Pro-face
for the best interface

PS-4600 Series

User Manual

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Pro-face nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

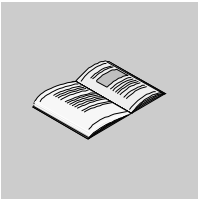
All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

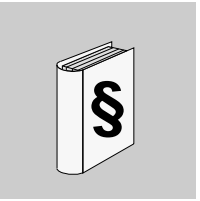
Failure to use Pro-face software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

Table of Contents



Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

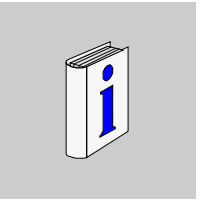
NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Pro-face for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book



At a Glance

Document Scope

This manual describes the configuration and usage of PS-4600 Series (Hereafter referred to as the “Industrial Personal Computer”).

The configuration number format is as follows:

Character Number	**Prefix (1-4)**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Part Number Example	**PFXP**	**P**	**1**	**6**	**1**	**D**	**D**	**2**	**3**	**G**	**2**	**1**	**N**	**0**	**0**
iPC Family	Standard Model	P													
	Rear Mount Model	F													
Product Generation	Reserved		*												
Display	12" - XGA			6											
Expansion Slots	0 slot				0										
	1 slot = 1 PCI				1										
	1 slot = 1 PCIe				C										
	2 slots = 1 PCI+1 PCIe				2										
	2 slots = 2 PCI				A										
CPU Type	Celeron 827E					D									
	Core i3					E									
Power Supply*1	AC						A								
	DC with interface for UPS Battery Unit						B								
	DC						D								
	AC with interface for UPS Battery Unit						U								
RAM (Configuration available depending on OS)	1 GB							1							
	2 GB							2							
	3 GB = 1 GB + 2 GB							3							
	4 GB = 4 GB							5							
	6 GB = 2 GB + 4 GB							6							
	8 GB							8							
	12 GB = 8 GB + 4 GB							C							
	16 GB = 8 GB + 8 GB							G							

*1 When using UPS Battery Unit, only one COM Expansion Board can be installed in the interface module slot 2.

Character Number	Prefix (1-4)	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Part Number Example	**PFXP**	**P**	**1**	**6**	**1**	**D**	**D**	**2**	**3**	**G**	**2**	**1**	**N**	**0**	**0**
Operating System	None								0						
	Windows Embedded Standard 2009 MUI								1						
	Windows XP Pro Japanese								2						
	Windows XP Pro MUI								3						
	Windows Embedded Standard 7 Premium MUI (32-bit)								4						
	Windows 7 Ultimate MUI (32-bit)								5						
	Windows 7 Ultimate MUI (64-bit)								6						
Storage Device	None									N					
	CFast 4 GB									G					
	CFast 8 GB									H					
	CFast 16 GB									J					
	Primary CFast 4 GB + Secondary CFast 4 GB (for Windows Embedded Standard 2009 MUI)									L					
	Primary CFast 8 GB + Secondary CFast 4 GB (for Windows Embedded Standard 7 Premium MUI [32-bit])									M					
	HDD 500 GB									P					
	SSD 60 GB									T					
	SSD 128 GB									U					
Slide-in Slot **NOTE:** for 1 and 2 slots Industrial Personal Computer.	None										0				
	DVD multi drive										1				
	HDD 500 GB										2				
	SSD 60 GB										3				
Options	None											0			
	COM Expansion Board											4			
	COM Expansion Board + COM Expansion Board											W			
Software Bundle	None												N		
	WinGP												G		
Reserved	None													*	
Reserved	None														*

NOTE: All instructions applicable to the enclosed product and all safety precautions must be observed.

Validity Note

This documentation is valid for PS-4600 Series.

The technical characteristics of the devices described in this manual also appear online. To access this information online, please go to our site http://www.proface.com/otasuke/
The characteristics that are presented in this manual should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the manual and online information, use the online information as your reference.

Registered Trademarks

The company names and product names used in this manual are the trade names, trademarks (including registered trademarks), and service marks of their respective companies. This product omits individual descriptions of each of these rights.

Trademark / Tradename	Right Holder
Microsoft, Windows	Microsoft, U.S.
Pro-face	Digital Electronics Corporation (in Japan and other countries)
Intel	Intel Corporation

The following terms differ from the abovementioned trade names and trademarks.

Term used in this manual	Formal Trademark or Tradename
Windows Embedded Standard 2009	Microsoft® Windows® Embedded Standard Runtime
Windows Embedded Standard 7	Windows® Embedded Standard 7 Runtime (WS7P)(ESD)
Windows XP Pro	Microsoft® Windows® XP Professional for Embedded Systems (1-2 CPU) ESD
Windows 7	Windows® 7 Ultimate for Embedded Systems x32/x64 (1-2 CPU) (ESD)
Celeron 827E	Intel® Celeron® Processor 827E
Core i3	Intel® Core™ i3 Processor 3217UE

Related Documents

Title of Documentation
PS-4600 Series User Manual (this manual)

You can download these technical publications and other technical information from our website “Otasuke Pro!” at http://www.pro-face.com/otasuke/.

Global Code

A global code is assigned to every Pro-face product as a universal reference. For more information on product models and their matching global codes, please refer to the following URL.

URL: http://www.pro-face.com/product/globalcode.html

Product Related Information

Some Industrial Personal Computers are certified for use in Class I, Division 2 hazardous locations as defined in ANSI/ISA 12.12.01 or CSA C22.2 N°213. Observe the following:

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.(1)
- Each implementation of an Industrial Personal Computer must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

(1) For additional information, refer to *NEMA ICS 1.1 (latest edition)*, *"Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems" or other applicable standards in your location.*

NOTE: The Industrial Personal Computer is a highly configurable device and is not based on a real-time operating system. Changes to the software and settings of the following must be considered new implementations as discussed in the previous warning messages. Examples of such changes include:

- System BIOS
- System Monitor

- Operating system
- Installed hardware
- Installed software

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Use only Pro-face software with the devices described in this manual.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

General Overview

I

Subject of this Part

This part provides an overview of the Industrial Personal Computer products.

What Is in This Part?

This part contains the following chapters:

Important Information

1

General

This chapter describes specific aspects related to the operation of the Industrial Personal Computer.

What Is in This Chapter?

This chapter contains the following topics:

Federal Communications Commission Radio Frequency Interference Statement - For U.S.A.

FCC Radio Interference Information

This equipment has been tested and found to comply with the Federal Communications Commission (FCC) limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial, industrial or business environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause or be subject to interference with radio communications. To minimize the possibility of electromagnetic interference in your application, observe the following two rules:

- Install and operate the Industrial Personal Computer in such a manner that it does not radiate sufficient electromagnetic energy to cause interference in nearby devices.
- Install and test the Industrial Personal Computer to ensure that the electromagnetic energy generated by nearby devices does not interfere with the Industrial Personal Computer's operation.

⚠ WARNING

ELECTROMAGNETIC / INTERFERENCE

Electromagnetic radiation may disrupt the Industrial Personal Computer's operations, leading to unintended equipment operation. If electromagnetic interference is detected:

- Increase the distance between the Industrial Personal Computer and the interfering equipment.
- Reorient the Industrial Personal Computer and the interfering equipment.
- Reroute power and communication lines to the Industrial Personal Computer and the interfering equipment.
- Connect the Industrial Personal Computer and the interfering equipment to different power supplies.
- Always use shielded cables when connecting the Industrial Personal Computer to a peripheral device or another computer.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Qualified Personnel

General

Only qualified personnel can install, operate, and maintain the product. A qualified person is one who has skills and knowledge related to the construction, operation, and installation of electrical equipment, and has received safety training to recognize and avoid the hazards involved. Refer to the most current release of NFPA 70E®, Standard for Electrical Safety in the Workplace, for electrical safety training requirements or other applicable standards in your location. Examples of qualified personnel may include:

- at the application design level, engineering department personnel who are familiar with automation safety concepts (for example, a design engineer)
- at the equipment implementation level, personnel who are familiar with the installation, connection and commissioning of automation equipment (for example, an installation assembly or cabling engineer or a commissioning technician)
- at the operation level, personnel who are experienced in the use and control of automation and computing equipment (for example, an operator)
- for preventive or corrective maintenance, personnel trained and qualified in regulating or repairing automated and computing devices (for example, an operating technician or after-sales service technician.)

Certifications and Standards

Agency Certifications

Pro-face submitted this product for independent testing and qualification by third-party agencies. These agencies have certified this product as meeting the following standards:

Underwriters Laboratories Inc., UL 508 and CSA C22.2 N°142, Industrial Control Equipment

Underwriters Laboratories Inc., ANSI/ISA 12.12.01 and CSA C22.2 N°213, Electrical Equipment for Use in Class I, Division 2 Hazardous (Classified) Locations

GOST-R certification

For information on certifications and standards, such as certified models and certificates, see the following or product markings.

http://www.pro-face.com/worldwide.html

Compliance Standards

Pro-face tested this product for compliance with the following compulsory standards:

- United States:
  - Federal Communications Commission, FCC Part 15 Class A
- Europe: CE
  - Directive 2006/95/EC (Low Voltage)
  - Directive 2004/108/EC (EMC)
  - Programmable Controllers: EN 61131-2 (Ed 3)
  - EMI: EN 61000-6-4
  - EMS: EN 61000-6-2
- Australia:
  - Standard EN61000-6-4 (RCM)

Qualification Standards

Pro-face voluntarily tested this product to additional standards. The additional tests performed, and the standards under which the tests were conducted, are specifically identified in Environmental Characteristics *(see page 42)*.

Hazardous Substances

This product is compliant with:

- WEEE, Directive 2012/19/EU
- RoHS, Directive 2011/65/EU
- RoHS China, Standard SJ/T 11363-2006
- REACH regulation EC 1907/2006

End of Life (Battery)

The product contains electronic boards. It must be disposed of in specific treatment channels. The product contains cells and/or storage batteries which must be collected and processed separately, when they have run out and at the end of product life.

Refer to the section Maintenance *(see page 183)* to extract cells and batteries from the product. These batteries do not contain a weight percentage of heavy metals over the threshold notified by European Directive 2006/66/EC.

KC Marking

사용자안내문

기 종 별	사 용 자 안 내 문
A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

European (CE) Compliance

CE Compliance Note

The products described in this manual comply with the European Directives concerning Electromagnetic Compatibility and Low Voltage (CE marking) when used as specified in the relevant documentation, in applications for which they are specifically intended, and in connection with approved third-party products.

Hazardous Location Installations - For USA and Canada

General

The Industrial Personal Computer has been designed with the intention of meeting the requirements of Class I, Division 2 hazardous location applications. Division 2 locations are those locations where ignitable concentrations of flammable substances are normally confined, prevented by ventilation, or present in an adjacent Class I, Division 1 location, but where an abnormal situation might result in intermittent exposure to such ignitable concentrations.

While the Industrial Personal Computer is a non-incendive device under ANSI/ISA 12.12.01 and CSA C22.2 N°213, it is not designed for, and should never be used within a Division 1 (normally hazardous) location.

This equipment is suitable for use in Class I, Division 2, Groups A, B, C, and D hazardous locations or in non-hazardous locations. Before installing or using your Industrial Personal Computer, confirm that the ANSI/ISA 12.12.01 or CSA C22.2 N°213 certification appears on the product labeling

NOTE: Some Industrial Personal Computer devices are not yet rated as suitable for use in hazardous locations. Always use your product in conformance with the product labeling and this manual.

⚠ DANGER

POTENTIAL FOR EXPLOSION

- Do not use your Industrial Personal Computer in hazardous environments or locations other than Class I, Division 2, Groups A, B, C, and D.
- Always confirm that your Industrial Personal Computer is suitable for use in hazardous locations by checking that the ANSI/ISA 12.12.01 or CSA C22.2 N°213 certification appears on the product labeling.
- Do not install any Pro-face or OEM components, equipment, or accessories unless these have also been qualified as suitable for use in Class I, Division 2, Groups A, B, C, and D locations.
- In addition, confirm that any PCI controller cards have an adequate temperature code (T-code), and are suitable for a surrounding air temperature range of 0 to 50 °C (32 to 122 °F).
- Do not attempt to install, operate, modify, maintain, service, or otherwise alter the Industrial Personal Computer except as permitted in this manual. Unpermitted actions may impair the unit's suitability for Class I, Division 2 operation.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER

POTENTIAL FOR EXPLOSION

- Always confirm the ANSI/ISA 12.12.01 and CSA C22.2 N°213 hazardous location rating of your device before installing or using it in a hazardous location.
- To power on or power off a Industrial Personal Computer installed in a Class I, Division 2 hazardous location, you must either:
  - Use a switch located outside the hazardous environment, or
  - Use a switch certified for Class I, Division 1 operation inside the hazardous area.
- Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous. This applies to all connections including power, ground, serial, parallel, network and rear USB connections.
- Never use unshielded / ungrounded cables in hazardous locations.
- When enclosed, keep enclosure doors and openings closed at all times to avoid the accumulation of foreign matter inside the workstation.
- Use only non-incendive front USB configurations *(see page 69)*.

Failure to follow these instructions will result in death or serious injury.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

Ensure that the product is properly rated for the location. If the intended location does not presently have a Class, Division and Group rating, then users should consult the appropriate authorities having jurisdiction in order to determine the correct rating for that hazardous location.

In accordance with Federal, State/Provincial, and Local regulations, all hazardous location installations should be inspected prior to use by the appropriate authority having jurisdiction. Only technically qualified personnel should install, service, and inspect these systems.

Power Switch

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

The amount of input power required by systems with a Industrial Personal Computer classifies the power switch as an incendive device because the voltage and current across the make/break component are capable of generating a spark.

If using an ordinary power switch, hazardous location regulations require the power switch be located in an area specified as non-hazardous.

However, limits in cable length between the workstation and the power switch may apply. Otherwise the switch must be compliant with Class I, Division 1 requirements (intrinsically safe). These switches are built in a manner that prevents the possibility of a spark when contact is made or broken.

Use suitable UL listed and/or CSA Certified Class I, Division 1 switches in hazardous locations. These switches are available from a wide number of sources. It is the responsibility to ensure you select a power switch that conforms to the hazardous location rating for the installation.

Cable Connections

⚠ DANGER

POTENTIAL FOR EXPLOSION

- Always confirm the ANSI/ISA 12.12.01 and CSA C22.2 N°213 hazardous location rating of your device before installing or using it in a hazardous location.
- To power on or power off a Industrial Personal Computer installed in a Class I, Division 2 hazardous location, you must either:
  - Use a switch located outside the hazardous environment, or
  - Use a switch certified for Class I, Division 1 operation inside the hazardous area.
- Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous. This applies to all connections including power, ground, serial, parallel, network and rear USB connections.
- Never use unshielded / ungrounded cables in hazardous locations.
- When enclosed, keep enclosure doors and openings closed at all times to avoid the accumulation of foreign matter inside the workstation.
- Use only non-incendive front USB configurations *(see page 69)*.

Failure to follow these instructions will result in death or serious injury.

Division 2 hazardous location regulations require that all cable connections be provided with adequate strain relief and positive interlock. Use only non-incendive USB devices as USB connections do not provide adequate strain relief to allow the use of Industrial Personal Computer USB connections *(see page 69)*. Never connect or disconnect a cable while power is applied at either end of the cable. All communication cables should include a chassis ground shield. This shield should include both copper braid and aluminum foil. The D-sub style connector housing must be a metal conductive type (for example, molded zinc) and the ground shield braid must be terminated directly to the connector housing. Do not use a shield drain wire.

The outer diameter of the cable must be suited to the inner diameter of the cable connector strain relief so that a reliable degree of strain relief is maintained. Always secure the D-Sub connectors to the workstation-mating connectors via the two screws located on both sides.

Operation and Maintenance

The systems have been designed for compliance with relevant spark ignition tests for front USB connection only.

⚠ DANGER

POTENTIAL FOR EXPLOSION

In addition to the other instructions in this manual, observe the following rules when installing the Industrial Personal Computer in a hazardous location:

- Wire the equipment in accordance with the National Electrical Code article 501.10 (B) for Class I, Division 2 hazardous locations.
- Install the Industrial Personal Computer in an enclosure suitable for the specific application. IP65 enclosures are recommended even when not required by regulations.
- The device must be installed in an end-use enclosure, which may only be opened by the use of a tool (tool secured enclosure).

Failure to follow these instructions will result in death or serious injury.

NOTE: IP65 is not part of UL certification.

Physical Overview

2

Subject of this Chapter

This chapter provides a physical overview of the Industrial Personal Computer.

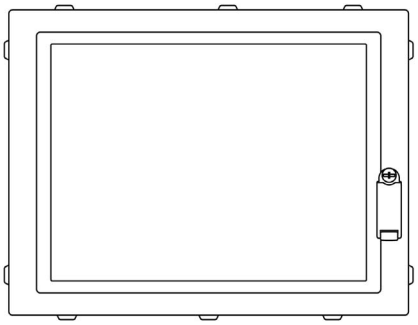
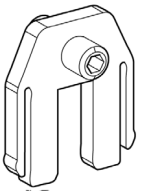
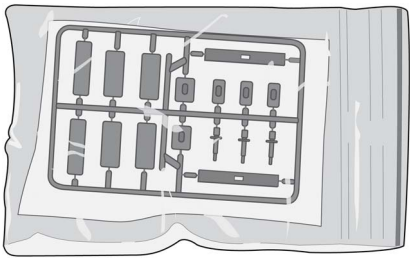
What Is in This Chapter?

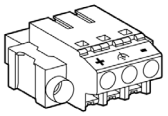
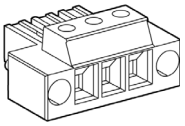
This chapter contains the following topics:

Package Contents

Items

The following items are included in the package of the Industrial Personal Computer. Before using the Industrial Personal Computer, confirm that all items listed here are present:

Industrial Personal Computer: 1	
Installation Fasteners: ● 10 per set only for Standard Models.	
Restore DVD-ROM containing the software required to reinstall the Operating System	
Documents	Warning/Caution Information (1) The MS Windows EULA PS4000 Series Installation Guide (1)
Connector Cover	

DC Terminal Block (For the DC Industrial Personal Computer only)	
AC Terminal Block (For the AC Industrial Personal Computer only)	

This Industrial Personal Computer has been carefully packed, with special attention to quality. However, should you find anything damaged or missing, contact your local distributor immediately.

Industrial Personal Computer - Description

Introduction

The following Industrial Personal Computer 12" - description shows the port interfaces, the expansion slots, the Slide-in Disk, the CFast slot and the power supplies.

During operation, surface temperatures of the heat sink may reach more than 70 °C (158 °F).

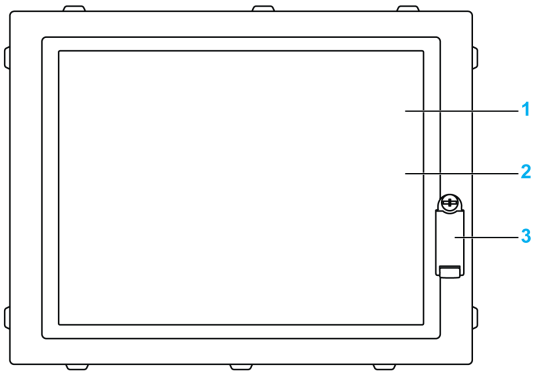
⚠ WARNING

RISK OF BURNS

Do not touch the surface of the heat sink during operation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Front View



1 Display
2 Touch panel
3 Front USB (USB5 max. 500 mA) with cover (Except for Rear Mount Model)

NOTE:

- The front USB is a diagnostic interface for service and maintenance.
- Front USB cover must be tighten with 0.55 ±0.05Nm (4.87 ±0.44 lb-in) to comply with degree of protection NEMA 4x Indoor and IP65.

⚠ CAUTION

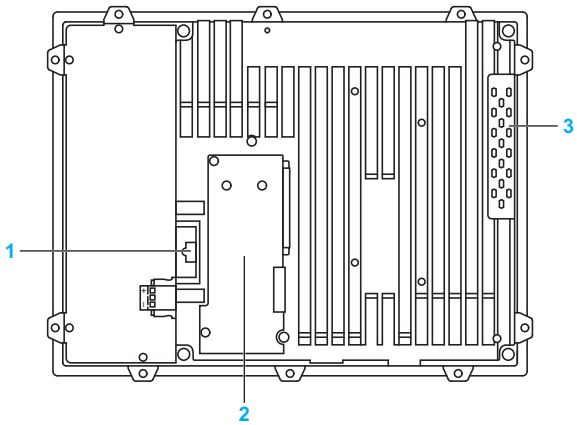
OVERTORQUE AND LOOSE HARDWARE

- Do not exert more than 0.55 ±0.05Nm (4.87 ±0.44 lb-in) of torque when tightening the screw of the Front USB cover. Tightening the screw with excessive force can damage the screw and cover.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

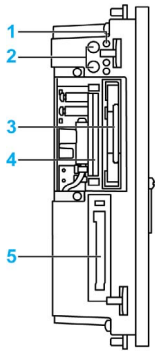
NOTICE
UNINTENDED EQUIPMENT OPERATION ● Do not use the front USB while the machine is in operation. ● Always keep the cover in place during normal operation. **Failure to follow these instructions can result in equipment damage.**

Rear View



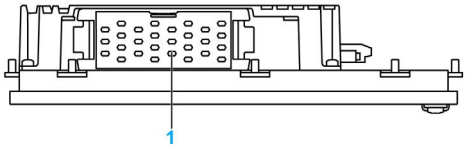
1 Battery
2 Interface modules cover
3 RAM HDD cover

Left View



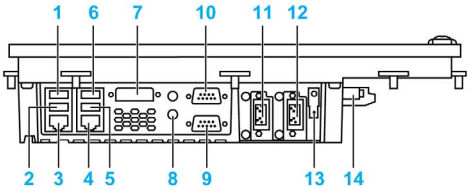
1 Status LEDs
2 Power/Reset buttons
3 Slide-in Disk
4 Main memory cards
5 CFast slot

Top View



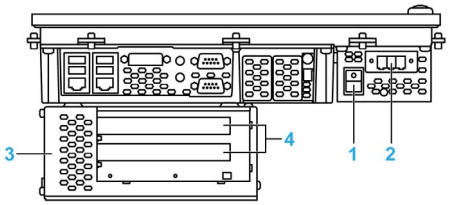
1 Location for optional fan necessary for the operation with HDD storage device into Slide-in Disk

Bottom View



1 USB2
2 USB1
3 ETH1 (10/100/1000 MBit)
4 ETH2 (10/100/1000 MBit)
5 USB3
6 USB4
7 DVI-I
8 MIC, Line IN, Line out
9 COM2
10 COM1
11 Add-on interface module slot 2 (IF2)
12 Add-on interface module slot 1 (IF1)
13 Ground connection
14 DC power connector

Bottom View for Industrial Personal Computer with AC Power Supply and Slot Expansion

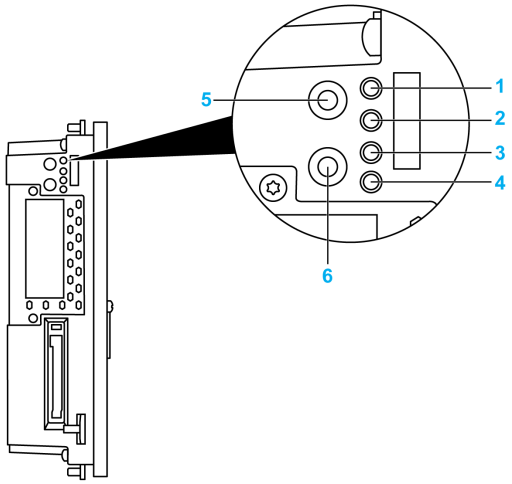


1 Power switch
2 AC power connector (with AC terminal block)
3 Slot expansion and Slide-in Slot
4 PCI / PCIe slot half size

Industrial Personal Computer LED and Push Button Description

LED Description

The following figure shows the LEDs and push button on the Industrial Personal Computer:



1 **[Power]** LED
2 **[HDD]** LED
3 **[Link]** LED
4 **[RUN]** LED
5 **[POWER]** button
6 **[RESET]** button

NOTE: Modifying products to install an HDD into a Slide-in Disk when it was not installed from factory, requires to change the unit firmware settings for proper behavior of the fan (that are required when running with HDD into a Slide-in Disk) - Please contact Pro-face support if you want to proceed such modification.

Status LED

The following table describes the meaning of the status LEDs on the Industrial Personal Computer:

LED	Color	State	Meaning
[Power]	Green	On	Supply voltage is OK.
		Flashing	The device has booted, the battery status is low. The data buffering is provided for approximately 500 hours from the point when the battery capacity is recognized as insufficient.
	Red	On	The system is in standby mode (S5: Soft-off mode or S4: hibernate mode - suspend-to-disk).
		Flashing	Not supported
	Green/Red	3 flash green 1 flash red	Faulty or incomplete BIOS, controller or I/O FPGA update, battery status OK, power supply OK.
		1 flash green 3 flash red	Faulty or incomplete BIOS, controller or I/O FPGA update, battery status OK, standby mode (S5: Soft-off mode or S4: hibernate mode - suspend-to-disk).
		Flashing green/red	Faulty or incomplete BIOS, controller or I/O FPGA update, battery status BAD, power supply OK.
		Flashing red/green	Faulty or incomplete BIOS, controller or I/O FPGA update, battery status BAD, standby mode (S5: Soft-off mode or S4: hibernate mode - suspend-to-disk).
[HDD]	Orange	On	Indicates IDE drive access (CFast, HDD, CD and so on).
[Link]	Orange	On/Flashing	Not supported
[Run]	Green	On/Flashing	Not supported

Power Button

Press the power button with a pointed object (for example, paper clip or tip of a pen).

The power button acts like the On/Off switch on a normal desktop PC with a controller power supply:

- Press and release: switches on the Industrial Personal Computer or shuts down the operating system and switches off the Industrial Personal Computer.
- Press and hold: controller power supply switches off without shutting down the Industrial Personal Computer (data could be lost!).

Pressing the power button does not reset the processor.

Reset button

Press the reset button with a pointed object (for example, paper clip or tip of a pen).

Pushing the reset button triggers a hardware and PCI reset. The Industrial Personal Computer restarts cold.

Pressing the reset button does not reset the processor.

Characteristics

3

Subject of this Chapter

This chapter lists the product characteristics.

What Is in This Chapter?

This chapter contains the following topics:

Industrial Personal Computer Characteristics

Characteristics of Celeron 827E Pre-installed Models

The characteristics of the Celeron 827E Pre-installed models are shown below:

Element		Characteristics		
		0 slot	**1 slot**	**2 slots**
Expansion Slots		–	1 = 1 PCI or PCIe	2 = 1 PCI + 1 PCIe or 2 = 2 PCI
Slide-in Slot		None	1 slide-in equipped with one of the following: ● DVD-RW ● or HDD, SSD, CFast (with Slide-in Disk Adapter unit) through Slide-in Slot Adapter unit	1 slide-in equipped with one of the following: ● DVD-RW ● or HDD, SSD, CFast (with Slide-in Disk Adapter unit) through Slide-in Slot Adapter unit
Intel® Chipset and Processor		Celeron M 827E 1.40 GHz + 1.5 MB (do not support RAID option)		
Cooling Method		Passive heat sink for the operation without HDD storage device into Slide-in Disk. Optional fan kit necessary for the operation with HDD storage device into Slide-in Disk.		
SDRAM		2 x DDR3 25.6 GB/s - 16 GB max		
Graphics	Controller	Intel® HD Graphics 3000		
	Video Memory	Up to 1 GB (reserved from main memory)		
	Color depth	32-bit (maximum)		
	RGB Resolution	350 MHz RAMDAC, up to 2048 x 1537 @75 Hz (QXGA)		
	DVI Resolution	Up to 1920 x 1200 (WUXGA)		
Slide-in Disk		1 slot equipped ● HDD, SSD or CFast with Slide-in Disk Adapter unit **NOTE:** Modifying products to install an HDD into a Slide-in Disk when it was not installed from factory, requires to change the unit firmware settings for proper behavior of the fan (that are required when running with HDD into a Slide-in Disk) - Please contact Pro-face support if you want to proceed such modification.		
CFast		TYPE-I 1SLOT		
Reset Button		Yes		
Buzzer		Buzzer support is depending on OS (for example, no support for Windows® 7 Ultimate (32-bit) and Windows® 7 Ultimate (64-bit).		
Industrial Personal Computer Weight	Standard Model	4.0 kg (8.81 lb)	4.1 kg (9.03 lb)	4.2 kg (9.26 lb)
	Rear Mount Model	3.9 kg (8.59 lb)	4.0 kg (8.81 lb)	4.1 kg (9.03 lb)

Characteristics of Core i3 Pre-installed Models

The characteristics of the Core i3 Pre-installed models are shown below:

Element		Characteristics		
		0 slot	**1 slot**	**2 slots**
Expansion Slots		–	1 = 1 PCI or PCIe	2 = 1 PCI + 1 PCIe or 2 = 2 PCI
Slide-in Slot		None	1 slide-in equipped with one of the following: ● DVD-RW ● or HDD, SSD, CFast (with Slide-in Disk Adapter unit) through Slide-in Slot Adapter unit	1 slide-in equipped with one of the following: ● DVD-RW ● or HDD, SSD, CFast (with Slide-in Disk Adapter unit) through Slide-in Slot Adapter unit
Intel® Chipset and Processor		Intel® Core™ i3-3217UE 1.60 GHz + 3 MB (support RAID option)		
Cooling Method		Passive heat sink for the operation without HDD storage device into Slide-in Disk. Optional fan kit necessary for the operation with HDD storage device into Slide-in Disk.		
SDRAM		2 x DDR3 25.6 GB/s - 16 GB max		
Graphics	Controller	Intel® HD Graphics 4000		
	Video Memory	Up to1 GB (reserved from main memory)		
	Color depth	32-bit (maximum)		
	RGB Resolution	350 MHz RAMDAC, up to 2048 x 1537 @75 Hz (QXGA)		
	DVI Resolution	Up to 1920 x 1200 (WUXGA)		
Slide-in Disk		1 slot equipped ● HDD, SSD or CFast with Slide-in Disk Adapter unit **NOTE:** Modifying products to install an HDD into a Slide-in Disk when it was not installed from factory, requires to change the unit firmware settings for proper behavior of the fan (that are required when running with HDD into a Slide-in Disk) - Please contact Pro-face support if you want to proceed such modification.		
CFast		TYPE-I 1SLOT		
Reset Button		Yes		
Buzzer		Buzzer support is depending on OS (for example, no support for Windows® 7 Ultimate (32-bit) and Windows® 7 Ultimate (64-bit).		
Industrial Personal Computer Weight	Standard Model	4.0 kg (8.81 lb)	4.1 kg (9.03 lb)	4.2 kg (9.26 lb)
	Rear Mount Model	3.9 kg (8.59 lb)	4.0 kg (8.81 lb)	4.1 kg (9.03 lb)

Display Characteristics

Element	12" Screen Size
Graphics	XGA TFT active matrix (1024 x 768 pixels)
Number of Colors	16 million
Brightness Control	Step less adjustment
Touch Sensitive Screen	Analog resistive film, resolution 4,096 x 4,096
Backlight	LED - Life span > 50,000 h @ 25 °C (77 °F)

Multiple touch operation on the Industrial Personal Computer having analog-resistive touch panel may cause unexpected input around the center of touched positions.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Do not touch simultaneously more than two point on the Industrial Personal Computer.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

DC Power Supply

Element	Characteristics
Rated Voltage	24 Vdc ±25 %
Power Consumption	130 W (max.)
Inrush Current	Typical 7 A, max. 60 A < 300 µs
Battery Backup	Optional UPS

AC Power Supply

Element	Characteristics
Rated Voltage	100...240 Vac
Frequency	50/60 Hz
Rated Current	0.6...2 A (max.)
Inrush Current	< 20 A (Cold restart, 100 % load, 100 Vac).
Battery Backup	Optional UPS

Operating Systems

Element	Characteristics
Operating System*1	HDD or SSD: Windows® XP Professional SP3/Windows® 7 Ultimate CFast*2: Windows® Embedded Standard 2009/Windows® Embedded Standard 7 Premium

*1 For details on languages supported by pre-installed operating systems, read "The List of OS Pre-installed Languages for Multi-language" (see page 40).

*2 For Windows® Embedded Standard 2009, CFast of 4 GB or more is required. For Windows® Embedded Standard 7 Premium, CFast of 8 GB or more is required.

The List of OS Pre-installed Languages for Multi-language

	Windows® XP Professional	Windows® 7 Ultimate	Windows® Embedded Standard 2009	Windows® Embedded Standard 7
Arabic	✓	✓	✓	*1
Bulgarian	✓	✓	—	*1
Chinese(Simplified)	✓	✓	✓	*1
Chinese(Traditional)	✓	✓	✓	*1
Croatian	✓	✓	—	*1
Czech	✓	✓	✓	*1
Danish	✓	✓	✓	*1
Dutch	✓	✓	✓	*1
English	✓	✓	✓	✓
Estonian	✓	✓	—	*1
Finnish	✓	✓	✓	*1
French	✓	✓	✓	✓
German	✓	✓	✓	✓
Greek	✓	✓	✓	*1
Hebrew	✓	✓	✓	*1
Hungarian	✓	✓	✓	*1
Italian	✓	✓	✓	✓
Japanese	✓	✓	✓	✓
Korean	✓	✓	✓	*1
Latvian	✓	—	—	*1
Lithuanian	✓	✓	—	*1
Norwegian	✓	✓	✓	*1
Polish	✓	✓	✓	*1
Portuguese	✓	✓	✓	*1
Portuguese(Brazil)	✓	✓	✓	*1
Romanian	✓	✓	—	*1
Russian	✓	✓	✓	*1
Serbian Latin	—	✓	—	*1
Slovak	✓	✓	—	*1
Slovenian	✓	✓	—	*1
Spanish	✓	✓	✓	✓
Swedish	✓	✓	✓	*1
Thai	✓	✓	—	*1
Turkish	✓	✓	✓	*1
Ukrainian	—	✓	—	*1

*1 The languages can be downloaded from Pro-face website "Otasuke Pro!".
http://www.pro-face.com/otasuke/

Industrial Personal Computer Interface Characteristics

Serial Interface

Element	Characteristics
Amount	2
Type	RS-232C, modem-capable, not electrically isolated
UART	16550-compatible, 16-byte FIFO
Transfer Rate	Maximum 115 kbps
Connection	D-Sub 9 pin, plug *(see page 68)*

USB Interface

Element	Characteristics
Type USB5[*1]	USB 2.0
Type USB1...4	USB 2.0 (USB 3.0: for Core i3 models with Windows® 7 or Windows® Embedded Standard 7)
Amount	5 (4 bottom side and 1 front side[*1])
Transfer Rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s), to super speed (5 GBit/s)
Connection	Type A *(see page 68)*
Current load	Maximum 500 mA per connection for USB5[*1] Maximum 1 A per connection for USB1, USB2, USB3 and USB4

*1 USB5 is Front USB equipped on the models except for Rear Mount Model.

Ethernet Interface

Element	Characteristics
Amount	2 x RJ45
Speed	10/100/1000 Mbit/s

NOTE: The serial, USB and Ethernet interfaces on this product have internal port numbers that may differ from their physical port numbers, such as “ETH1” or “USB1”, used for identification in this manual. As the internal port number assigned to the interface differs between operating systems, please check the interface in your environment.

Ethernet Interface Example) Physical port number on this product : ETH1 ETH2
Internal port number (Windows® 7) : LAN1 LAN2
Internal port number (Windows® XP) : LAN2 LAN1

Environmental Characteristics

Characteristics

The environmental characteristics of the Industrial Personal Computer are as follows:

Characteristics	Value	Standards
Degree of Protection	IP65, Type 4X (Indoor use only) ● when the front USB cover is closed on the models except for Rear Mount Model	IEC60529, UL50E
Pollution Degree	For use in Pollution Degree 2 environment	EN/IEC 61131-2
Surrounding air temperature during operation	0...50 °C (32...122 °F) ● when using HDD running with a fan kit, SSD or CFast 0...45 °C (32...113 °F): ● when using Gigabit Ethernet 5...45 °C (41...113 °F): ● when using DVD multi drive	EN/IEC 61131-2, UL 508
Storage temperature	– 20...60 °C (– 4...140 °F)	IEC 60068-2-2 tests Bb, IEC 60068-2-14 tests Na
Operating altitude	2000 m (6560 ft) max	EN/IEC 61131-2
Vibration		EN/IEC 60068-2-6 Fc
Operation (continuous) for products with SSD or CFast card storage device.	2...9 Hz: 1.5 mm 9...200 Hz: 4.9 m/s^2	
	5...8.4 Hz: 1.75 mm 8.4...150 Hz: 4.9 m/s^2	
Operation (continuous) for products with HDD storage device.	5...100 Hz: 1.225 m/s^2	
Operation (occasional) for products with SSD or CFast card storage device.	2...9 Hz: 3 mm 9...200 Hz: 9.8 m/s^2	
	5...8.4 Hz: 3.5 mm 8.4...150 Hz: 9.8 m/s^2	
Operation (occasional) for products with HDD storage device.	5...100 Hz: 2.450 m/s^2	
Shock Resistance (in operation)	147 m/s^2 for a duration of 11 ms	IEC 60068-2-27 Ea test
Surrounding air humidity during operation	10...85 % RH (Wet bulb temperature: 29 °C (84.2 °F) max. - no condensation)	EN/IEC 60068-2-78 Cab
Storage humidity	10...85 % RH (Wet bulb temperature: 29 °C (84.2 °F) max. - no condensation)	EN/IEC 60068-2-30 Db
Electromagnetic Compatibility (EMC)	Immunity to High Frequency Interference	EN/IEC 61131-2, IEC 61000-4-x
	Electromagnetic Emissions Class A	EN61000-6-4

NOTE: IEC 61131-2 and IP65 are not part of UL certification.

Dimensions/Assembly

4

Subject of this Chapter

This chapter describes Industrial Personal Computer dimensions and installation panels.

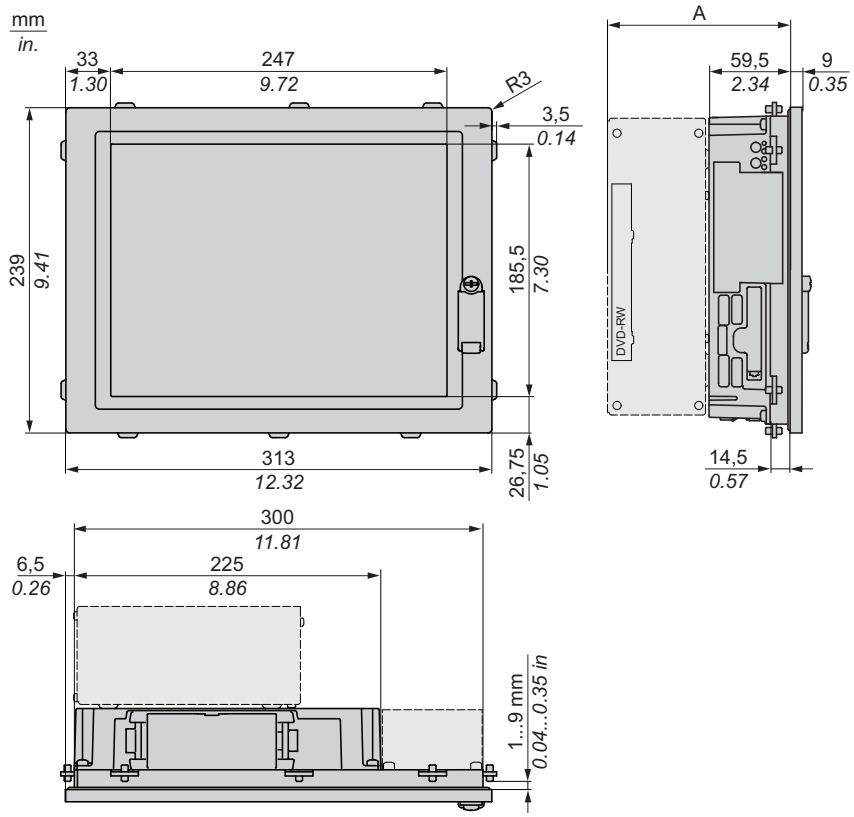
What Is in This Chapter?

This chapter contains the following topics:

Industrial Personal Computer Dimensions

Standard Models - 0, 1 and 2 Slot Dimensions

The figure shows the dimensions of the Industrial Personal Computer 12":



NOTE: Measurement “A” depends on the number of slot PCI/PCIe cards *(see page 45)*.

Values

The table provides the “A” measurement value:

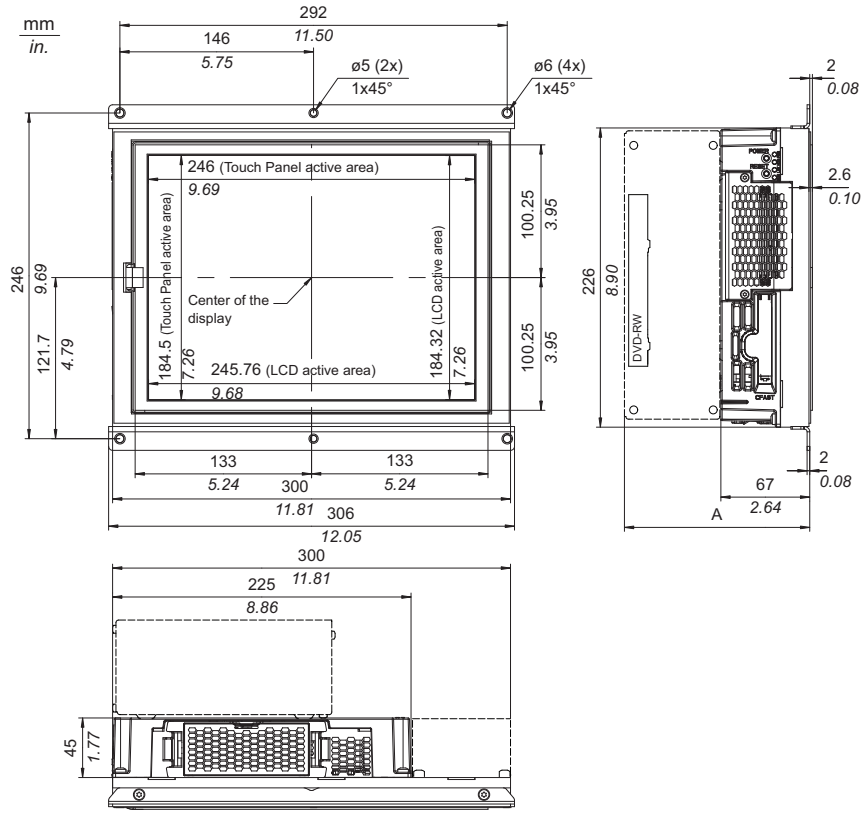
Industrial Personal Computer 12”	“A” Value
0 slot Industrial Personal Computer	59.5 mm (2.342 in.)
1 slot Industrial Personal Computer	114.2 mm (4.496 in.)
2 slots Industrial Personal Computer	134.5 mm (5.295 in.)

The table shows the general tolerance for the Industrial Personal Computer dimensions:

Nominal Measurement	General Tolerance acc. DIN ISO 2768 Medium
up to 6mm (up to 0.236 in.)	±0.1 mm (±0.004 in.)
over 6 to 30 mm (over 0.236 to 1.181 in.)	±0.2 mm (±0.0078 in.)
over 30 to 120 mm (over 1.18 to 4.724 in.)	±0.3 mm (±0.012 in.)
over 120 to 400 mm (over 4.724 to 15.747 in.)	±0.5 mm (±0.02 in.)

Rear Mount Model - 0, 1 and 2 Slot Dimensions

The figure shows the dimensions of the 12" Rear Mount Model :



NOTE: Measurement “A” depends on the number of slot PCI/PCIe cards *(see page 47)*.

Values

The table provides the “A” measurement value:

Industrial Personal Computer 12”	“A” Value
0 slot Industrial Personal Computer	67 mm (2.637 in.)
1 slot Industrial Personal Computer	121.7 mm (4.791 in.)
2 slots Industrial Personal Computer	142 mm (5.591 in.)

The table shows the general tolerance for the Industrial Personal Computer dimensions:

Nominal Measurement	General Tolerance acc. DIN ISO 2768 Medium
up to 6mm (up to 0.236 in.)	±0.1 mm (±0.004 in.)
over 6 to 30 mm (over 0.236 to 1.181 in.)	±0.2 mm (±0.0078 in.)
over 30 to 120 mm (over 1.18 to 4.724 in.)	±0.3 mm (±0.012 in.)
over 120 to 400 mm (over 4.724 to 15.747 in.)	±0.5 mm (±0.02 in.)

Installation Requirements

Important Mounting Information

Overheating can cause incorrect software behavior, therefore:

- Ensure that environmental characteristics *(see page 42)* are respected.
- The Industrial Personal Computer is only permitted for operation in closed rooms.
- The Industrial Personal Computer vent holes must not be covered.
- When mounting the Industrial Personal Computer, adhere to the allowable mounting angle.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Do not place the Industrial Personal Computer next to other devices that might cause overheating.
- Keep the Industrial Personal Computer away from arc-generating devices such as magnetic switches and non-fused breakers.
- Avoid using the Industrial Personal Computer in environments where corrosive gases are present.
- Install the Industrial Personal Computer in a location providing a minimum clearance of 10 mm (0.39 in.) or more on the left and right sides, 50 mm (1.96 in.) or more on the rear side, and 100 mm (3.93 in.) or more above and below the product from all adjacent structures and equipment.
- Install the Industrial Personal Computer with sufficient clearance to provide for cable routing and cable connectors.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ CAUTION

OPERATOR INJURY

- DO NOT touch the edge of mounting plate strongly.
- Confirm the finger position on mounting to avoid pinching operator's finger between the Industrial Personal Computer and mounting enclosures.

Failure to follow these instructions can result in injury or equipment damage.

⚠ CAUTION

EQUIPMENT DAMAGE

- Do not expose the Industrial Personal Computer in direct sunlight.

Failure to follow these instructions can result in injury or equipment damage.

NOTICE

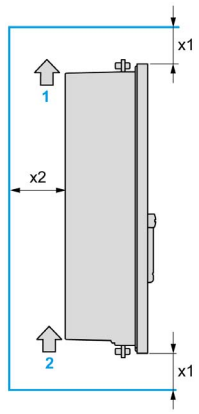
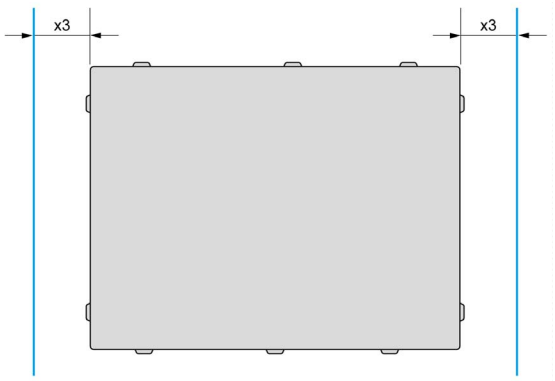
UNINTENDED EQUIPMENT DAMAGES

- Confirm the position of an enclosure and a touch panel and mount them carefully not to contact with them strongly, when you mount the Industrial Personal Computer onto enclosures.

Failure to follow these instructions can result in equipment damage.

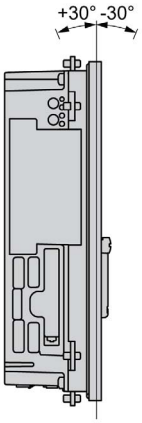
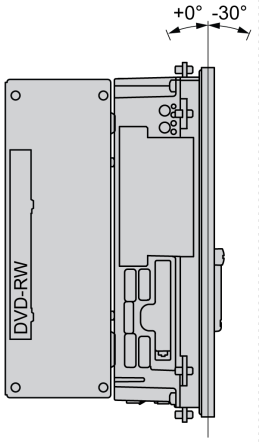
Spacing Requirements

In order to provide sufficient air circulation, mount the Industrial Personal Computer so that the spacing on the top, bottom, and sides is as follows:

Top, Bottom and Rear Sides	Left and Right Sides
 **1** Air out **2** Air in	
x1 > 100 mm (3.93 in.) **x2** > 50 mm (1.96 in.) **x3** > 10 mm (0.39 in.)	

Mounting Orientation

The figures show the allowable mounting orientation for the Industrial Personal Computer depending on the Slide-in Slot 1 option:

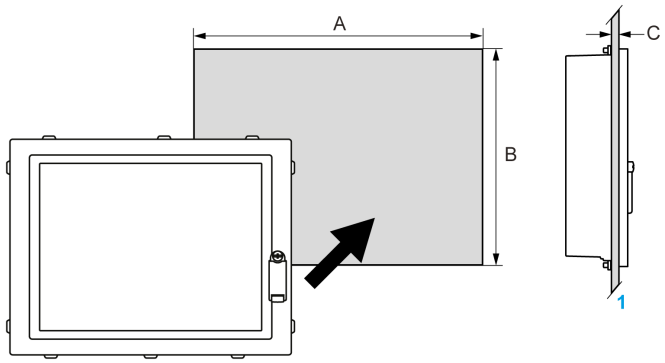
Without DVD-RW	With DVD-RW
	

Panel Cut Dimensions

For cabinet installation, you need to cut the correct sized opening in the installation panel.

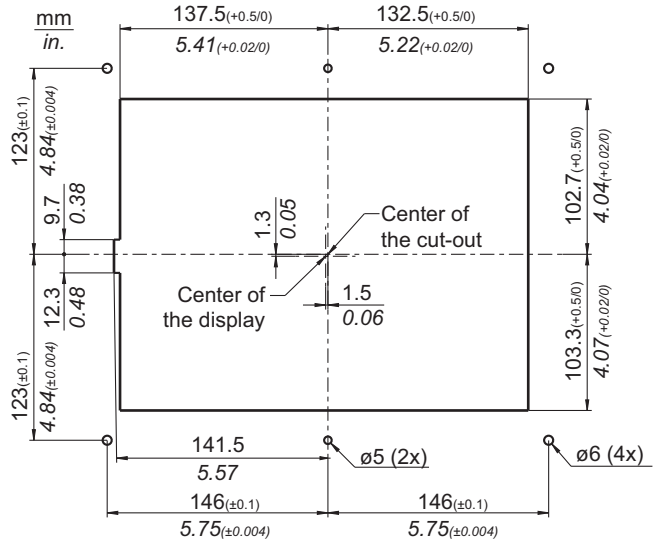
The dimensions of the opening for installing the Industrial Personal Computer are shown below:

Standard Models



1 Installation panel
A 301.5 +1/0 mm (11.87 +0.04/0 in.)
B 227.5 +1/0 mm (8.96 +0.04/0 in.)
C 1.6...9 mm (0.06...0.35 in.)

Rear Mount Models



NOTE:

- Ensure the thickness of the installation panel is from 1.6 to 9 mm (0.06 to 0.35 in.).
  (For Rear Mount Model, the thickness must be exactly 2.3 mm [0.09 in.].)
- All installation panel surfaces should be strengthened. Give due consideration to the weight of the Industrial Personal Computer, especially if high levels of vibration are expected and the installation panel can move. Attach metal reinforcing strips to the inside of the panel near the panel cut-out, to increase the strength of the installation panel.
- Ensure all installation tolerances are maintained.
- The Industrial Personal Computer is designed for use on a flat surface of a Type 4X enclosure (Indoor use only).

NOTE: The Slide-in Disk drive can only be exchanged without removing the Industrial Personal Computer unit from the control cabinet if the wall is less than 5.5 mm (0.216 in.) thick.

Industrial Personal Computer Installation

Vibration and Shocks

Take extra care with respect to vibration levels when installing or moving the Industrial Personal Computer. If the Industrial Personal Computer is moved, for example, while it is installed in a rack equipped with caster wheels, it can receive excessive shock and vibration.

⚠ CAUTION

EXCESSIVE VIBRATION

- Plan your installation activities so that shock and vibration tolerances in the unit are not exceeded.
- Ensure that the installation panel opening and thickness are within the specified tolerances.
- Before mounting the Industrial Personal Computer into a cabinet or panel, ensure that the installation gasket is in place. The installation gasket provides additional protection from vibration.
- Tighten the installation fasteners using a torque of 0.5 Nm (4.5 lb-in).

Failure to follow these instructions can result in injury or equipment damage.

Installation Gasket

Use of the installation gasket may help extend the operating life of your Industrial Personal Computer. The gasket is required to meet the protection ratings (IP65, IP20) of the Industrial Personal Computer and provides additional protection from vibration.

⚠ CAUTION

LOSS OF SEAL

- Inspect the gasket prior to installation or reinstallation, and periodically as required by your operating environment.
- Replace the complete Industrial Personal Computer if visible scratches, tears, dirt, or excessive wear are noted during inspection.
- Do not stretch the gasket unnecessarily or allow the gasket to contact the corners or edges of the frame.
- Ensure that the gasket is fully seated in the installation groove.
- Install the Industrial Personal Computer into a panel that is flat and free of scratches or dents.
- Tighten the installation fasteners using a torque of 0.5 Nm (4.5 lb-in).

Failure to follow these instructions can result in injury or equipment damage.

Slide-in Disk Drive

NOTE: The Slide-in Disk drive can only be exchanged without removing the Industrial Personal Computer Unit from the control cabinet if the wall is less than 5.5 mm (0.216 in) thick.

Installing the Industrial Personal Computer Unit

The installation gasket and installation fasteners are required when installing the Industrial Personal Computer.

⚠ CAUTION

OVERTORQUE AND LOOSE HARDWARE

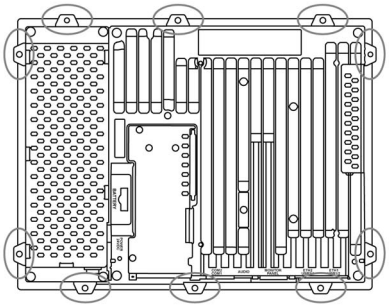
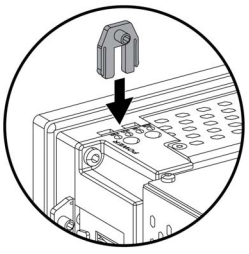
- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the plastic installation fastener.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

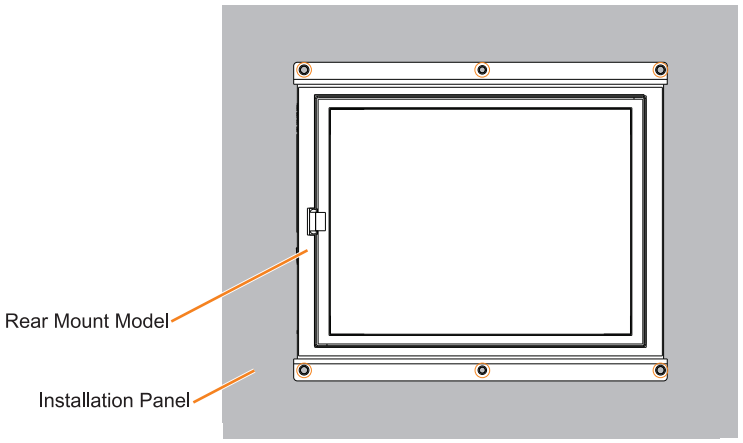
NOTE: The screw installation fasteners are required for Type 4X Indoor protection.

Follow the steps shown below when installing the Industrial Personal Computer:

Standard Models

Step	Action
1	Check that the gasket is correctly attached to the Industrial Personal Computer. **NOTE:** When checking the gasket, avoid contact with the sharp edges of the Industrial Personal Computer frame, and insert it completely into its groove.
2	Check whether the included mounting screws are screwed into the installation fasteners. If not, then the mounting screws must be screwed into the installation fasteners with a hex-head screwdriver. The mounting screws must only be screwed in far enough that they no longer protrude above the installation fastener.
3	Install the Industrial Personal Computer in the panel opening *(see page 50)*.
4	Insert each installation fastener securely into the slots at the top, bottom, left and right side of the Industrial Personal Computer:   The number of slots is 10. **NOTE:** You can purchase the installation fasteners as spare parts: reference PFXZPPAF10P2.
5	Use a 2.5 hexagon head screwdriver to tighten each of the fastener screws and secure the Industrial Personal Computer in place. **NOTE:** To ensure a high degree of moisture resistance, use a torque of 0.5 Nm (4.5 lb-in).
6	Ensure that the angle is tilted no more than mounting orientation requirements allow *(see page 49)*.

Rear Mount Models

Step	Action
1	Check that the gasket is correctly attached to the Industrial Personal Computer. **NOTE:** When checking the gasket, avoid contact with the sharp edges of the Industrial Personal Computer frame, and insert it completely into its groove.
2	Insert the Industrial Personal Computer into the back of the smooth, flat installation panel opening *(see page 50)*.
3	From the front, fasten the Industrial Personal Computer (using a torque 0.5 Nm [4.5 lb-in]) to the installation panel with 6 counter sink screws (2x M5 and 4x M6). The screws must be long enough to secure them with nuts on the opposite side. 

Implementation

II

Subject of this Part

This part describes setting up the product.

What Is in This Part?

This part contains the following chapters:

Getting Started

5

First Power-up

License Agreement

Limitations on your usage of the Windows® Operating System are noted in Microsoft's End User License Agreement (EULA). Read this document before first powering-up.

On first power-up of your Industrial Personal Computer, to customize and set the parameters for your system, refer to the "PS4000 Series Installation Guide".

Windows Embedded Standard 7 (WES7)

The WES7 is a modularized version of the Windows 7 Ultimate operating system that provides increased reliability and customizations not available in other Windows OS. It offers the power and familiarity of Windows in a compact, more reliable form.

WES7 is an operating system that features the Windows Embedded Core and many additional packages you can select to meet your specific application needs. Choosing only the necessary packages allows for an optimized operating system with a small footprint. Because WES7 is based on Windows 7 Ultimate, many compatible drivers, services, and applications for the Windows 7 operating system can also run on WES7. This greatly reduces development time by eliminating the need for custom drivers or conversion efforts.

WES7 also provides many tools for the customization of menus, boot screens, and dialog boxes. With WES7, you can remove the Windows boot and resume animations so the screen remains black during startup. You also can remove the Windows logo from the logon desktop background and all startup screens. Other common features of Windows include the message and dialog boxes. WES7 can filter these messages and keep them from appearing during run time. The developer can choose to hide any dialog box and predefine its default operation so it never displays to the user.

EWF Manager (Enhanced Write Filter Manager)

The Industrial Personal Computer operating system, Windows®, is installed on a memory card. This card is a re-writable CFast card that allows approximately 100,000 write operations.

The EWF Manager (Enhanced Write Filter Manager) minimizes the number of write operations to help extend the life of the CFast card. It loads temporary data (for example, system updates and software operations) into RAM, and does not write this information to the CFast card.

As a result, when using the EWF Manager, restarting the Industrial Personal Computer causes any changes the user made to the system to be overwritten. The following types of modifications may be overwritten if the EWF Manager is active and the system is restarted:

- Newly installed applications.
- Newly installed peripherals.
- Newly created or modified user accounts.
- Network configuration changes (for example, IP address, default gateway, and so on).
- Operating System customizations (for example, background pictures, and so on).

NOTICE
DATA AND CONFIGURATION LOSS ● Disable the EWF Manager before making any permanent changes to the hardware, software, or Operating System of the Industrial Personal Computer. Confirm that the EWF icon in the Windows system tray has a red “X”. ● Re-enable the EWF Manager after making permanent changes and confirm that the EWF icon in the Windows system tray does not have a red “X”. This can help extend the operating life of the CFast card. ● Back up all CFast card data regularly to another storage media. **Failure to follow these instructions can result in equipment damage.**

Enabling/Disabling the EWF Manager

You can change the status of the EWF Manager by running the `ChangeEWFState.exe` program located in the `C:\Utility\Change EWF State\` directory. After running this program, you need to restart the system for the change to take effect. You need administrator privileges to enable and disable the EWF Manager.

Right Click from Touch Screen Interface

To access **Right-click** function from the touch screen, keep touching the screen for 2 seconds and the corresponding **Right-click** function is activated (for instance, menu will display).

Calibrating a Touch Screen

If the touch position recognized in the panel deviates from the actual touch, you need to calibrate the touch screen. Select the [Start] -> [All Programs] -> [Touch] -> [Touch Screen Calibration]. When a cross appears on the screen, press it, then click [OK] to finish the calibration.

Industrial Personal Computer Connections

6

Subject of this Chapter

This chapter describes the connection of the Industrial Personal Computer to the main power supply. It also describes the USB ports and identifies the serial interface pin assignment.

What Is in This Chapter?

This chapter contains the following topics:

Grounding

Overview

The grounding resistance between the Industrial Personal Computer ground and the ground must be 100 Ω or less. When using a long grounding wire, check the resistance and, if required, replace a thin wire with a thicker wire and place it in a duct. In addition, refer to the table below for maximum lengths of various wire thicknesses.

Ground Wire Dimensions

Wire Cross-section	Maximum Line Length
2.5 mm^2 (AWG 13)	30 m (98 ft)
	60 m (196 ft) round trip.

Precaution

⚠ WARNING

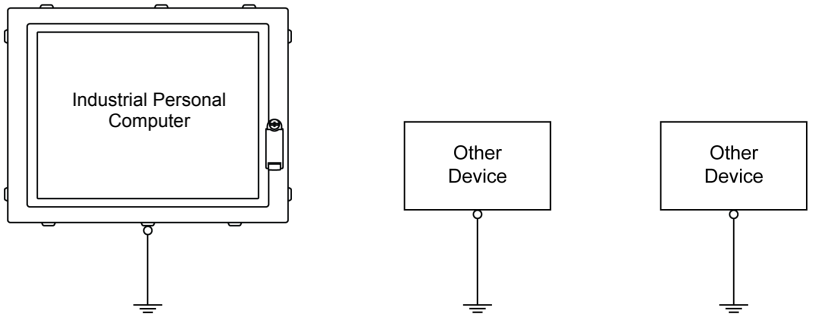
UNINTENDED EQUIPMENT OPERATION

- Use only the authorized grounding configurations shown below.
- Confirm that the grounding resistance is 100 Ω or less.
- Test the quality of your ground connection before applying power to the device. Excess noise on the ground line can disrupt operations of the Industrial Personal Computer.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

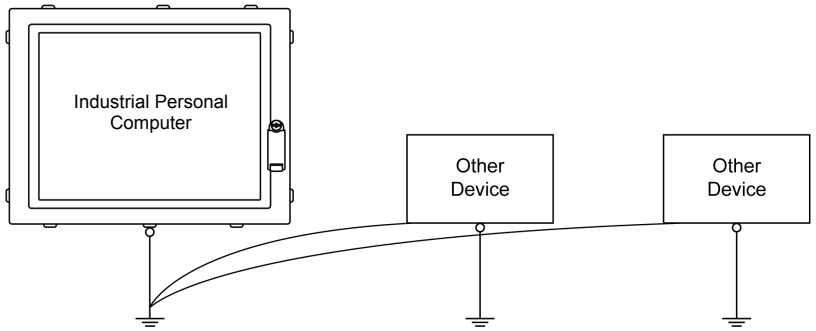
Dedicated Ground

Connect the Industrial Personal Computer ground to a dedicated ground:



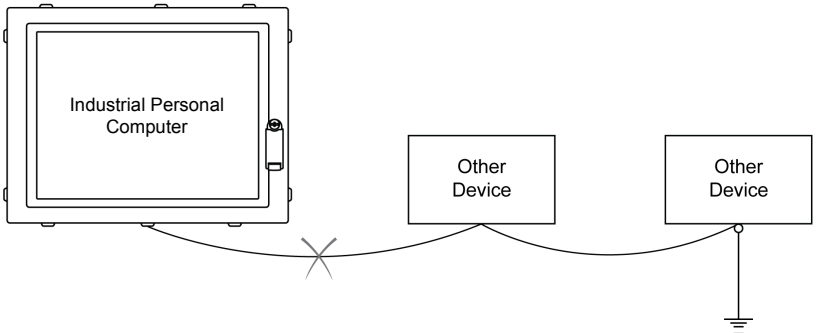
Shared Ground Allowed

If a dedicated ground is not possible, use a shared ground, as shown below:



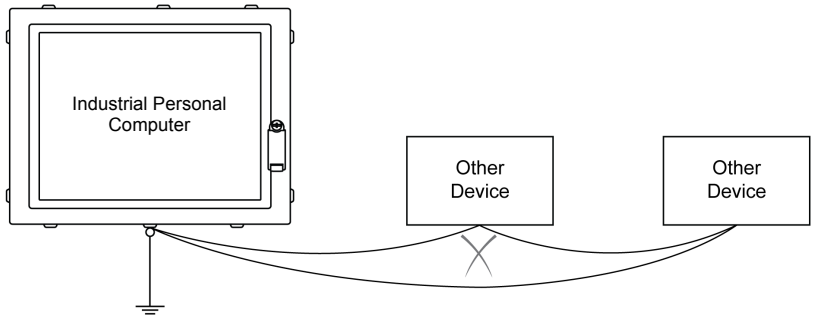
Shared Ground not Allowed

Do not connect the Industrial Personal Computer to ground through other devices using shared ground terminals:



Shared Ground - Avoid Ground Loop

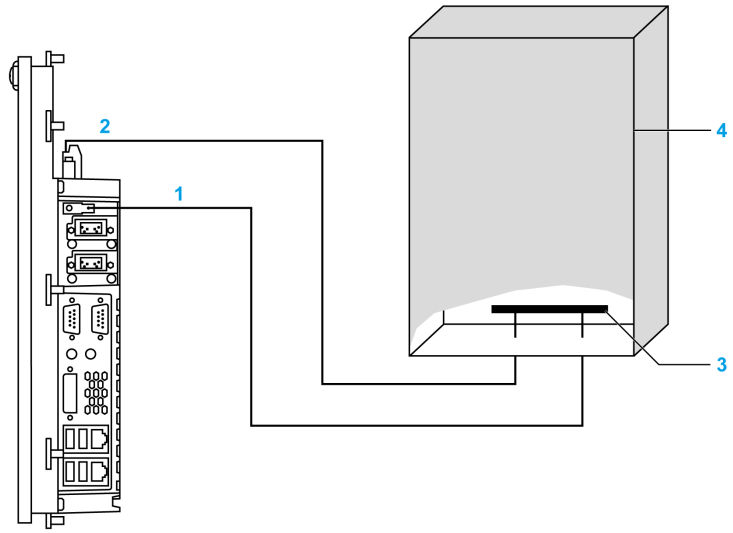
When connecting an external device to a Industrial Personal Computer with the shield ground (SG), ensure that a ground loop is not created. The Industrial Personal Computer's ground connection screw and SG are connected internally.



Grounding Procedure

The Industrial Personal Computer ground has 2 connections:

- DC Supply voltage *(see page 65)* or AC Supply voltage *(see page 67)*
- Ground connection pin



1 Ground connection pin (functional earth connection pin)
2 Supply voltage
3 Grounding strip
4 Switching cabinet

When grounding, follow the procedure below:

Step	Action
1	Check that the grounding resistance is 100 Ω or less.
2	When connecting the SG line to another device, ensure that the design of the system/connection does not produce a ground loop. **NOTE:** The SG and ground connection screw are connected internally in the Industrial Personal Computer.
3	Use 2.5 mm^2 (AWG 13) wire to make the ground connection. Create the connection point as close to the Industrial Personal Computer as possible and make the wire as short as possible.

Grounding I/O Signal Lines

⚠ DANGER

POTENTIAL FOR EXPLOSION

- Always confirm the ANSI/ISA 12.12.01 and CSA C22.2 N°213 hazardous location rating of your device before installing or using it in a hazardous location.
- To power on or power off a Industrial Personal Computer installed in a Class I, Division 2 hazardous location, you must either:
  - Use a switch located outside the hazardous environment, or
  - Use a switch certified for Class I, Division 1 operation inside the hazardous area.
- Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous. This applies to all connections including power, ground, serial, parallel, network and rear USB connections.
- Never use unshielded / ungrounded cables in hazardous locations.
- When enclosed, keep enclosure doors and openings closed at all times to avoid the accumulation of foreign matter inside the workstation.
- Use only non-incendive front USB configurations *(see page 69)*.

Failure to follow these instructions will result in death or serious injury.

Electromagnetic radiation may interfere with the control communications of the Industrial Personal Computer.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- If wiring of I/O lines near power lines or radio equipment is unavoidable, use shielded cables and ground one end of the shield to the Industrial Personal Computer ground connection screw.
- Do not wire I/O lines in proximity to power cables, radio devices, or other equipment that may cause electromagnetic interference.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Connecting the DC Power Cord

Precaution

When connecting the power cord to the power connector on the Industrial Personal Computer, first ensure that the power cord is disconnected from the DC power supply.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

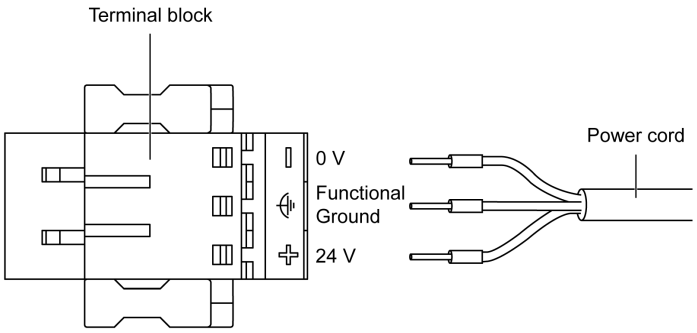
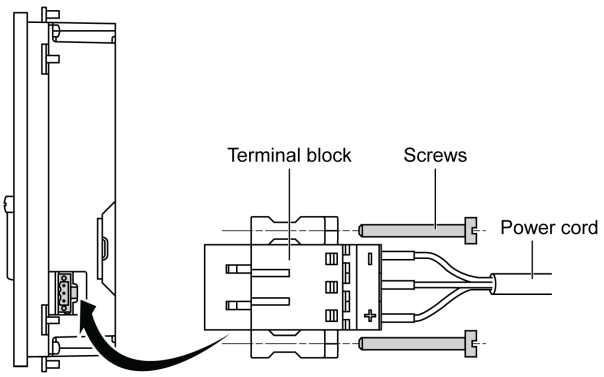
UNINTENDED EQUIPMENT OPERATION

- Ensure that power, communication, and accessory connections do not place excessive stress on the ports. Consider the vibration environment when making this determination.
- Securely attach power, communication, and external accessory cables to the panel or cabinet.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Wiring and Connecting the Terminal Block

The table below describes how to connect the power cord to the DC Industrial Personal Computer:

Step	Action
1	Remove all power from the Industrial Personal Computer and confirm that the DC power supply has been disconnected from its power source.
2	Remove the terminal block from the power connector and connect the power cord to the terminal block as shown below:  Use 75 °C (167 °F) wire. Use wire with cross-section 0.75 to 2.0 mm^2 (AWG 18 to AWG 14).
3	Place the terminal block in the power connector and tighten the screws.  **NOTE:** The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).

Connecting the AC Power Cord

Precaution

When connecting the power cord to the power connector on the Industrial Personal Computer, first ensure that the power cord is disconnected from the AC power supply.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

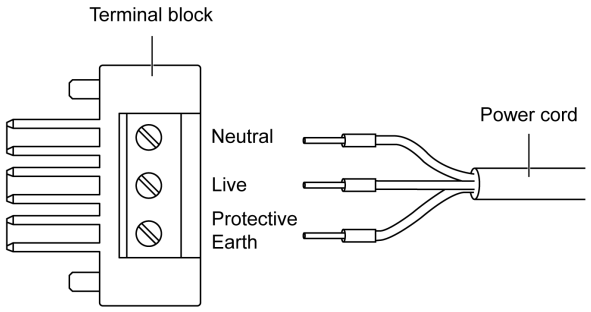
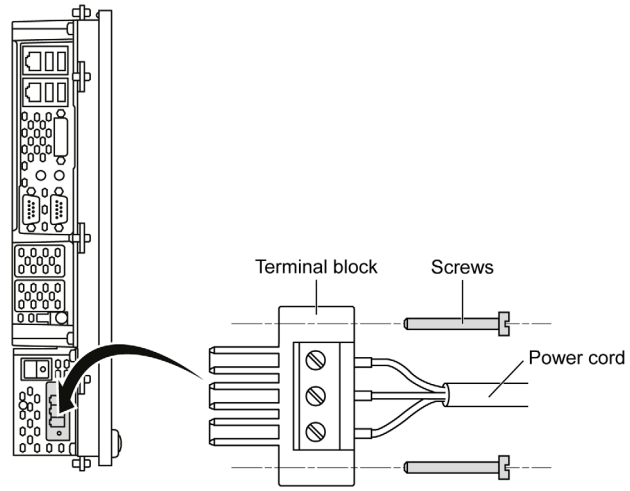
EQUIPMENT DISCONNECTION OR UNINTENDED EQUIPMENT OPERATION

- Ensure that power, communication, and accessory connections do not place excessive stress on the ports. Consider the vibration environment when making this determination.
- Securely attach power, communication, and external accessory cables to the panel or cabinet.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Wiring and Connecting the Terminal Block

The table below describes how to connect the power cord to the AC Industrial Personal Computer:

Step	Action
1	Confirm that the power cord is unplugged from the power supply.
2	Remove the AC terminal block from the power connector and connect the power cord to the AC terminal block as shown below:  Use 75 °C (167 °F) wire. Use wire with cross-section 0.75 mm^2 to 2.5 mm^2 (AWG 18 to AWG 12). Attach the wire ends with screws. Use a slot screwdriver (size 0.6 x 3.5) to tighten the connector screws. **NOTE:** Required torque is: 0.5...0.6 Nm (4.5...5.3 lb-in).
3	Place the terminal block in the power connector at the bottom side of the Industrial Personal Computer and tighten the screws:  **NOTE:** The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).

Industrial Personal Computer Interface Connections

Introduction

The information below describes usage of the interface connections of the Industrial Personal Computer in Class I, Division 2 Groups A, B, C, and D hazardous locations.

⚠ DANGER

POTENTIAL FOR EXPLOSION

- Always confirm the ANSI/ISA 12.12.01 and CSA C22.2 N°213 hazardous location rating of your device before installing or using it in a hazardous location.
- To power on or power off a Industrial Personal Computer installed in a Class I, Division 2 hazardous location, you must either:
  - Use a switch located outside the hazardous environment, or
  - Use a switch certified for Class I, Division 1 operation inside the hazardous area.
- Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous. This applies to all connections including power, ground, serial, parallel, network and rear USB connections.
- Never use unshielded / ungrounded cables in hazardous locations.
- When enclosed, keep enclosure doors and openings closed at all times to avoid the accumulation of foreign matter inside the workstation.
- Use only non-incendive front USB configurations *(see page 69)*.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

EQUIPMENT DISCONNECTION OR UNINTENDED EQUIPMENT OPERATION

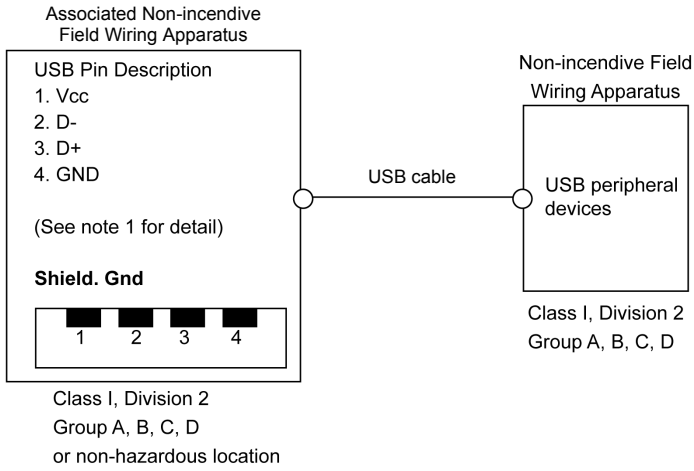
- Ensure that power, communication, and accessory connections do not place excessive stress on the ports. Consider the vibration environment when making this determination.
- Securely attach power, communication, and external accessory cables to the panel or cabinet.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Front USB Connections

Non-incendive equipment (keyboards, mouse) are permitted for use on the Industrial Personal Computer (Associated Non-incendive Field Wiring Apparatus) front USB 5. In addition to being non-incendive, any equipment connected to the front USB 5 must satisfy the following criteria.

The figure shows the USB cable wiring:



Notes:

1. The following table gives the Non-incendive Circuit Parameters:

Circuit Parameters	**USB port 5 (front USB)**
Open-circuit voltage = V_{oc}	4.96 V
Short-circuit current = I_{sc}	1180 mA
Associated capacitance = C_a	20 μF
Associated inductance = L_a	3.21 μH

The Entity Concept allows interconnection of non-incendive apparatus with associated apparatus – not specifically examined combinations – as a system when the approved values of V_{oc} (or U_o) and I_{sc} (or I_o) for the associated apparatus are less than or equal to Vmax (U_i) and Imax (I_i) for the non-incendive apparatus, and the approved values of C_a (C_o) and L_a (L_o) for the associated apparatus are greater than or equal to $C_i + C_{cable}$ and $L_i + L_{cable}$, respectively, for the non-incendive field wiring apparatus.

2. Non-incendive field wiring apparatus shall satisfy the following:

Industrial Personal Computer Associated Non-incendive Field Wiring Apparatus	**-**	**Non-incendive Field Wiring Apparatus (Mouse, Keyboard)**
V_{oc} I_{sc} C_a L_a	≤ ≤ ≥ ≥	V_{max} I_{max} $C_i + C_{cable}$ $L_i + L_{cable}$

3. If the electrical parameters of the cable are unknown, the following values may be used:

- C_{cable} = 196.85 pF/m (60 pF/ft)
- L_{cable} = 0.656 μH/m (0.20 μH/ft)

4. Wiring methods must be in accordance with the electrical code of the country in use.

The Industrial Personal Computer must be installed in an enclosure. If installed in a Class I, Division 2 Location, the enclosure must be capable of accepting one or more Division 2 wiring methods.

⚠ DANGER

POTENTIAL FOR EXPLOSION

- Substitution of any components may impair suitability for Class I, Division 2.
- Do not disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations.
- The associated non-incendive field wiring apparatus shall not be connected in parallel unless permitted by the associated non-incendive apparatus approval.

Failure to follow these instructions will result in death or serious injury.

The Industrial Personal Computer is suitable for use in Class I, Division 2, Groups A, B, C, D and provides non-incendive field wiring to apparatus in Class I, Division 2, Groups A, B, C, D.

Serial Interface Connections

This interface is used to connect Industrial Personal Computer to remote equipment, via an RS-232C cable. The connector is a D-Sub 9 pin plug connector.

By using a long PLC cable to connect to the Industrial Personal Computer, it is possible that the cable can be at a different electrical potential than the panel, even if both are connected to ground.

The Industrial Personal Computer serial port is not isolated. The SG (signal ground) and the functional ground (FG) terminals are connected inside the panel.

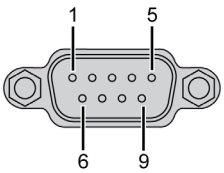
⚠ ⚠ DANGER

ELECTRIC SHOCK

- Make a direct connection between the ground connection screw and ground.
- Do not connect other devices to ground through the ground connection screw of this device.
- Install all cables according to local codes and requirements. If local codes do not require grounding, follow a reliable guide such as the US National Electrical Code, Article 800.

Failure to follow these instructions will result in death or serious injury.

The table shows the D-Sub 9 pin assignments:

Pin	Assignment	
1	DCD	D-Sub 9 pin plug connector: 
2	RXD	
3	TXD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Any excessive weight or stress on communication cables may disconnect the equipment.

⚠ CAUTION

LOSS OF POWER

- Ensure that communication connections do not place excessive stress on the communication ports of the Industrial Personal Computer.
- Securely attach communication cables to the panel or cabinet.
- Use only D-Sub 9 pin cables with a locking system in good condition.

Failure to follow these instructions can result in injury or equipment damage.

Configuration of the BIOS

7

What Is in This Chapter?

This chapter contains the following topics:

BIOS Options

General Information

BIOS stands for “Basic Input Output System”. It is the most basic communication between the user and the hardware. The BIOS used in the Industrial Personal Computer is produced by Pro-face.

The BIOS Setup Utility lets you modify basic system configuration settings. These settings are stored in CMOS and in an EEPROM (as a backup).

The CMOS data is buffered by a battery (if present), and remains in the Industrial Personal Computer even when the power is turned off (24 Vdc power supply is disconnected).

BIOS Setup and Boot Procedure

BIOS is immediately activated when switching on the power supply of the Industrial Personal Computer or pressing the power button. The system checks if the setup data from the EEPROM is OK. If the data is OK, then it is transferred to CMOS. If the data is not OK, then the CMOS data is checked for validity. A message appears if the CMOS data contains anomalies, but you can continue the boot procedure by pressing the [F1] key. To prevent the message from appearing at each restart, open the BIOS setup by pressing the [DEL] key and re-save the settings.

BIOS reads the system configuration information in CMOS RAM, checks the system, and configures it using the Power On Self Test (POST).

When these preliminaries are complete, the BIOS seeks the operating system from the data storage devices available (hard drive, floppy drive, and so on). BIOS launches the operating system and hands over to the operating system control of system operations.

To enter BIOS Setup, press the [DEL] key after the USB controller has been initialized, and as soon as the following message appears on the monitor (during POST): “Press DEL to run Setup”.

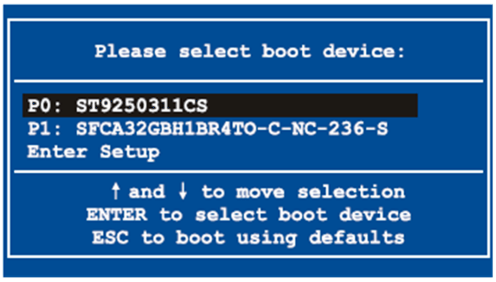
The figure shows an example BIOS startup screen:

NOTE: When you press the [DEL] key during startup, the Main BIOS setup menu appears *(see page 77)*.

BIOS Setup Keys

The following keys are enabled during the POST:

Key	Function
DEL	Enters the BIOS setup menu
F12	Using the [F12] key, you can boot from the network.

Key	Function
F11	Displays the boot menu. Lists all bootable devices that are connected to the system. Use the up cursor ↑ and down cursor ↓ and then press the [Enter] key to select the boot device. 
Pause	Pressing the [Pause] key stops the POST. Press any other key to resume the POST.

NOTE: Keys input from the USB keyboard are only registered after the USB controller has been initialized.

You can use the following keys after entering the BIOS setup:

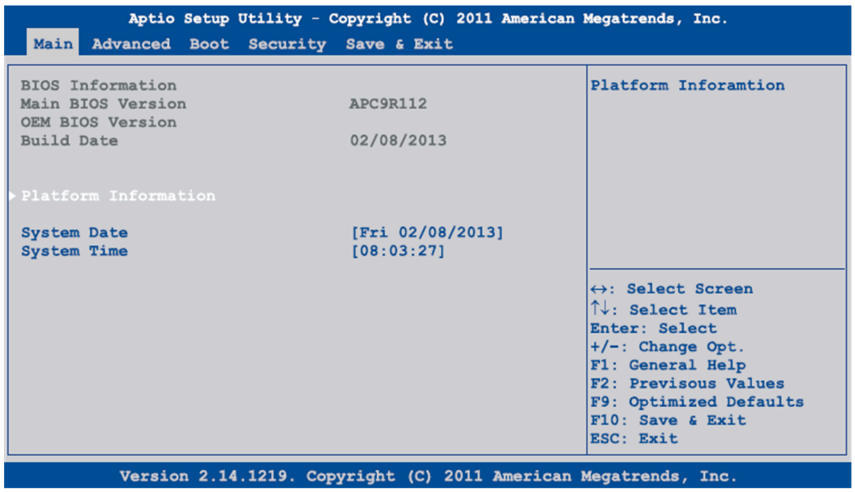
Key	Function
F1	General help.
Cursor ↑	Moves to the previous item.
Cursor ↓	Goes to the next item.
Cursor ←	Moves to the previous item.
Cursor →	Goes to the next item.
±	Changes the value of the selected item.
Enter	Changes to the selected menu.
PgUp ↑	Changes to the previous page.
PgDn ↓	Changes to the next page.
Start	Jumps to the first BIOS menu item or object.
End	Jumps to the last BIOS menu item or object.
F2/F3	Switches the colors of the BIOS setup.
F7	Resets any changes.
F9	Loads these settings for all BIOS configurations.
F10	Saves and closes BIOS setup.
Esc	Exits the submenu.

Main Menu

Main Menu

When you press the [DEL] key during startup, the **Main** BIOS setup menu appears.

The figure shows the **Main** menu:

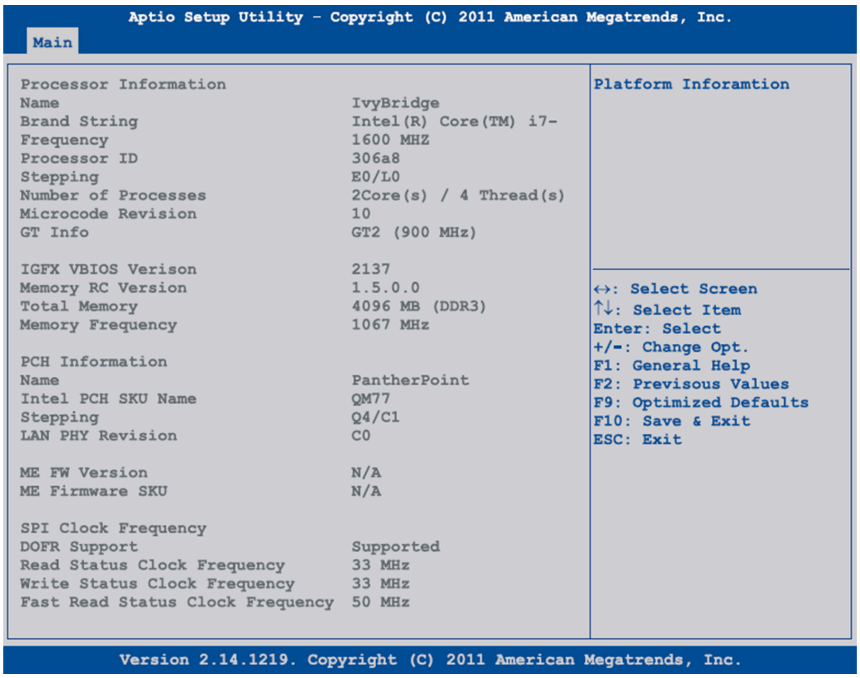


The table shows the **Main** menu setting options:

BIOS Setting	Description	Setting Options	Effect
BIOS Information	-	–	–
Main BIOS Version	Displays the BIOS detection.	None	
OEM BIOS Version	Displays the OEM BIOS detection.	None	
Build Date	Displays the date the BIOS was created.	None	
Platform Information	Displays information about the chipset, CPU board and main memory.	Enter	Opens the Platform information sub-menu.
System Date	This is the current system date setting. Buffered by a battery (CMOS battery) after the system has been switched off.	Changes to the system date	Sets the system date in the format mm:dd:yyyy (month:day:year).
System Time	This is the current system time setting. Buffered by a battery (CMOS battery) after the system has been switched off.	Adjustment of the system time	Sets the system time in the format hh:mm:ss (hours:minutes:seconds).

Platform Information

The figure shows the **Main** submenu:

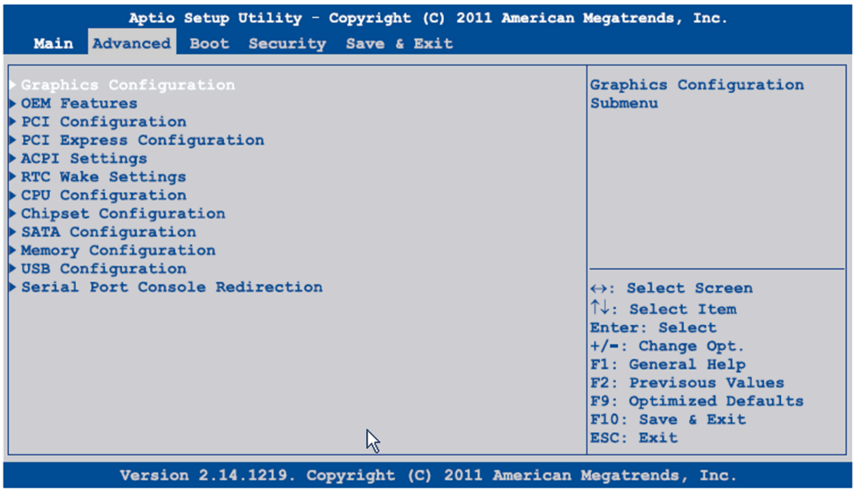


The table shows the **Platform Information** menu setting options:

BIOS Setting	Description	Setting Options	Effect
Processor Information			
Name	Displays the processor architecture.	None	–
Brand String	Displays the processor type.		
Frequency	Displays the processor frequency.		
Processor ID	Displays the processor ID.		
Stepping	Displays the processor stepping version.		
Number of Processors	Displays the processor core/threads.		
Microcode Revision	Displays the processor microcode revision.		
GT Info	Displays the GT information.		
IGFX VBIOS Version	Displays the IGFX VBIOS version.		
Memory RC Version	Displays the memory RC version.		
Total memory	Displays the total memory.		
Memory frequency	Displays the memory frequency.		
PCH information			
Name	Displays the platform controller hub.	None	–
Intel PCH SKU name	Displays the chipset on the CPU board.		
Stepping	Displays the chipset stepping version.		
LAN PHY Revision	Displays the LAN revision.		
ME FW Version	Displays the Intel management engine firmware version.		
ME Firmware SKU	Displays the Intel management stock keeping unit version.		
SPI Clock Frequency			
DOFR Support	Displays the DOFR support.	None	–
Read Status Clock frequency	Displays the read status clock frequency.		
Write Status Clock frequency	Displays the write status clock frequency.		
Fast Read Status Clock frequency	Displays the read status clock frequency.		

Advanced Menu - PCI and PCIe configuration - USB Configuration

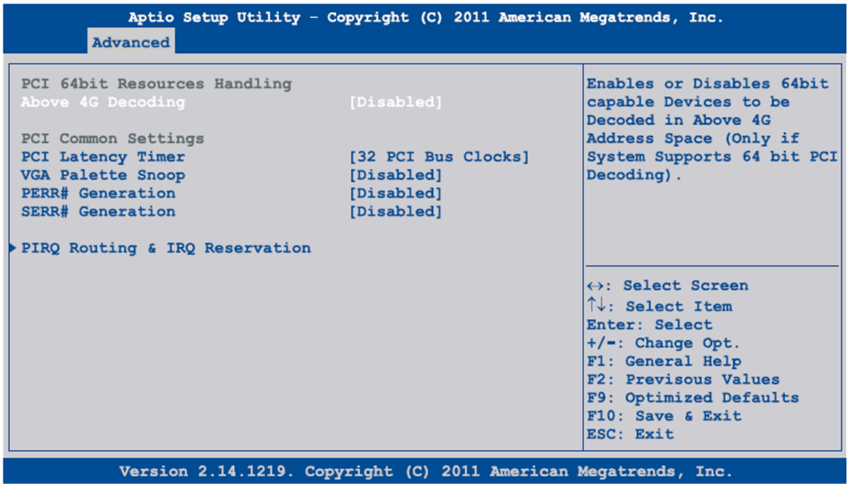
Advanced Menu



The table shows the accessible submenus from the **Advanced** menu:

BIOS Setting	Description	Setting Options	Effect
Graphics Configuration	Configures graphics settings.	Enter	Opens submenu
OEM Features	Configuration of OEM features.	Enter	Opens submenu
PCI Configuration	Configuration of PCI devices.	Enter	Opens submenu PCI Configuration
PCI Express Configuration	Configuration of PCI Express devices.	Enter	Opens submenu PCI Express Configuration
ACPI Settings	Configuration of ACPI settings.	Enter	Opens submenu PCI Configuration
RTC Wake Settings	Configuration of start time from being switched off.	Enter	Open submenu
CPU Configuration	Configures the CPU settings.	Enter	Opens submenu
Chipset Configuration	Configuration of chipset settings.	Enter	Opens submenu
SATA Configuration	Configuration of SATA settings.	Enter	Opens submenu
Memory Configuration	Configuration of main memory settings.	Enter	Opens submenu
USB Configuration	Configures USB settings.	Enter	Opens submenu PCI Configuration
Serial Port Console Redirection	Configures the keyboard/mouse options.	Enter	Opens submenu
Remote Access Configuration	Configures the remote access settings.	Enter	Opens submenu
CPU Board Monitor	Displays the current voltage and temperature of the processor	Enter	Opens submenu
Baseboard/Panel Features	Displays device-specific information and setup of device-specific values.	Enter	Opens submenu

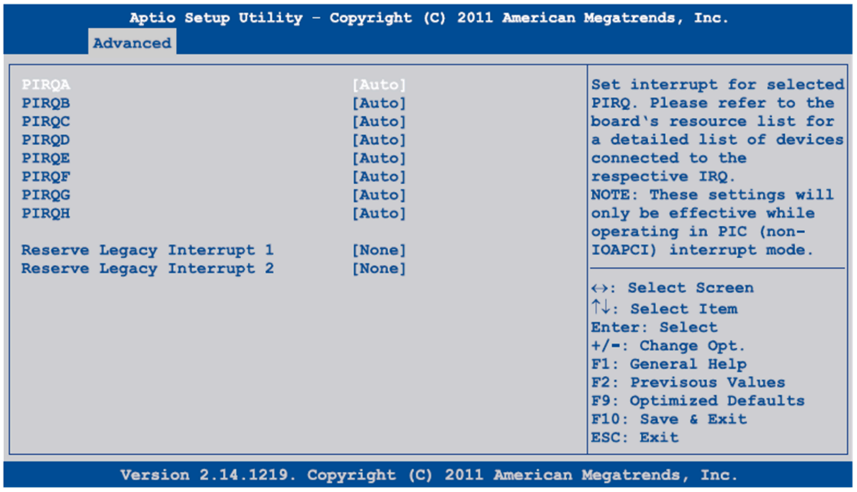
Advanced PCI Configuration



The table shows the **Advanced** PCI Configuration setting options:

BIOS Setting	Description	Setting Options	Effect
Above 4G Decoding	Option to enable/disable 64-bit capable devices to decode those in the address space above 4 GB (only if the system supports 64-bit decoding).	Disabled	Disables this function.
		Enabled	Enables this function.
PCI Latency Timer	This option controls how long (in PCI ticks) 1 PCI bus card can continue to use the master after another PCI card has requested access.	32...248 PCI bus clocks	Manually sets the value in PCI ticks.
VGA Palette Snoop	Option to support graphics cards with 256 colors. This option should set only to Enable if colors are not displayed correctly.	Disabled	Disables this function.
		Enabled	Enables this function.
PERR Number Generation	Option to generate a PERR signal (parity error detected). This signal indicates a data parity error detected 1 cycle after PAR.	Disabled	Disables this function.
		Enabled	Enables this function.
SERR Number Generation	Option to generate a SERR signal (system error). This signal indicates a data error or other type of system error for a special cycle command.	Disabled	Disables this function.
		Enabled	Enables this function.
PIRQ Routing & IRQ Reservation	Configuration of PIRQ routing.	Enter	Opens the submenu.
		Enabled	Enables this function.

Advanced PIRQ Routing & IRQ Reservation

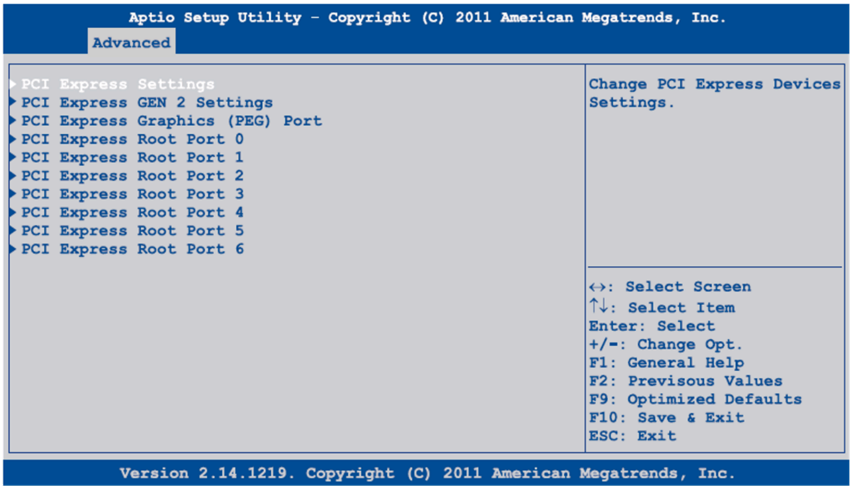


The table shows the **Advanced** PIRQ routing & IRQ reservation options:

BIOS Setting	Description	Setting Options	Effect
PIRQA	Option for setting the PIRQ A.	Auto	Automatic assignment by the BIOS and operating system.
		IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ14, IRQ15	Manual assignment.
PIRQB	Option for setting the PIRQ B.	Auto	Automatic assignment by the BIOS and operating system.
		IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ14, IRQ15	Manual assignment.
PIRQC	Option for setting the PIRQ C.	Auto	Automatic assignment by the BIOS and operating system.
		IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ14, IRQ15	Manual assignment.
PIRQD	Option for setting the PIRQ D.	Auto	Automatic assignment by the BIOS and operating system.

BIOS Setting	Description	Setting Options	Effect
PIRQE	Option for setting the PIRQ E.	Auto	Automatic assignment by the BIOS and operating system.
		IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ14, IRQ15	Manual assignment.
PIRQF	Option for setting the PIRQ F.	Auto	Automatic assignment by the BIOS and operating system.
		IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ14, IRQ15	Manual assignment.
PIRQG	Option for setting the PIRQ G.	Auto	Automatic assignment by the BIOS and operating system.
		IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ14, IRQ15	Manual assignment.
PIRQH	Option for setting the PIRQ H.	Auto	Automatic assignment by the BIOS and operating system.
		IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ14, IRQ15	Manual assignment.
Reserve Legacy Interrupt 1	The interrupt reserved here is not made available to a PCI or PCI Express device.	None	No interrupt is assigned.
		IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ14, IRQ15	IRQx is reserved.
Reserve Legacy Interrupt 2	The interrupt reserved here is not made available to a PCI or PCI Express device.	None	No interrupt is assigned.
		IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ14, IRQ15	IRQx is reserved.

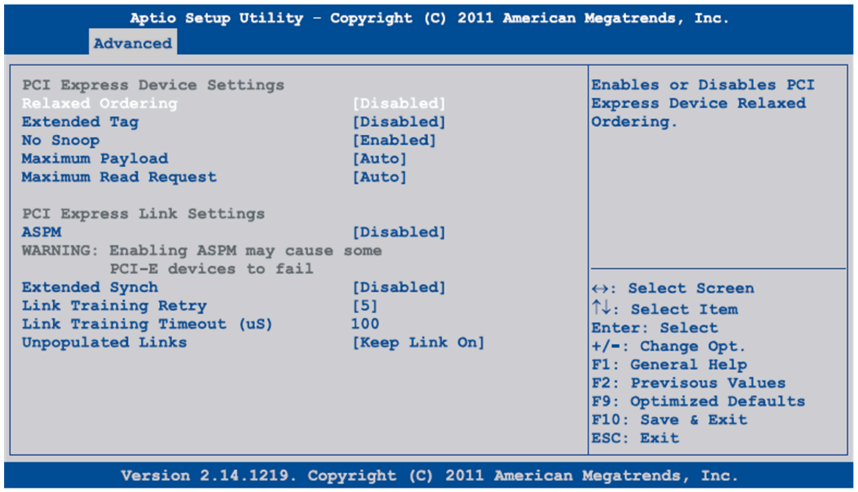
Advanced PCI Express Configuration Menu



The table shows the **Advanced** PCI Express Configuration Menu options:

BIOS Setting	Description	Setting Options	Effect
PCI Express Settings	Configuration of the PCI Express settings.	Enter	Opens the submenu.
PCI Express GEN 2 Settings	Configuration of the PCI Express GEN 2 settings.	Enter	Opens the submenu.
PCI Express Graphics (PEG) port	Configuration of the PCI Express graphics settings.	Enter	Opens the submenu.
PCI Express Root Port 0	Configuration of the PCI Express settings on Port 0.	Enter	Opens the submenu.
PCI Express Root Port 1	Configuration of the PCI Express settings on port 1.	Enter	Opens the submenu.
PCI Express Root Port 2	Configuration of the PCI Express settings on port 2.	Enter	Opens the submenu.
PCI Express Root Port 3	Configuration of the PCI Express settings on port 3.	Enter	Opens the submenu.
PCI Express Root Port 4	Configuration of the PCI Express settings on port 4.	Enter	Opens the submenu.
PCI Express Root Port 5	Configuration of the PCI Express settings on port 5.	Enter	Opens the submenu.
PCI Express Root Port 6	Configuration of the PCI Express settings on port 6.	Enter	Opens the submenu.

Advanced PCI Express Settings

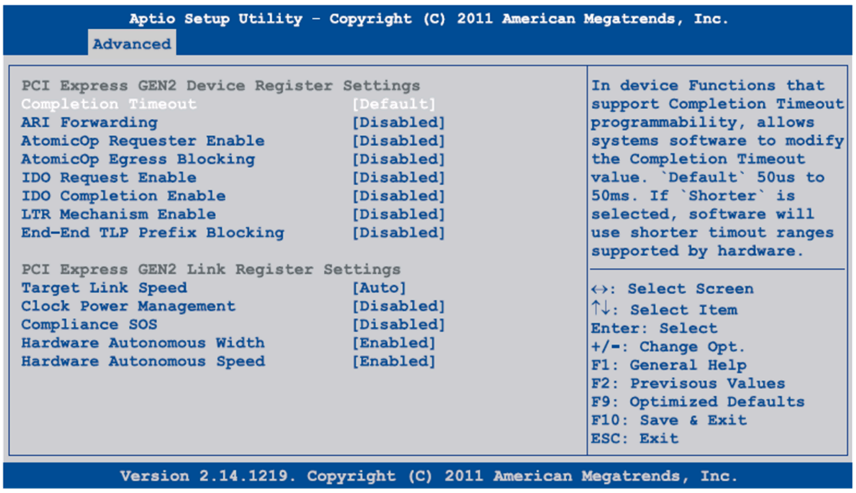


The table shows the **Advanced** PCI Express Settings options:

BIOS Setting	Description	Setting Options	Effect
Relaxed Ordering	Option to activate/deactivate relaxed ordering.	Disabled	Disables this function.
		Enabled	Enables this function.
Extended Tag	Option to activate/deactivate the extended tag.	Disabled	Disables this function. You can use only 5 bits.
		Enabled	Enables this function. You can use devices with 8 bits in the requester transaction ID field.
No Snoop	Option to activate/deactivate no snoop option.	Disabled	Disables this function.
		Enabled	Enables this function.
Maximum Payload	Option to set the maximum surface packet size for data transfer.	Auto	Automatic mapping of packet size.
		128...4096 bytes	Manual mapping of packet size.
Maximum Read Request	Option to set the maximum read request.	Auto	Automatic assignment.
		128...4096 bytes	Manual assignment.
ASPM[1]	Option to set a power-saving function (L0s/L1) for PCIE slots if they do not require full power.	Disabled	The energy saving function is disabled.
		Auto	Maximum energy savings. The energy saving function is set to L0 or L1.
		Force L0s	L0 mode is enabled.
Extended Synch	Option to set an extended synchronization to improve system performance.	Disabled	Disables this function.
		Enabled	Enables this function.
Link Training Retry	Option to define the number of times the software should attempt to reroute the link if the previous training attempt was unsuccessful.	Disabled	Disables this function.
		2	2 link training attempts.
		3	3 link training attempts.
		5	5 link training attempts.
1) ASPM = Active State Power Management.			

BIOS Setting	Description	Setting Options	Effect
Link Training Timeout (µs)	Option to define how many microseconds the software waits before the link training bit in the link status register is queried.	10...1000	Time setting in µs.
Unpopulated Links	Option to enable/disable PCIe slots where no devices are connected.	Keep on link	PCIe slots where no devices are connected remain enabled.
		Disable link	PCIe slots where no devices are connected are disabled to save power.
1) ASPM = Active State Power Management.			

Advanced PCI Express GEN 2 Settings

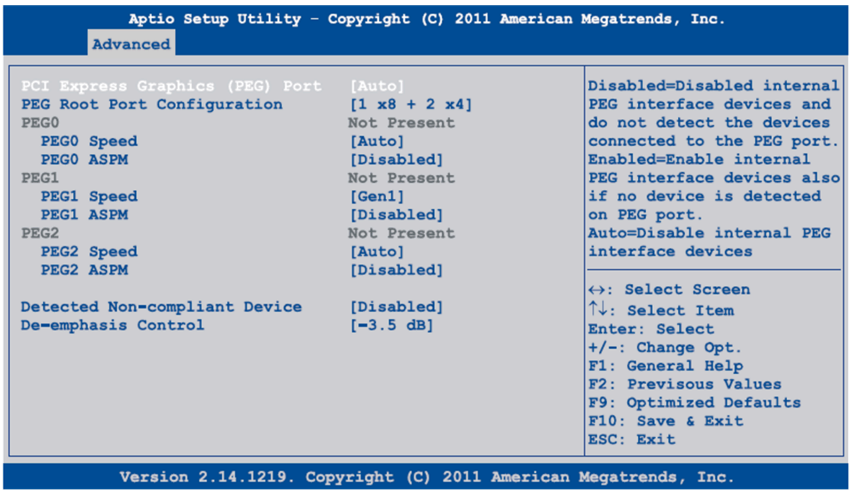


The table shows the **Advanced** PCI Express GEN 2 Settings options:

BIOS Setting	Description	Setting Options	Effect
Completion Timeout	In device functions that support a programmable completion timeout, the software permits modifying the completion timeout value.	Default	The timeout range is between 50 µs and 50 ms.
		Shorter	The software uses shorter timeout ranges that are supported by the hardware.
		Longer	The software uses longer timeout ranges that are supported by the hardware.
		Disabled	Disables this function.
ARI Forwarding	If supported by hardware and set to enabled, the downstream port disables its traditional device number field being 0 enforcement. When turning a Type1 Configuration Request into a Type0 configuration request, permitting access to Extended functions in an ARI device immediately below the port.	Disabled	Disables this function.
		Enabled	Enables this function. (ARI for Alternative Routing-ID Interpretation or Alternative Requester ID Interpretation).

BIOS Setting	Description	Setting Options	Effect
AtomicOp Requester Enable	Option to enable/disable the AtomicOp requester.	Disabled	Disables this function.
		Enabled	Enables this function. AtomicOp queries are only initiated when the bus master enable bit is set in the command register.
AtomicOp Egress Blocking	Option to enable/disable AtomicOp egress blocking. If supported by hardware and set to enabled, outbound AtomicOp requests via egress ports will be locked.	Disabled	Disables this function.
		Enabled	Enables this function. Outbound AtomicOp requests via the output port are blocked.
IDO Request Enable	If supported by hardware and set to enabled, this permits setting the number of ID-based ordering (IDO) bit (Attribute[2]) requests to be initiated.	Disabled	Disables this function.
		Enabled	Enables this function.
IDO Completion Enable	If supported by hardware and set to enabled, this permits setting the number of ID-based ordering (IDO) bit (Attribute[2]) requests to be initiated.	Disabled	Disables this function.
		Enabled	Enables this function.
LTR Mechanism Enable	If supported by hardware and set to enabled, this enables the Latency Tolerance Reporting (LTR) mechanism.	Disabled	Disables this function.
		Enabled	Enables this function.
End-End TLP Prefix Blocking	If supported by hardware and set to enabled, this function block forwards the TLPs containing End-End TLP prefixes.	Disabled	Disables this function.
		Enabled	Enables this function.
Target Link Speed	If supported by hardware and set to force to 2.5 GT/s for downstream ports, this sets an upper limit on link operational speed by restricting the values advertised by the upstream component in its training sequences. When Auto is selected hardware initialized data is used.	Auto	–
		Force to 2.5 GT/s	–
		Force to 5.0 GT/s	–
Clock Power Management	If supported by hardware and set to enabled, the device is permitted to use CLKREQ number signal for power management of link clock in accordance to protocol defined in appropriate from form factor specification.	Disabled	Disables this function.
		Enabled	Enables this function.
Compliance SOS	If supported by hardware and set to enabled, it forces the LTSSM to send SKP ordered sets between sequences when sending Compliance Pattern or Modified Compliance Pattern.	Disabled	Disables this function.
		Enabled	Enables this function.
Hardware Autonomous Width	If supported by hardware and set to disabled, it disables the hardware ability to change the width except width size reduction for correcting unstable link operation.	Disabled	Disables this function.
		Enabled	Enables this function.
Hardware Autonomous Speed	If supported by hardware and set to disabled, it disables the hardware ability to change link speed except speed size reduction for correcting unstable link operation.	Disabled	Disables this function. The PCIe device can no longer change the link speed except to correct unstable operation.
		Enabled	Enables this function.

Advanced PCI Express Graphics (PEG) Port



The table shows the **Advanced PCI Express Graphics (PEG) Port** options:

BIOS Setting	Description	Setting Options	Effect
PCI Express Graphics (PEG) Port	Option to set the PCI Express Graphics port.	Disabled	Internal PEG interface devices are disabled, and devices connected to the PEG port are not detected.
		Enabled	Internal PEG interface devices are enabled even if no device is detected on the PEG port.
		Auto	Internal PEG interface devices are disabled if no device is detected on the PEG port.
PEG Root Port Configuration	Option to select the root port configuration on the 16 PCIe channels of the PEG port.	1 x 16	Configuration with 1 x 16.
		2 x 8	Configuration with 2 x 8.
		1 x 8 + 2 x 4	Configuration with 1 x 8 and 2 x 4.
PEG0	Displays the mode in which the device connected to the PEG0 port is operated.	None	–
PEG0 Speed	Option for setting the maximum transfer rate for the PEG0 port.	Auto	The maximum transfer rate is selected.
		Gen1	The maximum transfer rate is 2.5 GT/s.
		Gen2	The maximum transfer rate is 5 GT/s.
		Gen3	The maximum transfer rate is 8 GT/s.

1) ASPM = Active State Power Management.
2) This setting is only possible when PEG0 ASPM is set to ASPM L0s or ASPM L0sL1.
3) This setting is only possible when PEG1 ASPM is set to ASPM L0s or ASPM L0sL1.
4) This setting is only possible when PEG2 ASPM is set to ASPM L0s or ASPM L0sL1.

BIOS Setting	Description	Setting Options	Effect
PEG0 ASPM[1]	Option for setting a power-saving function for the PEG0 port if it does not require full power.	Disabled	Disables this function.
		Auto	Automatic assignment by the BIOS and operating system.
		ASPM L0s	Enables the L0 energy saving function.
		ASPM L1	Enables the L1 energy saving function. Power consumption is lower than with L0, but the exit latency higher.
		ASPM L0sL1	Automatic assignment of L0s or L1 power-saving function by the PCIe device.
ASPM L0s[2]	Option for setting the L0 power-saving function.	Disabled	Disables this function.
		Root port only	Enables the power-saving function for the root port.
		Endpoint only	Enables the power-saving function for the endpoint port.
		Both root and endpoint ports	Enables the power-saving function for the root and endpoint ports.
PEG1	Displays the mode in which the device connected to the PEG1 port is operated.	None	–
PEG1 speed	Option for setting the maximum transfer rate for the PEG1 port.	Auto	The maximum transfer rate is selected.
		Gen1	The maximum transfer rate is 2.5 GT/s.
		Gen2	The maximum transfer rate is 5 GT/s.
		Gen3	The maximum transfer rate is 8 GT/s.
PEG1 ASPM[1]	Option for setting a power-saving function for the PEG1 port if it does not require full power.	Disabled	Disables this function.
		Auto	Automatic assignment by the BIOS and operating system.
		ASPM L0s	Enables the L0 energy saving function.
		ASPM L1	Enables the L1 energy saving function. Power consumption is lower than with L0, but the exit latency higher.
		ASPM L0sL1	Automatic assignment of L0s or L1 power-saving function by the PCIe device.

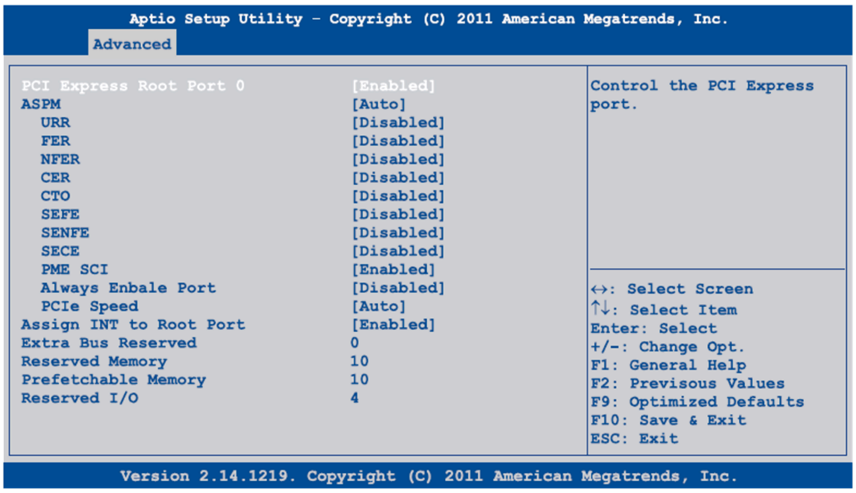
1) ASPM = Active State Power Management.
2) This setting is only possible when PEG0 ASPM is set to ASPM L0s or ASPM L0sL1.
3) This setting is only possible when PEG1 ASPM is set to ASPM L0s or ASPM L0sL1.
4) This setting is only possible when PEG2 ASPM is set to ASPM L0s or ASPM L0sL1.

BIOS Setting	Description	Setting Options	Effect
ASPM L0s[3]	Option for setting the L0 power-saving function.	Disabled	Disables this function.
		Root port only	Enables the power-saving function for the root port.
		Endpoint only	Enables the power-saving function for the endpoint port.
		Both root and endpoint ports	Enables the power-saving function for the root and endpoint ports.
PEG2	Displays the mode in which the device connected to the PEG1 port is operated.	None	–
PEG2 Speed	Option for setting the maximum transfer rate for the PEG2 port.	Auto	The maximum transfer rate is selected.
		Gen1	The maximum transfer rate is 2.5 GT/s.
		Gen2	The maximum transfer rate is 5 GT/s.
		Gen3	The maximum transfer rate is 8 GT/s.
PEG2 ASPM[1]	Option for setting a power-saving function for the PEG2 port if it does not require full power.	Disabled	Disables this function.
		Auto	Automatic assignment by the BIOS and operating system.
		ASPM L0s	Enables the L0 energy saving function.
		ASPM L1	Enables the L1 energy saving function. Power consumption is lower than with L0, but the exit latency higher.
		ASPM L0sL1	Automatic assignment of L0s or L1 power-saving function by the PCIe device.
ASPM L0s[4]	Option for setting the L0 power-saving function.	Disabled	Disables this function.
		Root port only	Enables the power-saving function for the root port.
		Endpoint only	Enables the power-saving function for the endpoint port.
		Both root and endpoint ports	Enables the power-saving function for the root and endpoint ports.
Detect non-compliant Device	Option for detecting incompatible PCI Express devices on the PEG port.	Disabled	Disables this function.
		Enabled	Enables this function. Even incompatible PCI Express devices are detected on the PEG port.
De-emphasis Control	Option for equalizing the PEG port.	-6 dB	-6 dB equalization.
		-3.5 dB	-3.5 dB equalization.

1) ASPM = Active State Power Management.
2) This setting is only possible when PEG0 ASPM is set to ASPM L0s or ASPM L0sL1.
3) This setting is only possible when PEG1 ASPM is set to ASPM L0s or ASPM L0sL1.
4) This setting is only possible when PEG2 ASPM is set to ASPM L0s or ASPM L0sL1.

Advanced PCI Express Root Port

> **⚠ WARNING**
>
> **UNGUARDED MACHINERY CAN CAUSE SERIOUS INJURY**
>
> Defining improper settings can cause instability or device problems. It is therefore, we strongly recommended that these settings only be changed by experienced users.
>
> **Failure to follow these instructions can result in death, serious injury, or equipment damage.**



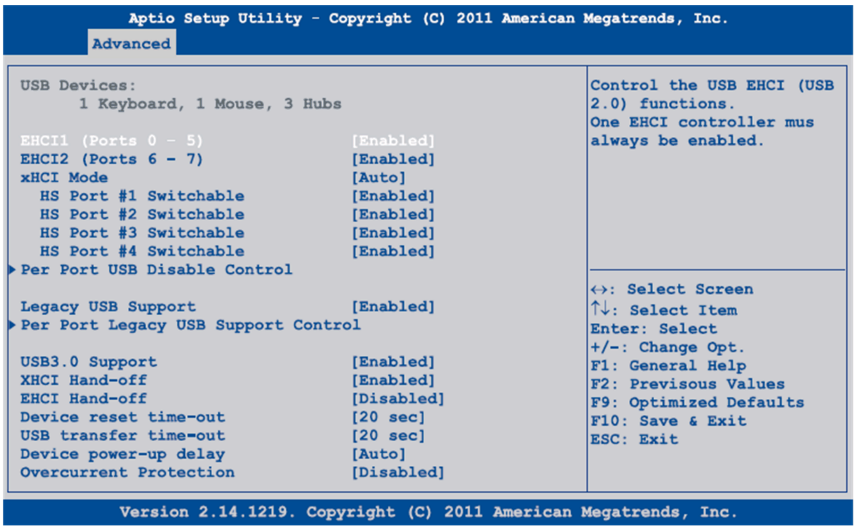
The table shows the **Advanced PCI Express Root Port** options:

BIOS Setting	Description	Setting Options	Effect
PCI Express Root Port x	This option is used to enable/disable the PCI Express root port.	Enabled	PCI Express root port 1 enabled.
		Disabled	PCI Express root port 1 and 2 are disabled.
ASPM	Active State Power Management Option for setting a power-saving function (L0s/L1) for PCIE devices if not required full power.	Disabled	Disables this function.
		L0s	Enables the L0 energy saving function.
		L1	Enables the L1 energy saving function. Power consumption is lower than with L0, but the exit latency higher.
		L0sL1	Automatic assignment of L0s or L1 power-saving function by the PCIe device.
		Auto	Automatic assignment by the BIOS and operating system.
URR	Unsupported Request (UR) reporting Option for reporting unsupported requests. Logging of error detected messages received by the root port is controlled exclusively by the Root Control Register.	Enabled	Enables this function.
		Disabled	Disables this function.

BIOS Setting	Description	Setting Options	Effect
FER	Fatal error reporting Option for reporting fatal errors detected. All of the functions in a multifunction device is monitored. The report for the root port takes place internally inside the root complex.	Enabled	Enables this function.
		Disabled	Disables this function.
NFER	Non-fatal error reporting Option for reporting non-fatal errors detected. All of the functions in a multifunction device is monitored. The report for the root port takes place internally inside the root complex.	Enabled	Enables this function.
		Disabled	Disables this function.
CER	Correctable error reporting Option for reporting non-fatal errors detected. All of the functions in a multifunction device is monitored. The report for the root port takes place internally inside the root complex.	Enabled	Enables this function.
		Disabled	Disables this function.
CT0	PCI Express completion timer T0 This option is used to enable/disable PCI Express Completion Timer. **NOTE:** If the system detected an ROB (Processor Reorder Buffer) Timeout, then this setting should be set to enabled.	Enabled	Enables this function.
		Disabled	Disables this function.
SEFE	System error on fatal error Option for generating a system error detected, if a fatal error detected is registered by a device on the root port or on the root port itself.	Enabled	Enables this function.
		Disabled	Disables this function.
SENFE	System error on non-fatal error Option for generating a system error detected, if a nonfatal error detected is registered by a device on the root port or on the root port itself.	Enabled	Enables this function.
		Disabled	Disables this function.
SECE	System error on correctable error Option for generating a system error detected if a correctable error detected is registered by a device on the root port or on the root port itself.	Enabled	Enables this function.
		Disabled	Disables this function.
PME SCI	Option for generating an SCI if power management is detected.	Enabled	Enables this function.
		Disabled	Disables this function.
Always Enable Port	Option to keep port constantly enabled.	Enabled	Enables this function.
		Disabled	Disables this function.
PCIe speed	Option for setting the PCI Express transfer rate.	Disabled	Disables this function.
		Auto	Transfer rate is set automatically.
		Gen1	The maximum transfer rate is 2.5 GT/s.
		Gen2	The maximum transfer rate is 5 GT/s.
Assign INT to Root Port	Option for enabling/disabling the IRQ for the root port.	Enabled	Enables this function.
		Disabled	Disables this function.

BIOS Setting	Description	Setting Options	Effect
Extra Bus Reserved	Option for setting extra bus reserved for bridges behind this root bridge.	0...7	–
Reserved Memory	Option for setting reserved memory for this root bridge.	0...20	–
Prefetchable Memory	Option for setting perfectible memory for this root bridge.	1...20	–
Reserved I/O	Option to configure a reserved I/O range (4K/8K/12K/16K/20K) for this root bridge.	4...20	–

Advanced USB Devices



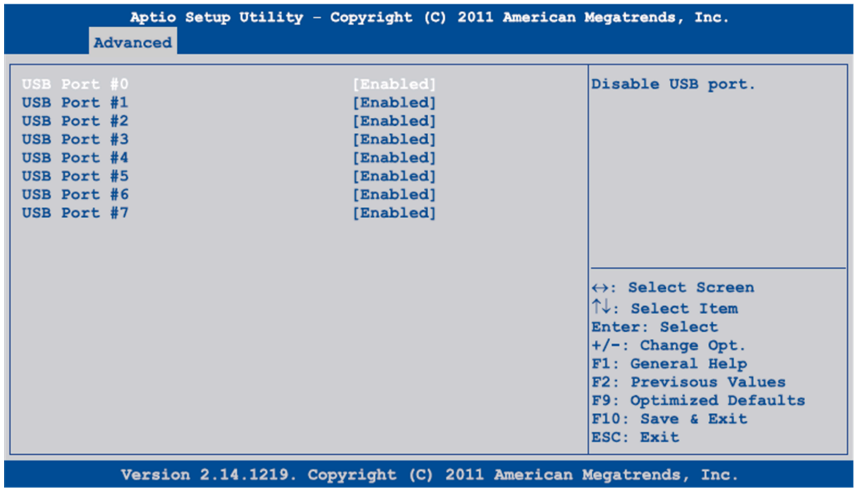
The table shows the **USB Configuration** menu setting options:

BIOS Setting	Description	Setting Options	Effect
EHCI1 (Ports 0...5)	Sets USB EHCI Controller 1 for USB ports number 0 through number 5 (USB1 through USB4 on the system unit, USB on the monitor/panel interface and the bus unit).	Enabled	Enables EHCI Controller 1.
		Disabled	Disables EHCI Controller 1.
EHCI2 (Ports 6...7)	Sets USB EHCI Controller 2 for USB ports number 6 through number 7 (USB5 on the system unit, USB on the monitor/panel option).	Enabled	Enables EHCI Controller 2.
		Disabled	Disables EHCI Controller 2.

BIOS Setting	Description	Setting Options	Effect
xHCI Mode	Option for setting the xHCI controller.	Smart auto	The USB 3.0 ports are not handled as USB 3.0 until after the operating system has started. Before that they are handled as USB 2.0 ports. If the Industrial Personal Computer is rebooted, then the USB 3.0 ports are handled as USB 3.0 during the boot process.
		Auto	During the BIOS boot procedure, USB 3.0 ports are handled as USB 2.0 ports. They are not handled as USB 3.0 ports until after the operating system has started and loaded the USB 3.0 driver.
		Enabled	The xHCI controller is enabled and USB 3.0 ports are always identified as such.
		Disabled	The xHCI controller is disabled. All USB 3.0 ports become USB 2.0 ports.
HS Port Number 1 Switchable	Option to switch HS port 1 between xHCI and EHCI.	Disabled	Port 1 is routed to EHCI and operated with maximum USB 2.0.
		Enabled	Port 1 is routed to xHCI. The corresponding SS port is enabled.
HS Port Number 2 Switchable	Option to switch HS port 2 between xHCI and EHCI.	Disabled	Port 2 is routed to EHCI and operated with maximum USB 2.0.
		Enabled	Port 2 is routed to xHCI. The corresponding SS port is enabled.
HS Port Number 3 Switchable	Option to switch HS port 3 between xHCI and EHCI.	Disabled	Port 3 is routed to EHCI and operated with maximum USB 2.0.
		Enabled	Port 3 is routed to xHCI. The corresponding SS port is enabled.
HS Port Number 4 Switchable	Option to switch HS port 4 between xHCI and EHCI.	Disabled	Port 4 is routed to EHCI and operated with maximum USB 2.0.
		Enabled	Port 4 is routed to xHCI. The corresponding SS port is enabled.
HS Port Number 1 Switchable	Option to switch HS port 1 between xHCI and EHCI.	Disabled	Port 1 is routed to EHCI and operated with maximum USB 2.0.
		Enabled	Port 1 is routed to xHCI. The corresponding SS port is enabled.

BIOS Setting	Description	Setting Options	Effect
Per port USB Disable Control	Option to enable/disable individual USB ports.	Enter	Opens the submenu.
Legacy USB support	Option for setting legacy USB support. USB ports do not function during startup. USB is supported again after the operating system has started. A USB keyboard is still recognized during the POST.	Enabled	Enables this function.
		Disabled	Disables this function.
		Auto	Automatic enabling.
Per port Legacy USB Support Control	Option to enable/disable legacy support for individual USB ports.	Enter	Opens the submenu.
USB3.0 Support	Option for enabling or disabling USB 3.0 mode.	Enabled	All USB 3.0 ports run in USB 3.0 mode.
		Disabled	All USB ports run in USB 2.0 or 1.1 mode.
XHCI Hand-off	Option for setting support for operating systems without a fully automated XHCI function.	Enabled	Enables USB 3.0 support.
		Disabled	Disables this function. With operating systems that do not have a fully automated XHCI function, USB devices are only operated with USB 2.0.
EHCI Hand-off	Option for setting support for operating systems without a fully automated EHCI function.	Disabled	Disables this function. With operating systems that do not have a fully automated EHCI function, USB devices are only operated with USB 1.1.
		Enabled	Enables USB 3.0 support.
Device Reset Timeout	The waiting time that the USB device POST requires after the device start command set.	10 seconds, 20 seconds, 30 seconds, 40 seconds	Value in seconds.
USB Transfer Timeout	Option to set the timeout value for control, bulk, and interrupt transfer.	1 second, 5 seconds, 10 seconds, 20 seconds	Value in seconds.
Device Power-up Delay	Option to set the maximum time to wait for a USB device to report to the host controller.	Auto	The maximum time is set automatically. For a root port, 100 ms is set, for a hub port, the data from the hub descriptor is used.
		Manual	You can enter the maximum time manually using the option device power-up delay in seconds.
Device Power-up Delay	Option to set the device power-up delay manually.	1...40	Value in seconds. This setting is only possible if ***Device power-up delay*** is set to ***Manual***.
Overcurrent Protection	Option to set overcurrent protection for all USB ports.	Disabled	Disables this function.
		Enabled	Enables this function.

Advanced Per Port USB Disable Control

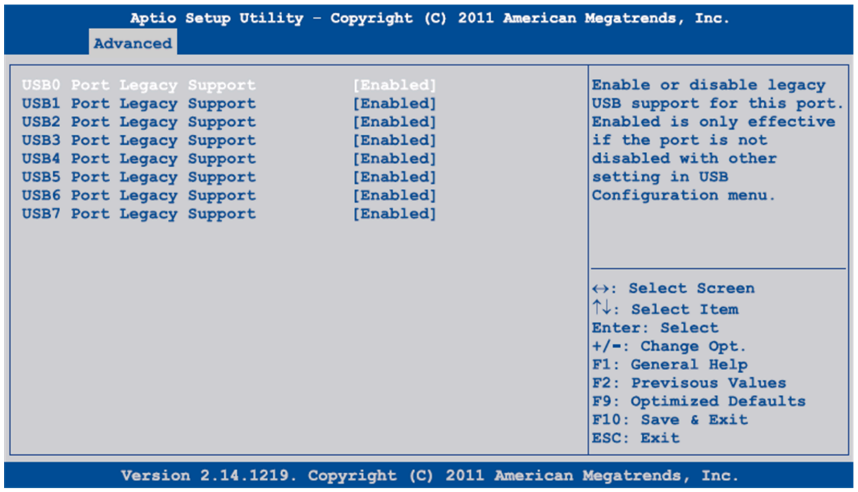


The table shows the **Per Port USB Disable Control** options:

BIOS Setting	Description	Setting Options	Effect
USB Port number 0	Option to enable/disable the USB4 port.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB Port number 1	Option to enable/disable the USB2 port.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB Port number 2	Option to enable/disable the USB3 port.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB Port number 3	Option to enable/disable the USB1 port.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB Port number 4	Option to enable/disable the USB port on the bus unit.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB Port number 5	Option to enable/disable the USB port on the monitor/panel interface.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB Port number 6	Option to enable/disable the USB5.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB Port number 7[*1]	Option to enable/disable the USB port on the monitor/panel option.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.

*1 This setting is for Front USB.

Advanced Per Port Legacy USB Support Control

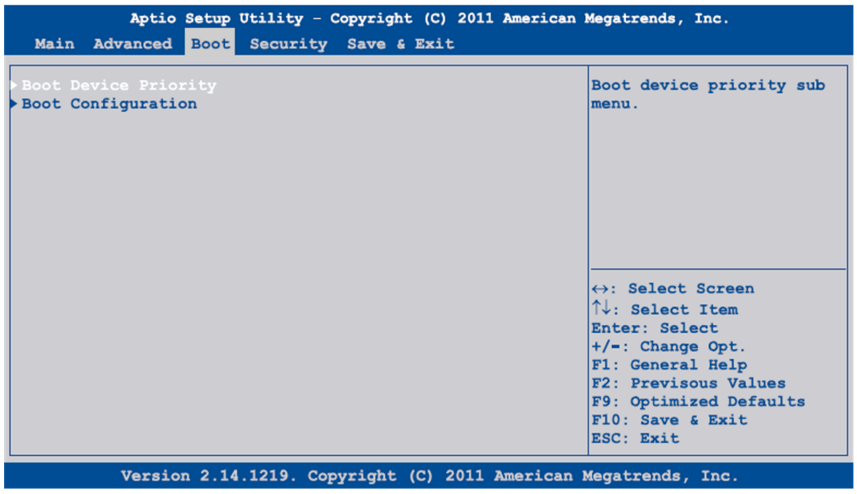


The table shows the **Per Port Legacy USB Support Control** options:

BIOS Setting	Description	Setting Options	Effect
USB0 Port Legacy Support	Option to enable/disable legacy support for the USB4 port.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB1 Port Legacy Support	Option to enable/disable legacy support for the USB2 port.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB2 Port Legacy Support	Option to enable/disable legacy support for the USB3 port.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB3 Port Legacy Support	Option to enable/disable legacy support for the USB1 port.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB4 Port Legacy Support	Option to enable/disable USB port legacy support on the bus unit.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB5 Port Legacy Support	Option to enable/disable USB port legacy support on the monitor/panel interface.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB6 Port Legacy Support	Option to enable/disable USB port legacy support for the USB5 port.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.
USB7 Port Legacy Support	Option to enable/disable USB port legacy support on the monitor/panel option.	Disabled	Disables the USB port.
		Enabled	Enables the USB port.

Boot Menu

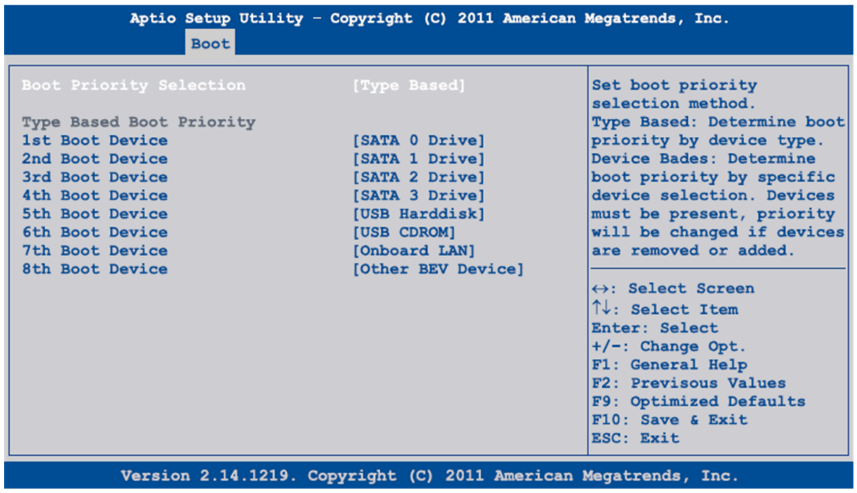
Boot Menu



The table shows the **Boot** menu setting options:

BIOS Setting	Description	Setting Options	Effect
Boot Device Priority	Configuration of boot order.	Enter	Opens the submenu Boot Device Priority *(see page 99)*.
Boot Configuration	Configuration of boot properties.	Enter	Opens the submenu Boot Configuration *(see page 99)*.

Boot Priority Selection Submenu

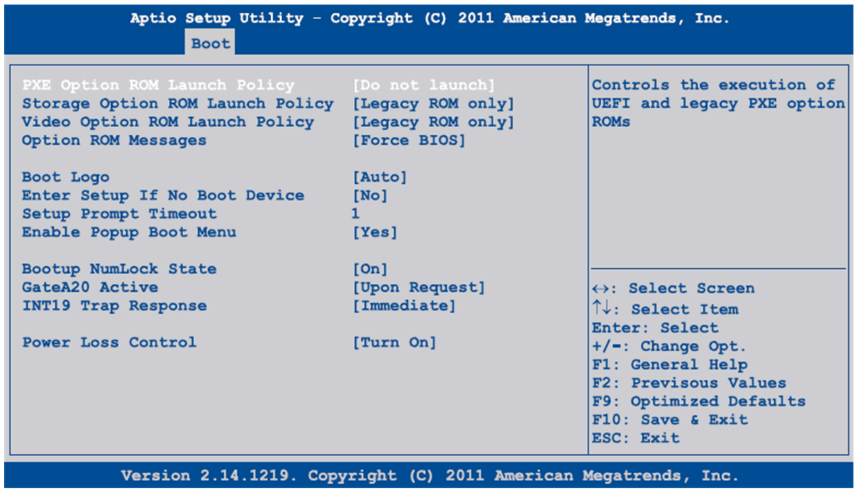


Boot Device Priority Settings

The table shows the **Boot Priority Selection** setting options:

BIOS Setting	Description	Setting Options	Effect
Boot Priority Selection	You can define the drive used to boot up the machine.	Device based	**NOTE:** Only devices that are recognized by the system are listed. You can change the sequence of items in the device list.
		Type based	**NOTE:** You can change the sequence of items in the device list. You can add to the list device types that are not connected.
1st Boot Device	Use this option to define the boot drive.	Disabled, SATA 0 Drive, SATA 1 Drive, SATA 2 Drive, SATA 3 Drive, USB Floppy, USB Hard disk, USB CDROM, Onboard LAN, External LAN, Other BEV Device.	Select the desired boot sequence.
2nd Boot Device			
3rd Boot Device			
4th Boot Device			
5th Boot Device			
6th Boot Device			
7th Boot Device			
8th Boot Device			

Boot Configuration Submenu



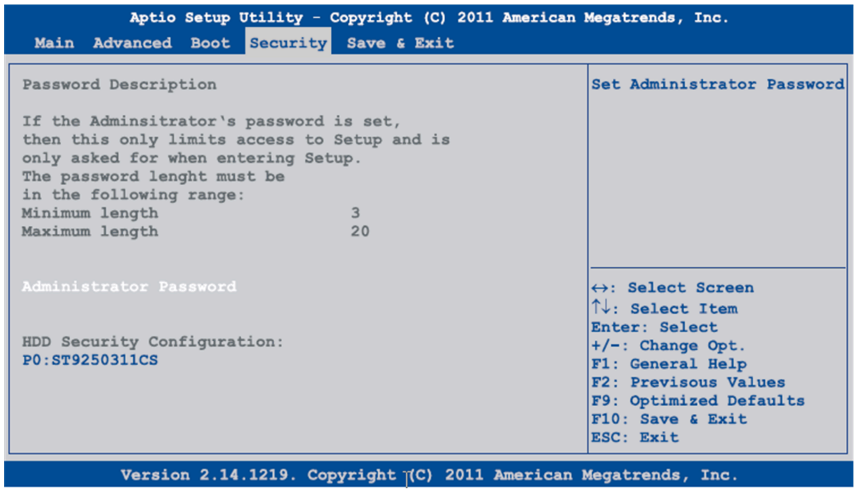
The table shows the **Boot Configuration** setting options:

BIOS Setting	Description	Setting Options	Effect
PXE Option ROM Launch Policy	Option to boot from PXE option ROM.	Do not launch	Does not boot from PXE option ROM.
		UEFI ROM only	Boots from UEFI ROM.
		Legacy ROM only	Boots from legacy ROM.

BIOS Setting	Description	Setting Options	Effect
Storage Option ROM Launch Policy	Option to boot from storage option ROM.	Do not launch	Does not boot from storage option ROM.
		UEFI ROM only	Boots from UEFI ROM.
		Legacy ROM only	Boots from legacy ROM.
Video Option ROM Launch Policy	Option to boot from video option ROM.	Do not launch	Does not boot from video option ROM.
		UEFI ROM only	Boots from UEFI ROM.
		Legacy ROM only	Boots from legacy ROM.
Option ROM Messages	Option to display option ROM messages during POST.	Force BIOS	Option ROM messages are displayed during POST.
		Keep current	Option ROM messages are not displayed during POST.
Boot Logo	Option for setting the boot logo.	Disabled	The boot logo is not displayed.
		Enabled	The boot logo is displayed.
		Auto	The boot logo is displayed.
Enter Setup If No Boot Device	Option to set how long the setup activation key (key to enter BIOS) is displayed.	1...65534	The setup activation key is shown for x seconds.
		Yes	The setup menu is displayed.
Enable Popup Boot Menu	Option to enable/disable the popup boot menu.	Yes	Enables this function. Press F11 during POST to select a boot device.
		No	Disables this function. It is not possible to select a boot device during POST. The devices boot in the configured boot order.
Bootup NumLock State	Option to configure the numeric keypad when the system is booted.	On	Numeric keypad is enabled.
		Off	Only the cursor functions of the numerical keypad are activated.
GateA20 Active	Defines how memory above 1 MB is accessed.	Upon request	GA20 is disabled.
		Always	GA20 is not disabled.
INT19 Trap Response	Sets the BIOS reaction on INT19 trapping by option.	Immediate	The trap is executed right away.
		Postponed	The trap is executed during legacy boot.
Power Loss Control	Determines if the system is On/Off following power loss.	Remain off	Industrial Personal Computer stays off.
		Turn off	Turns on the Industrial Personal Computer.
		Last state	Enables the previous state.

Security Menu

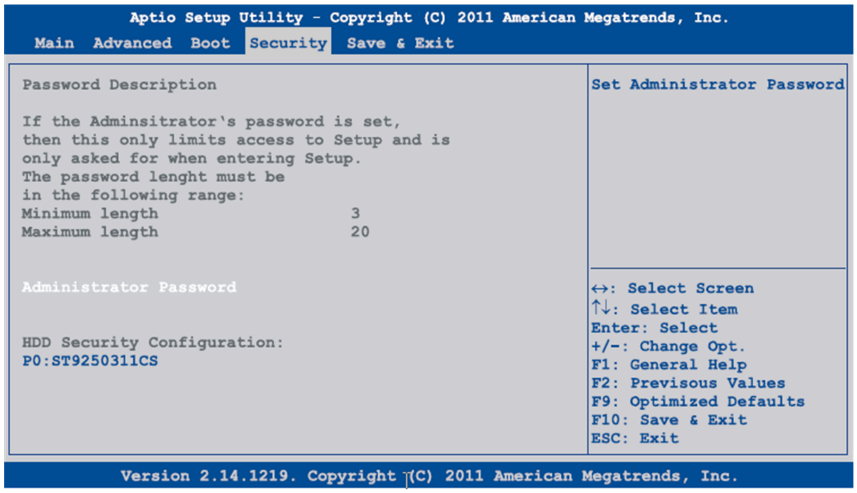
Security Menu



The table shows the **Security** menu setting options:

BIOS Setting	Description	Setting Options	Effect
Administrator Password	Function to enter/change the administrator password.	Enter	Enter password.

Hard Disk Security User Passwords



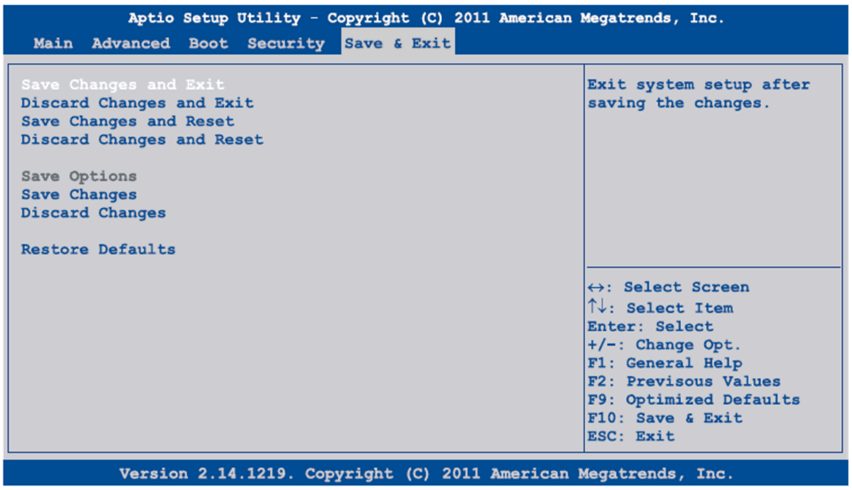
BIOS Setting	Description	Setting Options	Effect
Primary Slave HDD User Password	With a valid user password, you can change or configure hard drives without rebooting the device. A user password allows the user to edit specific BIOS settings.	Enter	Enter password.

Hard Disk Security Master Passwords

BIOS Setting	Description	Setting Options	Effect
Primary Slave HDD Master Password	With a valid user password, you can change or configure hard drives without rebooting the device.	Enter	Enter password.

Exit Menu

Exit Menu



The table shows the **Exit** menu setting options:

BIOS Setting	Description	Setting Options	Effect
Save Changes and Exit	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation.	Yes/No	-
Discard Changes and Exit	With this item you can close BIOS setup without saving the changes modem.	Yes/No	-
Save Changes and Reset	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	Yes/No	-
Save changes and reset	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	Yes/No	-
Discard Changes and Reset	With this item you can close BIOS setup without saving the changes made. The system is then rebooted.	Yes/No	-
Save Changes	Changes made are saved in CMOS after confirmation.	Yes/No	-
Discard Changes	You can no longer remember the event where the settings are made and you can reset (as long as they haven't been saved).	Yes/No	-
Restore Defaults	This option restores the BIOS default values.	Yes/No	-

BIOS Default Settings

The CMOS profile switches, located on the front side of the unit near the LEDs, are used to load pre-defined BIOS profile settings, which are based on the position of the switches.

The switch positions at delivery represents the optimum BIOS default values and should not be changed.

Hardware Modifications

8

Subject of this Chapter

This chapter is about the hardware modifications for the Industrial Personal Computer.

You can use optional units, main memory and CFast cards manufactured by Pro-face, as well as commercial devices and boards with this product.

NOTE: The Slide-in Disk drive can only be exchanged without removing the Industrial Personal Computer Unit from the control cabinet if the wall is less than 5.5 mm (0.216 in) thick.

What Is in This Chapter?

This chapter contains the following sections:

8.1 Before Modifications

Before Modifications

Overview

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER

POTENTIAL FOR EXPLOSION

- Always confirm the ANSI/ISA 12.12.01 and CSA C22.2 N°213 hazardous location rating of your device before installing or using it in a hazardous location.
- To power on or power off a Industrial Personal Computer installed in a Class I, Division 2 hazardous location, you must either:
  - Use a switch located outside the hazardous environment, or
  - Use a switch certified for Class I, Division 1 operation inside the hazardous area.
- Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous. This applies to all connections including power, ground, serial, parallel, network and rear USB connections.
- Never use unshielded / ungrounded cables in hazardous locations.
- When enclosed, keep enclosure doors and openings closed at all times to avoid the accumulation of foreign matter inside the workstation.
- Use only non-incendive front USB configurations *(see page 69)*.

Failure to follow these instructions will result in death or serious injury.

During operation, surface temperatures of the heat sink may reach more than 70 °C (158 °F).

⚠ WARNING

RISK OF BURNS

Do not touch the surface of the heat sink during operation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ CAUTION

OVERTORQUE AND LOOSE HARDWARE

- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the plastic installation fastener.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

⚠ CAUTION

STATIC SENSITIVE COMPONENTS

Industrial Personal Computer internal components, including accessories such as RAM modules and expansion boards, can be damaged by static electricity.

- Keep static-producing materials (plastic, upholstery, carpeting) out of the immediate work area.
- Do not remove ESD-sensitive components from their anti-static bags until you are ready to install them.
- When handling static-sensitive components, wear a properly grounded wrist strap (or equivalent).
- Avoid unnecessary contact with exposed conductors and component leads with skin or clothing.

Failure to follow these instructions can result in injury or equipment damage.

8.2 AC Power Supply Unit, UPS Battery Unit

Overview

This section describes the AC Power Supply Module, the UPS Battery Unit and the UPS principle.

What Is in This Section?

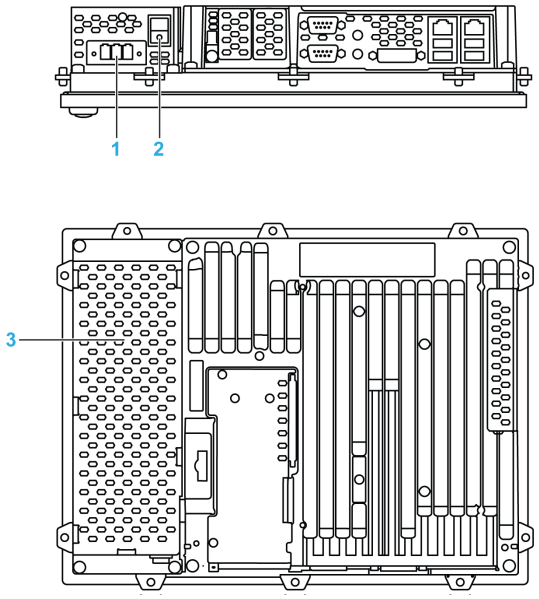
This section contains the following topics:

AC Power Supply Unit Description and Installation

Overview

The AC Power Supply Unit can optionally be mounted on the Industrial Personal Computer to allow the Industrial Personal Computer to be operated with 100...240 Vac.

The figure shows a Industrial Personal Computer equipped with the AC Power Supply Unit:



1 AC power connector (with AC terminal block)
2 Power switch
3 AC Power Supply Unit

AC Power Supply Unit Description

The table gives the technical data of the AC Power Supply Unit integrated in the Industrial Personal Computer:

Features	Values
Nominal Input Voltage	100...240 Vac
Frequency	50/60 Hz
Starting Current	< 20 A (cold restart, 100% load and 100 Vac)
Power Failure Bypass	> 10 ms (100 Vac and 230 Vac)
Power Switch	Yes
Internal Fuse	Yes
Nominal Output Voltage	24 Vdc ± 10%
Output Current	Max. 5.5 A
EN 60529 Protection	IP20 protection (back), as fully-assembled and operational device
Ambient Temperature: Operation Storage and Transport	 0...55 °C (32...131 °F) -20...60 °C (-4...140 °F)
Relative Humidity: Operation Storage and Transport	 5...90 %, non-condensing 5...90 %, non-condensing
Vibration: Operation (continuous) Operation (occasional) Storage and Transport	 2...9 Hz: 1.75 mm amplitude / 9...150 Hz: 0.5 g 2...9 Hz: 3.5 mm amplitude / 9...150 Hz: 1 g 2...8 Hz: 7.5 mm amplitude / 8...200 Hz: 2 g / 200...500 Hz: 4 g
Shock: Operation Storage and Transport	 15 g, 11 ms 30 g, 6 ms
Dimensions	73.6 x 225.5 x 44.5 mm (2.89 x 8.87 x 1.75 in.)
Weight	Approx. 0.6 kg (1.32 lb)

Installing the AC Power Supply Unit

Before installing a AC Power Supply Unit, shut down Windows® in an orderly fashion and remove all power from the device.

⚠ ⚠ DANGER

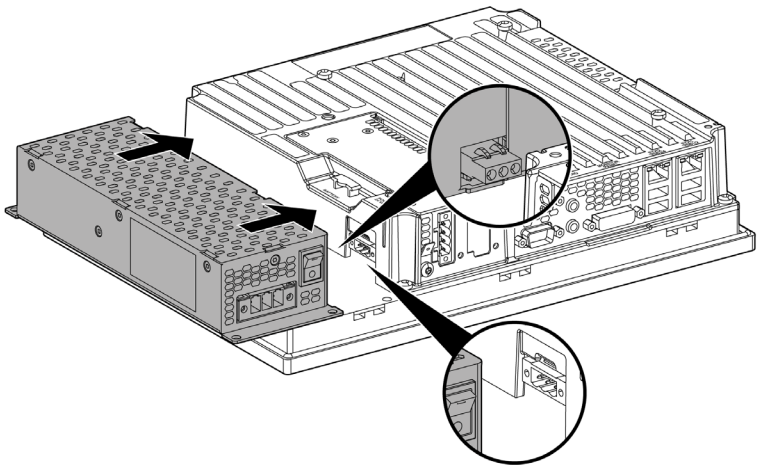
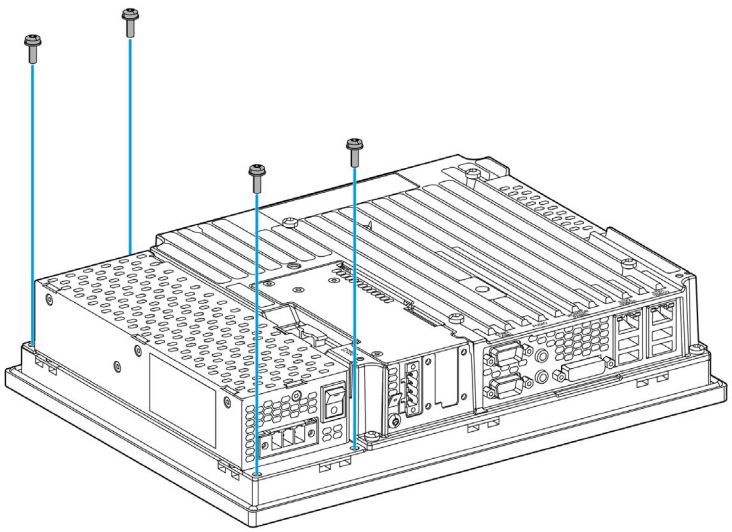
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

Follow the steps when installing the AC Power Supply Unit:

Step	Action
1	Disconnect the power cord to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Remove the Industrial Personal Computer from the control cabinet and follow the steps in Industrial Personal Computer Installation *(see page 52)* in reverse order.
4	Place the Industrial Personal Computer on a clean and flat surface.
5	Remove the DC power connector. For Standard Models, remove the 2 installation fasteners on the right side.

Step	Action
6	The AC Power Supply Unit can now be moved parallel to the Industrial Personal Computer in the direction indicated by the arrows in the figure below:  Plug the power supply plug into the socket on the Industrial Personal Computer. Be sure that the housing is parallel and the plug on the AC Power Supply Unit is inserted in the socket on the Industrial Personal Computer. There must not be any pressure or mechanical strain on the connection.
7	Insert 4 Torx screws (T20) showed in the following figure: 
8	The Industrial Personal Computer can now be mounted back in the control cabinet, see Industrial Personal Computer Installation *(see page 52)*.

⚠ CAUTION

OVERTORQUE AND LOOSE HARDWARE

- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the plastic installation fastener.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

Removing the AC Power Supply Unit

Before removing a AC Power Supply Unit, shut down Windows® in an orderly fashion and remove all power from the device.

⚠ ⚠ DANGER

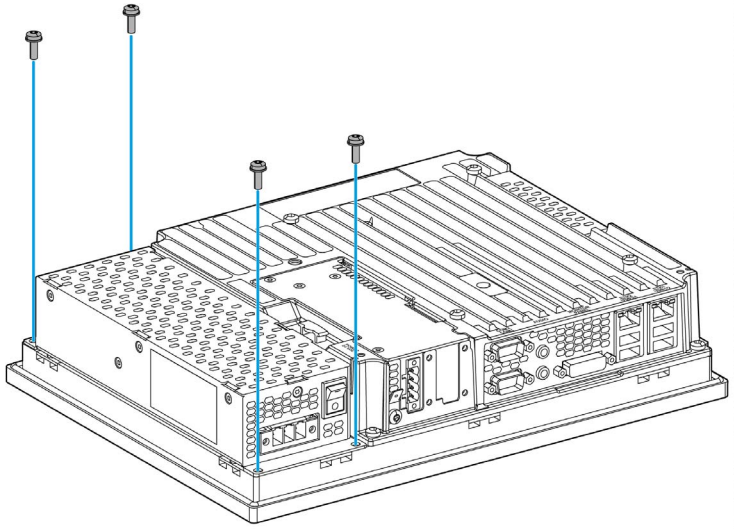
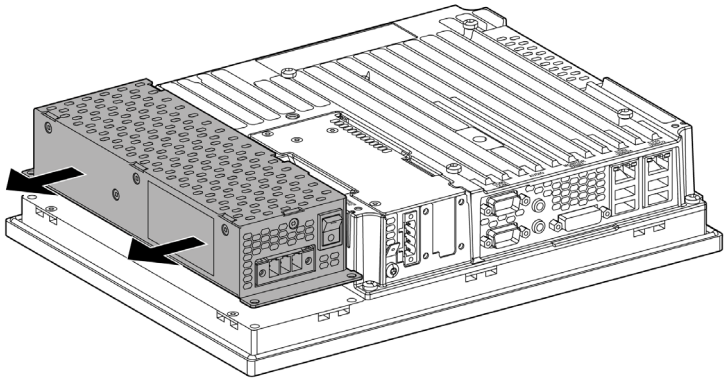
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

Follow the steps when removing the AC Power Supply Unit:

Step	Action
1	Disconnect the power cord to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Remove the Industrial Personal Computer from the control cabinet and follow the steps in Industrial Personal Computer Installation *(see page 52)* in reverse order.
4	Place the Industrial Personal Computer on a clean and flat surface.
5	For Standard Models, remove the 2 installation fasteners on the right side.

Step	Action
6	Remove the 4 Torx screws (T20) showed in the following figure: 
7	The AC Power Supply Unit can now be moved parallel to the Industrial Personal Computer in the direction indicated by the arrows in the figure below: 

⚠ CAUTION

OVERTORQUE AND LOOSE HARDWARE

- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the plastic installation fastener.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

Uninterruptible Power Supply (UPS) Battery Unit Description and Installation

Overview

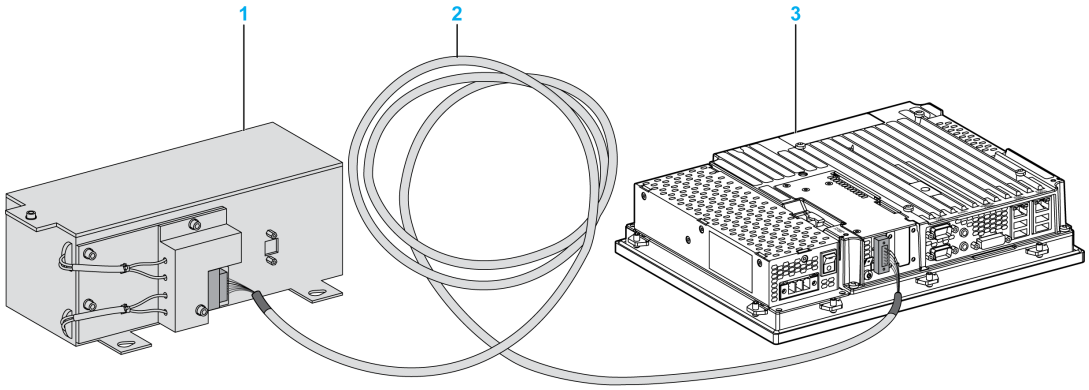
⚠ WARNING

EXPLOSION, FIRE, OR CHEMICAL HAZARD

Handling and storage:
- Store in cool, dry and well ventilated rooms with impermeable surfaces and appropriate containment in case of leakage.
- Protect from adverse weather conditions and keep separate from incompatible materials during storage and transport.
- A sufficient supply of water must be located nearby.
- Damage to containers where batteries are stored and transported must be prevented.
- Keep away from fire, sparks and excessive heat.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The figure shows an Industrial Personal Computer equipped with the UPS option:



1 UPS Battery Unit
2 UPS Connection Cable 3 m (9.84 ft)
3 Industrial Personal Computer with integrated UPS Interface Board

NOTE: When using an Industrial Personal Computer with UPS Interface Board, connect the UPS Battery Unit before starting up the Industrial Personal Computer. If the Industrial Personal Computer is started before the UPS Battery Unit is connected, a system error will occur and the buzzer will sound, so please use caution.

The main features of the UPS option are:
- Long-lasting, maintenance-free rechargeable batteries
- Communication via integrated interfaces
- Temperature sensor
- Deep discharge protection

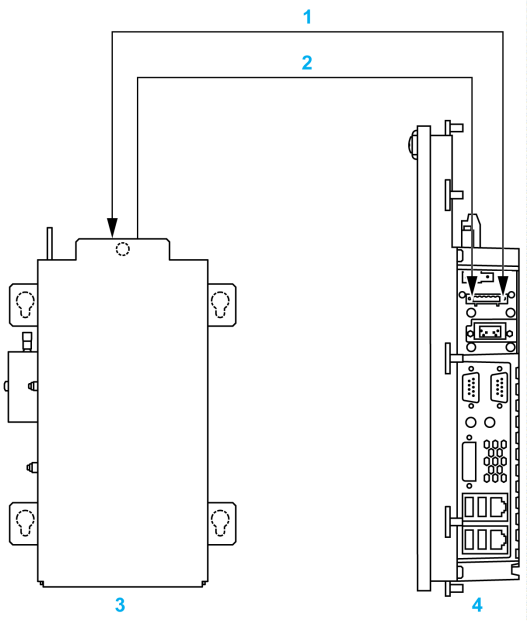
NOTE: The UPS Interface Board can only be operated in the interface module slot 1 *(see page 126)*.

UPS Principle

With the optional integrated UPS Interface Board, the Industrial Personal Computer system completes write operations even after a power loss. When the UPS Interface Board detects a power loss, it switches to battery operation immediately without interruption. This means that all running programs are ended properly by the UPS software. This prevents the possibility of inconsistent data.

NOTE:

- This function is only available if the UPS is configured and its driver is activated *(see page 174)*.
- The monitor is not handled by the UPS and will shut off when the power fails.

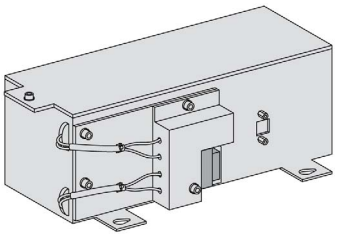


1 Battery / Load mode
2 Temperature
3 UPS Battery Unit
4 Industrial Personal Computer with integrated UPS Interface Board

UPS Battery Unit Description

The UPS Battery Unit is subject to wear and should be replaced regularly (at least following the specified life span).

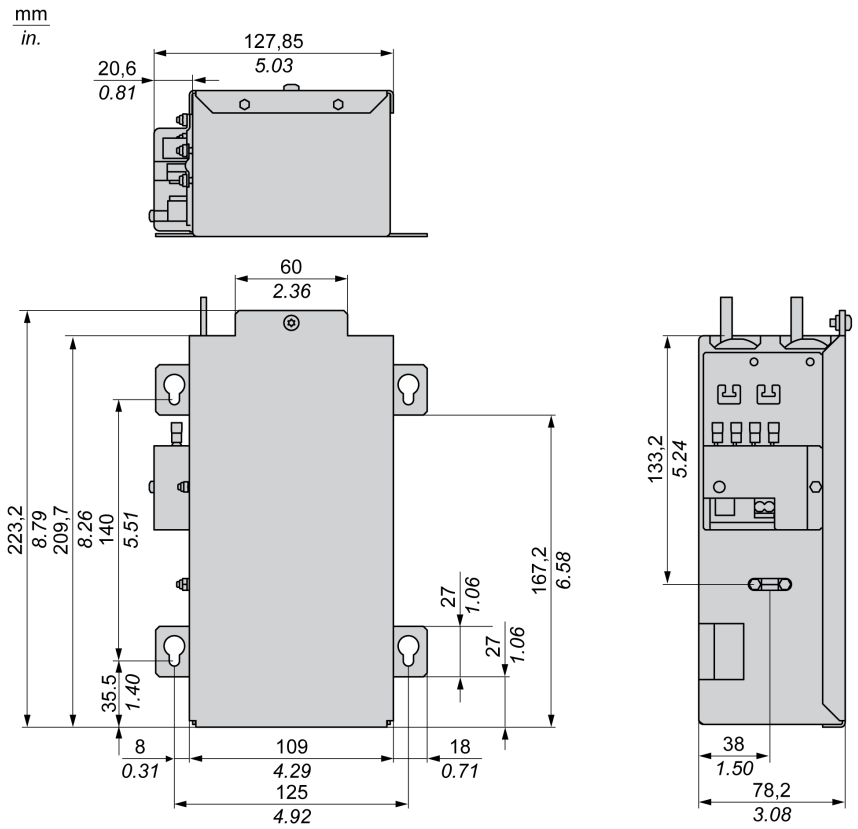
The figure shows the UPS Battery Unit:



The table provides the technical data on the UPS Battery Unit:

Features	Values
Battery: Type Method	 Hawker Cyclon 12 Vdc 4.5 Ah (2 connected in series) Single cell (X cell)
Rated Voltage	24 Vdc
Operating Current	Max. 4.5 Ah
Battery Charging Current	Max. 2.88 A
Ambient Temperature: Charging Mode Storage and Transport	 –30...60 °C (–22...140 °F) –65...80 °C (–85...176 °F)
Relative Humidity: Operation Storage and Transport	 5...95 %, non-condensing 5...95 %, non-condensing
Altitude	Max. 3000 meters (9843 feet)
Life Span	Up to 15 years at 20 °C (68 °F) Up to 10 years at 25 °C (77 °F) (up to 80 % battery capacity)
Maintenance Interval (During Storage)	Charge once every 6 months
Typical Recharge Time at Low Battery	15 hours
Weight	Approximately 5 kg (11.02 lbs)

The figure shows the dimensions of the UPS battery unit:



UPS Connection Cable

The UPS connection cable has two different shapes of 4-pin connectors to help prevent a cable connector from being inserted in the incorrect connector (UPS battery or Industrial Personal Computer side).

The table provides the technical data for the UPS connection cable:

Features	Values
Length	3 m (9.843 ft)
Outer Diameter	7 mm (0.27 in.)
Connector Type	4-pin plug connectors, screw clamps Tightening torque 0.4...0.5 Nm (3.54...4.42 lbf-in)
Wire Cross Section Temperature Sensor Wire Voltage Wire	 2 x 0.5 mm^2 (AWG 20) 2 x 2.5 mm^2 (AWG 13)
Line Resistance at 20 °C 0.5 mm^2 2.5 mm^2	 Max. 39 Ω/km (63 Ω/mile) Max .7.98 Ω/km (13 Ω/mile)
Flex Radius Fixed Installation Free-moving	 5 x wire cross-section 10 x wire cross-section
Temperature Range Operation Storage	 –5...70 °C (23...158 °F) –30...70 °C (–22...158 °F)
Materials Cable Shielding Color	 Thermoplastic PVC-based material Window gray (similar to RAL 7040)
Peak Operating Voltage	Typical 30 Vdc
Testing AC Voltage Wire/wire	 1500 Vac
Operating Voltage	Max. 30 Vdc
Current Load	10 A at 20 °C (68 °F)
Weight	Approximately 250 g (8.81 oz)

Installing Instructions

Before installing The UPS system, shut down Windows® in an orderly fashion and remove all power from the device.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

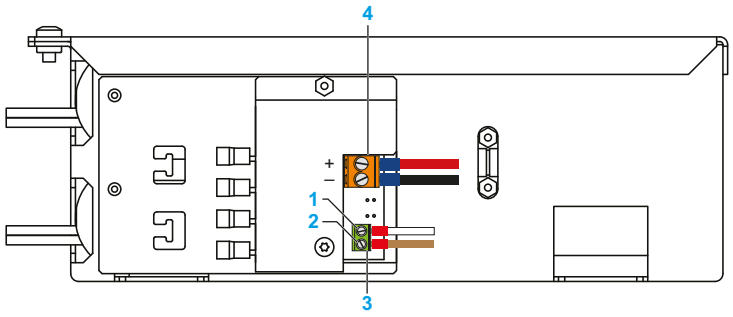
Failure to follow these instructions will result in death or serious injury.

By integrating the charging circuit in the Industrial Personal Computer housing, installation is reduced to merely attaching the connection cable to the UPS Battery Unit mounted next to the Industrial Personal Computer.

NOTE: Due to the construction of these batteries, you can store and operate the UPS Battery Unit in any position.

Follow the steps when installing the UPS system:

Step	Action
1	Disconnect the power supply to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Install the UPS Battery Unit, according to the drilling template. Ensure that the distance between the UPS Battery Unit and the Industrial Personal Computer allows them to be connected with the UPS Connection Cable (3 m). Installation requires 4xM5 screws, 4 washers and 1 screw lock (min. torque 1.3 Nm; screw depth as per applicable DIN regulations and specific application). These are not included in the delivery.

Step	Action
4	Connect the UPS Connection Cable to the UPS Battery Unit, whereby the red and black wires are connected to the supply voltage (orange screw clamp terminal block). Be sure to use the right connection terminals (red wire for +; black wire for -).
5	Connect the white and brown wires to the temperature sensor (green screw clamp terminal block) (white wire for 1; brown wire for 2):  **1** White wire temperature sensor **2** Brown wire temperature sensor **3** Temperature sensor screw clamp terminal block **4** Battery screw clamp terminal block
6	Tighten the connected wires in the screw clamps with a screwdriver (to a max. tightening torque of 0.4 Nm).
7	Connect the 4-pin screw clamp to the UPS Interface Board and tighten the two screws with a screwdriver (max. torque 0.4 Nm).

⚠ CAUTION

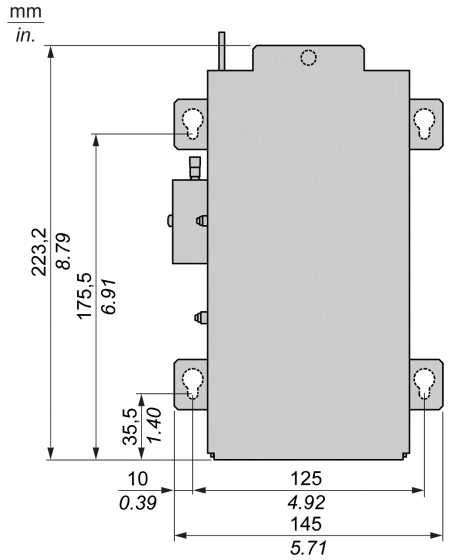
OVERTORQUE AND LOOSE HARDWARE

- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the plastic installation fastener.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

Drilling Template of UPS Battery Unit

For mounting the UPS Battery Unit, use the following figure as the drilling template:



8.3 Interface Modules

Overview

This section describes the 3 interface modules and of the installation.

What Is in This Section?

This section contains the following topics:

Interface Module Installation

Overview

Before installing or removing an interface module, shut down Windows® in an orderly fashion and remove all power from the device.

⚠ ⚠ DANGER

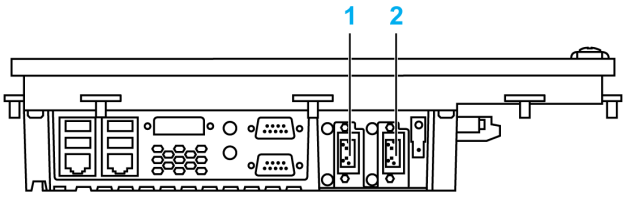
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

Interface Module Position

The figure shows the slot positions:



1 Slot 2 (IF2)
2 Slot 1 (IF1)

NOTE: Take into account the interface module restrictions as identified in the table below. After replacing or installing an interface module, restore BIOS default settings via Exit Menu *(see page 103)*.

The table provides the possible positions of the interface modules in the slots:

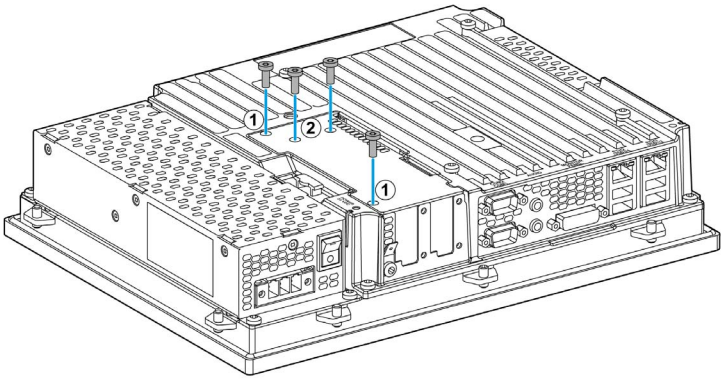
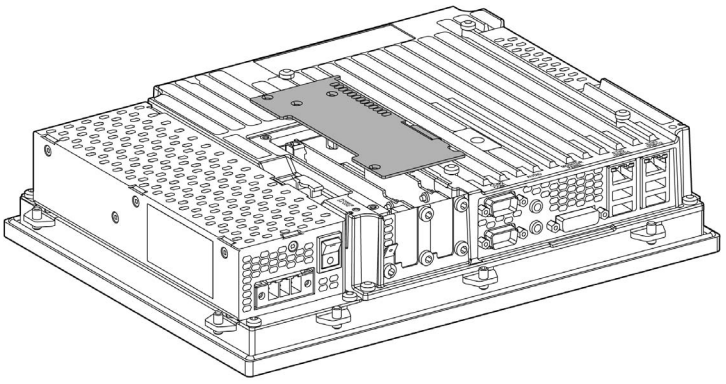
Industrial Personal Computer	Part Number	Slot 1	Slot 2
UPS Interface Board *(see page 132)*	PFXZPSIUUPM2	x	–
COM Expansion Board *(see page 129)*	PFXZPSIUCMR42	x	x

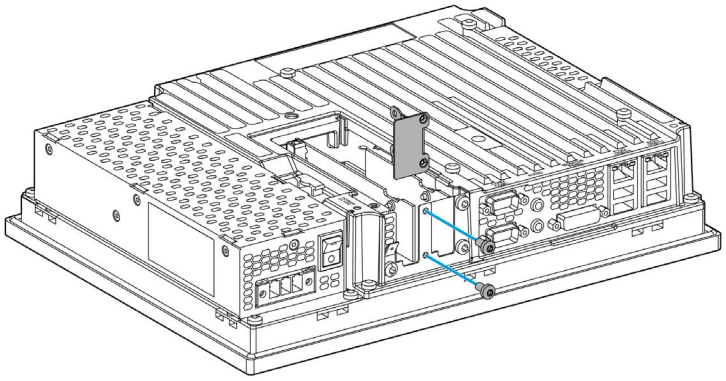
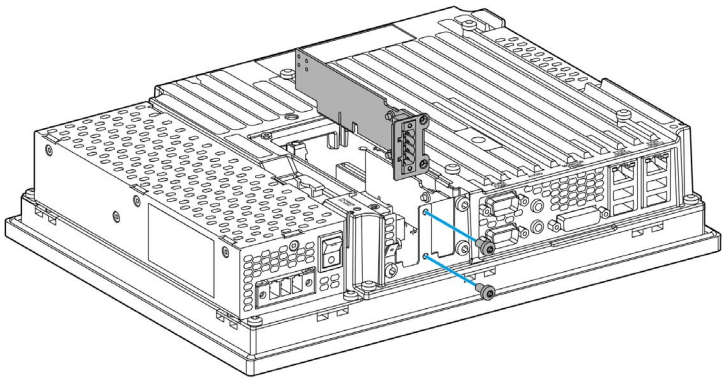
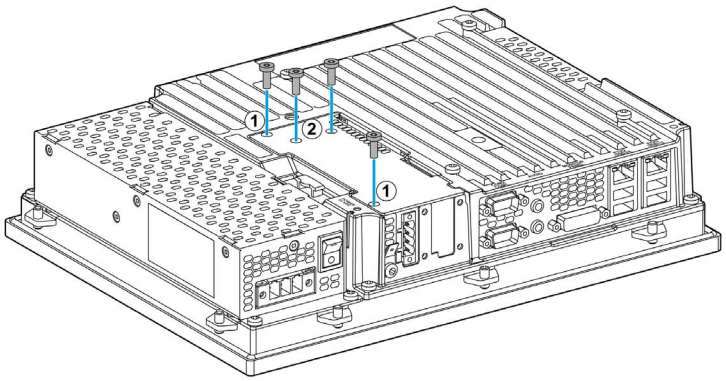
Interface Module Installation

NOTICE
ELECTROSTATIC DISCHARGE Take the necessary protective measures against electrostatic discharge before attempting to remove the Industrial Personal Computer cover. **Failure to follow these instructions can result in equipment damage.**

NOTE: Be sure to remove all power before attempting this procedure.

The table describes how to install an interface module:

Step	Action
1	Disconnect the power cord to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	If a slot expansion is mounted on the Industrial Personal Computer, it must first be removed. *(see page 135)*
4	Remove the Torx screws (T10) marked (1) in the figure:  **NOTE:** Remove the screw (2) if an interface module is already mounted.
5	Lift the cover plate up and away to remove it: 

Step	Action
6	Remove the marked Torx screws (T10) and slot cover: 
7	Insert the interface module in the slot and fasten it to the Industrial Personal Computer with 2 Torx screws (T10):  **NOTE:** The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).
8	Replace the cover plate. Secure the cover plate to the Industrial Personal Computer using the Torx screws (T10) marked (1). The screws (2) only need to be replaced if an interface module is mounted: 

⚠ CAUTION

OVERTORQUE AND LOOSE HARDWARE

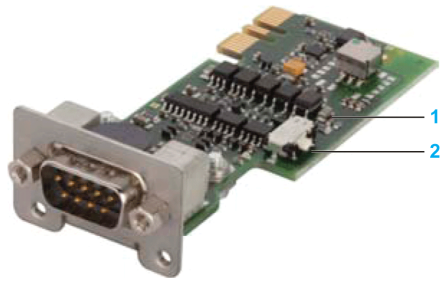
- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the plastic installation fastener.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

COM Expansion Board Description

Overview

The figure shows the COM Expansion Board:



1 LED
2 Switch

A terminating resistor for the serial interface is already integrated on the interface module. There is a switch to connect or disconnect the terminating resistor, but the Industrial Personal Computer unit needs to be opened in order to reach it. An active terminating resistor is indicated by a yellow LED.

Serial Interface

The serial interface of the COM Expansion Board is a combined RS-232C/RS-422/RS-485 interface with D-SUB 9 pin connector.
The operating mode (RS-232C/RS-422/RS-485) is selected automatically, depending on the electrical connection. The serial interface and COM Expansion Board use a different pin assignment for RS-232C communication.
When using the COM Expansion Board for RS-232C communication, pins 1, 4, 6 and 9 are not connected to anything.

The table provides the technical data of the serial interface:

Element	Characteristics
Amount	1
Type	RS232/422/485, modem-capable, electrically isolated
UART	16550-compatible, 16-byte FIFO
Transfer Rate RS232	Maximum 115 kbps with cable length ≤ 10 m Maximum 64 kbps with cable length ≤ 15 m
Transfer Rate RS422/485	Maximum 115 kbps with cable length ≤ 1200 m
Power Consumption	1 W
Connection	D-sub 9 pin, plug
Ambient Temperature: Operation Storage Transport	 0...55 °C (32...131 °F) –20...60 °C (–4...140 °F) –20...60 °C (–45...140 °F)
Relative Humidity: Operation Storage Transport	 5...90 %, non-condensing 5...90 %, non-condensing 5...90 %, non-condensing
Weight	35 g (1.23 oz)

Cable Serial Interface

The table provides the technical data of the cable serial interface:

Element	Characteristics	
Signal Lines	Cable cross section RS232 Cable cross section RS422 Cable cross section RS485 Wire insulation Conductor resistance Stranding Shield	4 x 0.16 mm² (26 AWG), tinned Cu. wire 4 x 0.25 mm² (24 AWG), tinned Cu. wire 4 x 0.25 mm² (24 AWG), tinned Cu. wire PE ≤ 82 Ohm/km Wires stranded in pairs Paired shield with aluminum foil
Grounding Line	Cable cross section Wire insulation Conductor resistance	1 x 0.34 mm² (22 AWG/19), tinned Cu. wire PE ≤ 59 Ohm/km
Outer Sheathing	Material Features Cable shielding	PUR mixture Halogen free From tinned cu. wires

Serial Interface Connections

This interface is used to connect Industrial Personal Computer to remote equipment. The connector is a D-sub 9 pin, plug connector.

By using a long PLC cable to connect to the Industrial Personal Computer, it is possible that the cable can be at a different electrical potential than the panel, even if both are connected to ground.

The Industrial Personal Computer serial port is not isolated. The SG (signal ground) and the functional ground (FG) terminals are connected inside the panel.

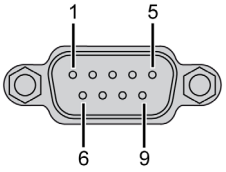
⚠ ⚠ DANGER

ELECTRIC SHOCK

- Make a direct connection between the ground connection screw and ground.
- Do not connect other devices to ground through the ground connection screw of this device.
- Install all cables according to local codes and requirements. If local codes do not require grounding, follow a reliable guide such as the US National Electrical Code, Article 800.

Failure to follow these instructions will result in death or serious injury.

The table shows the D-Sub 9 pin assignments:

Pin	Assignment		
	RS232	**RS422/485**	
1	N.C.	TXD\	D-Sub9 pin plug connector: 
2	RXD	N.C.	
3	TXD	N.C.	
4	N.C.	TXD	
5	GND	GND	
6	N.C.	RXD\	
7	RTS	N.C.	
8	CTS	N.C.	
9	N.C.	RXD	

Any excessive weight or stress on communication cables may disconnect the equipment.

⚠ CAUTION

LOSS OF POWER

- Ensure that communication connections do not place excessive stress on the communication ports of the Industrial Personal Computer.
- Securely attach communication cables to the panel or cabinet.
- Use only D-sub 9 pin cables with a locking system in good condition.

Failure to follow these instructions can result in injury or equipment damage.

RS485 Interface Specificity

NOTE: The pins of the RS422 default interface (1, 4, 6 and 9) should be used for operation.

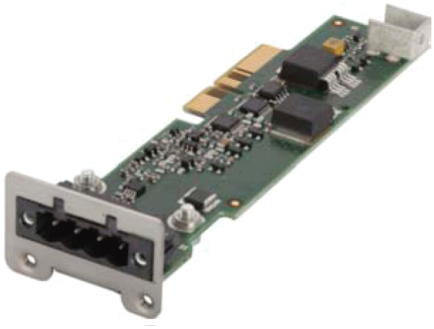
The RTS line must be switched each time the driver is sent and received. There is no automatic switch back. This cannot be configured in Windows.

The voltage drop caused by long line lengths can lead to greater potential differences between bus stations, which can hinder communication. You can improve the communication by running a ground wire with the other wires.

UPS Interface Board Description

Overview

The figure shows the UPS Interface Board:



UPS Interface Module Description

NOTE: The UPS Interface Board can only be operated in interface module slot 1 *(see page 126)*.

The table provides the technical data for the UPS Interface Board integrated in the Industrial Personal Computer:

Features	Values
Power Consumption	Max. 15 W at 0.5 A
Charging Current	Typ. 0.5 A / Max. 1 A
Deep Discharge Protection	Yes
Short Circuit Protection	Yes
Power Requirements	Max. 15 W
Status Indicators	Via the system monitor *(see page 174)*
Configuration	Via the system monitor settings *(see page 174)*

The UPS Interface Board is installed using the materials included in the delivery. For more information regarding installation, see Interface module installation *(see page 125)*.

8.4 Slot Expansion

Overview

This section shows the installation of the slot expansion. It describes the Slide-in Slot, the Slide-in Disk drive and the PCI/PCIE cards.

What Is in This Section?

This section contains the following topics:

Slot Expansion Installation

Overview

Before installing a slot expansion, shut down Windows® in an orderly fashion and remove all power from the device.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

Slot Expansion Installation

NOTICE

ELECTROSTATIC DISCHARGE

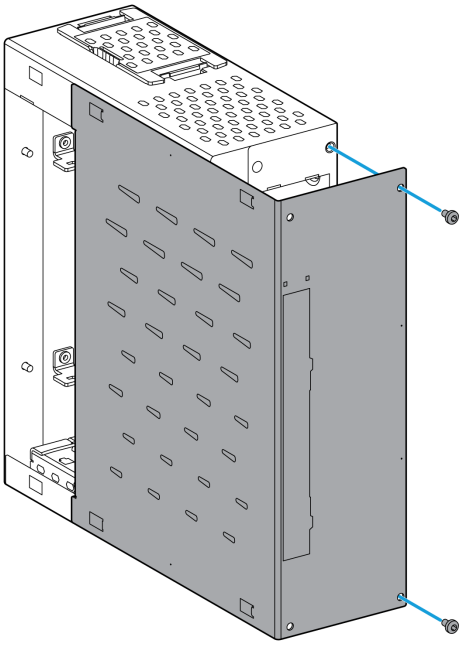
Take the necessary protective measures against electrostatic discharge before attempting to remove the Industrial Personal Computer cover.

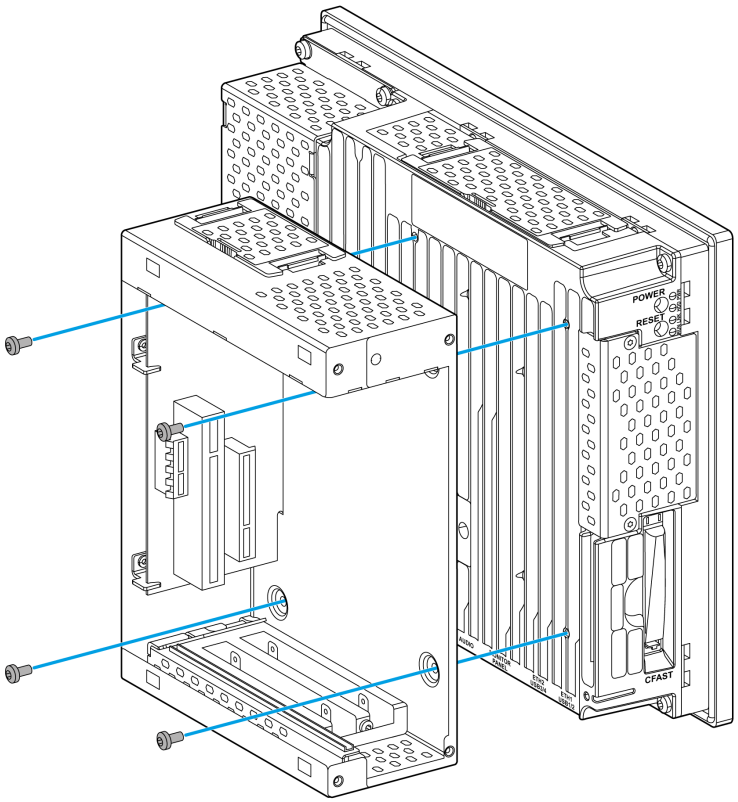
Failure to follow these instructions can result in equipment damage.

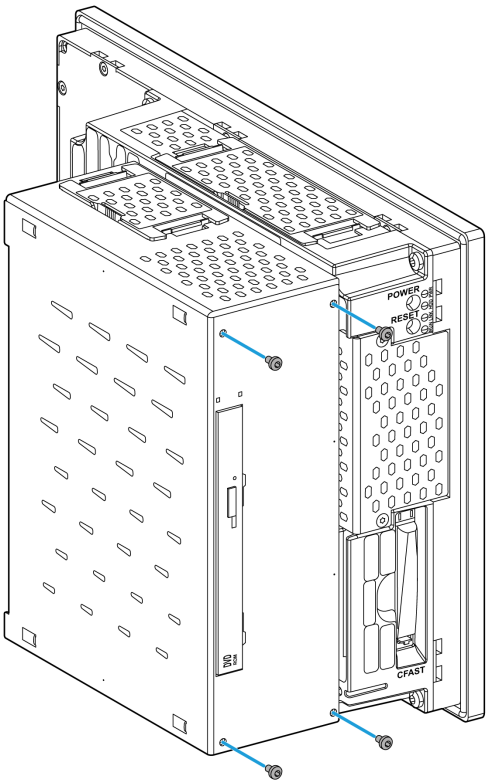
NOTE: Be sure to remove all power before attempting this procedure.

NOTE: This procedure describes how to install a slot expansion with 1 or 2 slots.

The table below describes how to install a slot expansion:

Step	Action
1	Disconnect the power cord to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Remove the Industrial Personal Computer from the control cabinet and follow the steps in Industrial Personal Computer Installation *(see page 52)* in reverse order.
4	Place the Industrial Personal Computer on a clean and flat surface.
5	Remove the 2 marked Torx screws (T10) in the following figure and slide the cover plate forward to remove it: 

Step	Action
6	Mount the slot expansion on the rear side of the Industrial Personal Computer, using the Torx screws (T20) included in the delivery:  **NOTE:** The recommended torque to tighten these screws is 1.2 Nm (10.6 lb-in).

Step	Action
7	Install the side cover on the slot expansion using the 4 marked Torx screws (T10) (2 were removed and 2 are included in the delivery): 
8	The Industrial Personal Computer can now be mounted back in the control cabinet, see Industrial Personal Computer Installation *(see page 52)*.

⚠ CAUTION

OVERTORQUE AND LOOSE HARDWARE

- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the plastic installation fastener.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

Slide-in Slot Installation

Overview

Before installing or removing any Slide-in Slot, shut down Windows® in an orderly fashion and remove all power from the device.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

Slide-in Slot Installation

NOTICE

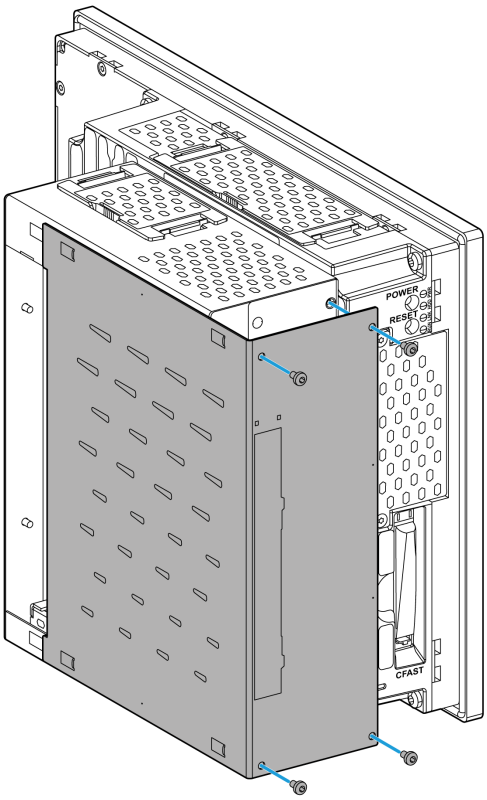
ELECTROSTATIC DISCHARGE

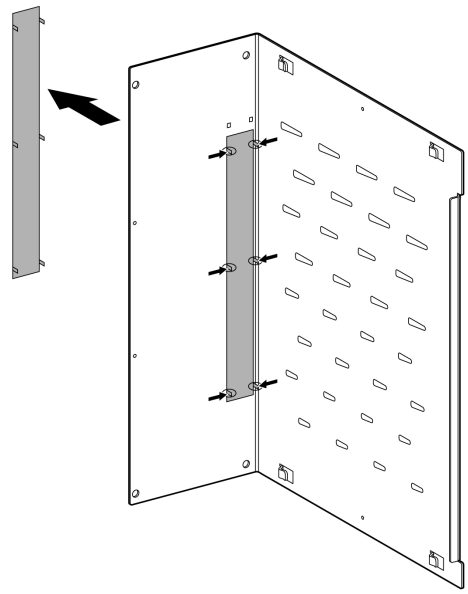
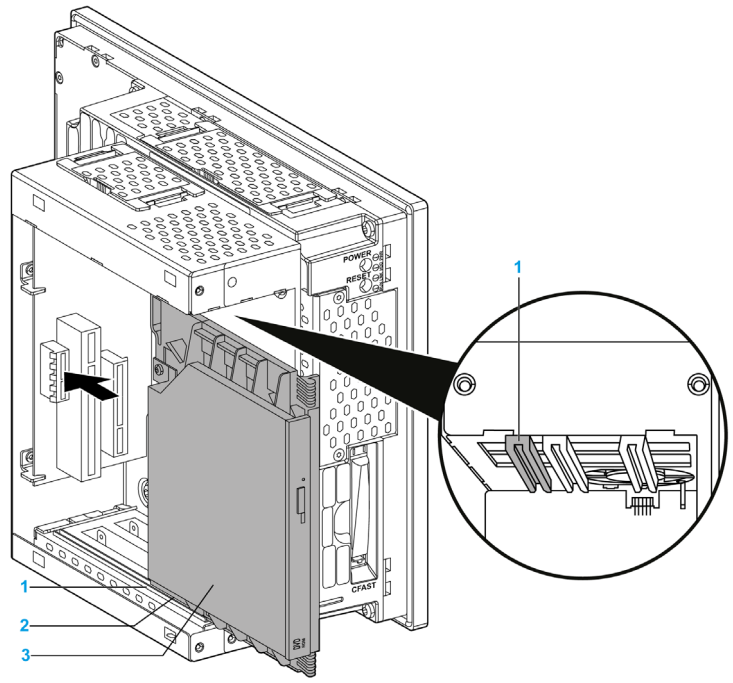
Take the necessary protective measures against electrostatic discharge before attempting to remove the Industrial Personal Computer cover.

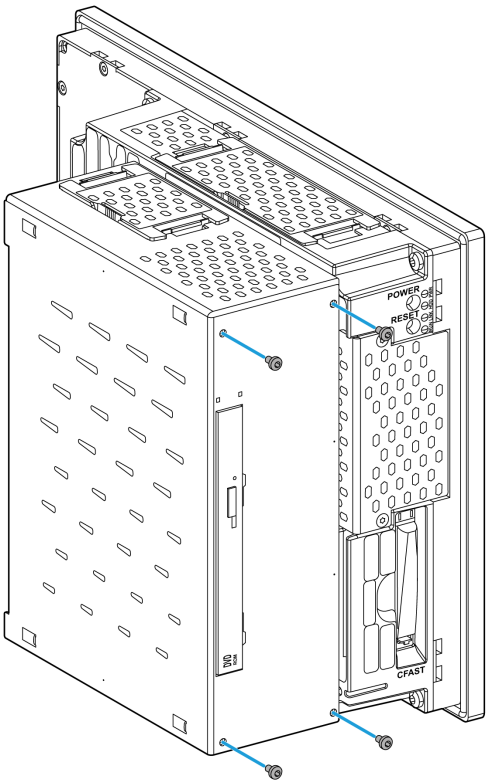
Failure to follow these instructions can result in equipment damage.

NOTE: Be sure to remove all power before attempting this procedure.

The table below describes how to install a Slide-in Slot:

Step	Action
1	Disconnect the power cord to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Remove the Industrial Personal Computer from the control cabinet and follow the steps inIndustrial Personal Computer Installation *(see page 52)* in reverse order.
4	Place the Industrial Personal Computer on a clean and flat surface.
5	Remove the 4 Torx screws (T10) marked in the following figure and slide the cover plate forward to remove it: 

Step	Action
6	Remove the slide-in slot cover from the side cover. This is done by pressing in the 6 marked snap arms and removing the slot cover: 
7	Install the Slide-in Slot in the slot expansion. Be sure to insert the Slide-in Slot in the black guide rails at the top and bottom of the slot expansion:  **1** Slide-in Slot guide rails **2** Slide-in Slot **3** DVD Multi Drive

Step	Action
8	Install the side cover on the slot expansion using the 4 marked Torx screws (T10): 
9	The Industrial Personal Computer can now be mounted back in the control cabinet, see Industrial Personal Computer Installation *(see page 52)*.

⚠ CAUTION

OVERTORQUE AND LOOSE HARDWARE

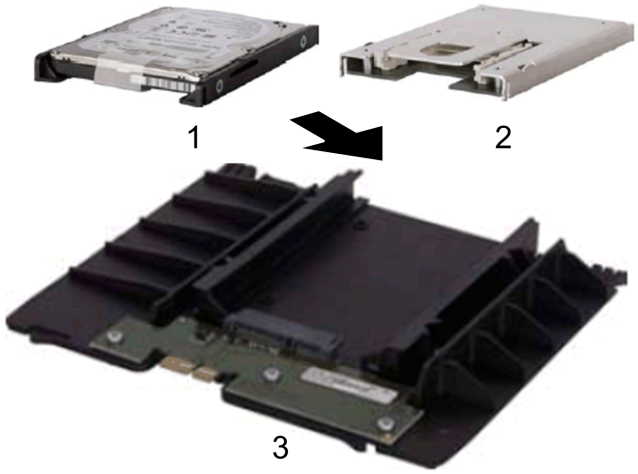
- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the plastic installation fastener.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

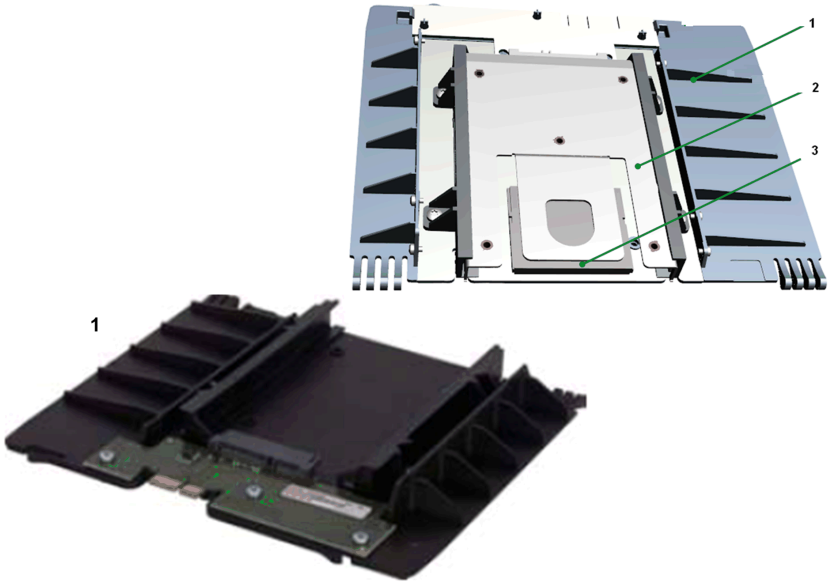
Slide-in Disk Drive

The Slide-in Slot Adapter Unit is an interface where Slide-in Disk drives can be installed.

The following figure shows the Slide-in Disk drives:



1 Hard disk
2 Slide-in Disk Adapter Unit
3 Slide-in Slot Adapter Unit



1 Slide-in Slot Adapter Unit
2 Slide-in Disk Adapter Unit
3 CFast card

The Slide-in Disk Adapter Unit is an interface where a CFast card can be installed.

The following figure shows the Slide-in Disk Adapter Unit:

DVD Multi Drive

The DVD Multi Drive can be used with a Slide-in Slot.

The following figure shows the DVD Multi Drive:

PCI/PCIe Card Installation

Overview

Before installing or removing a PCI/PCIe card, shut down Windows® in an orderly fashion and remove all power from the device.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

PCI/PCIe Cards with Cables

When using a PCI/PCIe card with an external cable attached, install a clamp or other device to secure the cable.

⚠ WARNING

EQUIPMENT DISCONNECTION OR UNINTENDED EQUIPMENT OPERATION

- Ensure that power, communication, and accessory connections do not place excessive stress on the ports. Consider the vibration environment when making this determination.
- Securely attach power, communication, and external accessory cables to the panel or cabinet.
- Use only commercially available USB cables.

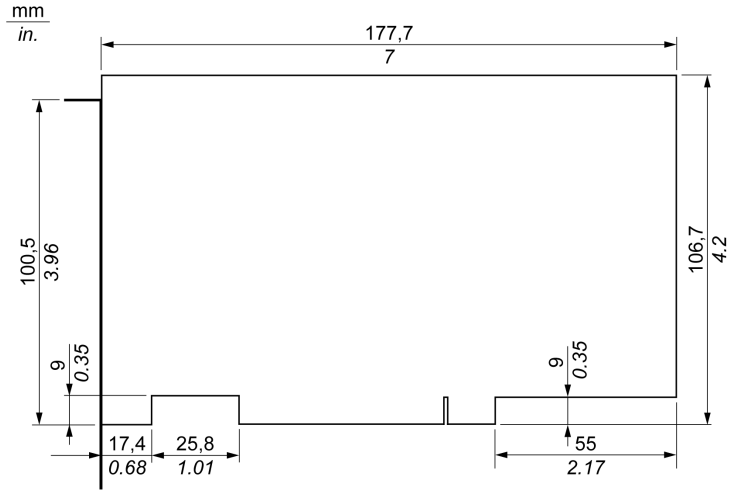
Failure to follow these instructions can result in death, serious injury, or equipment damage.

PCI/PCIe Card Dimensions

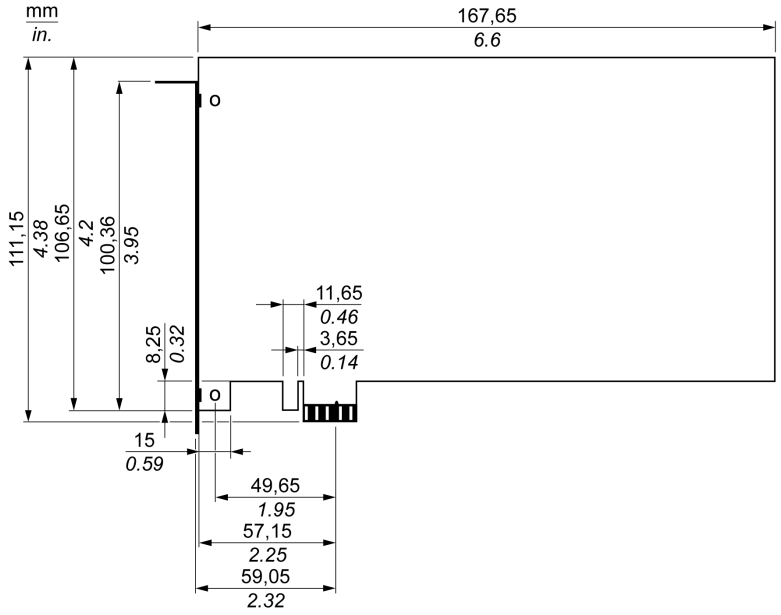
Depending on the bus type, you can use standard PCI 2.2 half-size cards or PCI Express (PCIe) half-size cards.

NOTE: PCI/PCIe cards cannot exceed the following dimensions.

The figure shows the dimensions of the standard half-size PCI card:

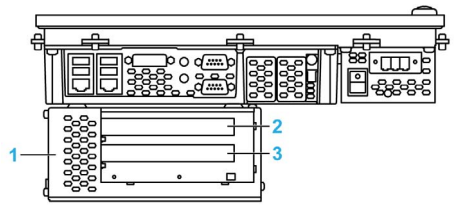


The figure shows the dimensions of the standard half-size PCIe card:



PCI Card Slot Position

The figure shows the PCI card slot position:



1 Slot expansion and slide-in module
2 PCI/PCIe slot 1
3 PCI/PCIe slot 2

NOTE: The slot position is required for configuration *(see page 80)*.

Take into account the PCI/PCIe card type restriction:

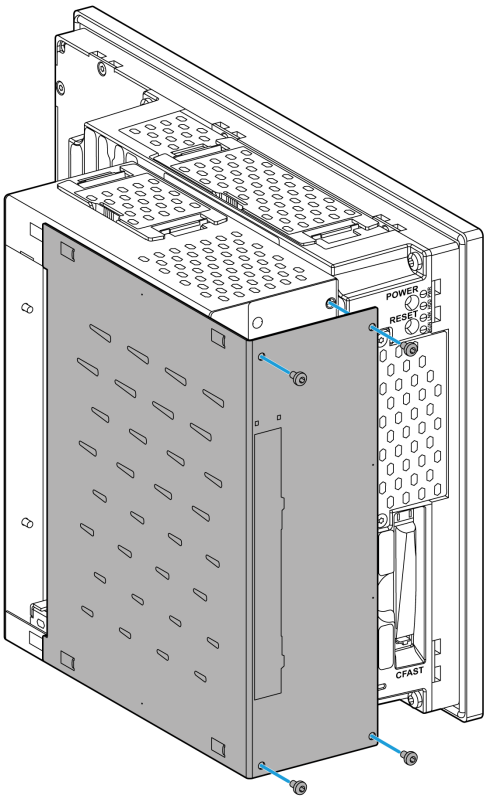
Industrial Personal Computer		**Quantity**	
		PCI **32-bit half size 2.2 33-MHz**	**PCIe** **Half size 1.0 a x8 (2 GB/s)**
Bus Expansion	1 slot	1	0
		0	1
	2 slots	2	0
		1	1

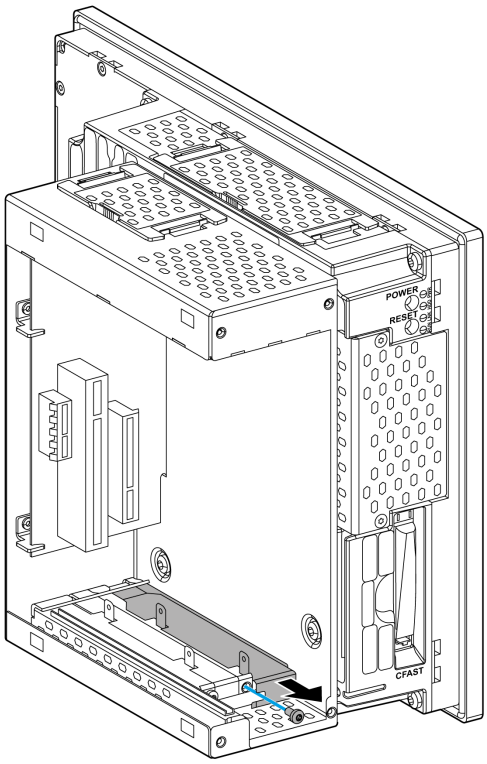
PCI/PCIe Card Installation

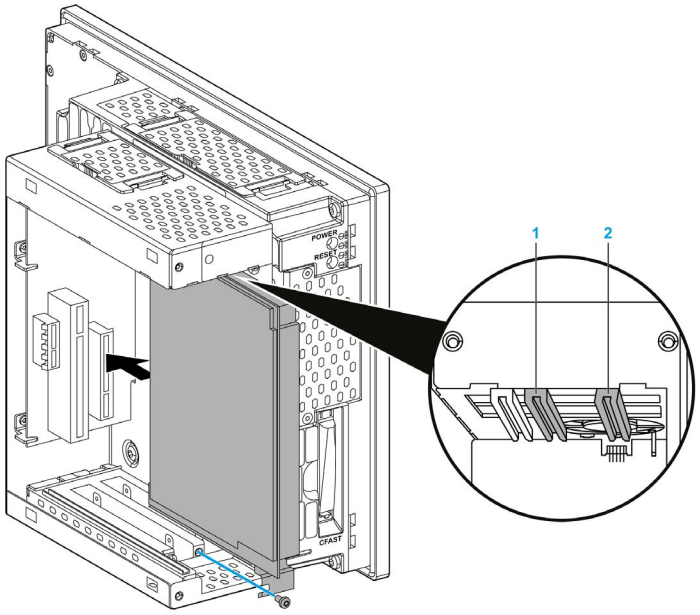
NOTICE
ELECTROSTATIC DISCHARGE Take the necessary protective measures against electrostatic discharge before attempting to remove the Industrial Personal Computer cover. **Failure to follow these instructions can result in equipment damage.**

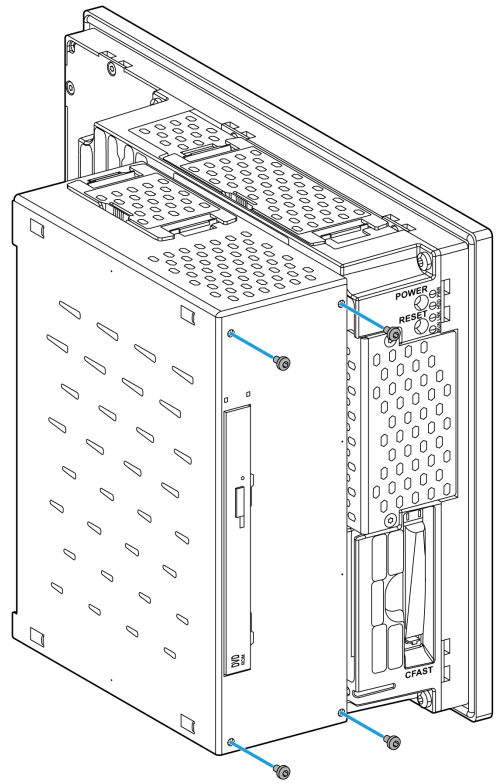
NOTE: Be sure to remove all power before attempting this procedure.

The table below describes how to install a PCI/PCIe card:

Step	Action
1	Disconnect the power cord to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Remove the Industrial Personal Computer from the control cabinet and follow the steps in Industrial Personal Computer Installation *(see page 52)* in reverse order.
4	Remove the 4 Torx screws (T10) marked in the following figure and slide the cover plate up to remove it: 

Step	Action
5	Remove the PCI slot cover from the slot expansion. Remove the marked Torx screws (T10) and the slot cover: 

Step	Action
6	Install the PCI/PCIe card in the slot expansion. Be sure to insert the PCI/PCIe card in the black guide rail in the top of the slot expansion. Fasten the PCI/PCIe card using the marked (previously removed) Torx screws (T10):  **1** Guide rail for slot 1 **2** Guide rail for slot 2

Step	Action
7	Install the side cover on the slot expansion using the 4 marked Torx screws (T10): 

⚠ CAUTION

OVERTORQUE AND LOOSE HARDWARE

- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the plastic installation fastener.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

8.5 Slide-in Disk Drive and Fan Kit

Overview

This section describes the installation of the Slide-in Disk drive and fan kit.

What Is in This Section?

This section contains the following topics:

Slide-in Disk Drive Description and Installation

Overview

Before installing or removing any Slide-in Disk drive, shut down Windows® in an orderly fashion and remove all power from the device.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

Slide-in Disk Drive Installation

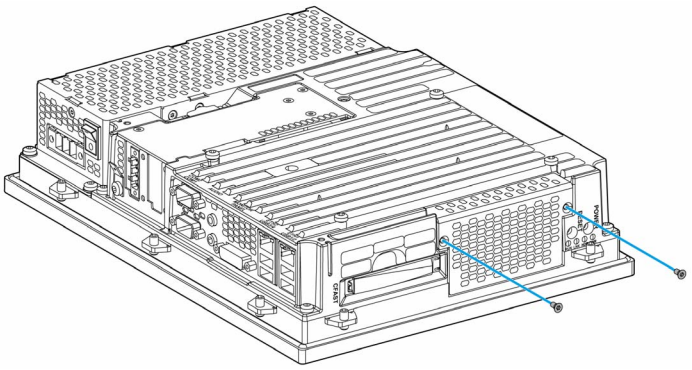
NOTICE
ELECTROSTATIC DISCHARGE Take the necessary protective measures against electrostatic discharge before attempting to remove the Industrial Personal Computer cover. **Failure to follow these instructions can result in equipment damage.**

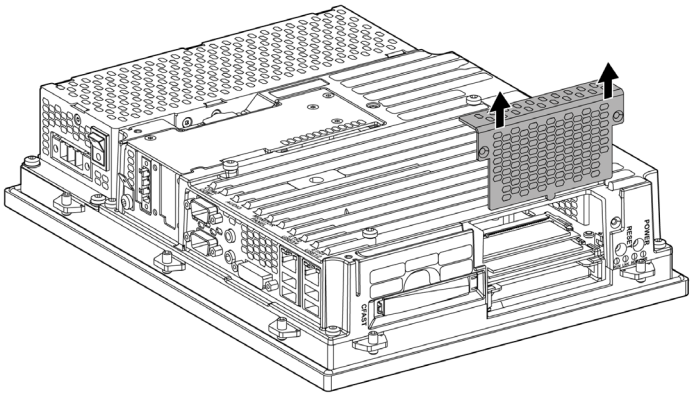
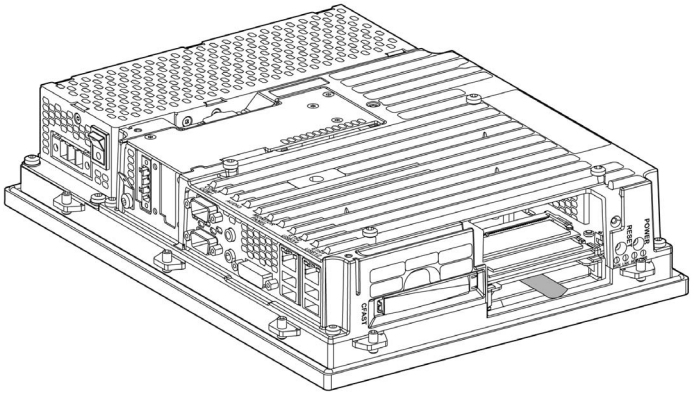
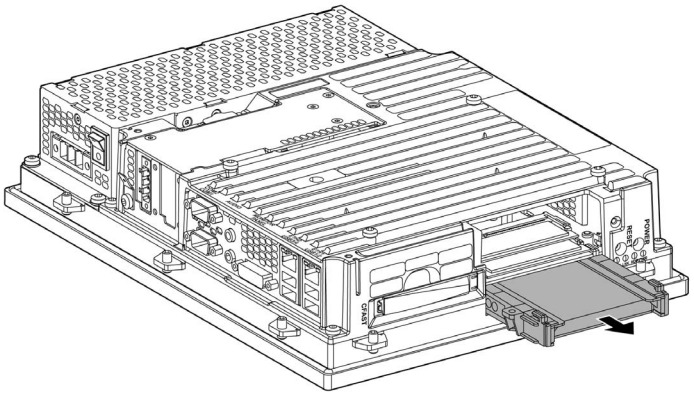
NOTE: Be sure to remove all power before attempting this procedure.

NOTE: The 500 GB hard disk or the 60 GB/128 GB SSD (Solid State Drive) are Slide-in Disk drives.

NOTE: Modifying products to install an HDD into a Slide-in Disk when it was not installed from factory, requires to change the unit firmware settings for proper behavior of the fan (that are required when running with HDD into a Slide-in Disk) - Please contact Pro-face support if you want to proceed such modification.

The table below describes how to install a Slide-in Disk drive:

Step	Action
1	Disconnect the power cord to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Remove the Industrial Personal Computer from the control cabinet and follow the steps in Industrial Personal Computer Installation *(see page 52)* in reverse order.
4	Place the Industrial Personal Computer on a clean and flat surface.
5	Remove the Torx screws (T20) marked in the following figure: 

Step	Action
6	Slide the cover plate up to remove it: 
7	Free the plastic removal strip fastened to the side of the Slide-in Disk drive: (If no Slide-in Disk drive is present, proceed to step 9.) 
8	Pull firmly on the removal strip to remove the Slide-in Disk drive: 
9	When inserting a Slide-in Disk drive, be sure to align it with the guide rails. Tuck the removal strip back between the drive and the frame (as it was before you pulled it out).
10	The cover plate can now be replaced by following the steps in the reverse order.
11	The Industrial Personal Computer can now be mounted back in the control cabinet, see Industrial Personal Computer Installation *(see page 52)*.

⚠ CAUTION

OVERTORQUE AND LOOSE HARDWARE

- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the plastic installation fastener.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

Fan Kit Installation and Removing

Overview

Before installing or removing a fan kit, shut down Windows® in an orderly fashion and remove all power from the device.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

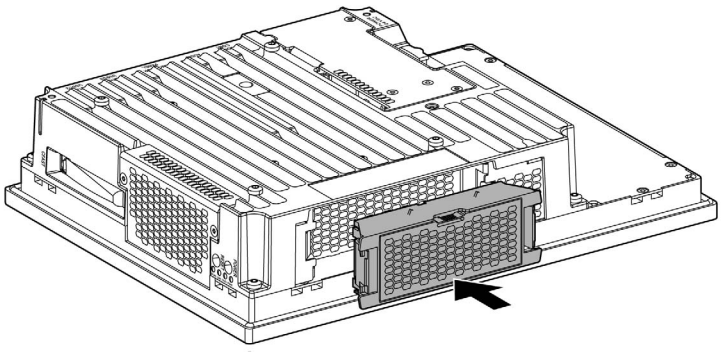
Fan Kit Installation

NOTE: Only qualified personnel can change the fan kit.

NOTE: Modifying products to install an HDD into a Slide-in Disk slot when it was not installed from factory, requires to change the unit firmware settings for proper behavior of the fan (that are required when running with HDD into a Slide-in Disk) - Please contact Pro-face support if you want to proceed such modification.

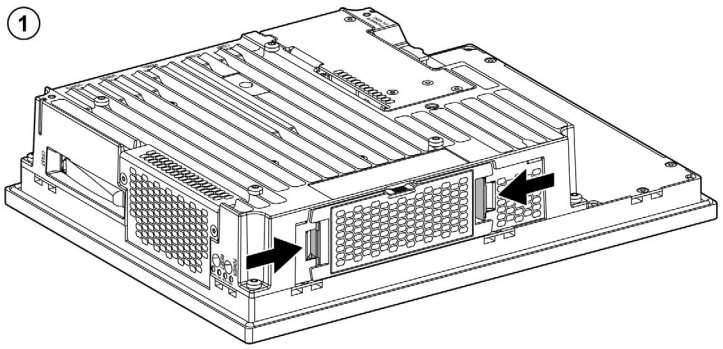
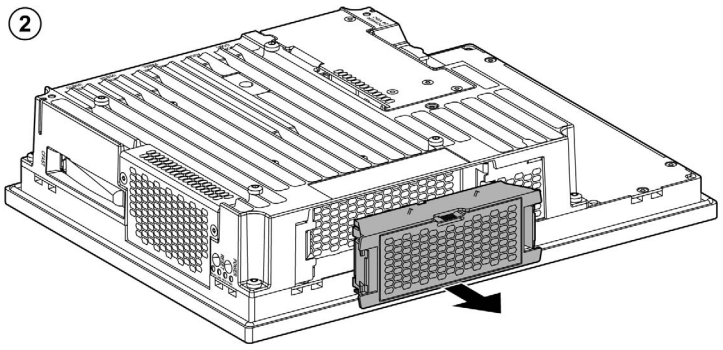
The table below describes how to install a fan kit:

Step	Action
1	Disconnect the power supply to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Remove the cover.

Step	Action
4	Align the fan kit parallel to the Industrial Personal Computer and press it in until it latches. Make sure the fan kit is inserted so that the connections match-up: 

Removing Fan Kit

The table below describes how to remove a fan kit:

Step	Action
1	Disconnect the power supply to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Press in the marked latching mechanism as you pull out the fan kit. ①  ② 

8.6 Main Memory Cards and CFast Cards

Overview

This section describes the installation of the main memory and CFast cards.

What Is in This Section?

This section contains the following topics:

CFast Card Installation and Removal

Overview

CFast cards are based on Single Level Cell (SLC) technology and are SATA 2.6 compatible.

Preparing to Use a CFast Card

The Industrial Personal Computer operating system views the CFast card as a hard disk. Proper handling and care of the CFast card helps extend the life of the Card. Familiarize yourself with the card prior to attempting insertion or removal of the card.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

⚠ CAUTION

CFAST CARD DAMAGE AND DATA LOSS

- Remove all power before making any contact with an installed CFast card.
- Use only CFast cards manufactured by Pro-face. The performance of the Industrial Personal Computer has not been tested using CFast cards from other manufacturers.
- Confirm that the CFast card is correctly oriented before insertion.
- Do not bend, drop, or strike the CFast card.
- Do not touch the CFast card connectors.
- Do not disassemble or modify the CFast card.
- Keep the CFast card dry.

Failure to follow these instructions can result in injury or equipment damage.

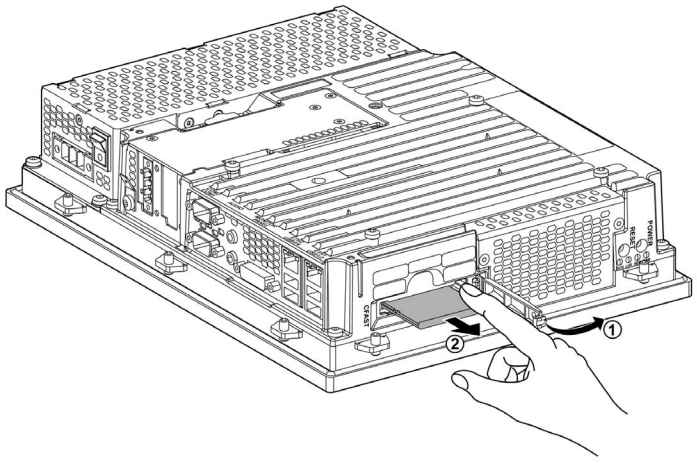
Inserting the CFast Card

The procedure describes how to insert the CFast card:

Step	Action
1	Shut down Windows® in an orderly fashion and remove all power from the device.
2	Open the CFast card cover.
3	Insert the CFast card firmly into the CFast card slot, and check that the eject button pops out.
4	Close the CFast card cover.

Removing the CFast Card

The procedure below describes how to remove the CFast card:

Step	Action
1	Shut down Windows® in an orderly fashion and remove all power from the device.
2	Open the CFast card cover: 
3	Press the eject button all the way to remove the CFast card from the CFast card slot. **NOTE:** The CFast card can be exchanged quickly and easily using the ejector.
4	After removing the CFast card, close the CFast card cover.

Data Writing Limitation

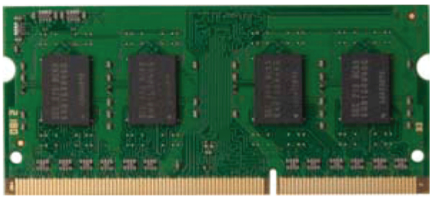
The CFast card is limited to approximately 100,000 write operations. Back up all CFast card data regularly to another storage media.

Main Memory Card Description and Installation

Overview

These 204-pin DDR3 main memory cards and range in size from 1 GB to 8 GB.

The figure shows the main memory card:



Main Memory Card Restriction

If two RAM cards with the same size (for example 2 GB) are inserted into the controller, then dual-channel memory technology is supported. This technology is not supported if two RAM cards of different sizes (for example 2 GB and 4 GB) are inserted.

If two 2 GB cards or one 4 GB card is installed on a 32-bit operating system, only 3 GB of main memory can be used. On a 64-bit operating system, up to 16 GB of main memory can be used.

Main Memory Card Description

The table provides the technical data of the main memory card:

Feature	**Values**			
Part Number	**PFXZPSD311**	**PFXZPSD321**	**PFXZPSD341**	**PFXZPSD381**
Type	SO-DIMM DDR3 SDRAM			
Memory size	1 GB	2 GB	4 GB	8 GB
Construction	204-pin			
Organization	128 M x 64-bit	256 M x 64-bit	512 M x 64-bit	1024 M x 64-bit
Speed	DDR3-1.60 GHz (PC3-12800)			

Main Memory Card Exchange

Before installing or removing a main memory card, shut down Windows® in an orderly fashion and remove all power from the device.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

NOTICE

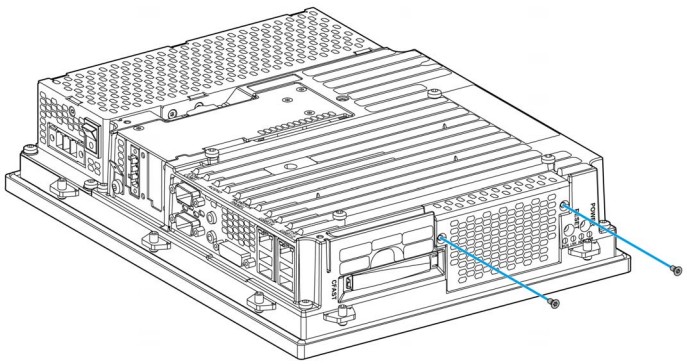
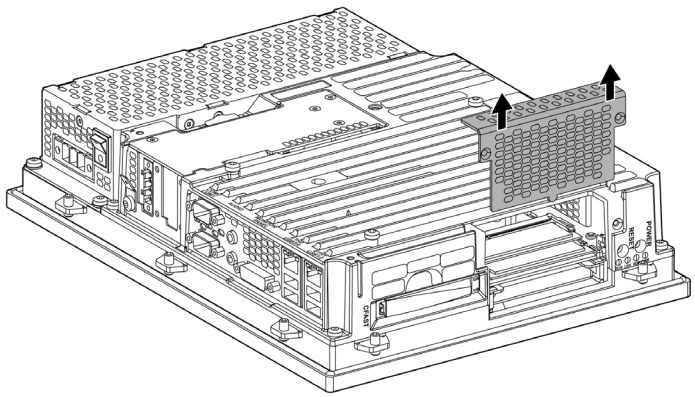
ELECTROSTATIC DISCHARGE

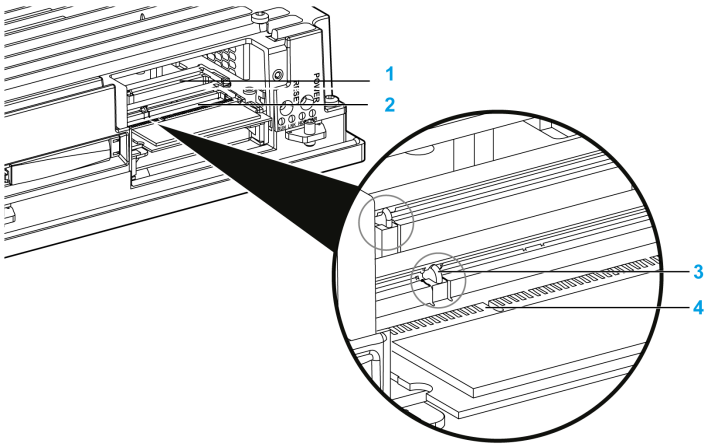
Take the necessary protective measures against electrostatic discharge before attempting to remove the Industrial Personal Computer cover.

Failure to follow these instructions can result in equipment damage.

NOTE: Be sure to remove all power before attempting this procedure.

The table describes how to exchange a main memory card:

Step	Action
1	Disconnect the power cord to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Remove the Industrial Personal Computer from the control cabinet and follow the steps in Industrial Personal Computer Installation *(see page 52)* in reverse order.
4	Place the Industrial Personal Computer on a clean and flat surface.
5	Remove the Torx screws (T20) marked in the following figure: 
6	Slide the cover plate up to remove it: 
7	The main memory card can now be exchanged. To do so, carefully press the fastening clamps outward and pull out the main memory card. **NOTE:** The lower main memory card can only be exchanged after the top one has been removed.

Step	Action
8	If inserting a new main memory card, align the notch on the plug-side of the memory card with the notch above the slot. The main memory card can now be carefully pressed into the slot until the fastening clamps are engaged.  **1** Slot **2** Memory card **3** Notch above the slot **4** Notch on the plug-side of the memory card
9	The cover plate can now be replaced by following the steps in reverse order.
10	The Industrial Personal Computer can now be mounted back in the control cabinet, see Industrial Personal Computer Installation *(see page 52)*.

⚠ CAUTION

OVERTORQUE AND LOOSE HARDWARE

- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the plastic installation fastener.
- When installing or removing screws, ensure that they do not fall inside the Industrial Personal Computer chassis.

Failure to follow these instructions can result in injury or equipment damage.

8.7 RAID

RAID

Introduction

Only Core i3 pre-installed models are supported by Intel® Rapid Storage Technology.

Supported Intel chipset and operating system information is available at the Intel® web page.

The information is to enable a user to properly set up and configure a system using Intel® Rapid Storage Technology. It provides steps for set up and configuration, as well as a brief overview on Intel® Rapid Storage Technology features.

Intel® Rapid Storage Technology features is a code module built into the system BIOS that provides boot support for **RAID** volumes as well as a user interface for configuring and managing **RAID** volumes.

Redundant Array of Independent Drives (**RAID**) allows data to be distributed across multiple hard drives to provide data redundancy or to enhance data storage performance.

The latest version of Intel® Rapid Storage Technology can also be downloaded from Download Center at:

http://downloadcenter.intel.com/

For all settings about RAID tool on windows, refer to the user manual:

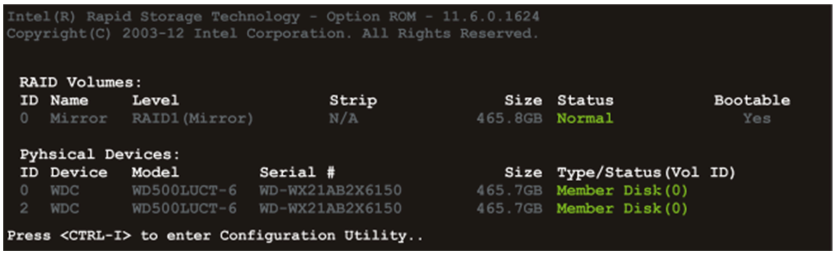
http://download.intel.com/support/chipsets/imsm/sb/irst_user_guide.pdf

NOTE: This device does not support hot swapping. Before any RAID hardware modification, shut down Windows® in an orderly fashion and remove all power from the device.

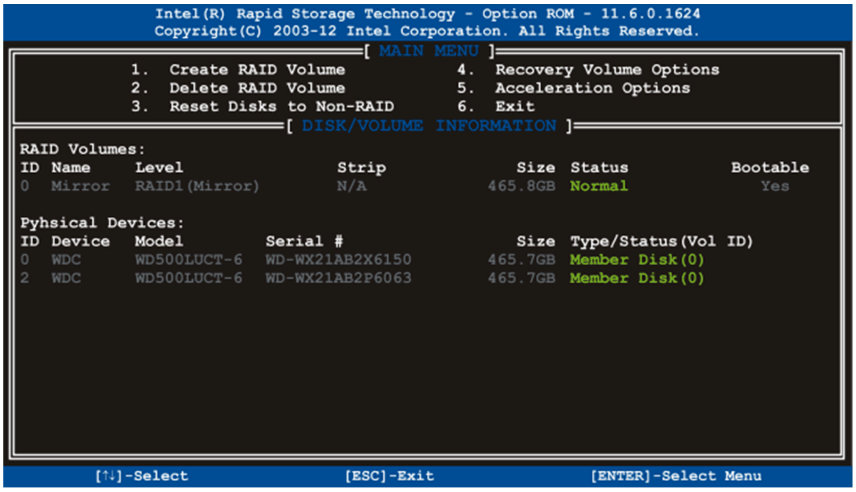
NOTE: In order to create the **SATA RAID** volume and get into the **Configuration Utility**, **SATA** mode selection must be set to **RAID** in the **Advanced** → **SATA configuration** BIOS setting menu *(see page 80)*.

RAID Configuration Utility

The **Configuration Utility** in BIOS must be started in order to make the necessary settings. After **POST**, pressing `Ctrl+I` opens the RAID BIOS:



To create the RAID system as **Mirrored** = RAID1 use the **MAIN MENU**:



You can use the following keys after entering the BIOS setup:

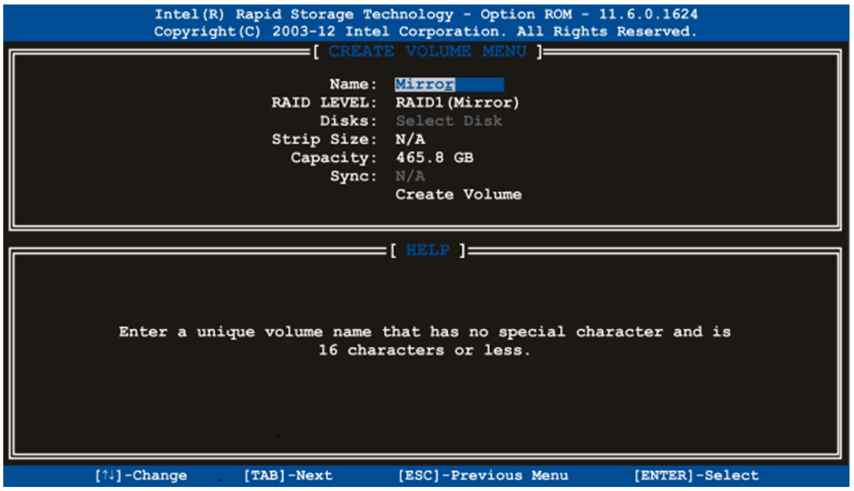
Key	Function
Up cursor ↑	Go to previous item.
Down cursor ↓	Go to the next item.
Enter	Select an item or open a submenu.
ESC	Go back to previous menu.
Ctrl+E	Exit setup and save the changed settings.

You can access the following screens from the BIOS setup:

- **CREATE VOLUME MENU**
- **DELETE VOLUME MENU**
- **RESET RAID DATA**
- **RECOVERY VOLUME OPTIONS**

Create RAID Volume

To recreate the RAID system as **Mirrored** = RAID1 use the **CREATE VOLUME MENU**:



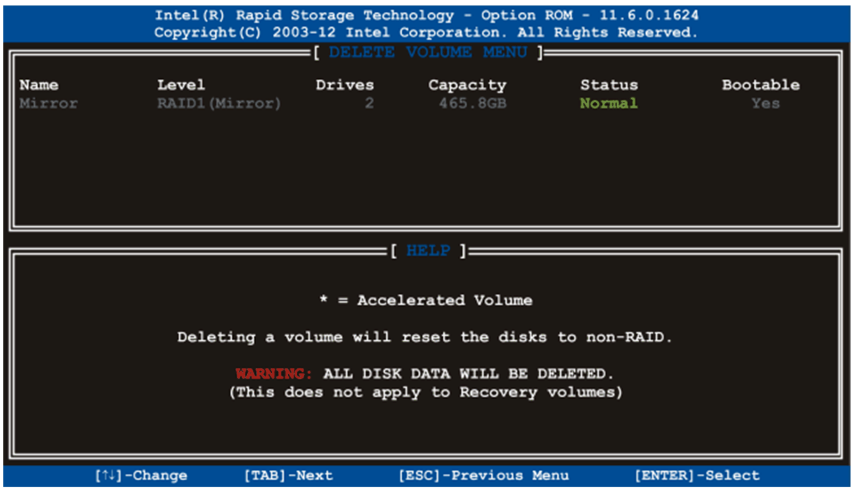
The table shows the Configuration Utility - Create RAID volume:

Parameter	Description	Setting Options	Effect
Name	Option for entering the RAID name.	Name with up to 16 characters	Assigns a name to the RAID volume.
RAID Level	Option for setting the RAID level.	RAID0 (Stripes)	Creates RAID0.
		RAID1 (Mirror)	Creates RAID1.
		Recovery	Creates recovery RAID.
Disk[1]	Specifies the installed hard disks as either Master or Recovery.	Master, Recovery	Defines the hard disks as Master or Recovery.
Strip Size[2]	Option for configuring the size of data blocks.	4 kB, 8 kB, 16 kB, 32 kB, 64 kB, 128 kB	Configures the size of the data block.
Capacity	Option for configuring the RAID capacity.	–	Configures the memory size of the RAID.
Sync[3]	Option for configuring RAID synchronization.	N/A	–
		Continuous	Automatically synchronizes the RAID.
		On request	Manually synchronizes the RAID.
Create Volume	Creates the RAID volume.	–	Creates the RAID volume.

1) This setting is only possible if RAID level is set to Recovery.
2) This setting is only possible if RAID level is set to RAID0(Stripe).
3) This setting is only possible if RAID level is set to Recovery.

Delete RAID Volume

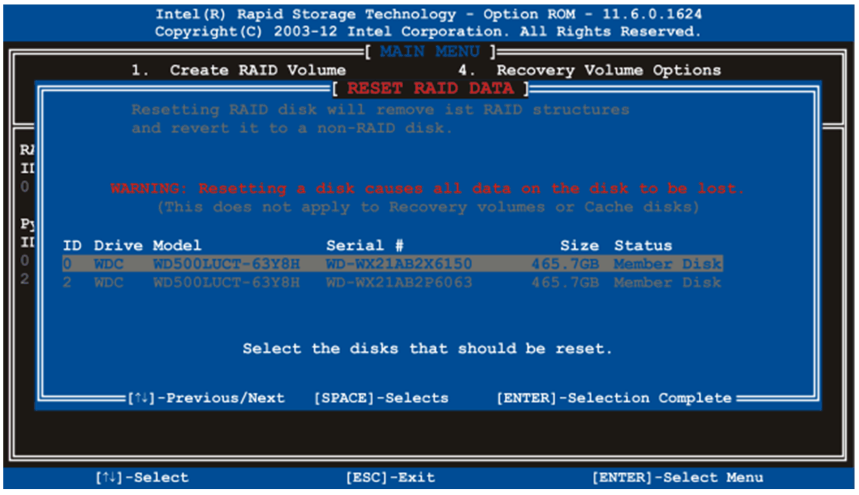
You can delete an existing RAID by using the **DELETE VOLUME MENU** to format the RAID drive, making it non-RAID. The drive to be deleted must be selected and then deleted by pressing **DEL**:



NOTE: This option deletes all data on the drive, including the operating system.

Reset Disks to Non-RAID

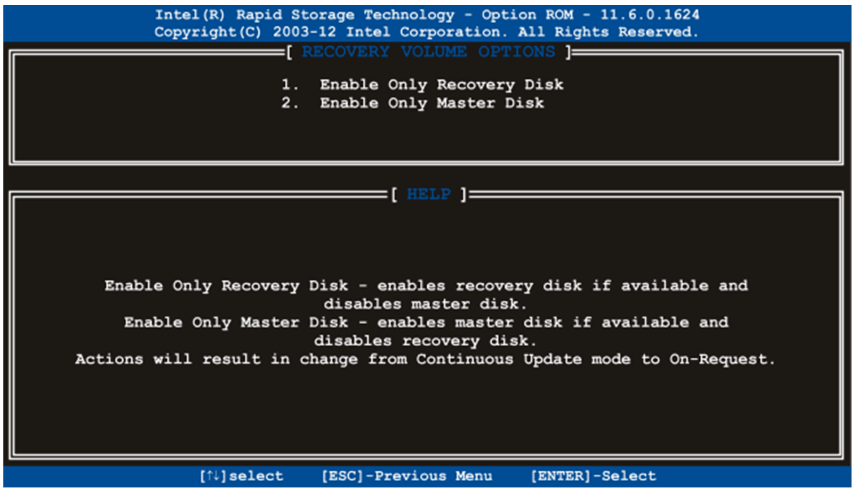
You can delete an existing RAID volume by using the **RESET RAID DATA**. The drive to be deleted must be selected and then deleted by pressing **SPACE** → **ENTER**:



NOTE: This option deletes all data on the drive.

Recovery Volume Options

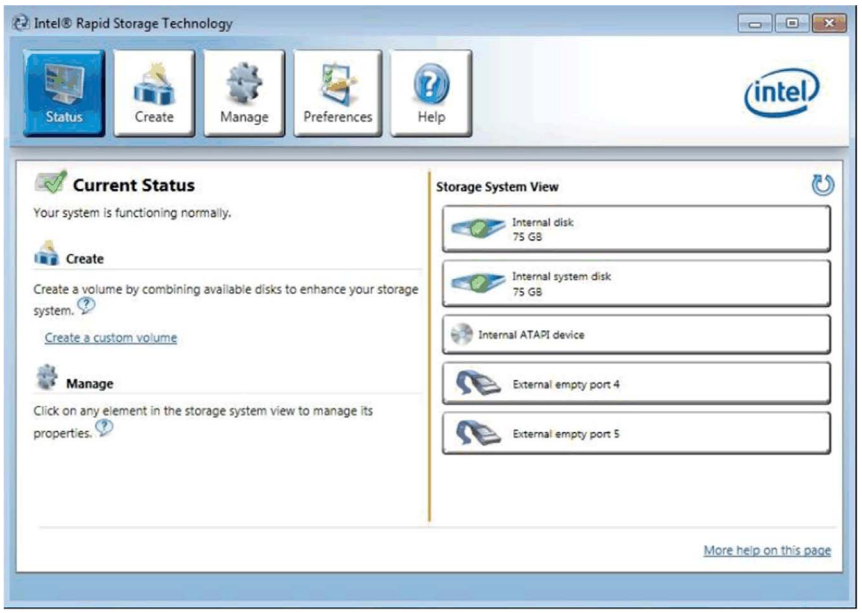
You can enable/disable recover disk and master disk by using the **RECOVERY VOLUME OPTIONS**:



Configuration for SATA RAID Option

When installation is complete, a Intel® Rapid Storage Technology icon is available in the task bar.

Double-click the Intel® Rapid Storage Technology icon and the Intel® Rapid Storage Technology windows appears:



Installation

III

Subject of this Part

This part describes the product installation.

What Is in This Part?

This part contains the following chapters:

System Monitor

9

Subject of this Chapter

This chapter describes the system monitor features of the Industrial Personal Computer.

What Is in This Chapter?

This chapter contains the following topics:

System Monitor Interface

Overview

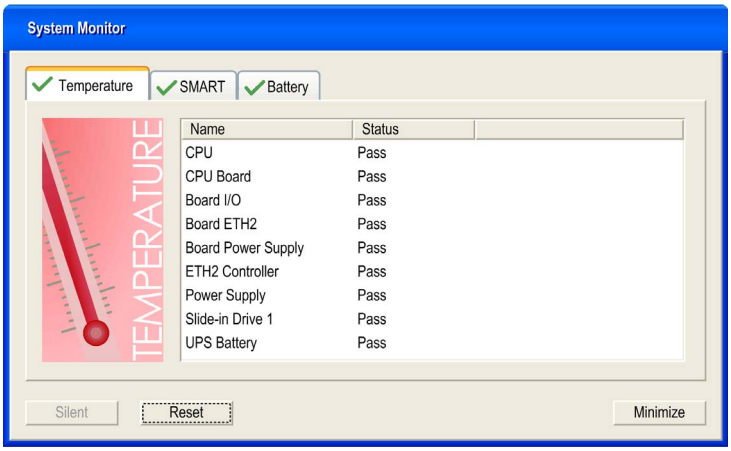
The System Monitor software enables you to monitor the following system parameters:

- **Temperature**
- **Fan**
- **SMART**
- **Battery**

Depending on the configuration *(see page 180)*, if thresholds are exceeded the System Monitor Software alerts via a popup message *(see page 178)*, sound, buzzer and an entry in the windows event log. You can configure *(see page 182)* a system shutdown when an alarm occurs.

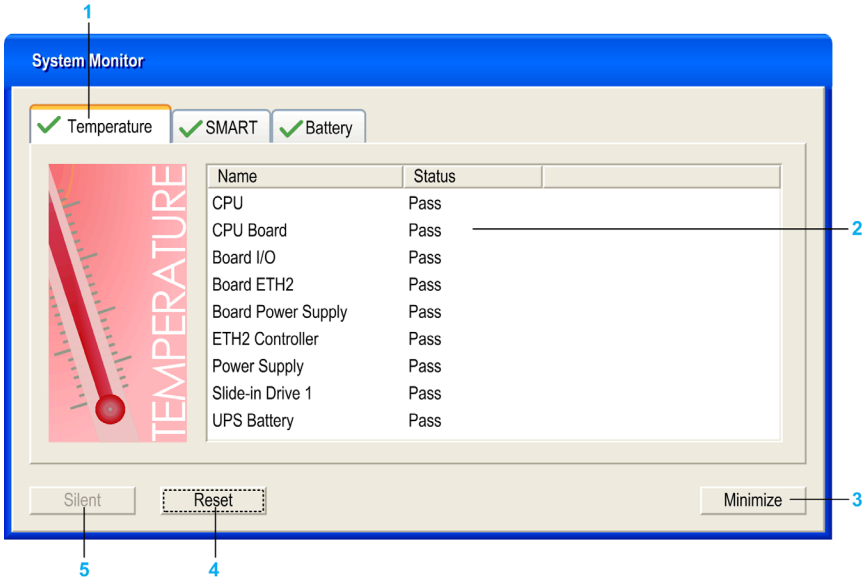
Accessing the System Monitor

The procedure below shows how to access the System Monitor interface:

Step	Action
1	Start the Industrial Personal Computer operating system.
2	In the task bar, double-click the following icon:  **NOTE:** If you cannot see the icon in the task bar, launch the System Monitor software by double-clicking the *SysMonGui.exe* file located in the following path: *C:\Utility\SysMon*. The following figure shows the System Monitor main window: 

System Monitor Interface Description

The System Monitor interface shows all possible parameters and their actual status in system parameter tabs.



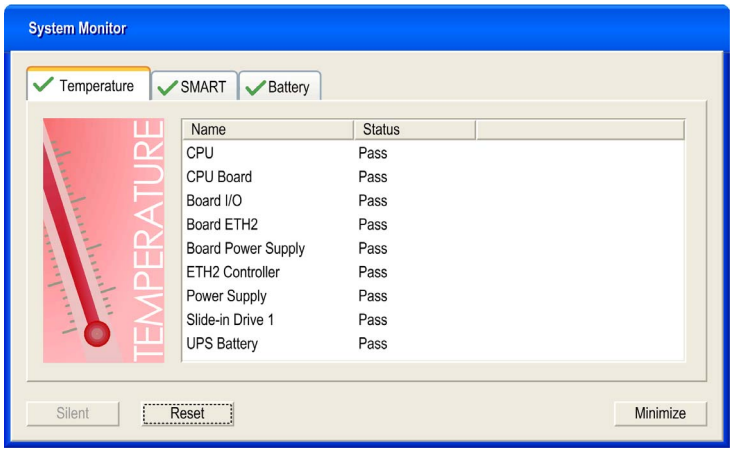
1 Icon specific tab (Refer to the table below).
2 Item name and status
3 Minimize the System Monitor to the system tray.
4 Resets alarmed item.
5 Disable buzzer and sound. Only active when sound or buzzer is playing.

The following table describes the icons of the system parameter tab:

Icon	Status	Meaning
	Ok	No alarm detected
	Disabled	The system parameter is not monitored.
	Alarm	At least one detected alarm.

Temperature Status

The following figure shows the **Temperature** tab:



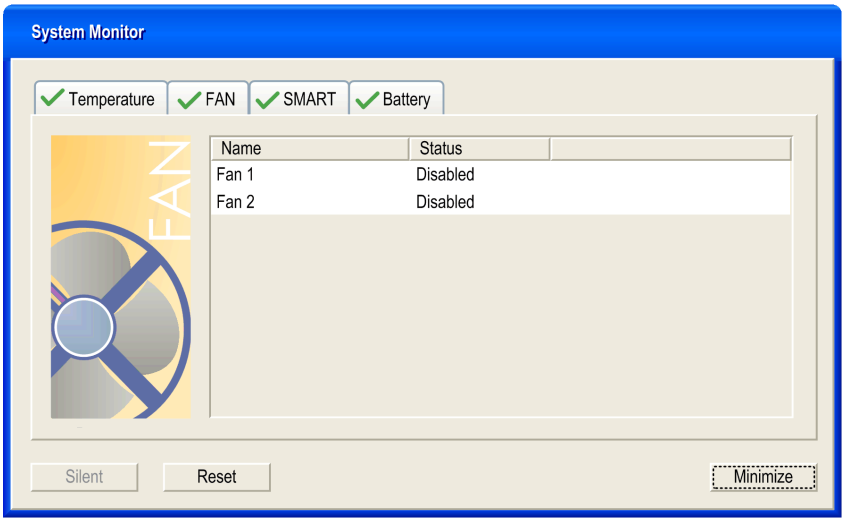
The following table describes the status messages of temperature parameters:

Status	**Meaning**
Pass	No alarm detected
Error	Alarm (limit exceeded)
Disabled	No alarm monitoring
***	Service is not running

Fan Status

NOTE: Only available with the fan kit option and an HDD into Slide-in Disk slot.

The following figure shows the **Fan** tab:



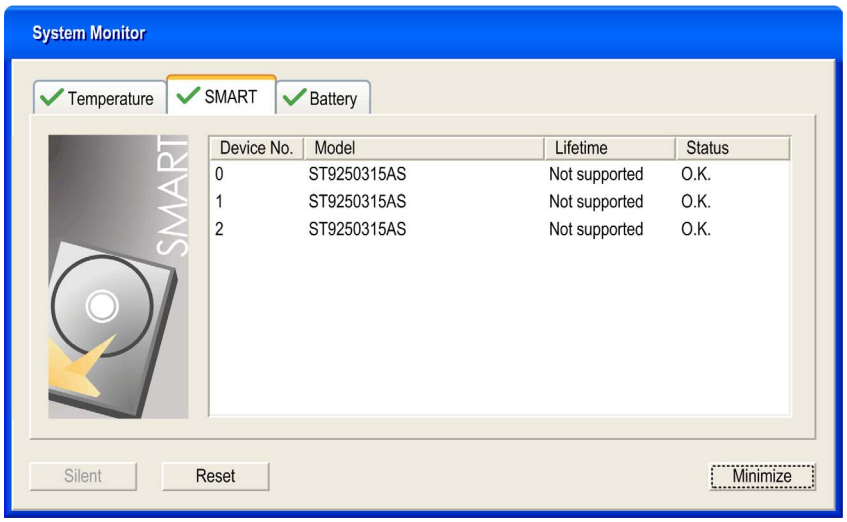
The following table describes the status messages of fan parameters:

Status	Meaning
Pass	No alarm detected
Error	Alarm (a fan does not function as expected)
Disabled	No alarm monitoring
***	Service is not running

SMART Status

The **SMART** status monitors the hard disk.

The following figure shows the **SMART** tab:



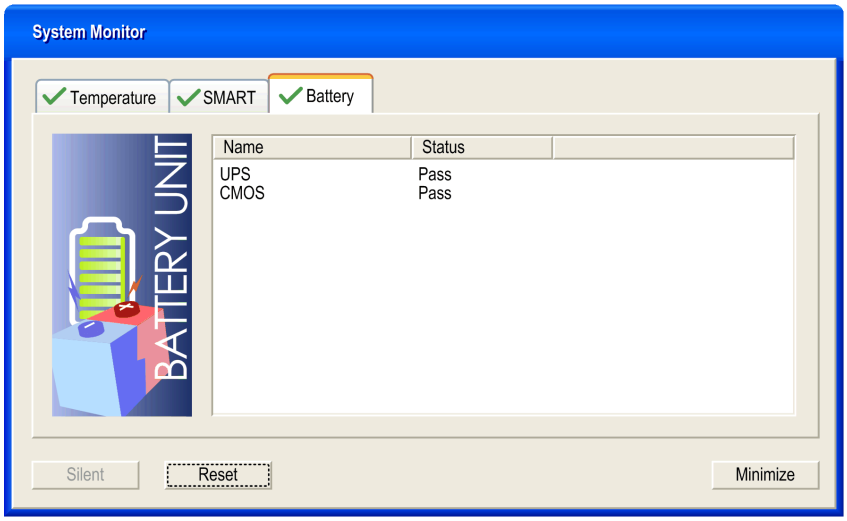
NOTE: In addition to the **Status** column, the **SMART** tab shows a column for the device lifetime. If the device has lifetime support, a **Lifetime** value in percent with a bar graph is displayed, otherwise "**Not supported**" is shown.

The following table describes the status message of the Industrial Personal Computer drives:

Status	Meaning
O.K.	No alarm detected
Alert	Failure reported by SMART or disk life-time reached
Disabled	No alarm monitoring
***	Service is not running

Battery Status

The following figure shows the **Battery** tab:

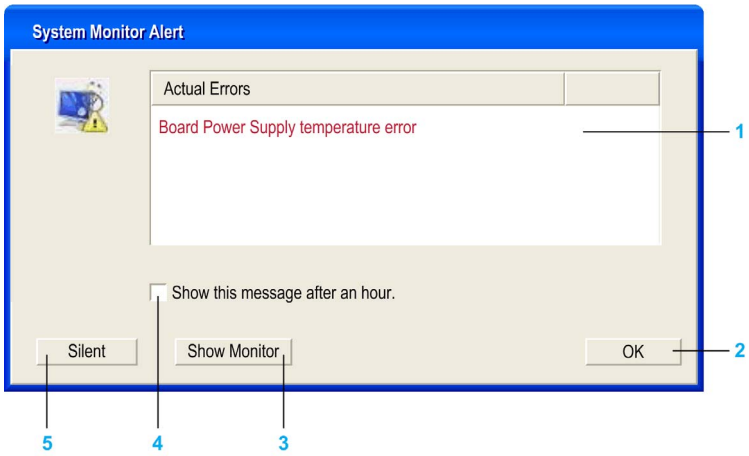


The following table describes the status message of the battery parameters:

Status	Meaning
Pass	No alarm detected.
Error	Battery unit detected a failure, for example, battery is disconnected.
On Battery	Power failure - system is running on battery.
Low Battery	Battery level is critically low.
No Battery	No battery connected.
Low Battery Shutdown	Power failure - system is running on battery and battery level is critically low –> system shutdown is initiated.
Disabled	No alarm monitoring.
***	Service is not running.

Popup Window Description

When an alarm is detected the following popup window is displayed:



1 Shows the alarm or item that can be reset.
2 Closes the System Monitor Alert window.
3 Shows the main window.
4 If the check box is selected, closes the window for one hour even though the alarm is active. (A new alarm shows the window again).
5 Disable buzzer and sound. Only active when sound or buzzer is playing.

System Monitor Setting

Overview

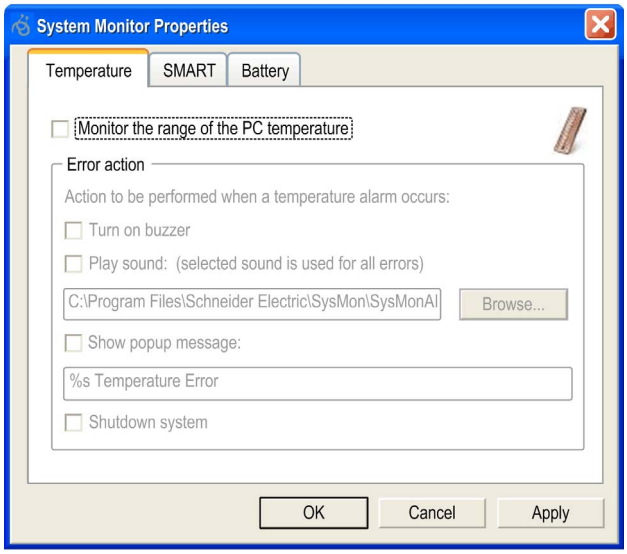
You can set the System Monitor parameters and specify the type of alarm in the System Monitor applet in the Windows Control Panel.

Each system parameter has its own tab.

Use the following dialog box tabs to display the monitoring parameters and set up the various elements to monitor.

Temperature - System Monitor Properties

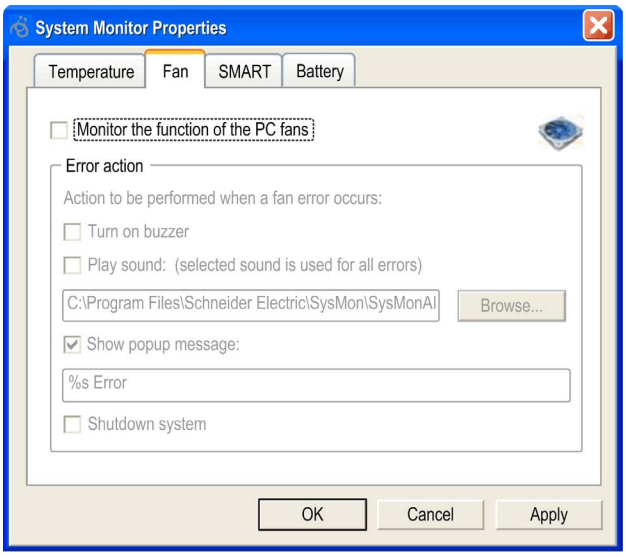
The screenshot below shows the **Temperature** tab:



Field	Description
Monitor the range of the PC temperature	Select this check box to enable and begin monitoring the PC temperature. When enabled *(see page 182)*, set the **Error action**.

Fan - System Monitor Properties

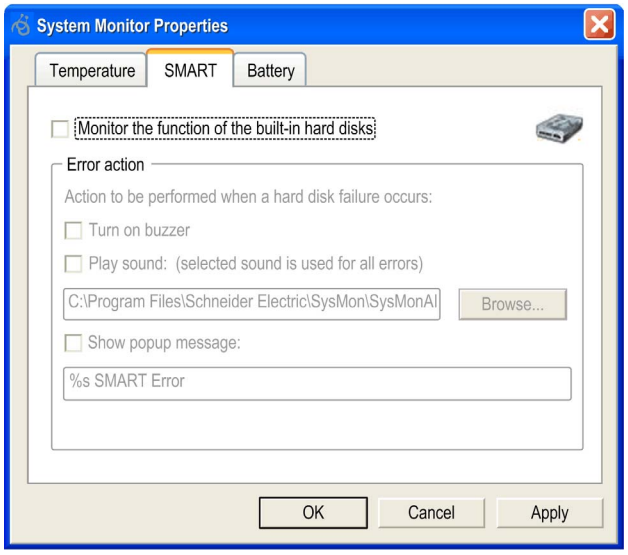
NOTE: Only available with the fan kit option and an HDD into Slide-in Disk slot.
The screenshot below shows the **Fan** tab:



Field	Description
Monitor the function of the PC fans	Select this check box to enable and begin monitoring the function of fans. When enabled *(see page 182)*, set the **Error action**.

SMART - System Monitor Properties

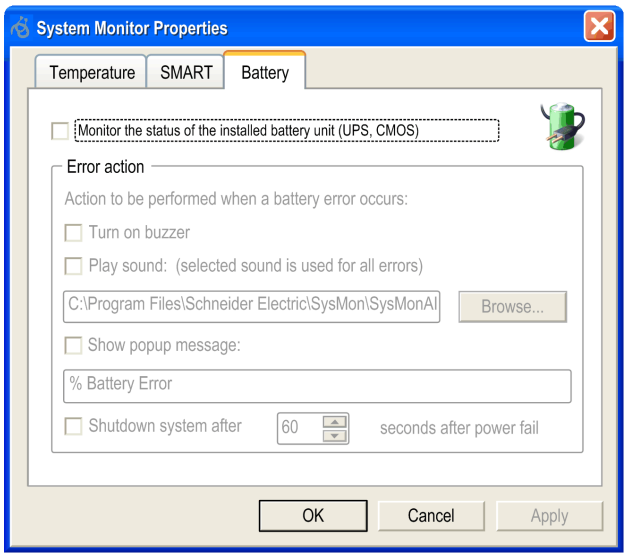
The screenshot below shows the **SMART** tab:



Field	Description
Monitor the function of the built-in hard disks	Select this check box to enable and begin monitoring the built-in hard disks. When enabled *(see page 182)*, set the **Error action**.

Battery - System Monitor Properties

The screenshot below shows the **Battery** tab:



Field	Description
Monitor the status of the installed battery unit (UPS, CMOS)	Select this check box to enable and begin monitoring the installed battery unit. When enabled *(see page 182)*, set the **Error action**.

Error Action Configuration

Field	Description
Turn on buzzer	Select this check box to enable the buzzer.
Play sound	Select this check box to enable the sound that is used for all detected errors. Specify the sound file path (**Browse...** button).
Show popup message	When this check box is selected, status messages are displayed in the form of a popup.
Shutdown system	If you want the system to stop when an error is detected, select this check box. Not available in **SMART** tab.

Maintenance

10

Subject of this Chapter

This chapter covers maintenance of the Industrial Personal Computer.

What Is in This Chapter?

This chapter contains the following topics:

Reinstallation Procedure

Introduction

In certain cases, it may be necessary to reinstall the operating system.

Precautions to be taken:

- Keep static-producing materials (plastic, upholstery, carpeting) out of the immediate work area.
- Do not remove ElectroStatic Discharge (ESD) sensitive components from their anti-static bags until you are ready to install them.
- When handling static-sensitive components, wear a properly grounded wrist strap (or equivalent).
- Avoid unnecessary contact with exposed conductors and component leads with skin or clothing.

Before Reinstallation

Hardware required:

- Reinstallation DVD-ROM
- External DVD drive, compatible with DVD+R DL format, or a USB connection for Industrial Personal Computer without DVD drive.

Setting up the hardware:

- Shut down Windows® in an orderly fashion and remove all power from the device. Then, follow the applicable instructions described in *Uninterruptible Power Supply (UPS) (see page 115)*.
- Disconnect all external peripherals.

NOTE: Save all important data on the hard drive or CFast card (the reinstallation process erases all data). The reinstallation process returns the computer to its factory settings.

Reinstallation

Refer to the relevant procedure in “PS4000 Series Installation Guide” in a package.

Regular Cleaning and Maintenance

Introduction

Inspect the Industrial Personal Computer periodically to determine its general condition. For example:

- Are all power cords and cables connected properly? Have any become loose?
- Are all installation fasteners holding the unit securely?
- Is the ambient temperature within the specified range?
- Are there any scratches or traces of dirt on the installation gasket?

The following describes service/maintenance work which can be carried out by a trained, qualified user.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Industrial Personal Computer and the power supply.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace and secure all covers or elements of the system before applying power to the unit.
- Use only the specified voltage when operating the Industrial Personal Computer. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc. Always check whether your device is AC or DC powered before applying power.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER

POTENTIAL FOR EXPLOSION

- Always confirm the ANSI/ISA 12.12.01 and CSA C22.2 N°213 hazardous location rating of your device before installing or using it in a hazardous location.
- To power on or power off a Industrial Personal Computer installed in a Class I, Division 2 hazardous location, you must either:
  - Use a switch located outside the hazardous environment, or
  - Use a switch certified for Class I, Division 1 operation inside the hazardous area.
- Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous. This applies to all connections including power, ground, serial, parallel, network and rear USB connections.
- Never use unshielded / ungrounded cables in hazardous locations.
- When enclosed, keep enclosure doors and openings closed at all times to avoid the accumulation of foreign matter inside the workstation.
- Use only non-incendive front USB configurations *(see page 69)*.

Failure to follow these instructions will result in death or serious injury.

During operation, surface temperatures of the heat sink may reach more than 70 °C (158 °F).

⚠ WARNING

RISK OF BURNS

Do not touch the surface of the heat sink during operation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Cleaning Solutions

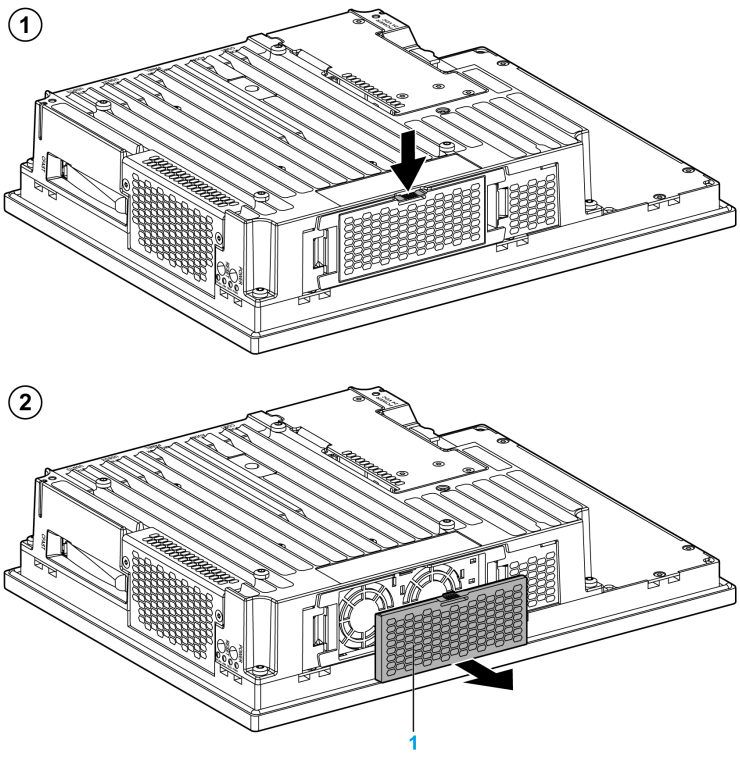
⚠ CAUTION

HARMFUL CLEANING SOLUTIONS

- Do not clean the unit or any component of the unit with paint thinner, organic solvents, or strong acids.
- Use only a mild soap or detergent that will not harm the poly carbonate material of the screen.

Failure to follow these instructions can result in injury or equipment damage.

Filter Cover

Step	Action
1	Disconnect the power supply to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Press in the marked latching mechanism as you pull out the filter cover:  **1** Filter cover
4	Insert the new filter cover into the fan kit by following these instructions in the reverse order.

Lithium Battery

The Industrial Personal Computer contains one battery, for backing up the real-time clock (RTC).

NOTE: The following characteristics, features and limits only apply to this accessory and can deviate from those specified for the entire device. For the device where this accessory is installed, refer to the data provided specifically for the device.

Features	Values
Capacity	950 mAh
Voltage	3 Vdc
Self Discharge at 23 °C (73.4 °F)	< 1% per year
Storage Time	Maximum 3 years at 30 °C (86 °F)
Environmental Characteristics	
Storage Temperature	– 20...60 °C (– 4...140 °F)
Relative Humidity	0...95% non-condensing

Replacing the Lithium Battery

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the safety information in the Regular Cleaning and Maintenance section *(see page 185)* before attempting this procedure.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER

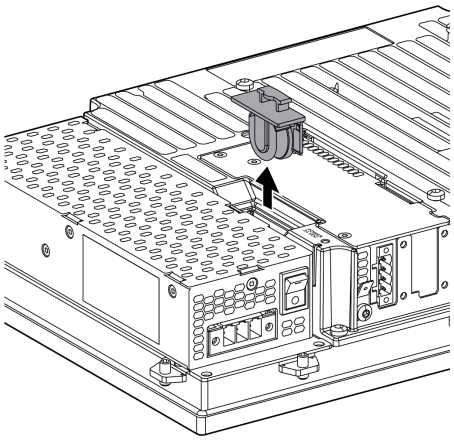
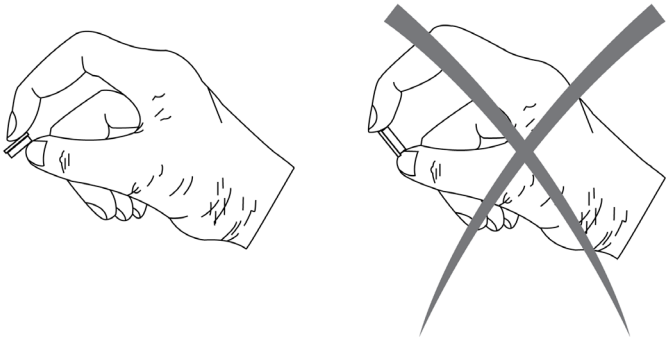
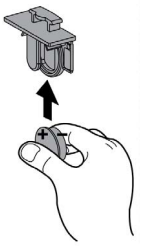
EXPLOSION, FIRE, OR CHEMICAL HAZARD

- Replace battery with identical type.
- Follow all battery manufacturer's instructions.
- Do not recharge, disassemble, heat above 100 °C (212 °F), or incinerate.
- Use your hands or insulated tools to remove or replace the battery.
- Maintain proper polarity when inserting and connecting a new battery.
- Remove all replaceable batteries before discarding the Industrial Personal Computer.
- Recycle or properly dispose of used batteries.

Failure to follow these instructions will result in death or serious injury.

NOTE:

- The product design allows you to change the battery with the Industrial Personal Computer either on or off.
- Saved settings will be restored when changing the battery with the power turned off (as the settings are stored in non-volatile EEPROM). However, the date and time must be reset because this data is lost when changing the battery.
- Only qualified personnel can change the battery.

Step	Action
1	Disconnect the power supply to the Industrial Personal Computer.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Pull battery holder out of the Industrial Personal Computer and remove the battery. 
4	The battery should not be held by its edges. Insulated tweezers may also be used for inserting the battery. 
5	Insert the new battery with correct polarity: 
6	Insert battery holder into the Industrial Personal Computer.
7	Reconnect the power supply to the Industrial Personal Computer (plug in power cable and press power switch).
8	You may need to reset the date and time in the BIOS settings.

NOTE: Replacement of the battery in the Industrial Personal Computer other than with the type specified in this document may present a risk of fire or explosion.

⚠ WARNING
IMPROPER BATTERY CAN PROVOKE FIRE OR EXPLOSION
Replace battery only with identical type: Type CR2477N.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Appendices

What Is in This Part?

This part contains the following chapters:

Accessories

A

Accessories for the Industrial Personal Computer

Available Accessories

Accessories are available as options. The list of accessories available for the Industrial Personal Computer is shown below:

Description	Reference
CFast Card, 4 GB	PFXZCDSCCFA41
CFast Card, 8 GB	PFXZCDSCCFA81
CFast Card, 16 GB	PFXZCDSCCFA161
HDD Unit without OS, 500 GB (for Slide in Disk)	PFXZPSSCHDD502
SSD Unit without OS, 60 GB (for Slide in Disk)	PFXZPSSCSSD62
SSD Unit without OS, 128 GB (for Slide in Disk)	PFXZPSSCSSD122
DVD multi drive (for Slide in Slot)	PFXZPSSSMD2
Disposable, dirt-resistant sheet for the 12-inch screen (5 sheets/set)	CA7-DFS12-01
Adaptor to install an unit for Slide in Disk to Slide in Slot	PFXZPSSSAD2
Adaptor to install a CFast card to Slide in Disk	PFXZPSSCAD2
COM Expansion Board (Add 1 ch for RS-232C/422/485)	PFXZPSIUCMR42
UPS Interface Board	PFXZPSIUUPM2
UPS battery unit	PFXZPSEUUPB2
UPS conneciton cable between UPS interface board and UPS battery unit	PFXZPSCBUP32
SO-DIM module DDR3 1 GB	PFXZPSD311
SO-DIM module DDR3 2 GB	PFXZPSD321
SO-DIM module DDR3 4 GB	PFXZPSD341
SO-DIM module DDR3 8 GB	PFXZPSD381
AC power supply unit	PFXZPSPUAC1
DC power supply connector (Screw type 5 pcs)	PFXZPSCNDC1
AC power supply connector (Screw type 5 pcs)	PFXZPSCNAC1
Lithium battery for replacement (for BIOS backup)	PFXZPSBTLT1
Installation fasteners used to install PS4600 Series into a solid panel (10 pcs)	PFXZPPAF10P2
1 slot Expansion Unit (PCIe x1 + Slide in Slot x1)	PFXZPSEUPCIC1
1 slot Expansion Unit (PCI x1 + Slide in Slot x1)	PFXZPSEUPCI11
2 slots Expansion Unit (PCI x1 + PCIe x1 + Slide in Slot x1)	PFXZPSEUPCI21
2 slots Expansion Unit (PCI x2 + Slide in Slot x1)	PFXZPSEUPCIA1

Description	Reference
Replacement FAN kit for PS-4600	PFXZPPIUFAN2
Replacement FAN filter for PS-4600 (5 pcs)	PFXZPPFTFAN2

After-sales service

B

For details on after-sales service, refer to Pro-face website at
http://www.pro-face.com/trans/en/manual/1001.html