to be connected.

2 Connect Ethernet Port 1 of the Box PC to the EtherCAT network.

3 Connect Ethernet port 2 of the Box PC to the Modbus-TCP network.

4 Connect Ethernet port 3 of the Box PC to a normal Ethernet network.

The Ethernet connectors are connected.
5-6 Initial Power ON

This section describes how to Power ON the IPC Programmable Multi Axis Controller for the first time.

**WARNING**

Ensure that installation and post-installation checks of the product are performed by personnel in charge who possess a thorough understanding of the machinery to be installed.

---

**5-6-1 Initial Power ON Procedure**

Use the following procedure to power ON the IPC Programmable Multi Axis Controller for the first time.

1. Ensure the following conditions are present before applying power for the first time:
   - The Box PC is securely fastened to the mounting surface.
   - The Box PC is connected to ground.
   - All connectors are securely fastened.

2. Ensure that the connected monitor(s) is powered ON.

3. Connect a keyboard and/or a mouse.
   - If using an OMRON Industrial Monitor this may not be required because it has touch functionality.

4. Ensure the power supply is ON.

**Precautions for Safe Use**

Always check the power supply and power connections before applying power. Incorrect power connections can damage the product or cause burning.

5. Press the power button and release within 1 second.
   - Refer to 2-2-1 Front and Top of the Industrial Box PC on page 2 - 4 for the power button location.
   - The Box PC starts and the PWR LED will go ON.

**Additional Information**

Do not connect or disconnect the DVI-D cable while power is supplied to the Box PC.

6. Verify the ERR LED is OFF.

The Box PC is ON and the Operating System starts.

The first time initialization will prepare the system and automatically reboot the Box PC when required.
5-6-2  Windows Startup First Time

Use the following procedure for the first time startup of Windows on your Box PC when the Language Selection Window is displayed.

1 Ensure the following conditions are present before starting up windows for the first time:
   • Do not power OFF the Box PC during this procedure.
   • Ensure a keyboard and mouse are connected.
   • Select the language carefully, the selected language can not be changed.

2 Select the preferred language in the Language Selection Window. Refer to 4-3-2 Supported Languages on page 4 - 20 for supported languages. Select Next to continue.

3 Set the preferred Local settings:
   (1) Country or Region
   (2) Time and Currency
   (3) Keyboard layout
   Select Next to continue.

4 Set name of computer and of main user:
   (1) the name for the main user account
   (2) the computer name
   Select Next to continue.

5 Input a password and password hint for the main user account.

   Precautions for Safe Use
   • Choose an OS password that is not obvious to prevent unauthorized access.
   • Remember the OS user name and password. The product is inaccessible without it.

6 Read the Microsoft Windows License information. Select the checkbox to accept the content and continue.

7 Read the License information for the OMRON Utilities. Select the checkbox to accept the content and continue. Select I accept to accept the content and continue. Contact your OMRON representative or OMRON support when disagreeing with the License information.
8 Select **Use recommended settings** for security settings.

**WARNING**

Security setting adjustments should only be performed by the engineer in charge that possesses a thorough understanding of the security settings. Selecting non-recommended security settings can put your system at risk.

9 Adjust time zone, date and time settings.
   Select **Next** to continue.
   The Box PC will restart.

10 Adjust the backlight, Logo LED, and Status LED brightness of the monitor(s) to your settings.

**Additional Information**

- Use the Industrial Monitor Utility to adjust the display and/or connected OMRON Industrial Monitor.
- Verify that the Box PC is responding to finger touches on the touchscreen of the product.

11 Install any third party software and drivers that may be required for your applications.

**Precautions for Safe Use**

Before operating the system, please make sure the appropriate software is installed and configured. Doing so may prevent unexpected operation.
5-7 Install Software

This section describes how to install the software for the IPC Programmable Multi Axis Controller.

5-7-1 Install Internet Browser

The IPC Programmable Multi Axis Controller does not have an internet browser pre-installed for security reasons. An executable file for browser installation is provided in the user data partition of the drive supplied with the IPC Programmable Multi Axis Controller.

Use the following procedure to perform the browser installation.

**Additional Information**

Check the IT policy of your company for available software and for details on the software environment the IPC Programmable Multi Axis Controller will operate in.

1. Use Windows Explorer to examine the contents of the user data partition mapped as drive letter D:
2. Open the Installer folder (D:\OMRON-NY\Installers) and locate the Internet Explorer installer files.
3. Select the installer suitable for your system (32/64 bits) and language (English/Japanese).
4. Ensure there is a connection to the Internet.
5. Launch the installer to begin the installation process.
6. Follow the installer steps to complete the browser installation.
7. Download and install the latest updates via Windows Update.

**Precautions for Safe Use**

Install all updates and ensure the browser stays up-to-date.
5-7-2 Install Firewall

An industrial network should be separated from an office network.

Precautions for Safe Use

• Separate the machine network segment from the office network to avoid communication failures.
• Install all updates and ensure the firewall stays up-to-date.

Additional Information

Check the IT policy of your company for available software and for details on the software environment the IPC Programmable Multi Axis Controller will operate in.

5-7-3 Install Anti-virus Software

The Windows OS is vulnerable for viruses. Anti-virus software should be installed on the Windows OS.

Precautions for Safe Use

• Make sure that your OS environment is protected against malicious software and viruses.
• Install all updates and ensure virus definitions stay up-to-date.

Additional Information

Check the IT policy of your company for available software and for details on the software environment the IPC Programmable Multi Axis Controller will operate in.
5-7-4  Install Drivers and Custom Software

Use the following procedure to install drivers and custom software on your IPC Programmable Multi Axis Controller.

Drivers for most OMRON devices and common third party devices are already available on the system and will be installed automatically after the initial Windows configuration or upon connection of a device to the IPC Programmable Multi Axis Controller.

1. Install drivers that are required for the application.

2. Install third-party software that is required for application.
   Follow the installation instructions as supplied with the driver or software.

Precautions for Safe Use

Before operating the system, please make sure the appropriate software is installed and configured. Doing so may prevent unexpected operation.

5-7-5  Customize Windows

Windows provides customization tools.
Using these tools is only allowed for experienced software engineers.

Additional Information

- Refer to A-2-1 Enhanced Write Filter on page A - 11 for EWF details.
- Refer to A-2-2 File-Based Write Filter on page A - 12 for FBWF details.
Connect UPS

The OMRON S8BA UPS protects the Box PC from power failures, voltage variations and instantaneous voltage drops. Short power interruptions will be backed up by the UPS and the Box PC will continue normal operation. The UPS signals the Box PC when a power failure occurs and then the Box PC can shutdown normally without data loss. The Box PC can automatically start up again when the power is restored.

To connect the Box PC to the OMRON S8BA UPS use one of the following two options:

- The USB connector and Simple Shutdown Software
  Refer to 5-8-1 Connect UPS Using the USB Connector on page 5 - 52 for details.
  This is the preferred connection method.
- The I/O connector and a custom software program
  Refer to 5-8-2 Connect UPS Using the I/O Connector on page 5 - 54 for details.

WARNING

The use of an uninterruptible power supply (UPS) allows normal operation to continue even if a momentary power failure occurs, possibly resulting in the reception of an erroneous signal from an external device affected by the momentary power failure. Take external fail-safe measures. Where necessary, monitor the power supply voltage on the system for external devices and use it as an interlock condition.

Precautions for Safe Use

- Use an Omron S8BA UPS with the correct revision number to prevent improper system shutdown.
- Always use the recommended uninterruptible power supply (UPS) to prevent data loss and other system file integrity issues caused by unexpected power interruption. Back up the system files in the planned way to prevent data loss and other system file integrity issues caused by incorrect operation.
- Correctly perform wiring and setting, and ensure that the shutdown by the UPS can be executed.

Additional Information

- The minimum power requirements of the UPS are dependent on the power consumption. Refer to 4-1-3 Power Consumption Specifications on page 4 - 4 for power consumption details.
- Refer to the OMRON website for S8BA specifications or to the UPS S8BA User's Manual (Cat. No. U702) for the UPS manual.
  Note that the power consumption details determine the output current/capacity of your UPS.
5-8-1 Connect UPS Using the USB Connector

The Simple Shutdown Software monitors the UPS status via the USB interface and shuts down the IPC Programmable Multi Axis Controller when needed. The drivers for the S8BA UPS are pre-installed on the IPC Programmable Multi Axis Controller. The installation files for the Simple Shutdown Software are available on the OMRON website.

**Precautions for Safe Use**

- Use an Omron S8BA UPS with the correct revision number to prevent improper system shutdown.
- Correctly perform wiring and setting, and ensure that the shutdown by the UPS can be executed.
- Always use the recommended uninterruptible power supply (UPS) to prevent data loss and other system file integrity issues caused by unexpected power interruption. Back up the system files in the planned way to prevent data loss and other system file integrity issues caused by incorrect operation.

Follow the steps below to connect the S8BA UPS with a USB cable and to configure it correctly. Before proceeding with the steps below, check if the revision number of the UPS is correct. Refer to 2-10-9 UPS on page 2 - 23 for more information.

1. **Install and connect the S8BA UPS.**
   Refer to the **UPS S8BA User's Manual (Cat. No. U702)** for details.
   Connect the USB port of the S8BA UPS to the USB port of the IPC Programmable Multi Axis Controller using the USB cable provided with the S8BA UPS.

2. **Power ON the IPC Programmable Multi Axis Controller and Proceed to the next step after the device drivers are successfully installed.**

3. **Install the Simple Shutdown Software.**

4. **Configure the Simple Shutdown Software.**
   Refer to the **Simple Shutdown Software Instruction Manual (Cat. No. K1LD)** for more information.
Configure the IPC Programmable Multi Axis Controller to auto-start after power loss within the BIOS settings.

- Refer to A-1-1 BIOS Overview on page A - 2 for details on BIOS changes.
- Refer to A-1-5 BIOS - Boot on page A - 9 for power loss BIOS details.

The UPS is connected.

**Additional Information**

The default **Input sensitivity setting** is **Standard voltage sensitivity** and this is correct. Do not set this parameter to **Low voltage sensitivity**. Doing so can cause a system malfunction when switching to battery mode.
5-8-2 Connect UPS Using the I/O Connector

The I/O connector of the IPC Programmable Multi Axis Controller

• receives the power status of the UPS with the UPS power input.
• indicates the power status of the Box PC with the Power status output.

The Box PC does not react automatically to the UPS power input. A custom software program is required to shut down the Box PC when needed.

Precautions for Safe Use

• Use an Omron S8BA UPS with the correct revision number to prevent improper system shutdown.
• Correctly perform wiring and setting, and ensure that the shutdown by the UPS can be executed.
• Always use the recommended uninterruptible power supply (UPS) to prevent data loss and other system file integrity issues caused by unexpected power interruption. Back up the system files in the planned way to prevent data loss and other system file integrity issues caused by incorrect operation.

Follow the steps below to connect the S8BA UPS to the I/O connector of the Box PC and to configure it correctly. Before proceeding with the steps below, check if the revision number of the UPS is correct. Refer to 2-10-9 UPS on page 2 - 23 for more information.

1. Connect and install the S8BA UPS.
   Refer to the UPS S8BA User’s Manual (Cat. No. U702) for details.
   Connect the Contact port of the S8BA UPS to the I/O port of the Box PC with the connection cable S8BW-02.

2. Power ON the Box PC.

3. Configure the Box PC to auto-start after power loss within the BIOS settings.
   • Refer to A-1-1 BIOS Overview on page A - 2 for details on BIOS changes.
   • Refer to A-1-5 BIOS - Boot on page A - 9 for power loss BIOS details.

4. Create a software program that monitors the UPS Mode Input and initiates Power OFF of the Box PC when the UPS Mode Input becomes active.
   Use the Industrial PC System API to create the software program.
Install the created software program.

Test the created software program and ensure it functions correctly.

The UPS is connected.

**Additional Information**

The default **Input sensitivity setting** is **Standard voltage sensitivity** and this is correct. Do not set this parameter to **Low voltage sensitivity**. Doing so can cause a system malfunction when switching to battery mode.
5-9 Create a Windows System Repair Disk and a Windows Backup

A Windows Repair Disk is a disk that enables users to restore the Windows operating system. A Windows Backup is a backup that enables users to restore a user-defined content set. Use the following procedures to ensure you can always go back to this situation.

1. Create a Windows System Repair Disk.
   Refer to 5-9-2 Create a Windows System Repair Disk on page 5 - 56 for details.

2. Create a Windows Backup.
   Refer to 7-1-4 Create a Custom Backup with Windows Backup on page 7 - 4 for details.

5-9-1 IPC Programmable Multi Axis Controller Backup

Additional Information
The IPC Programmable Multi Axis Controller is not included in the Windows System Repair Disk and not included in the Windows Backup.

5-9-2 Create a Windows System Repair Disk

A Windows System Repair Disk can repair Windows if a serious error occurs.

Additional Information
To create a Windows System Repair Disk, a separate Windows PC with a DVD writer is required that has the same Windows edition and System type as the IPC Programmable Multi Axis Controller. The Windows System Repair Disk can not be created with the IPC Programmable Multi Axis Controller.

Prepare:
• A PC with a DVD writer that has the same Windows edition and System type as your Box PC.
  • An example of the Windows edition is "Windows 7" with "Service Pack 1".
  • An example of the System type is "64-bit Operating System".
  • An empty DVD
Use the Windows Backup and Restore mechanisms on the PC with a DVD writer to create a system repair disk.

To create a Windows System Repair Disk:

1. Start the PC that has a DVD writer and login.

2. Select the Windows Start Button.

3. In the search field, input Backup.
4 Select **Backup and Restore**.
The Backup and Restore window opens.

5 Select **Create a system repair disk**.
The Create a system repair disk window opens.

6 Select the applicable drive letter of the DVD writer and then select **Create disk**.

7 Wait until the disk is created and the remove it and store it in a safe place.

---

**Additional Information**

Operating Procedures

This section provides the operating procedures for the IPC Programmable Multi Axis Controller.

6-1 Power ON ........................................................................................................6 - 2
  6-1-1 Power ON Using the Power Button.............................................................. 6 - 2
  6-1-2 Power ON Using the Power ON/OFF Input................................................. 6 - 2
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  6-2-1 Power OFF Using the Power PMAC Support Utility...................................... 6 - 3
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6-3 React to Product Messages .......................................................................... 6 - 5

6-4 React to Windows Messages ........................................................................ 6 - 6
6-1 Power ON

This section provides Power ON details.

6-1-1 Power ON Using the Power Button

Start condition: Power is supplied to the Box PC and the Box PC is OFF.

1. Press the power button and release within 1 second.
   Refer to 2-2-1 Front and Top of the Industrial Box PC on page 2 - 4 for the power button location.
   The Box PC starts and the PWR LED will turn ON.

2. Wait until the PWR LED is ON and verify that the ERR LED is OFF.

The IPC Programmable Multi Axis Controller is ON and the Operating System starts.

6-1-2 Power ON Using the Power ON/OFF Input

Start condition: Power is supplied to the Box PC and the Box PC is OFF.

1. Supply an input signal to pins 3 and 4 of the I/O connector.
   The input signal must remain ON for a minimum of 60 ms and a maximum of 750 ms to be correctly detected by the Box PC.
   The Box PC starts and the PWR LED will turn ON.

2. Wait until the PWR LED is ON and verify that the ERR LED is OFF.

The IPC Programmable Multi Axis Controller is ON and the Operating System starts.

Additional Information

- Refer to 4-2-1 Power Connector Specifications on page 4 - 9 for connector specifications.
- Refer to 5-4-4 Wire the I/O Connector on page 5 - 38 for wiring details.

6-1-3 Auto Power ON

The IPC Programmable Multi Axis Controller can be configured to start up when power is supplied to the power connector.

The Power Loss Control BIOS setting controls this behavior.

Set the Power Loss Control setting to Turn ON to activate the Auto Power ON function.

Additional Information

Refer to A-1-5 BIOS - Boot on page A - 9 for BIOS details.
6-2 Power OFF

This section provides Power OFF details. Before following power OFF procedures below, check that the IPC Programmable Multi Axis Controller is ON by examining the LED indicators on the Box PC.

6-2-1 Power OFF Using the Power PMAC Support Utility

Additional Information

- Do not use the Windows shutdown option because it will only shutdown Windows and not the complete system.
- Do not use the Power button because it will only shutdown Windows and not the complete system.

To Power OFF the complete system:

1. Ensure all programs are closed. If required close all active programs.


   Refer to 3-1-3 Power PMAC Support Utility on page 3 - 3 for details.

3. Select **Shutdown Complete System** in the pop-up menu.

   The Box PC is powered OFF. This includes the operating system and the IPC Programmable Multi Axis Controller.

6-2-2 Forced Power OFF Using the Power Button

**Precautions for Safe Use**

Press the power button for several seconds to force the product shutdown. Always back up files in the planned way to prevent data loss or system file corruption.

1. Ensure all programs are closed. If required, close all active programs to prevent losing unsaved data.

2. Press and hold the power button on the Box PC for 5 to 10 seconds.
Refer to 2-2-1 Front and Top of the Industrial Box PC on page 2 - 4 for power button location information.
The IPC Programmable Multi Axis Controller will power OFF.
Any optional operating system settings related to power OFF will be disregarded.

3 Wait until the PWR LED is OFF.

The IPC Programmable Multi Axis Controller is powered OFF.
Confirm normal operation and check all product settings because unsaved data was lost.
6-3 React to Product Messages

The IPC Programmable Multi Axis Controller uses the Industrial PC Tray Utility icon A in the system tray area B of Windows to present Warnings and Errors.

Additional Information

Refer to 3-1-5 Industrial PC Tray Utility on page 3-8 for Industrial PC Tray Utility details.

Check the Industrial PC Tray Utility icon for a Warning or Error symbol. A Warning or Error symbol displayed on the Industrial PC Tray Utility icon indicates a product message.

To react to a product message:

1. Select the Industrial PC Tray Utility icon. A pop-up window will appear.
2. Read the message available in the pop-up.
3. Refer to 7-2-1 Warning and Error Messages on page 7-7 for all details on the message. Perform the actions presented for the message until the Warning or Error is resolved.

The product messages for the IPC Programmable Multi Axis Controller are resolved.
6-4 React to Windows Messages

Windows uses the Windows Action Center icon A in the system tray area B of Windows to present Warnings and Errors.

Check the Windows Action Center icon for a Warning or Error symbol. A Warning or Error symbol displayed on the Windows Action Center icon indicates a Windows message.

To react to a Windows message:

1. Select the Windows Action Center icon. A pop-up window will appear.
3  Read the message available in the window.
4  Perform the actions until each Warning or Error is resolved.

The Windows messages for the IPC Programmable Multi Axis Controller are resolved.
Maintenance

This section provides an overview of all maintenance tasks for the IPC Programmable Multi Axis Controller.

7-1 Preventive Maintenance ................................................................. 7 - 2
  7-1-1 Preventive Maintenance Schedule ........................................... 7 - 2
  7-1-2 Clean the Box PC ................................................................. 7 - 3
  7-1-3 Keep Software Updated ...................................................... 7 - 3
  7-1-4 Create a Custom Backup with Windows Backup .................. 7 - 4

7-2 Corrective Maintenance ............................................................... 7 - 7
  7-2-1 Warning and Error Messages ............................................. 7 - 7
  7-2-2 Remove the Cover ............................................................. 7 - 9
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# 7-1 Preventive Maintenance

Preventive Maintenance covers all actions that prevent downtime.

## 7-1-1 Preventive Maintenance Schedule

Prevent unscheduled downtime with the following preventive maintenance schedule.

<table>
<thead>
<tr>
<th>Daily</th>
<th>Reference</th>
</tr>
</thead>
</table>
| Check IPC Programmable Multi Axis Controller status | • Refer to 7-2-1 Warning and Error Messages on page 7 - 7 for Box PC Messages.  
  • Refer to 6-4 React to Windows Messages on page 6 - 6 for Windows Messages.  
  • Refer to 2-3 LED Indicators on page 2 - 7 for LED details. |

<table>
<thead>
<tr>
<th>Weekly</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean the Box PC</td>
<td>Refer to 7-1-2 Clean the Box PC on page 7 - 3 for cleaning details.</td>
</tr>
<tr>
<td>Ensure you have the latest software updates</td>
<td>Refer to 7-1-3 Keep Software Updated on page 7 - 3 for update details.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>When changing applications or configurations</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create a backup of the IPC Programmable Multi Axis Controller</td>
<td>Refer to 7-1-4 Create a Custom Backup with Windows Backup on page 7 - 4 for backup details.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Periodically but at least every 6 months</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check the ambient environment:</td>
<td>Refer to 4-4 Environmental Specifications on page 4 - 21 for environmental specifications.</td>
</tr>
<tr>
<td>• Temperature and humidity within</td>
<td></td>
</tr>
<tr>
<td>specifications</td>
<td></td>
</tr>
<tr>
<td>• Noise sources not close to the</td>
<td></td>
</tr>
<tr>
<td>IPC Programmable Multi Axis Controller</td>
<td></td>
</tr>
<tr>
<td>Check installation:</td>
<td>Refer to 5-3 Mount on page 5 - 15 for installation details.</td>
</tr>
<tr>
<td>IPC Programmable Multi Axis Controller</td>
<td></td>
</tr>
<tr>
<td>mounted securely</td>
<td></td>
</tr>
<tr>
<td>Check wiring and connections:</td>
<td>Refer to 5-4 Wire on page 5 - 27 for wiring details.</td>
</tr>
<tr>
<td>• Cable connectors fully inserted and</td>
<td>Refer to 5-5 Connect on page 5 - 41 for connection details.</td>
</tr>
<tr>
<td>locked</td>
<td></td>
</tr>
<tr>
<td>• No damaged wiring or connectors</td>
<td></td>
</tr>
</tbody>
</table>
| Check the battery replacement date on the label at the inside of the cover. Replace the battery before the replacement date. | • Refer to 7-2-2 Remove the Cover on page 7 - 9 to check the label.  
  • Refer to 7-2-4 Replace the Battery on page 7 - 12 to replace the battery. |
| Check that the Backup is available and operational. | • Refer to Restore a Custom Backup with Windows on page 7 - 24 for Restore Backup details. |
7-1-2 Clean the Box PC

Clean the Box PC periodically in order to keep it in the best operating condition. Wipe the Box PC with a dry, soft cloth.

**Precautions for Safe Use**

Do not use corrosive substances to clean the product. Doing so may result in the failure or malfunction.

7-1-3 Keep Software Updated

Always keep software at the latest released version to ensure stable operation. This is specifically important for:

- Anti-virus software
- Firewall software
- Internet browser
- Windows security patches
- OMRON software

**Precautions for Correct Use**

After an OS update or a peripheral device driver update for the product is executed, the product behavior might be different. Confirm that operation is correct before you start actual operation.

**Additional Information**

- Refer to 5-7-1 Install Internet Browser on page 5 - 48 for Browser details.
- Refer to 5-7-2 Install Firewall on page 5 - 49 for Firewall details.
- Refer to 5-7-3 Install Anti-virus Software on page 5 - 49 for Anti-virus details.
7-1-4 Create a Custom Backup with Windows Backup

Use the following procedure to create a custom backup of the IPC Programmable Multi Axis Controller with the Windows Backup and Restore mechanism.

To manually or automatically create a customized backup:

1. Select the Windows Start Button.
2. In search field, input Backup.
3. Select Backup and Restore. The Backup and Restore window opens.
4. Select Set up backup. The Set up backup window opens.
5. Select the backup destination. A network location can be added with Save on a network.

Additional Information

Preferred locations for an automatic backup are:
- A network drive
- The local drive in slot B
  Refer to 4-1-6 Storage Devices on page 4 - 6 for specifications.
Select **Next**. The following window will appear:

![Backup Setup Window](image1)

Select **Let me choose** and then select **Next**. The following window will appear:

![Backup Settings Window](image2)

Select all directories you want to include in the backup.

Select **Next**.
10 Select **Configure schedule** or **Change schedule** and change the backup schedule. Ensure:
- The interval is short enough to minimize data loss when a restore is required
- The IPC Programmable Multi Axis Controller is powered ON during the backup periods
- The time the backup is scheduled does not interfere with normal operation
or uncheck **Run backup on a schedule** if an automatic backup is not possible.

11 Select **OK**.

12 Select **Save settings and run backup** to create the first backup.

---

**Precautions for Correct Use**

Create backups according to the preventive maintenance schedule to prevent data loss and system integrity issues.
Refer to 7-1-1 **Preventive Maintenance Schedule** on page 7 - 2 for intervals.

---

**Additional Information**

- Check your backup to ensure it contains all data required for a restore.
- Refer to *Restore a Custom Backup with Windows* on page 7 - 24 for the Restore Procedure.
Corrective Maintenance

Corrective maintenance covers all actions to correct problems that cause downtime.

**WARNING**

Do not attempt to disassemble, repair, or modify the product in any way. Doing so may result in malfunction or fire.

Contact your local OMRON representative if the corrective maintenance actions did not solve the problem.

**7-2-1 Warning and Error Messages**

Warning and Error messages are provided by the IPC Programmable Multi Axis Controller when there is a potential problem that may cause downtime. This section provides details about these messages.

Warning messages inform you about a situation that will lead to downtime of the IPC Programmable Multi Axis Controller.

Error messages inform you about what caused the downtime of the IPC Programmable Multi Axis Controller.

The following message channels are available.

**LED Indicators**

The ERR LED indicator provides information on warnings and errors.

**Additional Information**

Refer to 2-3-2 ERR LED Indicator on page 2 - 8 for ERR details.

**Industrial PC Support Utility**

The Industrial PC Support Utility provides information on warnings and errors.

The Industrial PC Support Utility indicates:

- Internal temperature above setting
  
  Check the status of the Fan Unit and check the ambient conditions.

- Low revolution speed of the Fan Unit
  
  Check for excessive dust on the fans and in the Fan Unit.

- If required replace the Fan Unit.

- Low battery status
  
  Replace the battery.
7 Maintenance

Additional Information

- Refer to 4-4 Environmental Specifications on page 4 - 21 for environmental details.
- Refer to 7-2-2 Remove the Cover on page 7 - 9 for fan details.
- Refer to 7-2-3 Replace the Fan Unit on page 7 - 10 for Fan Unit replacement details.
- Refer to 7-2-4 Replace the Battery on page 7 - 12 for battery replacement details.

Windows Action Center

The Windows Action Center provides information on Windows related warnings and errors.

The Windows Action Center indicates security and maintenance issues.

Some examples:
- Virus protection (Important)
  Windows did not find anti-virus software on this computer.
- Windows Update (Important)
  Windows Update is not set up for this computer.
- Set up backup
  Your files are not being backed up.

Additional Information

Refer to 6-4 React to Windows Messages on page 6 - 6 for details.
7-2-2 Remove the Cover

The Cover of the IPC Programmable Multi Axis Controller provides access to the following items.
• Battery
• Fan Unit (applies to products with active cooling)
The inside of the Cover contains the following information.
• Battery replacement date
• License key for the operating system (optional)
No tools are required to open the Cover.
Use the following procedure to remove the Cover of the Box PC.

1 Power OFF your Box PC if it has active cooling.

2 Remove the Cover.

(1) Pull the lever 1 to unlock the Cover.
(2) Lift the side 2 to tilt the Cover.
(3) Remove 3 the complete Cover.

The Cover is removed.

To mount the Cover, position the side of the Cover in the Box PC and push the cover in place. The lever will lock in place.
7-2-3 Replace the Fan Unit

The fans are mounted in the Fan Unit.
Use the following procedure to replace the Fan Unit.

Precautions for Safe Use
In the case of an extended storage period, check the performance of the Fan Unit before production starts.

Additional Information
Refer to 2-9-2 Fan Unit on page 2 - 17 for the model.

1 Power OFF the Box PC.

2 Remove the Cover of the Box PC.

Additional Information
Refer to 7-2-2 Remove the Cover on page 7 - 9 for the cover removal procedure.

3 Disconnect the Fan Connectors from the board.
4 Replace the complete Fan Unit.

(1) Push the lever 1 to unlock the Fan Unit.

(2) Lift the lever to tilt 2 the Fan Unit.

(3) Remove 3 the complete Fan Unit.

5 Insert the new Fan Unit in the Box PC.
Ensure the end of the Fan Unit A is positioned under the fan guide B.

6 Connect the Fan Connectors to the board.

7 Mount the Cover.

8 Power ON the system.
Confirm both fans rotate immediately after Power ON.

The fans are replaced and the alarm is automatically reset.
7-2-4 Replace the Battery

Precautions for Safe Use

- The Battery may leak, rupture, heat, or ignite. Never short-circuit, charge, disassemble, heat, or incinerate the Battery or subject it to strong shock.
- Dispose of any Battery that has been dropped on the floor or otherwise subjected to excessive shock. Batteries that have been subjected to shock may leak if they are used.
- UL standards require that only an experienced engineer replace the Battery. Make sure that an experienced engineer is in charge of Battery replacement.

Precautions for Correct Use

- Always touch a grounded piece of metal to discharge static electricity from your body before starting an installation or maintenance procedure.
- Make sure to use a battery of the correct type and install the battery properly.
- Apply power for at least five minutes before changing the battery. Mount a new battery within five minutes after turning OFF the power supply. If power is not supplied for at least five minutes, the clock data may be lost. Check the clock data after changing the battery.
- Turn ON the power after replacing the battery for a product that has been unused for an extended period of time. Leaving the product unused without turning ON the power even once after the battery is replaced may result in a shorter battery life.

Additional Information

- Refer to 2-9-1 Battery on page 2-17 for the battery model.
- UL standards require that batteries be replaced by experienced technicians. Always place an experienced technician in charge of battery replacement.

Use the following procedure to replace the battery:

1. Power OFF the Box PC.
2. Remove the cover.

Additional Information

Refer to 7-2-2 Remove the Cover on page 7-9 for the cover removal procedure.
3 Lift the battery 1 from the compartment.

4 Disconnect the battery from the battery connector 2.

5 Connect the new battery to the battery connector.

6 Place the new battery in the Box PC.

7 Write the next date of replacement on the label at the inside of the cover.

Additional Information
Refer to 2-9-1 Battery on page 2 - 17 for lifetime of the battery.

8 Mount the cover.

9 Remove the power connector for at least 3 seconds to reset the battery warning.

10 Power ON the Box PC.

11 Check the Date and Time in the operating system.
Correct the Date and Time if this is required.

The battery is replaced and the alarm is reset.
7-2-5 Replace a Drive

Use the following procedure to replace a drive.

Prepare:
• The additional drive
  Refer to 2-10-4 Storage Devices on page 2 - 20 for the drive model.
  Refer to 4-1-6 Storage Devices on page 4 - 6 for drive specifications.
• The drive bracket with mounting screws
  These items are supplied with the IPC Programmable Multi Axis Controller.

To replace a drive:

1 Power OFF the Box PC.

2 Remove the drive cover.

   (1) Push the lock lever 1.
   (2) Tilt the cover 2.
   (3) Remove the drive cover 3.

Additional Information
• Refer to 2-2-1 Front and Top of the Industrial Box PC on page 2 - 4 for the location of the drive cover.
• The Box PC has 2 drive slots, marked with "A" and "B" at the left side of the drive cover. Take note of the slot position for the drive that is being removed and do not place a drive in the incorrect slot.
3 Pull the metal shielding cover out of the Box PC.

4 Insert the drive cover in the drive bracket slot 1 and move it down 2 so that it locks in the drive bracket.
5 Remove the drive bracket from the Box PC using the drive cover.

6 Remove the 4 mounting screws ① and then remove the drive ② from the drive bracket.
7 Align the connectors of the replacement drive as shown on the bracket. Then insert the replacement drive in the bracket and insert the 4 mounting screws. Tighten these screws with a torque of 0.35 N·m.

8 Insert the bracket with the replacement drive into the correct slot of the Box PC. Ensure the bracket is completely in the Box PC with an extra push.

The drive bracket will lock into place when it is fully inserted.
9 Insert the metal shielding cover.

10 Mount the drive cover.
   The lock lever will click when closed correctly.

11 Finalize the drive replacement.
   (1) If the replaced drive is the Additional Storage drive then allocate the drive to have it visible in Windows.
      Refer to 7-2-8 Allocate a Drive in Windows on page 7 - 28 for the allocation procedure.
   (2) If the replaced drive is the drive with the Operating System then restore the data from a backup.
      Refer to the restore procedure for details. The restore procedure is available:
      • For products NYB□ in the section Corrective Maintenance.
      • For products NYP□ in the section Corrective Maintenance.
      • For products NY512-A□ in the section Corrective Maintenance.
      • For products NY512-1□ refer to the NY-series IPC Machine Controller Industrial Panel PC / Industrial Box PC Setup User’s Manual (Cat. No. W568)

12 Ensure the drive is visible in Windows and confirm normal operation.

The drive is replaced.
7-2-6 Replace the PCIe Card

Use the following procedure to replace the PCIe Card.

Prepare:
- The PCIe Card

**Additional Information**

Refer to 4-1-7 PCIe Card Slot Specifications on page 4 - 7 for PCIe specifications.

- The PCIe Card mounting materials: Card Clip and Card Support
  These are supplied with the IPC Programmable Multi Axis Controller.

To replace the PCIe Card:

1. Power OFF the system.
2. Unmount the Box PC.
3. Remove the two crosshead screws indicated with "open" and then pull up the PCIe Drawer.
   The indent at the side of the drawer will help you to pull the drawer from the Box PC.
4 Push the notch ① at the bottom of the Card Support up and rotate ② the Card Support. Slide the Card Support ③ away from the card to create space and to remove it.

5 Pull the middle of the Card Clip to unlock it and remove it from the PCIe Drawer.
6 Remove the PCIe Card from the PCIe Drawer.

The PCIe Card is now removed.

7 Place the replacement PCIe Card in the PCIe Drawer.

Ensure the PCIe Card is inserted into the correct opening.
8. Place the Card Clip in the PCIe Card and PCIe Drawer ① and then rotate the Clip ② to lock it in place.

9. Slide the Card Support ① so that it supports the side of the PCIe Card. Rotate the Card Support ② to lock it in place.

Ensure the Card Support contacts the PCIe Card with the small groove so that there is support below and above the PCIe Card.
10 Insert the PCIe Drawer in the Box PC and then insert the two crosshead screws that hold the PCIe Drawer in place.

11 Remount the Box PC.

12 Confirm normal operation.

The PCIe Card is replaced.

7-2-7 Restore and Repair Data

Depending on the available backup and repair data an applicable restore or repair action can be selected.

Use following actions to restore or repair your Box PC.

• Restore a user's selection of folders to the moment the selected Windows backup was created. Refer to Restore a Custom Backup with Windows on page 7 - 24 for Windows restore details.
• Repair Windows. Refer to Repair Windows with the System Repair Disk on page 7 - 26 for Windows repair disk details.

Additional Information

Contact your OMRON representative when the Box PC needs to be restored and you do not have a system backup.
Restore a Custom Backup with Windows

Use the following procedure to restore a custom backup of user files with Windows Backup and Restore.

Additional Information

- With Windows Backup and Restore it is not possible to restore the complete boot disk or the operating system. Use the Windows Repair Disk to repair the Windows operating system.
  Refer to http://windows.microsoft.com/ for Backup and Restore details.
  Refer to Repair Windows with the System Repair Disk on page 7 - 26 for Repair Disk details.
- Refer to 7-1-4 Create a Custom Backup with Windows Backup on page 7 - 4 for Custom Backup details.
- Use the Windows System Repair Disk to repair the Windows operating system when Windows can not be started.
  Refer to 5-9-2 Create a Windows System Repair Disk on page 5 - 56 for repair details.

Ensure:

- The IPC Programmable Multi Axis Controller is ON
- You are logged in
- A backup is created earlier and it is available

To restore a backup:

1 Select the Windows Start Button.
2 In the search field, input Backup.
3 Select Backup and Restore. The Backup and Restore window opens.
4 Select **Restore my files**.
The restore files window opens.

5 Use the buttons **Search** and **Browse for files** or **Browse for folders** to find the created backup.

6 Add the files and folders to be restored and then select **Next**.

---

**Additional Information**

With this Windows Restore procedure it is not possible to restore files that are in use. This means system files and files of the logged in user can not be restored with this procedure. Refer to **Repair Windows with the System Repair Disk** on page 7 - 26 for Windows Repair details.
7 Select **In the original location** and then select **Next**. The progress window will appear.

![Image of progress window]

8 Wait until the message **Your files have been restored** appears and then select **Finish**.

![Image of message]

The files are restored.

## Repair Windows with the System Repair Disk

Use the following procedure to repair the Windows operating system with a System Repair Disk.

Ensure:

- The IPC Programmable Multi Axis Controller is powered OFF.
- A System Repair Disk is created earlier and it is available.

To perform a system repair:

1. Connect a USB keyboard, a USB mouse and a USB external DVD drive to the IPC Programmable Multi Axis Controller.

2. Power ON the IPC Programmable Multi Axis Controller and immediately press the **F11** key repeatedly.
3 Insert the System Repair Disk in the DVD drive.

4 Select DVD Drive as boot device and press Enter.
The message Windows is loading files ... and a progress bar appear.

5 Press any key to start and wait until the recovery software started.

6 Select your keyboard language and then select Next.
The System Recovery Options window appears.

7 Select Restore your computer using a system image that you created earlier and select Next.

8 Select Use latest available system image and then select Next.
The Re-Image Your Computer window appears.

9 Do not change the setting to restore C: , select Next.

10 Review the settings and select Finish.

11 Wait until the repair process is finished, this can take several hours.

12 Restart the IPC Programmable Multi Axis Controller.

Windows is repaired.

Additional Information

- Refer to 5-9-2 Create a Windows System Repair Disk on page 5 - 56 for System Repair disk creation.
- Refer to 7-1-4 Create a Custom Backup with Windows Backup on page 7 - 4 for Backup creation.
7-2-8 Allocate a Drive in Windows

An added drive must be allocated before it becomes visible in Windows.
To allocate a drive in Windows:

1. Ensure the Box PC is ON.
2. Select the Windows Start Button.
3. In the search field, input partition.
4. Select Create and format hard disk partitions.
The Disk Management window opens. The new disk is displayed with a storage space Unallocated.
5. Right click on the unallocated space and select New Simple Volume.
The New Simple Volume Wizard opens.
6. Follow the steps in the New Simple Volume Wizard.

The drive is installed and ready for use in Windows under the configured drive letter.

Additional Information
Do not format, resize or change settings for partition C:. Windows is installed on drive partition C: and any change to this partition can cause Windows to stop working.
7-2-9 Windows Event Viewer

The Windows Event Viewer displays logged events. These logged events can support you in corrective maintenance.

1. Select the Windows Start Button.

2. In the search field, input Event.

3. Select View event logs. The Event Viewer opens.

4. In the Selection tree expand Windows Logs and select Application. The Event list will display the Events.

5. Select the heading Source to sort the event messages per application.

6. Scroll to the event you want to investigate. Refer to the section 'Logging' of a specific utility for more details.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Selection tree</td>
</tr>
<tr>
<td>B</td>
<td>Event list</td>
</tr>
<tr>
<td>C</td>
<td>Event details</td>
</tr>
<tr>
<td>D</td>
<td>Action list</td>
</tr>
</tbody>
</table>
7 Select the event to display details in the Event details window or to take action in the Action overview window.

**Filter Events and Event Details**

This procedure explains how to filter events in the Windows event log.

To filter the events:

1. Open the Windows Event Viewer.
   Refer to 7-2-9 Windows Event Viewer on page 7 - 29 for details.

2. In the Actions list select *Filter Current Log*.
   The Filter Current Log page opens.

3. Input the desired filters and select *OK*.

4. The filtered events will appear in Event list of the Event Viewer.
   Select an event in the Event list to display Event details in the Event details part of the Event Viewer.

The filtered events are available including the details per event.
Appendices

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A-1 BIOS

This section provides the BIOS information of the IPC Programmable Multi Axis Controller.

WARNING

Changing BIOS information is only allowed for the engineer in charge that possesses a thorough understanding of the BIOS settings because it can change the behavior of the product.

A-1-1 BIOS Overview

The BIOS contains settings that influence the behavior of the IPC Programmable Multi Axis Controller. The touchscreen functionality is not functional when working in BIOS.

Ensure a USB keyboard is connected.

BIOS Setup Program

Press the DEL or F2 key repeatedly directly after Power ON to access the BIOS Setup Program.

Boot Selection Popup Menu

Press the F11 key repeatedly directly after Power ON to display the Boot Selection Popup menu. The popup menu allows selection of the boot device and the option to enter the BIOS setup program.

BIOS Structure

The BIOS contains a menu bar, a left frame and a right frame.
The left frame displays all the options that can be configured in the selected menu.
The left frame uses following colors:
  • Blue = Configurable options
  • Greyed-out = Not configurable
  • Inverse white = Selected
The right frame displays the key legend. Above the key legend is an area reserved for text messages. These text messages explain the options and the possible impacts when you change the selected option in the left frame.

Use the → ← keys to navigate between pages.
The menu bar gives access to following pages with settings:
  • Main
    Refer to A-1-2 BIOS - Main on page A - 4 for Main details.
  • Advanced
    Refer to A-1-3 BIOS - Advanced on page A - 5 for Advanced details.
  • Chipset
    Refer to A-1-4 BIOS - Chipset on page A - 8 for Chipset details.
  • Boot
Refer to A-1-5 BIOS - Boot on page A - 9 for Boot details.

- **Security**
  Refer to A-1-6 BIOS - Security on page A - 10 for Security details.

- **Save & Exit**
  Refer to A-1-7 BIOS - Save & Exit on page A - 10 for Save and Exit details.

## BIOS - Navigation and Function Keys

The right part of the BIOS screens is divided in two parts.

**Top part.**
Provides additional information on selected screens or parameters.

**Bottom part.**
Provides information on Keys.

- **→←:** Select Screen
  Changed between different BIOS pages.

- **↑↓:** Select Item
  Changed between different parameters.

- **Enter: Select**
  Selects the parameter that has the focus and displays a submenu or the possibility to change the parameter.

- **+/−:** Change Option
  Change settings. A numerical value will be increased or decreased. A boolean value will toggle.

- **F1: General Help**
  Displays help information.

- **F2: Previous Values**
  Changes all parameters to the values they had when entering the BIOS.

- **F9: Optimized Defaults**
  Changes all settings to the default values.

- **F10: Save & Exit**
  Saves all changes and exits the BIOS.

- **ESC: Exit**
  Go one level up. For parameters this is the previous level. For the main pages this exits the BIOS.
BIOS Password & Write Protection

A BIOS password protects the BIOS setup program from unauthorized access. This ensures that users cannot change the system configuration without authorization. With an assigned BIOS password, the BIOS prompts the user for a password on a setup entry. If the password entered is wrong, the BIOS setup program will not launch.

The BIOS uses encryption for the password.

The BIOS password is case sensitive with a minimum of 3 characters and a maximum of 20 characters. Once a BIOS password has been assigned, the BIOS activates the grayed out **BIOS Update and Write Protection** option. If this option is set to **enabled**, only authorized users (users with the correct password) can update the BIOS. With the BIOS password protection and the BIOS update and write protection, the system configuration is completely secured. If the BIOS is password protected, you cannot change the configuration of an end application without the correct password.

A-1-2 BIOS - Main

The main setup screen gives platform information about the BIOS, Board Information, Firmware Revision, MAC Addresses and information about the number of Boots and the Running Time.

Changeable BIOS Main parameters and their factory default values:

- **System Date**
  - Use the **Enter** key to the next Date field.

- **System Time**
  - Use the **Enter** key to the next Time field.
A-1-3 BIOS - Advanced

This section provides advanced BIOS information.

Changeable BIOS Advanced parameters and their factory default values:

<table>
<thead>
<tr>
<th>Item</th>
<th>Default / Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine Control</td>
<td></td>
</tr>
<tr>
<td>Primary Graphics Device</td>
<td>Auto</td>
</tr>
<tr>
<td>Internal Graphics Device</td>
<td>Auto</td>
</tr>
<tr>
<td>IGD Pre-Allocated Graphics Memory</td>
<td>32M</td>
</tr>
<tr>
<td>IGD Total Graphics Memory</td>
<td>256M</td>
</tr>
<tr>
<td>Primary IGD Boot Display Device</td>
<td>Auto</td>
</tr>
<tr>
<td>Active LFP Configuration</td>
<td></td>
</tr>
<tr>
<td>• eDP / for Industrial Panel PC</td>
<td></td>
</tr>
<tr>
<td>• No Local Flat Panel / for Industrial Box PC</td>
<td></td>
</tr>
<tr>
<td>Digital Display Interface 1</td>
<td>HDMI/DVI</td>
</tr>
<tr>
<td>Digital Display Interface 2</td>
<td>HDMI/DVI</td>
</tr>
<tr>
<td>Graphics</td>
<td></td>
</tr>
<tr>
<td>Start Temperature</td>
<td>50 C</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>30 C</td>
</tr>
<tr>
<td>Minimum Fan Speed</td>
<td>30% / Fixed</td>
</tr>
<tr>
<td>Maximum Fan Speed</td>
<td>100%</td>
</tr>
<tr>
<td>Fan Always On At Minimum Speed</td>
<td>Disabled</td>
</tr>
<tr>
<td>Hardware Health Monitoring</td>
<td></td>
</tr>
<tr>
<td>PIRQ Routing &amp; IRQ Reservation</td>
<td>PIRQA,B,C,D,E,F,G,H</td>
</tr>
<tr>
<td>PCI Express Settings</td>
<td></td>
</tr>
<tr>
<td>Relaxed Ordering</td>
<td>Disabled</td>
</tr>
<tr>
<td>Extended Tag</td>
<td>Disabled</td>
</tr>
<tr>
<td>No Snoop</td>
<td>Enabled</td>
</tr>
<tr>
<td>Maximum Payload</td>
<td>Auto</td>
</tr>
<tr>
<td>Maximum Read Request</td>
<td>Auto</td>
</tr>
<tr>
<td>ASPM</td>
<td>Disabled</td>
</tr>
<tr>
<td>Extended Synch</td>
<td>Disabled</td>
</tr>
<tr>
<td>Link Training Retry</td>
<td>5</td>
</tr>
<tr>
<td>Link Training Timeout (us)</td>
<td>100</td>
</tr>
<tr>
<td>Restore PCIe Registers</td>
<td>Disabled</td>
</tr>
</tbody>
</table>
### PCI & PCI Express

<table>
<thead>
<tr>
<th>Item</th>
<th>Default / Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI Express Gen 2 Settings</td>
<td></td>
</tr>
<tr>
<td>Completion Timeout</td>
<td>Default</td>
</tr>
<tr>
<td>ARI Forwarding</td>
<td>Disabled</td>
</tr>
<tr>
<td>AtomicOp Requester Enable</td>
<td>Disabled</td>
</tr>
<tr>
<td>AtomicOp Egress Blocking</td>
<td>Disabled</td>
</tr>
<tr>
<td>IDO Request Enable</td>
<td>Disabled</td>
</tr>
<tr>
<td>IDO Completion Enable</td>
<td>Disabled</td>
</tr>
<tr>
<td>LTR Mechanism Enable</td>
<td>Disabled</td>
</tr>
<tr>
<td>End-End TLP Prefix Blocking</td>
<td>Disabled</td>
</tr>
<tr>
<td>Target Link Speed</td>
<td>Auto</td>
</tr>
<tr>
<td>Clock Power Management</td>
<td>Disabled</td>
</tr>
<tr>
<td>Compliance SOS</td>
<td>Disabled</td>
</tr>
<tr>
<td>Hardware Autonomous Width</td>
<td>Enabled</td>
</tr>
<tr>
<td>Hardware Autonomous Speed</td>
<td>Enabled</td>
</tr>
<tr>
<td><strong>PCI Express Gen3 Settings (for Port 0 and 1)</strong></td>
<td></td>
</tr>
<tr>
<td>Run-time C7 Allowed</td>
<td>Disabled</td>
</tr>
<tr>
<td>Detect Non-compliant Device</td>
<td>Disabled</td>
</tr>
<tr>
<td>Program PCIe ASPM after OpROM</td>
<td>Disabled</td>
</tr>
<tr>
<td>PEG Sampler Calibrate</td>
<td>Disabled</td>
</tr>
<tr>
<td>Swing Control</td>
<td>Full</td>
</tr>
<tr>
<td>Peg Gen3 Equalization</td>
<td>Enabled</td>
</tr>
<tr>
<td>- Gen3 EQ Phase 2</td>
<td>Enabled</td>
</tr>
<tr>
<td>- PEG Gen3 Root Port Preset Value for each Lane. Lane 0...15</td>
<td>8</td>
</tr>
<tr>
<td>- PEG Gen3 Endpoint Preset Value for each Lane. Lane 0...15</td>
<td>7</td>
</tr>
<tr>
<td>- PEG Gen3 Endpoint Hint Value for each Lane. Lane 0...15</td>
<td>2</td>
</tr>
<tr>
<td>- Gen3 Eq Preset Search</td>
<td>Enabled</td>
</tr>
<tr>
<td>– Always Re-search Gen3 Eq Preset</td>
<td>Disabled</td>
</tr>
<tr>
<td>– Preset Search Dwell Time</td>
<td>1000</td>
</tr>
<tr>
<td>– Error Target</td>
<td>1</td>
</tr>
<tr>
<td>PEG RxCEM Loopback Mode</td>
<td>Disabled</td>
</tr>
<tr>
<td>PCIe Gen3 RxCTLEp Setting. PCIe Gen3 RxCTLEp 0...7</td>
<td>8</td>
</tr>
<tr>
<td>Item</td>
<td>Default / Remark</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td><strong>PCI &amp; PCI Express</strong></td>
<td></td>
</tr>
<tr>
<td>GbE Channel 0</td>
<td>PCI Express Port 0</td>
</tr>
<tr>
<td></td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td>ASPM</td>
</tr>
<tr>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td>GbE Channel 1</td>
<td>PCI Express Port 1</td>
</tr>
<tr>
<td></td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td>ASPM</td>
</tr>
<tr>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td>PCI Express Port 0, 1 (x4 Gen3)</td>
<td>PEG1 Speed</td>
</tr>
<tr>
<td></td>
<td>Auto</td>
</tr>
<tr>
<td></td>
<td>PEG1 ASPM</td>
</tr>
<tr>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td>PEG1 De-emphasis Control</td>
</tr>
<tr>
<td></td>
<td>-3.5 dB</td>
</tr>
<tr>
<td>PCI Express Port 2, 3, 4, 5 (x1 Gen2)</td>
<td>PCI Express Port x</td>
</tr>
<tr>
<td></td>
<td>Enabled</td>
</tr>
<tr>
<td></td>
<td>ASPM</td>
</tr>
<tr>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td>Hot Plug</td>
</tr>
<tr>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td></td>
<td>PCIe Speed</td>
</tr>
<tr>
<td></td>
<td>Auto</td>
</tr>
<tr>
<td></td>
<td>Detect Non-compliant Device</td>
</tr>
<tr>
<td></td>
<td>Disabled</td>
</tr>
<tr>
<td><strong>ACPI</strong></td>
<td></td>
</tr>
<tr>
<td>ACPI Sleep State</td>
<td>S3 (Suspend to RAM)</td>
</tr>
<tr>
<td>Lock Legacy Resources</td>
<td>Disabled</td>
</tr>
<tr>
<td>S3 Video Repost</td>
<td>Disabled</td>
</tr>
<tr>
<td>Native PCI Express Support</td>
<td>Enabled</td>
</tr>
<tr>
<td>- Native ASPM</td>
<td>Disabled</td>
</tr>
<tr>
<td>ACPI Debug</td>
<td>Disabled</td>
</tr>
<tr>
<td>ACPI 5.0 CPPC Support</td>
<td>Disabled</td>
</tr>
<tr>
<td><strong>RTC Wake</strong></td>
<td></td>
</tr>
<tr>
<td>Make System At Fixed Time</td>
<td>Disabled</td>
</tr>
<tr>
<td><strong>Trusted Computing</strong></td>
<td></td>
</tr>
<tr>
<td>Trusted Computing information</td>
<td>Display of Trusted Computing parameters</td>
</tr>
<tr>
<td><strong>CPU</strong></td>
<td></td>
</tr>
<tr>
<td>CPU information</td>
<td>Display of CPU parameters</td>
</tr>
<tr>
<td><strong>SATA</strong></td>
<td></td>
</tr>
<tr>
<td>SATA information</td>
<td>Display of SATA parameters</td>
</tr>
<tr>
<td><strong>Memory Configuration</strong></td>
<td></td>
</tr>
<tr>
<td>Memory Configuration inform-</td>
<td></td>
</tr>
<tr>
<td>ation</td>
<td></td>
</tr>
<tr>
<td><strong>Intel (R) Rapid Start</strong></td>
<td></td>
</tr>
<tr>
<td>Intel Rapid Start information</td>
<td>Display of Intel Rapid Start parameters</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td></td>
</tr>
<tr>
<td><strong>USB</strong></td>
<td></td>
</tr>
<tr>
<td>XHCI Mode</td>
<td>Auto</td>
</tr>
<tr>
<td>Overcurrent Protection</td>
<td>Disabled</td>
</tr>
<tr>
<td>USB Ports Per-Port Disable Control</td>
<td>USB Ports Per-Port Disable Control</td>
</tr>
<tr>
<td></td>
<td>Enabled</td>
</tr>
<tr>
<td>- USB Port 0...6</td>
<td>Enabled</td>
</tr>
<tr>
<td>- USB 3.0 Port 0...1</td>
<td>Enabled</td>
</tr>
<tr>
<td>Legacy USB Support</td>
<td>Enabled</td>
</tr>
<tr>
<td>External USB Controllers Sup-</td>
<td></td>
</tr>
<tr>
<td>ort</td>
<td></td>
</tr>
<tr>
<td>XHCI Hand-off</td>
<td>Enabled</td>
</tr>
<tr>
<td>EHCI Hand-off</td>
<td>Disabled</td>
</tr>
<tr>
<td>USB Mass Storage Driver Sup-</td>
<td></td>
</tr>
<tr>
<td>ort</td>
<td></td>
</tr>
<tr>
<td>USB Transfer Timeout</td>
<td>20 sec</td>
</tr>
<tr>
<td>Device Reset Timeout</td>
<td>20 sec</td>
</tr>
<tr>
<td>Device Power-up Delay Sele-</td>
<td></td>
</tr>
<tr>
<td>ction</td>
<td></td>
</tr>
<tr>
<td>Generic Ultra HS-COMBO</td>
<td>Auto</td>
</tr>
<tr>
<td><strong>SMART Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Smart Self Test &quot;1&quot;</td>
<td>Disabled</td>
</tr>
</tbody>
</table>
### A-1-4 BIOS - Chipset

Provides Chipset settings.

Changeable BIOS Chipset parameters and their factory default values:

<table>
<thead>
<tr>
<th>Item</th>
<th>Default / Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform Controller Hub (PCH) Isolate SMBus Segments</td>
<td>During POST</td>
</tr>
<tr>
<td>Processor (Integrated Components) Audio Device (B0:D3:F0)</td>
<td>Enabled</td>
</tr>
</tbody>
</table>

*1 Smart Self Test monitors the status of the HDD/SSD. Enable only when Smart Monitoring software is used.
## A-1-5 BIOS - Boot

Provides Boot information and configuration settings.

Changeable BIOS Boot parameters and their factory default values:

<table>
<thead>
<tr>
<th>Item</th>
<th>Default / Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quiet Boot</td>
<td>Disabled</td>
</tr>
<tr>
<td>Setup Prompt Timeout</td>
<td>1</td>
</tr>
<tr>
<td>Bootup NumLock State</td>
<td>On</td>
</tr>
<tr>
<td>Battery Support</td>
<td>Auto (Battery Manager)</td>
</tr>
<tr>
<td>Power Loss Control &quot;*1&quot;</td>
<td>Remained Off</td>
</tr>
<tr>
<td>CSM &amp; Option ROM Control</td>
<td></td>
</tr>
<tr>
<td>Launch CSM</td>
<td>Enabled</td>
</tr>
<tr>
<td>Boot Option Filter</td>
<td>UEFI and Legacy</td>
</tr>
<tr>
<td>PXE Option ROM Launch Policy</td>
<td>UEFI ROM Only</td>
</tr>
<tr>
<td>Storage Option ROM Launch Policy</td>
<td>Legacy ROM Only</td>
</tr>
<tr>
<td>Video Option ROM Launch Policy</td>
<td></td>
</tr>
<tr>
<td>Other Option ROM Launch Policy</td>
<td>UEFI ROM Only</td>
</tr>
<tr>
<td>Gate A20 Active</td>
<td>Upon Request</td>
</tr>
<tr>
<td>Option ROM Messages</td>
<td>Force BIOS</td>
</tr>
<tr>
<td>Enter Setup If No Boot Device</td>
<td>No</td>
</tr>
<tr>
<td>Enable Popup Boot Menu</td>
<td>Yes</td>
</tr>
<tr>
<td>Type Based Boot Priority</td>
<td></td>
</tr>
<tr>
<td>1st Boot Device</td>
<td>SATA 2 Drive</td>
</tr>
<tr>
<td>2nd Boot Device</td>
<td>Disabled</td>
</tr>
<tr>
<td>3rd Boot Device</td>
<td>Disabled</td>
</tr>
<tr>
<td>4th Boot Device</td>
<td>Disabled</td>
</tr>
<tr>
<td>5th Boot Device</td>
<td>Disabled</td>
</tr>
<tr>
<td>6th Boot Device</td>
<td>Disabled</td>
</tr>
<tr>
<td>7th Boot Device</td>
<td>Disabled</td>
</tr>
<tr>
<td>8th Boot Device</td>
<td>Disabled</td>
</tr>
<tr>
<td>UEFI Fast Boot</td>
<td>Disabled</td>
</tr>
</tbody>
</table>

*1 Power Loss Control settings are:
- Remain OFF: The Box PC will stay OFF when power is supplied to the power connector.
- Turn ON: The Box PC will automatically start up when power is supplied to the power connector.
- Last State: The Box PC will start up or remain OFF when power is supplied based on the Box PC state at the moment power was removed from the power connector.
A-1-6  BIOS - Security

Provides security information like BIOS Password and HDD information.

⚠️ WARNING

Security setting adjustments should only be performed by the engineer in charge that possesses a thorough understanding of the security settings. Selecting non-recommended security settings can put your system at risk.

Changeable BIOS Security parameters and their factory default values:

<table>
<thead>
<tr>
<th>Item</th>
<th>Default / Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS Password</td>
<td>Empty</td>
</tr>
<tr>
<td>BIOS Lock</td>
<td>Enabled</td>
</tr>
<tr>
<td>HDD Security Configuration</td>
<td>Diskname</td>
</tr>
<tr>
<td>Secure Boot Menu</td>
<td>Secure Boot</td>
</tr>
<tr>
<td>Secure Boot Mode</td>
<td>Custom</td>
</tr>
<tr>
<td>Key Management</td>
<td>Default Key Provision</td>
</tr>
<tr>
<td>Platform Key (PK)</td>
<td>NOT INSTALLED</td>
</tr>
<tr>
<td>Key Exchange Key (KEK)</td>
<td>NOT INSTALLED</td>
</tr>
<tr>
<td>Authorized Signatures</td>
<td>NOT INSTALLED</td>
</tr>
<tr>
<td>Forbidden Signatures</td>
<td>NOT INSTALLED</td>
</tr>
<tr>
<td>Authorized TimeStamps</td>
<td>NOT INSTALLED</td>
</tr>
</tbody>
</table>

A-1-7  BIOS - Save & Exit

Provides the possibility to leave the BIOS with or without saving changes.

Save & Exit Parameters: **Disabled**.

- **Save Changes and Exit**
  Changed settings are saved and the Operating System starts with the changed settings.

- **Discard Changes and Exit**
  Changed settings are not saved and the Operating System starts with the unchanged settings.

- **Save Changes and Reset**
  Changed settings are saved and the Box PC restarts using the changed settings.

- **Discard Changes and Reset**
  Changed settings are not saved and the Box PC restarts with the unchanged settings.

- **Save Changes**
  Changed settings are saved and the BIOS setup stays open.

- **Discard Changes**
  Changed settings are reverted to their last saved values and the BIOS setup stays open.

- **Restore Defaults**
  Revert all BIOS settings to factory default.
A-2 Customize Windows

This section provides an overview of the tools to customize Windows.

A-2-1 Enhanced Write Filter

Enhanced Write Filter (EWF) intercepts disk changes and stores them into a memory overlay in RAM memory instead of applying them to the original volume.

Additional Information

- File-Based Write Filter (FBWF) provides a similar function, but operates at the file level, while EWF operates at the sector level.
- Refer to the Microsoft Developer Network (MSDN) for detailed information.

Application

EWF and FBWF provide the following benefits:

- Write-protect one or more partitions on a system.
- Make it possible to revert changes and revert to the original disk content.
- Enable booting from read-only media.

By redirecting all write requests to RAM, EWF and FBWF enable the run-time image to maintain the appearance of a writable run-time image.

- Improve the file system performance when using relatively slow storage.
- Minimize write actions to the disk.

For example, minimize write access to flash memory. Write cycles on flash memory are limited for technical reasons.

Usage

EWF is included in the Windows Embedded Standard 7 image and disabled by default. The configuration of this component can be defined with the command line tool **EWMGR.EXE**.

To run EWF Manager, open the Command Prompt with Administrator rights.

<table>
<thead>
<tr>
<th>Command</th>
<th>Function</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ewfmgr</td>
<td>Shows an overview with current status.</td>
<td>---</td>
</tr>
<tr>
<td>ewfmgr c: -enable</td>
<td>Enables the write filter for the drive C:.</td>
<td>The protection is not effective until the system is restarted.</td>
</tr>
<tr>
<td>ewfmgr c: -commit</td>
<td>Writes all the changes in the memory overlay to the physical disk during the next restart.</td>
<td>Committing the overlay can affect the speed of the boot process.</td>
</tr>
<tr>
<td>ewfmgr c: -commitanddisable</td>
<td>Writes all the changes in the memory overlay to the physical disk during the next restart, and disables the disk protection.</td>
<td>Committing the overlay can affect the speed of the boot process. The protection is not disabled until the system is restarted.</td>
</tr>
</tbody>
</table>
### Command Function Remarks

<table>
<thead>
<tr>
<th>Command</th>
<th>Function</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ewfmgr c: -commitanddisable - live</td>
<td>Writes all the changes in the memory overlay to the physical disk immediately, and disables the disk protection.</td>
<td>Protection is also disabled immediately. No restart is required.</td>
</tr>
<tr>
<td>ewfmgr c: -disable</td>
<td>Disables the disk protection.</td>
<td>The protection is not disabled until the system is restarted.</td>
</tr>
<tr>
<td>ewfmgr /h</td>
<td>Displays a helpscreen that explains all commands and options available.</td>
<td>A complete reference can also be found at the Microsoft Developer Network (MSDN).</td>
</tr>
</tbody>
</table>

### Considerations

- EWF and FBWF cannot be used simultaneously.
- To prevent data loss in the event of a power failure, the use of a UPS is recommended.
- When the EWF function is enabled and a large amount of data is written, the system memory space will be reduced and operation may become unstable. To prevent this problem, it is recommended that a large amount of data be written to a different location.
- Automatic Adjustment of daylight saving time (DST) is incompatible with the Enhanced Write Filter (EWF).

#### Additional Information

- Refer to the Microsoft Developer Network (MSDN) for DST details.

### A-2-2 File-Based Write Filter

File-Based Write Filter (FBWF) intercepts file changes and stores them into a memory overlay in RAM memory instead of applying them to the original volume.

When FBWF is enabled, all files and folders of a partition are protected unless they are included in an exception list.

#### Additional Information

- Enhanced Write Filter (EWF) provides a similar function, but operates at the sector level, while FBWF operates at the file level. FBWF is more flexible in its configuration than EWF and allows immediate writing without rebooting.
- Refer to the Microsoft Developer Network (MSDN) for detailed information.

### Application

EWF and FBWF provide the following benefits:

- Write-protect one or more partitions on a system.
- Make it possible to revert changes and revert to the original disk content.
- Enable booting from read-only media.
  By redirecting all write requests to RAM, EWF and FBWF enable the run-time image to maintain the appearance of a writable run-time image.
- Improve the file system performance when using relatively slow storage.
- Minimize write actions to the disk.
For example, minimize write access to flash memory. Write cycles on flash memory are limited for technical reasons.

### Usage

FBWF is included in the Windows Embedded Standard 7 image and disabled by default. The configuration of this component can be defined with the command line tool `FBWFMGR.EXE`.

To run FBWF Manager, open the Command Prompt with Administrator rights.

<table>
<thead>
<tr>
<th>Command</th>
<th>Function</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>fbwfmgr</td>
<td>Shows an overview with current status.</td>
<td>---</td>
</tr>
<tr>
<td>fbwfmgr /displayconfig</td>
<td>Shows current configuration.</td>
<td>---</td>
</tr>
<tr>
<td>fbwfmgr /enable</td>
<td>Enables the write filter.</td>
<td>The protection is not effective until the system is restarted.</td>
</tr>
<tr>
<td>fbwfmgr /addvolume c:</td>
<td>Adds a volume to the protected volume list.</td>
<td>That volume will be protected after the next restart.</td>
</tr>
<tr>
<td>fbwfmgr /commit c: \Test.txt</td>
<td>Writes the changes to the protected file/folder.</td>
<td>---</td>
</tr>
<tr>
<td>fbwfmgr /addeclusion C: \Test.txt</td>
<td>Adds a write-through path to the exclusion list (file/folder).</td>
<td>The exclusion is active after the next restart.</td>
</tr>
<tr>
<td>fbwfmgr /removeexclusion C: \Test.txt</td>
<td>Removes the write-through path from the exclusion list (file/folder).</td>
<td>The exclusion is removed after the next restart.</td>
</tr>
<tr>
<td>fbwfmgr /h</td>
<td>Displays a helpscreen that explains all commands and options available.</td>
<td>A complete reference can also be found at the Microsoft Developer Network (MSDN).</td>
</tr>
</tbody>
</table>

### Additional Information

When specifying a file name, notice the space between drive name (c:) and file path (\Test.txt).

### Considerations

- EWF and FBWF cannot be used simultaneously.
- FBWF can only protect formatted volumes. Do not move files between protected and unprotected volumes.
- When the FBWF function is enabled and a large amount of data is written, the system memory space will be reduced and operation may become unstable. To prevent this problem, it is recommended that a large amount of data be written to a different location.
- FBWF supports only NTFS and FAT32 file systems.
- Automatic Adjustment of daylight saving time (DST) is incompatible with the File-Based Write Filter (FBWF).

### Additional Information

Refer to the Microsoft Developer Network (MSDN) for DST details.
## A-3 DVI-I Connector Pin Details

Pin details of the DVI-I connector.

The pin layout represents the DVI-I connector on the IPC Programmable Multi Axis Controller. Pin numbers increase from left to right for every row.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TMDS data 2−</td>
<td>Digital red− (link 1)</td>
</tr>
<tr>
<td>2</td>
<td>TMDS data 2+</td>
<td>Digital red+ (link 1)</td>
</tr>
<tr>
<td>3</td>
<td>0 VDC</td>
<td>TMDS data 2/4 shield</td>
</tr>
<tr>
<td>4</td>
<td>Not connected</td>
<td>---</td>
</tr>
<tr>
<td>5</td>
<td>Not connected</td>
<td>---</td>
</tr>
<tr>
<td>6</td>
<td>DDC clock</td>
<td>DDC clock</td>
</tr>
<tr>
<td>7</td>
<td>DDC data</td>
<td>DDC data</td>
</tr>
<tr>
<td>8</td>
<td>Analog vertical sync</td>
<td>For Intel® Core™ i7-4700EQ CPU type</td>
</tr>
<tr>
<td>9</td>
<td>TMDS data 1−</td>
<td>Digital green− (link 1)</td>
</tr>
<tr>
<td>10</td>
<td>TMDS data 1+</td>
<td>Digital green+ (link 1)</td>
</tr>
<tr>
<td>11</td>
<td>0 VDC</td>
<td>TMDS data 1/3 shield</td>
</tr>
<tr>
<td>12</td>
<td>Not connected</td>
<td>---</td>
</tr>
<tr>
<td>13</td>
<td>Not connected</td>
<td>---</td>
</tr>
<tr>
<td>14</td>
<td>+5 V</td>
<td>Power for monitor DDC interface</td>
</tr>
<tr>
<td>15</td>
<td>0 V</td>
<td>Return for pin 14 and analog sync</td>
</tr>
<tr>
<td>16</td>
<td>HPD</td>
<td>Hot Plug Detect</td>
</tr>
<tr>
<td>17</td>
<td>TMDS data 0−</td>
<td>Digital blue− (link 1) and digital sync</td>
</tr>
<tr>
<td>18</td>
<td>TMDS data 0+</td>
<td>Digital blue+ (link 1) and digital sync</td>
</tr>
<tr>
<td>19</td>
<td>0 VDC</td>
<td>TMDS data 0/5 shield</td>
</tr>
<tr>
<td>20</td>
<td>Not connected</td>
<td>---</td>
</tr>
<tr>
<td>21</td>
<td>Not connected</td>
<td>---</td>
</tr>
<tr>
<td>22</td>
<td>0 VDC</td>
<td>TMDS clock shield</td>
</tr>
<tr>
<td>23</td>
<td>TMDS clock+</td>
<td>Digital clock+</td>
</tr>
<tr>
<td>24</td>
<td>TMDS clock−</td>
<td>Digital clock−</td>
</tr>
<tr>
<td>C1</td>
<td>Analog red</td>
<td>For Intel® Core™ i7-4700EQ CPU type</td>
</tr>
<tr>
<td>C2</td>
<td>Analog green</td>
<td>For Intel® Core™ i7-4700EQ CPU type</td>
</tr>
<tr>
<td>Pin</td>
<td>Signal Name</td>
<td>Function</td>
</tr>
<tr>
<td>-----</td>
<td>---------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>C3</td>
<td>Analog blue</td>
<td>For Intel® Core™ i7-4700EQ CPU type</td>
</tr>
<tr>
<td>C4</td>
<td>Analog horizontal sync</td>
<td>For Intel® Core™ i7-4700EQ CPU type</td>
</tr>
<tr>
<td>C5</td>
<td>0 VDC</td>
<td>Analog ground return for red, green and blue for Intel® Core™ i7-4700EQ CPU type</td>
</tr>
</tbody>
</table>
The pin layout represents the RS-232 connector on the Box PC.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CD</td>
</tr>
<tr>
<td>2</td>
<td>RXD</td>
</tr>
<tr>
<td>3</td>
<td>TXD</td>
</tr>
<tr>
<td>4</td>
<td>DTR</td>
</tr>
<tr>
<td>5</td>
<td>0 VDC *1</td>
</tr>
<tr>
<td>6</td>
<td>DSR</td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
</tr>
<tr>
<td>9</td>
<td>RI</td>
</tr>
</tbody>
</table>

*1 The 0 VDC pin is internally connected to the functional ground connection.

**Additional Information**

Refer to 5-4-2 Ground on page 5 - 28 for grounding details.
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