Pro-face
for the best interface

PS5000 Series
User Manual

(Slim Panel Type Core i3 Model)

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 that is 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 the PS5000 Series, (from now on referred to as the Industrial Personal Computer).

The Industrial Personal Computer is designed to operate in an industrial environment.

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**	**S**	**2**	**H**	**N**	**3**	**D**	**8**	**0**	**N**	**0**	**N**	**N**	**0**	**0**
Base unit	Slim panel type	S													
Product generation	Second generation		2												
Display	Slim panel Core i3 W15”			H											
	Slim panel Core i3 W19”			K											
Box type	None				N										
CPU type	Core i3-4010U - 1.7 GHz					3									
Power supply	DC						D								
RAM sizes	8 GB							8							
Operating system	None								0						
	Windows Embedded Standard 7 (WES7P) SP1 64 bits MUI								4						
	Windows 7 Ultimate SP1 64 bits								6						
	Windows Embedded 8.1 Industry 64 bits MUI								8						
Storage device	None									N					
	CFast 16 GB									A					
	HDD 500 GB									C					
	HDD 1 TB									E					
	SSD 80 GB									F					
	SSD 160 GB									G					
	SSD 240 GB									H					

Character number	Prefix (1-4)	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Part number example	**PFXP**	**S**	**2**	**H**	**N**	**3**	**D**	**8**	**0**	**N**	**0**	**N**	**N**	**0**	**0**
Options	None										0				
	NVRAM mini PCIe										1				
	Interface 2 x RS 422/485 isolated										2				
	Interface 4 x RS 422/485										3				
	Interface 2 x USB 3.0										4				
	Interface 2 x RS 232 isolated										5				
	Interface 4 x RS 232										6				
	Interface 2 x Gigabit PoE LAN										7				
	Interface 16 x DI / 8 x DO										8				
	1 x Wi-Fi module										E				
	Interface 2 x CANopen										G				
	Interface 1 x PROFIBUS DP with NVRAM										J				
	Interface 1 x Gigabit IEEE1588 LAN										K				
Second storage	None											N			
	CFast 16 GB											A			
	HDD 500 GB											C			
	HDD 1 TB											E			
	SSD 80 GB											F			
	SSD 160 GB											G			
	SSD 240 GB											H			
Software bundle	None												N		
	BLUE												B		
	WinGP												G		
	Remote HMI server												R		
	BLUE and remote HMI server												H		
	WinGP and remote HMI server												J		
Customization	None													0	
Spare	None														0

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

Validity Note

This document is valid for the PS5000 Series.

The technical characteristics of the device(s) described in this manual also appear online at http://www.pro-face.com/trans/en/manual/1001.html

The characteristics presented in this manual should be the same as those that appear online. In line with our policy of constant improvement we may revise content over time to improve clarity and accuracy. In the event that you see a difference between the manual and online information, use the online information as your reference.

Registered trademarks

Microsoft® and Windows® are registered trademarks of Microsoft corporation in the United States and/or other countries.

Intel®, and Core i3® are registered trademarks of Intel corporation.

Product names used in this manual may be the registered trademarks owned by the respective proprietors.

Product Related Information

⚠ DANGER

RISK OF EXPLOSION IN HAZARDOUS LOCATION

Do not use this product in hazardous locations.

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 a 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.*

This product has a touchscreen with Projected Capacitive Touch technology that may have abnormal operation when surface is wet.

⚠ WARNING

LOSS OF CONTROL

- Do not operate when touchscreen surface is wet.
- If the touchscreen surface is wet, remove any excess water and dry the surface with a soft cloth before operation.

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

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.**

Part I
General Overview

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:

Chapter 1
Important Information

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:

FCC 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, according 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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this product.

⚠ 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 wiring 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 60950 and CSA 60950, Industrial Control Equipment

CCC, RCM and EAC or GOST-R certification. Refer to product markings.

NOTE: For information on certifications and standards, such as certified models and certificates, see product markings or the following: ***http://www.pro-face.com/trans/en/manual/1002.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 LV 2006/95/EC (low voltage), based on IEC 60950
  - Directive 2004/108/EC (EMC class A), based on IEC 61006-2 and IEC 61006-4
- Australia:
  - Standard AS/NZS CISPR11 (C-Tick), (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 30)*.

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 (WEEE)

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 115)* 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.

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.

KC Markings

해당 무선설비는 운용 중 전파혼신 가능성이 있음

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 목적 으로 합니다.

해당 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다

Chapter 2
Physical Overview

Subject of this Chapter

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

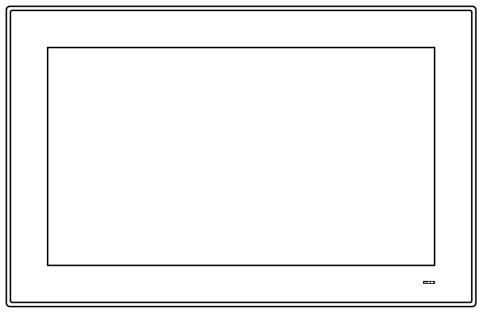
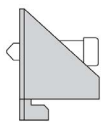
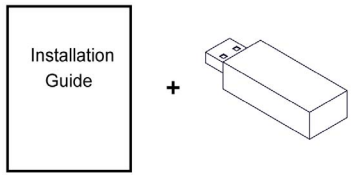
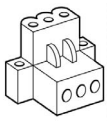
What Is in This Chapter?

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.	
Installation fasteners: ● 12 x panel mount clamps ● 12 x panel mount screws	
Restore & documentation recovery media containing the software required to reinstall the operating system, the Microsoft Windows EULA. Language pack DVD for windows PRO OS Chinese user manual "Before using this product" flyer Warning/Caution information Chinese RoHS flyer	
DC terminal block: 3-pin power connector. 1 x wire for chassis ground. A bag with 4 x screws for mounting the HDD/SSD and 2 x black screws for mounting mini PCIe cards.	

The 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 W15” Description

Introduction

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

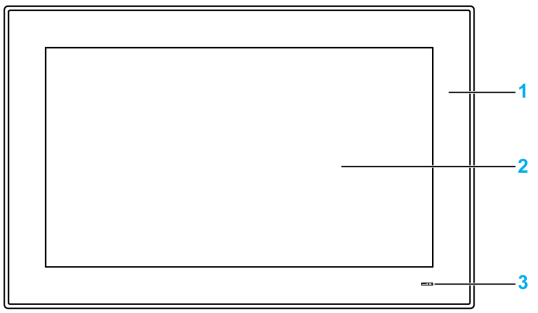
⚠ WARNING

RISK OF BURNS

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

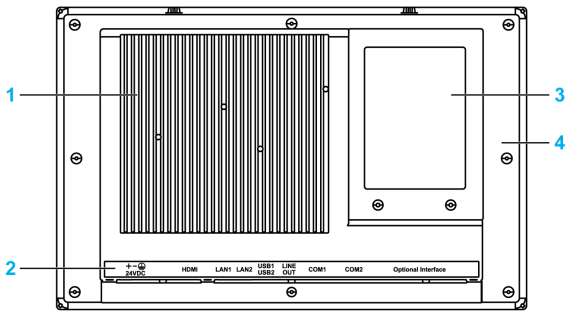
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Front View



1 Panel
2 Multi-touch panel
3 Status indicator

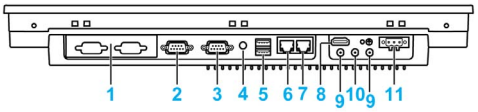
Rear View



1 Heat sink
2 Industrial Personal Computer interface
3 Industrial Personal Computer cover to storage drives (2.5" SATA HDD/SSD, CFast)
4 Industrial Personal Computer back to access mini PCIe and internal connector for optional interfaces

NOTE: The cooling method is passive heat sink.

Bottom View



1 1 x Optional interface
2 COM2 port RS-232/422/485
3 COM1 port RS-232
4 Audio line out
5 USB1 (USB 3.0) and USB2 (USB 3.0)
6 Eth2 (10/100/1000 Mbps)
7 Eth1 (10/100/1000 Mbps) support AMT (active management technology)
8 Monitor/Panel, HDMI
9 SMA connector for the Wi-Fi external antenna
10 SMA connector for the GPS external antenna
11 DC power connector

NOTE: Use an extension cable to connect the external antenna.

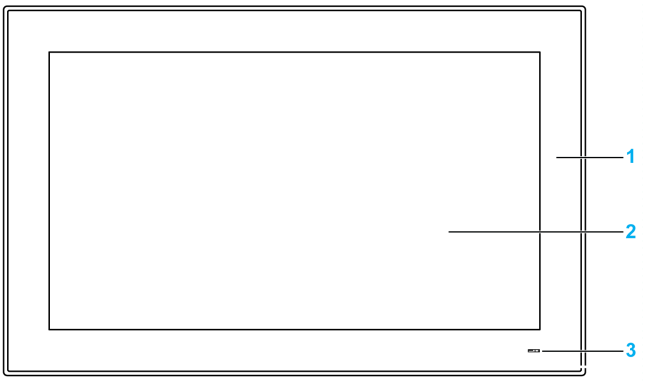
Industrial Personal Computer W19” Description

Introduction

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

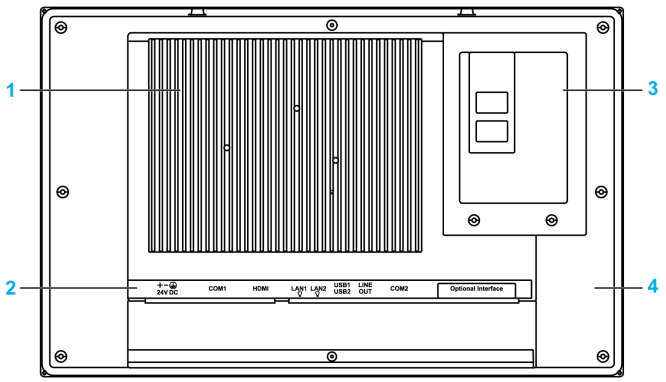
⚠ WARNING
RISK OF BURNS Do not touch the surface of the heat sink during operation. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Front View



1 Panel
2 Multi-touch panel
3 Status indicator

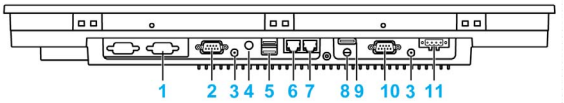
Rear View



1 Heat sink
2 Industrial Personal Computer interface
3 Industrial Personal Computer cover to storage drives (2.5" SATA HDD/SSD, CFast)
4 Industrial Personal Computer back to access mini PCIe and internal connector for optional interfaces

NOTE: The cooling method is passive heat sink.

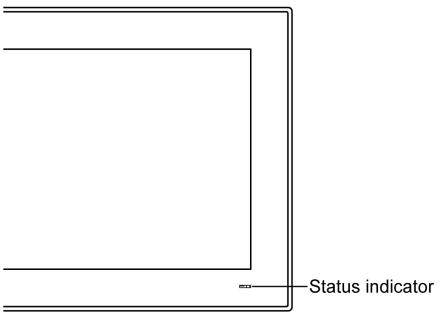
Bottom View



1 1 x Optional interface
2 COM2, port RS-232/422/485
3 SMA connector for the external antenna
4 Audio Line out
5 USB1 (USB 3.0) and USB2 (USB 3.0)
6 Eth2 (10/100/1000 Mbps)
7 Eth1 (10/100/1000 Mbps) support AMT (active management technology)
8 SMA connector for the external antenna (use an extension cable to connect the external antenna when HDMI cable is connected)
9 Monitor/Panel, HDMI
10 COM1, port RS-232
11 DC power connector

Industrial Personal Computer Status Indicator

Indicator Description



The table describes the meaning of the status indicator:

Color	State	Meaning
Blue	On	Supply voltage is OK.
Orange	On	Stand by.
–	No light	Supply voltage is off.

Chapter 3
Characteristics

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

The characteristics are shown below:

Element	Characteristics
Intel chipset and processor	Core i3-4010U, 1.7 GHz
Expansion slot	1 x Mini PCIe
Memory	8 GB, DDR3 1600 MHz, SO-DIMM SDRAM
Buzzer	Yes
Cooling method	Passive heat sink
Weight	W15” Industrial Personal Computer: Approximately 6 kg (13.22 lbs) W19” Industrial Personal Computer: Approximately 7 kg (15.44 lbs)

Display Characteristics

Element	15” Screen size	19" Screen size
Display type	HD TFT LED LCD	
Display size	15.6”	18.5”
Display resolution	1366 x 768 pixel (FWXGA)	
Number of colors	16.7 million	
Brightness control	Step less adjustment	
Backlight life	Life span > 50,000 h @ 25 °C (77 °F)	
Touchscreen resolution	4096 x 4096 DPI (dot per inch)	
Multi-touch	5 simultaneous touch (projected capacitive)	

DC Power Supply

The following table describes the DC power supply:

Element	Characteristics
Rated voltage	24 Vdc ±20 %
Inrush current	TBD
Power consumption	W15” Industrial Personal Computer: 18 W typical, 60 W max. W19” Industrial Personal Computer: 28 W typical, 60 W max.

Operating Systems

The products are delivered with a pre installed operating system according to the configuration:

Operating Systems
Windows Embedded 8.1 Industry 64 bits MUI
Windows 7 Ultimate SP1 64 bits
Windows Embedded Standard 7 (WES7P) SP1 64 bits MUI

NOTE: All Windows 8 configuration product must be connected to Internet during first start-up for activation of Operating System.

Interface Characteristics

Serial Interface

Element	Characteristics
Type	1 x RS-232/422/RS-485, with auto data flow control, modem-capable, not electrically isolated
Amount	2
Transfer rate	Maximum 115.2 kbps
Connection	D-Sub 9-pin, plug

USB Interface

Element	Characteristics
Type	USB 3.0
Amount	2
Transfer rate	Low speed (1.5 Mbps), full speed (12 Mbps), high speed (480 Mbps) and super speed (5 Gbps)
Connection	Type A
Current load	Maximum 1 A per connection

Ethernet Interface

Element	Characteristics
Type	RJ45
Amount	2
Speed	10/100/1000 Mbps
AMT	Support active management technology (Ethernet1)

HDMI Interface

Element	Characteristics
Type	High-Definition multimedia interface connector
Amount	1
Resolution	Supports HDVI up to1920 x 1200 at 60 Hz

Environmental Characteristics

Characteristics

Characteristics	Value
Degree of protection	IP66 front panel
Pollution degree	For use in pollution degree 2 environment
Operating temperature	0...55 °C (32...131 °F) with SSD or CFast 0...45 °C (32...113 °F) with HDD
Storage temperature	- 20...60 °C (- 4...140 °F)
Operating altitude	2,000 m (6,560 ft) max
Vibration	5...500 Hz: 1 g with HDD
Storage humidity	10...95 % RH at 40 °C (104 °F), no condensation

Chapter 4
Dimensions/Assembly

Subject of this Chapter

This chapter describes Industrial Personal Computer dimensions and installation panels.

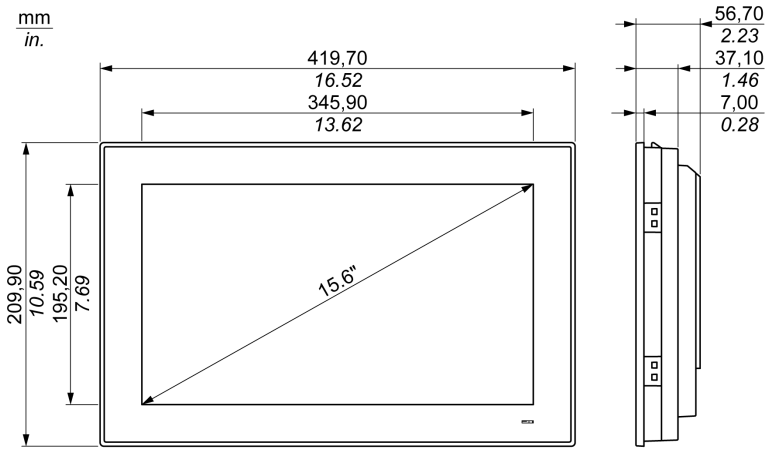
What Is in This Chapter?

This chapter contains the following topics:

Industrial Personal Computer W15” Dimensions

W15” Dimensions

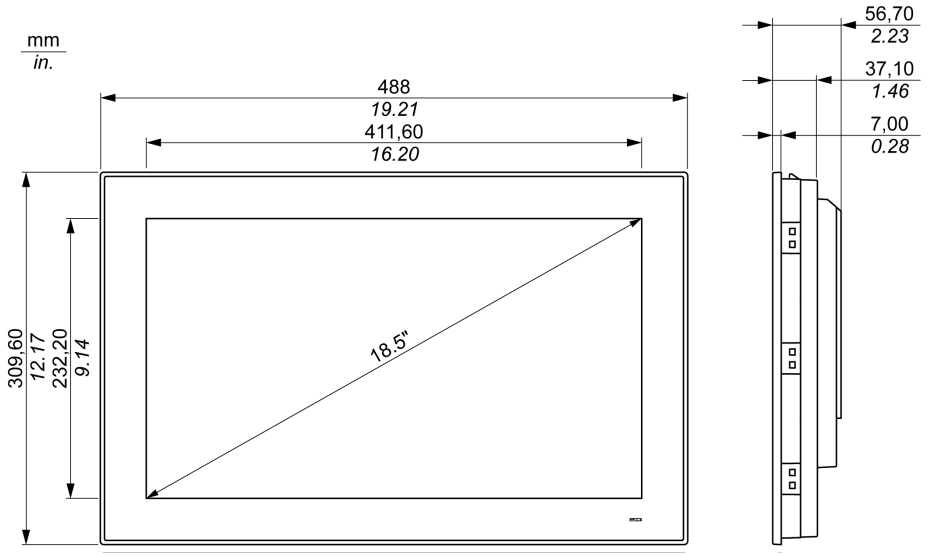
The following figure shows the dimensions:



Industrial Personal Computer W19” Dimensions

W19” Dimensions

The following figure shows the dimensions:



Installation Requirements

Important Mounting Information

Overheating can cause incorrect software behavior, therefore:

- Ensure that environmental characteristics are respected.
- The Industrial Personal Computer is only permitted for operation in closed rooms.
- The Industrial Personal Computer cannot be situated in direct sunlight.
- The Industrial Personal Computer vent holes must not be covered.
- When mounting the Industrial Personal Computer, adhere to the allowable mounting angle.

⚠ WARNING

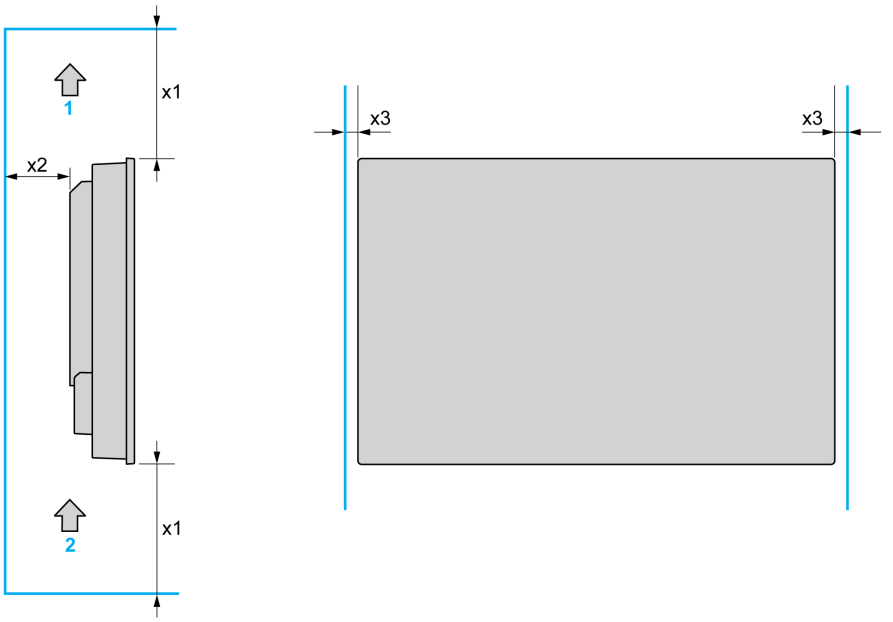
UNINTENDED EQUIPMENT OPERATION

- 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.

Spacing Requirements

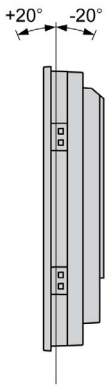
In order to provide sufficient air circulation, mount the Industrial Personal Computer so that the spacing on the top, bottom, and side is as follows:



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

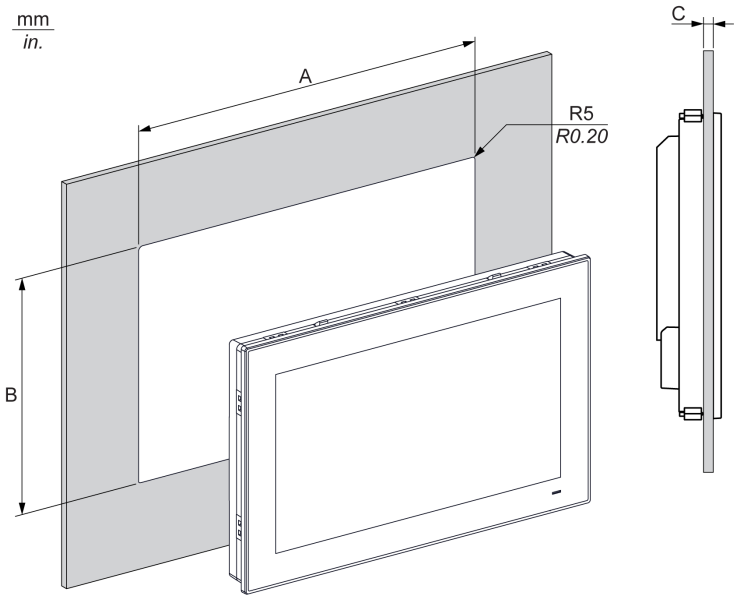
The following figure shows the allowable mounting orientation for the Industrial Personal Computer:



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:



Industrial Personal Computer Cut-out	A	B	C	R
W15”	412.4 ±0.7 mm (16.24 ±0.03 in.)	261.7 ±0.4 mm (10.30 ±0.02 in.)	2...6 mm (0.08...0.23 in.)	5 mm (0.20 in.)
W19”	479.3 ±1 mm (18.87 ±0.04 in.)	300.3 ±0.7 mm (11.82 ±0.03 in.)		

NOTE:

- Ensure that the thickness of the installation panel is from 2 to 6 mm (0.08 to 0.23 in.).
- All installation panel surfaces used should be strengthened. Due consideration should be given 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 that 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).

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, NEMA 4X Indoor) of the Industrial Personal Computer and provides additional protection from vibration.

NOTE: NEMA 4X Indoor or Type 4 is not part of UL certification.

⚠ 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).

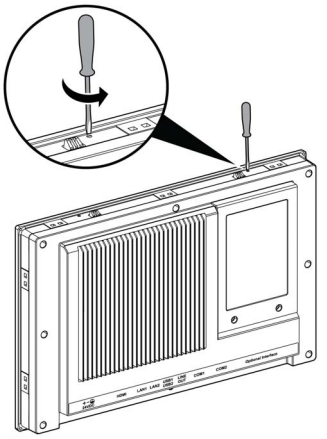
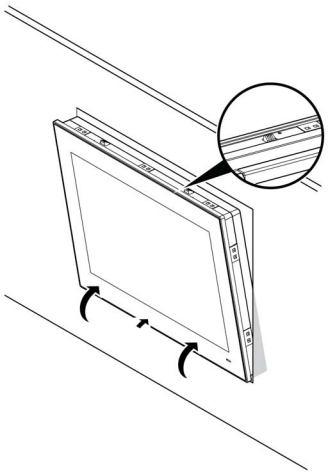
Failure to follow these instructions can result in injury or equipment damage.

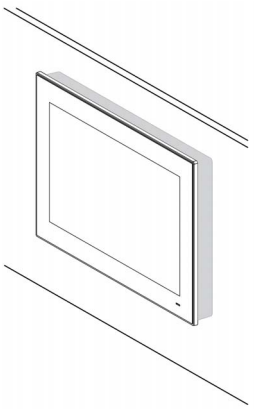
Easy Installation of the Industrial Personal Computer

The installation gasket is required when installing the Industrial Personal Computer. With easy installation, an individual can complete the panel mount process.

NOTE: For easy installation, the suggested mounting panel thickness can be up to 2 mm (0.079 in).

Follow these steps for the easy installation of the Industrial Personal Computer:

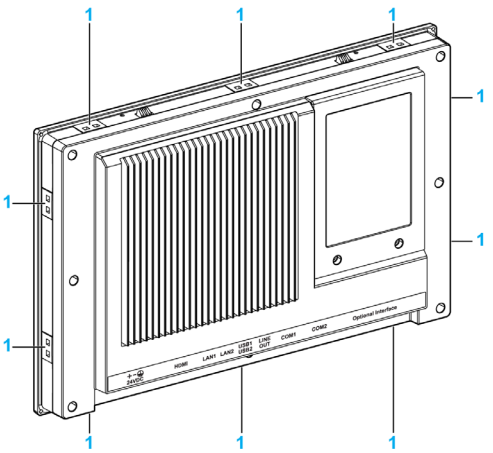
Step	Action
1	Check that the gasket is correctly attached to the Industrial Personal Computer. **NOTE:** When checking the gasket, avoid contact with the sharp edges of the Industrial Personal Computer frame, and insert the gasket completely into its groove.
2	Release the 2 screws, cross type, at the top of the Industrial Personal Computer to raise the snap hook: 
3	Install the Industrial Personal Computer in the panel opening *(see page 36)* and push it into the wall. The snap hook holds the Industrial Personal Computer to the wall: 

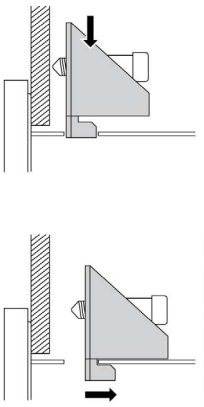
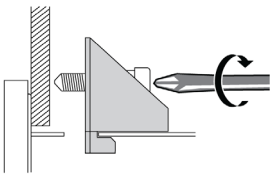
Step	Action
4	Industrial Personal Computer installation complete  **NOTE:** Ensure that the angle is tilted no more than allowed by the mounting orientation requirements.

Installation of the Industrial Personal Computer

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

Follow these steps when installing the Industrial Personal Computer with installation fasteners:

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 the gasket completely into its groove.
2	Install the Industrial Personal Computer in the panel opening *(see page 36)*.
3	Insert the 10 installation fasteners securely into the slots at the top, bottom, left and right side of the Industrial Personal Computer see legend 1. 

Step	Action
4	Insert each fastener in its corresponding slot and pull the fastener back until it is flush with the rear of the fastener hole 
5	Tighten each of the fastener screws, cross type, 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 allowed by the mounting orientation requirements.

⚠ 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 they do not fall inside the Industrial Personal Computer chassis.

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

NOTE: The installation fasteners are required for NEMA 4X Indoor protection. NEMA 4X Indoor or Type 4 is not part of UL certification.

Part II
Implementation

Subject of this Part

This part describes setting up the product.

What Is in This Part?

This part contains the following chapters:

Chapter 5
Getting Started

First Power-up

License Agreement

Limitations on your usage of the Microsoft Windows Operating System are noted in Microsoft's End User License Agreement (EULA). This EULA is included on the media containing the software required to reinstall the operating system. Read this document before first power-up.

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

EWF Manager

The Industrial Personal Computer operating system, WES, is installed on a memory card. This card is a re-writable CFast card that enables 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. The EWF Manager 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 overwrites changes that the user has made to the system. The following types of changes 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 (such as IP addresses or default gateways).
- Operating System customizations (such as desktop background).

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 helps extend the operating life of the memory card.
- Back up all memory 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 `C:\Program Files\Change EWF State\`. After running this program, 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, displaying the shortcut menu).

HORM

In HORM (Hibernate Once Resume Many) environment, a single hibernation file is used to boot the system repeatedly. To set a HORM environment, please follow the steps below.

Make sure EWF is disabled. You can run **OSUnLock** to disable EWF.

Enable hibernation support: From the **Control Panel**, run **Power Options** and then select **Enable Hibernation** in **Hibernation** panel.

Enable **EWF**: Run **OSLock**, and then the system restarts.

Open the software that customers want to use right after the system resumes from hibernation.

Hibernate via **HORM** utility: Click **Start Menu** →**All Programs** →**WF**

The system continues to use the HORM environment unless you disable HORM. To disable **HORM**: Run the **EWF** commit command (ewfmgr c: -commit) and then restart the system. When the system starts up, enter **F8** and select **Discard hibernation file**.

Chapter 6
Industrial Personal Computer Connections

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 assignments.

What Is in This Chapter?

This chapter contains the following topics:

Grounding

Overview

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

Ground Wire Dimensions

Wire cross-section	Maximum line length
2.5 mm^2 (AWG 14)	30 m (98 ft)
	60 m (196 ft) round trip

Precaution

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

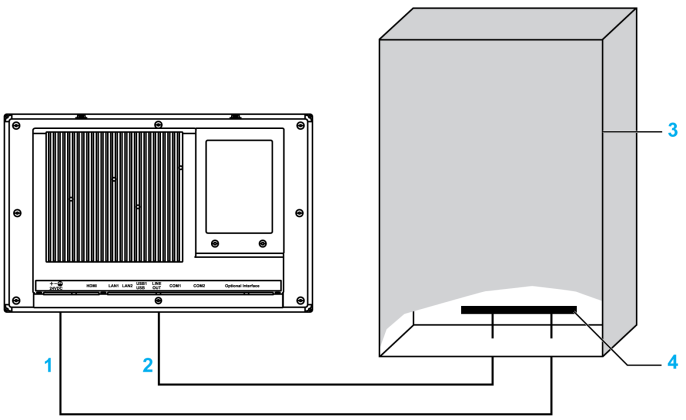
- Use only the authorized grounding configurations shown below.
- Confirm that the grounding resistance is 100 Ω or less.
- Test the quality of your ground connection before applying power to the device. Excess noise on the ground line can disrupt operations of the Industrial Personal Computer.

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

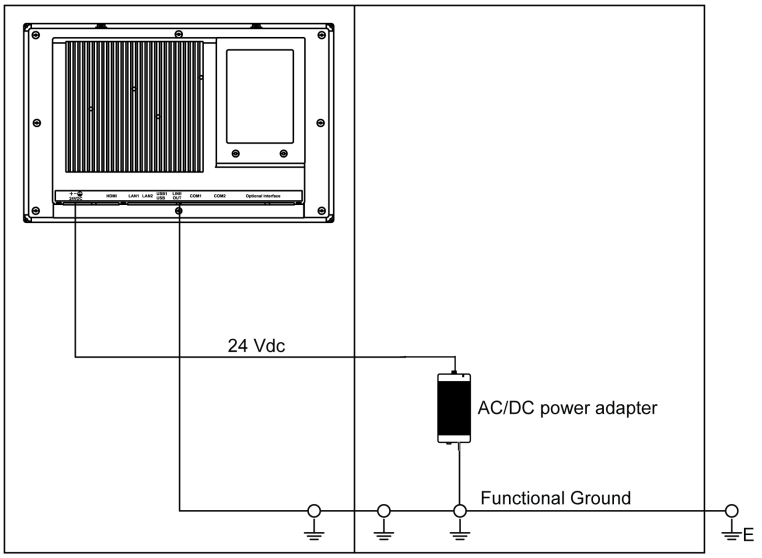
Grounding Procedure

The Industrial Personal Computer ground has 2 connections:

- DC Supply voltage
- Ground connection pin



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



Use the AC/DC power adapter for connecting the Industrial Personal Computer.

NOTE: Use the AC/DC power adapter for connecting the Industrial Personal Computer *(see page 51)*.

When grounding, use the following:

Step	Action
1	System wiring ● Connect the cabinet to ground. ● Ensure that all cabinets are grounded together. ● Connect the ground of the power supply to the cabinet. ● Connect the ground pin of the Industrial Personal Computer to the cabinet. ● Connect the I/O to the controller if needed. ● Connect the power supply to the Industrial Personal Computer.
2	Check that the grounding resistance is 100 Ω or less.
3	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.
4	Use 2.5 mm^2 (AWG 14) 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

RISK OF EXPLOSION IN HAZARDOUS LOCATION

Do not use this product in hazardous locations.

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.

NOTE: The power cord can be connected to an AC power module (PFXZPSPUAC3).

⚠⚠ 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 DC unit is designed to use 24 Vdc.

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

⚠ WARNING

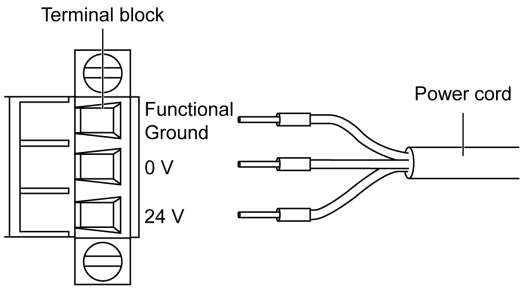
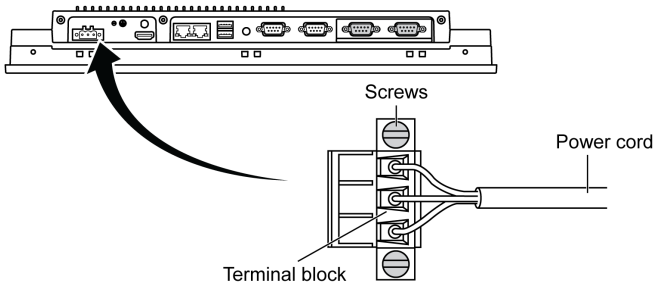
EQUIPMENT DISCONNECTION OR UNINTENDED EQUIPMENT OPERATION

- 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.
- Use only D-Sub 9-pin connector cables with a locking system in good condition.
- Use only commercially available USB cables.

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 terminal block of the 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 75C copper wire. Use wire with a cross-section of 0.75 to 2.5 mm^2 (AWG 18 to AWG 14) and use 2.5 mm^2 wire to make the ground connection.
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).

AC / DC Power Adapter Description

Introduction

The PFXZPSPUAC3 is an AC / DC power adapter. The external AC power adapter to be installed out of Industrial Personal Computer, delivered with US, Europe and Japan power cord.

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 DC unit is designed to use 24 Vdc.

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.
- Use only D-Sub 9-pin connector cables with a locking system in good condition.
- Use only commercially available USB cables.

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

⚠ WARNING

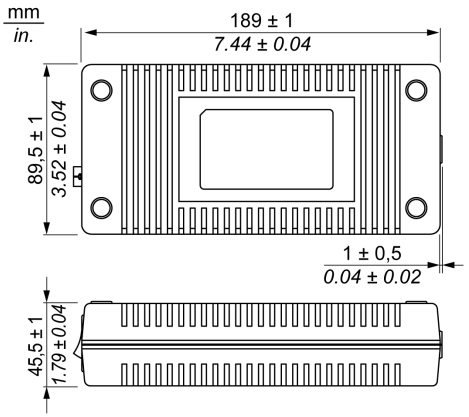
RISK OF BURNS

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.

This figure shows the AC/DC power adapter:

This figure shows the dimensions of the AC/DC power adapter:

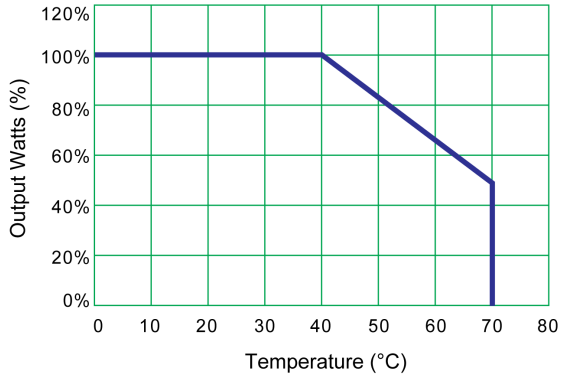


AC / DC Power Adapter

The table provides technical data for the AC / DC power adapter:

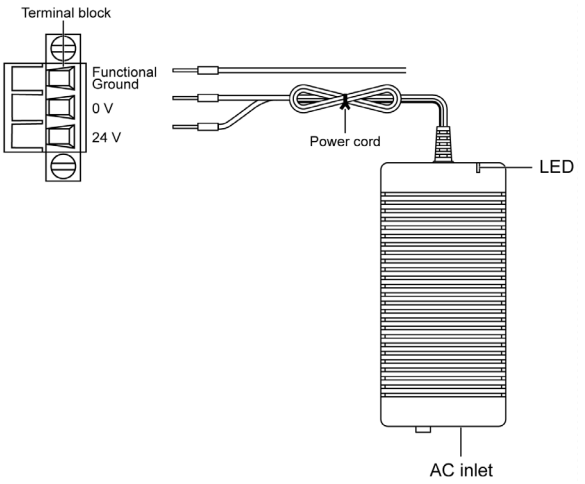
Element	Characteristics
Input	110...240 Vac / 47...63 Hz / 1.89...0.65 A
Output	24 Vdc / 6.25 A max.
Environment	
Operation temperature Storage temperature	See derating curve -40...85 ° C (-40...185 ° F)
Relative humidity:	0...95 %, non-condensing

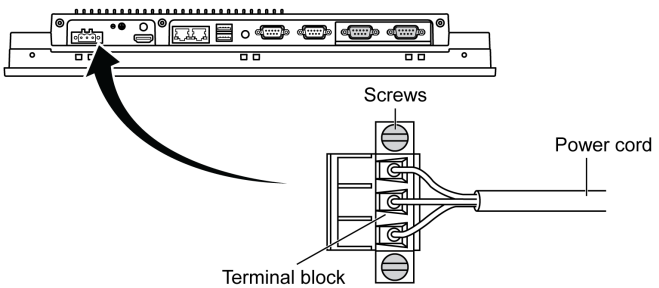
Operation temperature of the AC / DC power adapter derating curve:



Wiring and Connecting the Terminal Block

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

Step	Action
1	Remove all power from the Industrial Personal Computer and confirm that the power adapter 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:  Connect the black wire with the 0 V and the red wire with the 24 V of the terminal block. Use 2.5 mm^2 copper wire to make the ground connection of the terminal block.

Step	Action
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).

Industrial Personal Computer Interface Connections

Introduction

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

⚠ DANGER

RISK OF EXPLOSION IN HAZARDOUS LOCATION

Do not use this product in hazardous locations.

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.
- Use only D-Sub 9-pin connector cables with a locking system in good condition.
- Use only commercially available USB cables.

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

Serial Interface Connections

This interface is used to connect Industrial Personal Computer to remote equipment, via a serial interface 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 shield ground and the functional ground terminals are connected inside the panel.

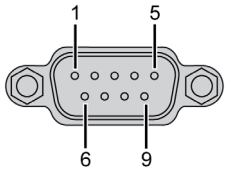
⚠ ⚠ DANGER

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 (COM1/COM2):

Pin	Assignment		
	RS-232	**RS-422/485**	
1	DCD	TxD-/Data-	D-Sub 9-pin plug connector: 
2	RxD	TxD+/Data+	
3	TxD	RxD+	
4	DTR	RxD-	
5	GND	GND/VEE	
6	DSR	N/A	
7	RTS	N/A	
8	CTS	N/A	
9	RI	N/A	

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

NOTE: Adjust the serial port configuration in the BIOS. You can select RS-232, RS-422, or RS-485. The RS-485 port is designed with auto data flow control capability and automatically detects the data flow direction.

Chapter 7
Configuration of the BIOS

What Is in This Chapter?

This chapter contains the following topics:

BIOS Main Menu

General Information

BIOS stands for **Basic Input Output System**. It is the most basic communication between the user and the hardware.

The **BIOS Setup Utility** lets you modify basic system configuration settings. This information is stored in flash ROM so it retains the **Setup** information when the power is turned off.

NOTE: To enter BIOS setup, press **DEL**, or **F2** key during startup.

Main Tab

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

This screen, like all the BIOS screens, is divided into three frames:
- Left: This frame displays the options available on the screen.
- Upper right: This frame gives a description of the user selected option.
- Lower right: This frame displays how to move to other screens and the screen edit commands.

This table shows the **Main** menu options that can be set by the user:

BIOS setting	Description
System Time	This is the current time setting. The time must be entered in HH:MM:SS format. The time is maintained by the battery (CMOS battery) when the unit is turned off.
System Date	This is the current date setting. The date must be entered in MM/DD/YY format. The date is maintained by the battery (CMOS battery) when the unit is turned off.

NOTE: The grayed-out options on all BIOS screens cannot be configured. The blue options can be configured by the user.

Advanced Menu

Advanced BIOS Features Tab

For details about the Advanced submenus, refer to:

- ACPI Settings
- CPU Configuration
- SATA Configuration
- PCH-FW Configuration
- USB Configuration
- IT8768E Super I/O Configuration
- iManager Configuration
- COM2 Configuration
- EC Watchdog Configuration

ACPI Settings Submenu Menu

This table shows the **ACPI Settings** options:

BIOS setting	Description
Enable ACPI Auto Configuration	Enables or disables BIOS ACPI auto configuration.
Enable Hibernation	Enables or disables hibernation. This option may be not effective with some OS.
ACPI Sleep State	Sets the ACPI sleep state. The system enters when the **SUSPEND** button is pressed.

CPU Configuration Submenu

This table shows the **CPU Configuration** options:

BIOS setting	Description
Hyper Threading Technology	Enables or disables the Intel hyper threading technology.
Active Processor Cores	Enable a number of cores in each processor package.
Execute Disable Bit	Enables or disables the no-execution page protection.
Limit CPUID Maximum	Enables or disables the limit CPUID maximum.
Intel Virtualization Technology	Enable or disable Intel virtualization technology. When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool technology.
Hardware Prefetcher	Enable or disable hardware prefetcher. Enable the mid level cache (L2) streamer prefetcher.
Adjacent Cache Line Prefetch	Enable or disable adjacent cache line prefetch. Enable the mid level cache (L2) prefetching of adjacent cache lines.
CPU AES	Enable or disable CPU advanced encryption standard instructions.
Boot performance mode	Select the performance state that the BIOS set before OS handoff.
EIST	Enable or disable Intel SpeedStep.
CPU C states	Enable or disable CPU C states.
ACPI CTDP BIOS	Enable or disable ACPI CTDP BIOS support.
Configurable TDP Level	Select configurable TDP level. Allow reconfiguration of TDP levels based on current power and thermal delivery capabilities of the system.
Config TDP Lock	Enable or disable config TDP Lock. Locks the config TDP control register.

SATA Configuration Submenu

This table shows the **SATA Configuration** options:

BIOS setting	Description
SATA Controller(s)	Enable or disable SATA devices.
SATA Mode Selection	Select SATA mode selection. (Determines how SATA controllers operate).
Aggressive LPM Support	Enable or disable PCH to enter, aggressively, link power state.
SATA Controller Speed	Indicates the maximum speed the SATA controller can support.
Serial ATA Port 1	Port 1: Enable or disable serial ATA port. Hot plug: Designates this port as hot pluggable.
Serial ATA Port 2	Port 2: Enable or disable serial ATA port. Hot plug: Designates this port as hot pluggable.
Serial ATA Port 3	Port 3: Enable or disable serial ATA port. Hot plug: Designates this port as hot pluggable.
Serial ATA Port 4	Port 4: Enable or disable serial ATA port. Hot plug: Designates this port as hot pluggable.

PCH-FW Configuration Submenu

This table shows the **PCH-FW Configuration** options:

BIOS setting	Description
MDES BIOS Status Code	Enable or disable MDES BIOS status code.
fTPM Device Selection	Select GPDMA work-around or MSFT QFE solution.)
TPM Device Selection	Enable or disable TPM device selection. (PTT or dTPM. PTT-Enables PTT in SkuMgr dTPM 1.2- Disables PTT in SkuMgr informing! PTT/dTPM is disabled and all data saved on it is lost.

Firmware Update Configuration Submenu

Configure management engine technology parameters.

This table shows the **Firmware Update Configuration** options:

BIOS setting	Description
ME FW Image Re-Flash	Enable or disable ME FW image re-Flash function.

USB Configuration Submenu

This table shows the **USB Configuration** options:

BIOS setting	Description
Legacy USB Support	Enable or disable legacy USB support. Auto option disables legacy support if no USB devices are connected. Disable option keeps USB devices available only for EFI applications.
USB3.0 Support	Enable or disable USB3.0 (XHCI) controller support.)
XHCI Hand-off	Enable or disable XHCI hand-off. This is a workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
EHCI Hand-off	Enable or disable EHCI hand-off. This is a workaround for OS without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.)
USB Mass Storage Driver Support	Enable or disable USB mass storage driver support.

BIOS setting	Description
USB transfer time-out	Select time-out section. The time-out value for control, bulk, and interrupt transfers.
Device reset time-out	Select device time-out section. USB mass storage devices start unit command time-out.
Device power-up delay	Select device power-up section. Maximum time the device takes before it properly reports itself to the host controller. **Auto** uses a default value: for a root port it is 100 ms, for a hub port the delay is taken from the hub descriptor.
USB2.0 FlashDisk2.10	Select USB2.0 FlashDisk2.10 section. Mass storage device emulation type. **Auto** enumerates devices according to their media format. Optical drives are emulated as **CDROM** drives with no media are emulated according to a drive type.

IT8768E Super IO Configuration Submenu

This table shows the **IT8768E Super IO Configuration** options:

BIOS setting	Description
Serial COM Port 1 Configuration	This item allows user to set parameters of COM port 1.
Serial COM Port 2 Configuration	This item allows user to set parameters of COM port 2.

Serial COM Port 1 Configuration Submenu

This table shows the **Serial COM Port 1 Configuration** options:

BIOS setting	Description
Serial COM Port 1	Enable or disable the COM port.
Change settings	Select an optimal setting for super I/O device.

Serial COM Port 2 Configuration Submenu

This table shows the **Serial COM Port 2 Configuration** options:

BIOS setting	Description
Serial COM Port 2	Enable or disable the COM port.
Change settings	Select an optimal setting for super I/O device.

iManager Configuration Submenu

This table shows the **iManager Configuration** options:

BIOS setting	Description
CPU Shutdown Temperature	Select CPU shutdown temperature.
iManager WatchDog IRQ	Select iManager IRQ number eBrain watchdog.
Backlight Enable Polarity	Switch backlight enable polarity for native or invert.

Hardware Monitor Submenu

This table shows the **Hardware Monitor** status:

BIOS setting	Description
CPU temperature	
+VBAT	
+V5SB	
+VIN	

COM2 Configuration Submenu

This table shows the **COM2 Configuration** options:

BIOS setting	Description
COM2 art mode setting	Select RS-232 or RS422/RS485 mode. The default setting is RS-232 mode.
COM2 RS422/485 type setting	Select RS485/422 slave or RS422 master setting.
COM2 RS422/485 120 ohm setting	Enable or disable the RS422 TX/485 data 120 ohm setting.
COM2 RS422 120 ohm setting	Enable or disable the RS422 RX 120 ohm setting.

EC Watchdog Configuration Submenu

This table shows the **EC Watchdog Configuration** options:

BIOS setting	Description
EC Watchdog setting	Select EC watchdog setting.

Chipset Menu

Chipset BIOS Features Tab

For details about the **Chipset** submenus, refer to:

- PCH-IO configuration
- System agent (SA) Configuration

PCH-IO Configuration Submenu

This table shows the **PCH-IO Configuration** options:

BIOS setting	Description
PCI Express Configuration	Change PCIe configuration settings.
USB Configuration	Change USB configuration settings.
PCH LAN Controller	Enable or disable on board NIC.
Wake on LAN	Enable or disable integrated LAN to wake the system. (The Wake on LAN cannot be disabled if ME is no at Sx state)
Restore AC Power Loss	Select AC power state when power is reapplied after a power outage.

PCI Express Configuration Submenu

This table shows the **PCI Express Configuration** options:

BIOS setting	Description
PCI Express Clock Gating	Enable or disable PCIe clock gating for each root port.
DMI Link ASPM Control	Enable or disable DMI link ASPM control. The control of active state power management on both NB side and SB side of the DMI link.
DMI Link Extended Synch Control	Enable or disable DMI link extended synch control. The control of extended synch on SB side of the DMI link.
PCIe-USB Glitch W/A	Enable or disable PCIe-USB glitch W/A. PCIe-USB glitch W/A for bad USB device connected behind PCIe/PEG port.
PCI Express Root Port 1	Change PCIe root port 1 settings.
MINI PCIe	Change PCIe root port 6 settings.

PCI Express Root Port 1 Configuration Submenu

This table shows the **PCI Express Root Port 1 Configuration** options:

BIOS setting	Description
PCI Express Root Port 1	Enable or disable PCIe root port.
ASPM Support	Set the ASPM level: ● Force L0s- force all links to L0s state. ● Auto-BIOS auto configure. ● Disable- disables ASPM.
L1 Substates	Change L1 substates settings.
PME SCI	Enable or disable PME SCI.
Hot Plug	Enable or disable hot plug.

PCIe Speed	Select PCIe speed.
Detect Non-Compliance Device	Enable or disable detect non-compliance device. If enabled, it takes more time at POST time.

Extra Bus Reserved	Select extra bus reserved (0...7) for bridges behind this root bridge.
Reserved Memory	Select reserved memory range for this root bridge. Prefetchable memory: Select prefetchable memory range for this root bridge.
Reserved I/O	Select reserved I/O (4k/8k/12k/16k…/48k) range for this root bridge.
PCIE LTR	Enable or disable PCIe LTR.
PCIE LTR Lock	Enable or disable PCIe LTR configuration Lock.
Snoop Latency Override	Select snoop latency override for PCH PCIe.
Non-Snoop Latency Override	Select non-Snoop latency override for PCH PCIe.

Mini PCIe Configuration Submenu

This table shows the **Mini PCIe Configuration** options:

BIOS setting	Description
PCI Express Root Port 6	Enable or disable PCIe root port 6
ASPM Support	Set the ASPM level: ● Force L0s- force all links to L0s state. ● Auto-BIOS auto configure. ● Disable- disables ASPM.
L1 Substates	Change L1 substates settings.
PME SCI	Enable or disable PME SCI.
Hot Plug	Enable or disable hot plug.
PCIe Speed	Select PCIe speed.
Detect Non-Compliance Device	Enable or disable detect non-compliance device. If enabled, it takes more time at POST time.
Extra Bus Reserved	Select extra bus reserved (0...7) for bridges behind this root bridge.
Reserved Memory	Select reserved memory range for this root bridge. memory: Select prefetchable memory range for this root bridge.
Reserved I/O	Select reserved I/O (4k/8k/12k/16k…/48k) range for this root bridge.
PCIE LTR	Enable or disable PCIe LTR.
PCIE LTR Lock	Enable or disable PCIe LTR configuration Lock.
Snoop Latency Override	Select snoop latency override for PCH PCIe.
Non-Snoop Latency Override	Select non-snoop latency override for PCH PCIe.

USB Configuration Submenu

This table shows the **USB Configuration** options:

BIOS setting	Description
USB Precondition	Enable or disable USB Precondition.Precondition work on USB host controller and root ports for faster enumeration.
XHCI Mode	Select mode of operation of XHCI mode.
XHCI Idle L1	Enable or disable XHCI Idle L1. XHCIIDLE L1 can be set to disable for LPT-LP Ax stepping to work around USB3 hot plug will fail after 1 hot plug removal.
BTCG	Enable or disable trunk clock gating.
USB Ports Per-Port Disable Control	Enable or disable USB ports per-Port disable control. Control each of the USB ports (0...13) disabling.

System Agent (SA) Configuration Submenu

This table shows the **System Agent (SA) Configuration** options:

BIOS setting	Description
VT-d	Enable or disable VT-d function.
Graphics Configuration	Change graphics setting.

Graphics Configuration Submenu

This table shows the **Graphics Configuration** options:

BIOS setting	Description
Graphics Turbo IMON Current	Shows graphics turbo IMON current values supported (14-31).
Primary Display	Select which of IGFX/PEG/PCI graphics device should be primary display or select SG for switchable Gfx.
Internal Graphics	This item keeps IGD enabled based on the setup options.
Aperture Size	Change aperture size.
DVMT Pre-Allocated	Select DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device.
DVMT Total Gfx Mem	Select DVMT 5.0 total graphic memory size used by the internal graphics device.
Gfx Low-Power Mode	This option is applicable for SFF only.

Boot Menu

Boot Settings

This table shows the boot menu options:

Boot setting	Description
Setup Prompt Timeout	Select the number of seconds to wait for setup activation key.
Bootup NumLock state	Select the keyboard **NumLock** state.
Quiet Boot	Enable or disable **Quiet Boot** option.
Fast Boot	Enable or disable boot with initialization of a minimal set of devices required to launch active boot option. It has no effect for BBS boot options.
Boot Option #1	Set the system boot order.
CSM parameters	Change CSM parameter setting.

CSM Parameters

This table shows the CSM parameters:

Boot setting	Description
Launch CSM	Enable or disable launch CSM.
Boot option filter	Select boot option filter setting.
Launch PXE OpROM policy	Select launch PXE OpROM policy setting.
Launch Storage OpROM policy	Select launch storage OpROM policy setting.
Launch Video OpROM policy	Select launch video OpROM policy setting.
Other PCI device ROM priority	Select other PCI device ROM priority setting.

Security Menu

Security Setup

Select **Security Setup** from the main BIOS setup menu. All **Security Setup** options, such as password protection is described in this section. To access the submenu for the following items, select the item and press **Enter**.

Change **Administrator / User Password**: Select this option and press **Enter** to access the submenu, and then type the password.

Save & Exit Menu

Menu

This table shows the **Save & Exit** menu setting options:

BIOS setting	Description
Save Changes and Exit	When the system configuration is complete, select this option to save changes, exit BIOS setup and, if necessary, reboot the computer to take into account all system configuration parameters.
Discard Changes and Exit	Select this option to quit setup without making any permanent changes to the system configuration.
Save Changes and Reset	Selecting this option displays a confirmation message box. On confirming, you save changes to the BIOS settings, save the settings to CMOS, and restart the system.
Discard Changes and Reset	Select this option to quit BIOS setup without making any permanent changes to the system configuration and reboot the computer.
Save Changes	Select this option to save the system configuration changes without exiting the BIOS setup menu.
Discard Changes	Select this option to discard any current changes and load previous system configuration.
Restore Defaults	Select this option to configure automatically all BIOS setup items to the optimal default settings. The optimal defaults are designed for maximum system performance, but may not work best for all computer applications. Do not use the optimal defaults if the user's computer is experiencing system configuration problems.
Save User Defaults	When the system configuration is complete, select this option to save changes as the user defaults without exit BIOS setup menu.
Restore User Defaults	Select this option to restore the user defaults.
Boot Override	Selects a device to use for a boot override.
Launch EFI Shell from filesystem device	Attempts to launch EFI shell application from one of the available file system devices.

Chapter 8
Hardware Modifications

Subject of This Chapter

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

What Is in This Chapter?

This chapter contains the following sections:

Section 8.1
Before Modifications

Before Modifications

Overview

For detailed installation procedures for optional units, refer to the OEM (Original equipment manufacturer) Installation guide included with the optional unit.

⚠⚠ 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 DC unit is designed to use 24 Vdc.

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

⚠ DANGER

RISK OF EXPLOSION IN HAZARDOUS LOCATION

Do not use this product in hazardous locations.

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 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.

Section 8.2
Storages Modifications

Overview

This section shows the installation of the HDD/SSD drives and the CFast card.

What Is in This Section?

This section contains the following topics:

HDD/SSD Drive Description and Installation

Overview

This device does not support hot swapping. Before any hardware modification, 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 DC unit is designed to use 24 Vdc.

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

HDD/SSD Drive Installation

NOTICE

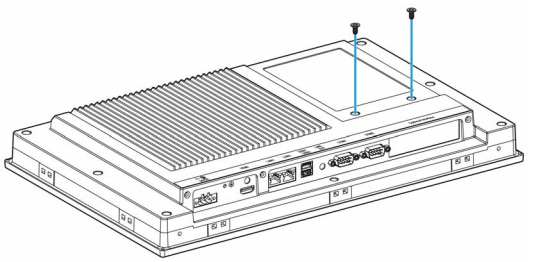
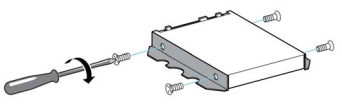
ELECTROSTATIC DISCHARGE

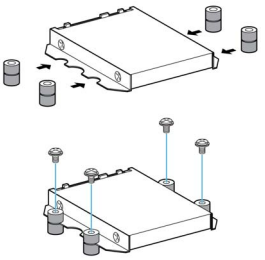
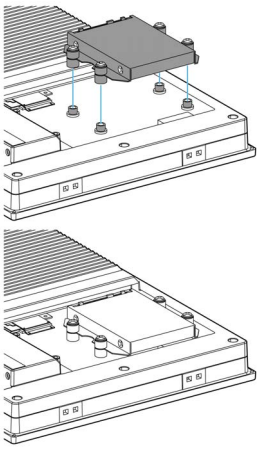
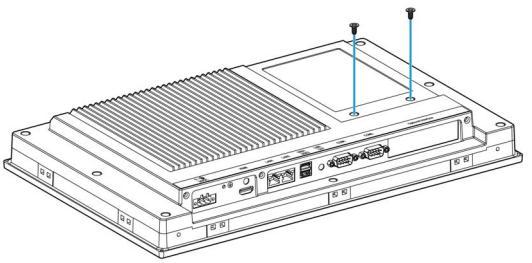
Take the necessary protective measures against electrostatic discharge before attempting to remove the Industrial Personal Computer cover.

Failure to follow these instructions can result in equipment damage.

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

This table describes how to install an HDD/SSD 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 two screws of the rear cover: 
4	Install the 2.5" SATA HDD/SSD on the HDD/SSD bracket. Screw in the 4 screws on the side of HDD/SSD bracket (the screws are in the accessory box): 

Step	Action
5	Install the dampers in the brackets: 
6	Connect the HDD/SSD into the SATA connector. Install it in the Industrial Personal Computer and secure with the 4 screws: 
7	Replace the rear cover. Secure the rear cover using the 2 screws:  **NOTE:** The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).

⚠ 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 they do not fall inside the Industrial Personal Computer chassis.

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

Memory Card Installation

Introduction

Before installing or removing a 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 DC unit is designed to use 24 Vdc.

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

Optional Memory Card

The table provides the possible memory card part number:

Part number	Description
PFXZPBMPCFA2	CFast card 16 GB

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 DC unit is designed to use 24 Vdc.

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

⚠ CAUTION

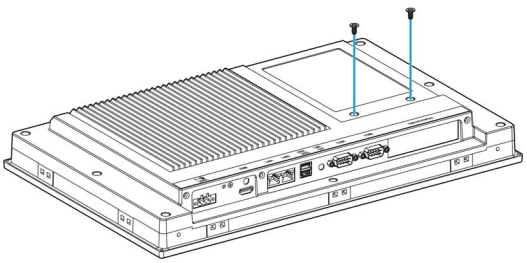
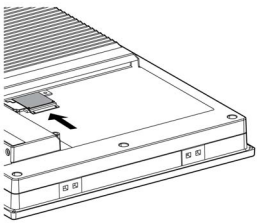
MEMORY CARD DAMAGE AND DATA LOSS

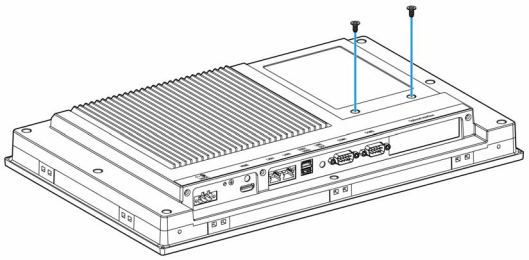
- Remove all power before making any contact with an installed memory card.
- Use only memory cards manufactured by Pro-face. The performance of the Industrial Personal Computer has not been tested using memory cards from other manufacturers.
- Confirm that the memory card is correctly oriented before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

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

Inserting the Memory Card

The procedure below describes how to insert the 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 two screws of the rear cover: 
4	Insert the CFast card firmly into the card slot and fasten it to the Industrial Personal Computer with 2 screws: 

Step	Action
5	Replace the rear cover. Secure the rear cover using the 2 screws:  **NOTE:** The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).

Data Writing Limitation

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

CFast Card Data Backup

Refer to the relevant procedure in the Software Installation Guide for Industrial Personal Computer and Terminals, shipped with the product.

Section 8.3
Optional Interfaces

Overview

This section describes the optional interfaces and of the installation.

What Is in This Section?

This section contains the following topics:

Optional Interface Installation

Introduction

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

⚠ ⚠ DANGER

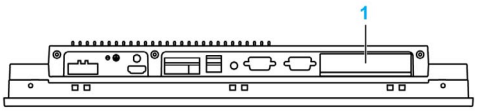
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- 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 DC unit is designed to use 24 Vdc.

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

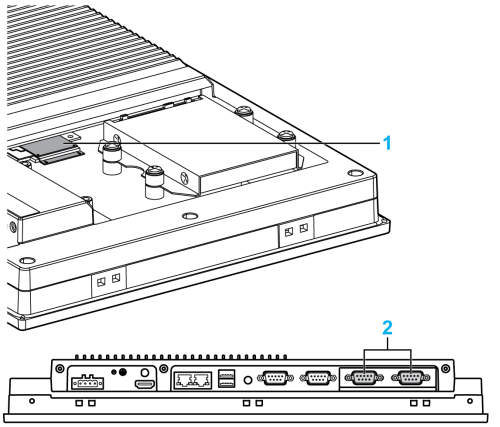
Optional Interface Module

The figure shows the interface module position:



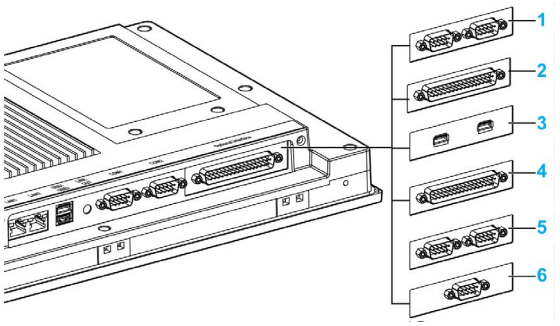
1 Optional interface

The figure shows the interface module parts:



1 Mini PCIe card
2 Optional interface with an interface module

The figure shows the possible interface modules:



1 2 x RS-232/422/485 interface module
2 4 x RS-232/422/485 interface module
3 USB interface module
4 DIO interface module
5 CANopen interface module
6 PROFIBUS DP interface module

The table lists the possible interface module part numbers:

Interface type	Part number	Interface
NVRAM mini PCIe	PFXZPBMPNR2	Card NVRAM (non-volatile random-access memory)
RS-232/422/485 interface module	PFXZPBMPR42P2	2 x RS-422/485 isolated
	PFXZPBMPR44P2	4 x RS-422/485
	PFXZPBMPR22P2	2 x RS-232 isolated
	PFXZPBMPR24P2	4 x RS-232
Ethernet interface module	PFXZPBMPRE2	1 x Ethernet Gigabit IEEE1588
DIO interface module	PFXZPBMPX16Y82	16 x DI / 8 x DO and 2 m cable and terminal
CANopen interface module	PFXZPBMPCANM2	2 x CANopen
PROFIBUS DP interface module	PFXZPBMPPBM2	1 x PROFIBUS DP master with NVRAM
Wi-Fi interface module	PFXZPBPFWF2	Wi-Fi module 802.11 a/b/g/n (USB PH) and 2 x antennas

Interface Module Installation

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

⚠ DANGER

RISK OF EXPLOSION IN HAZARDOUS LOCATION

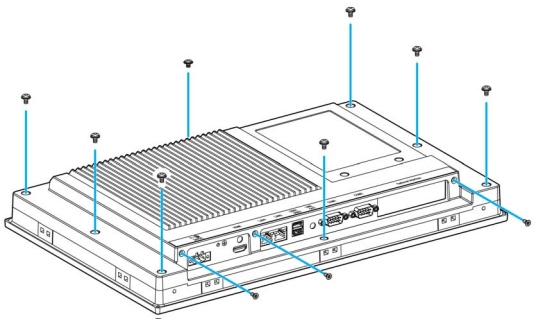
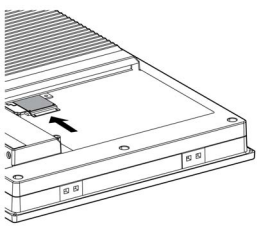
Do not use this product in hazardous locations.

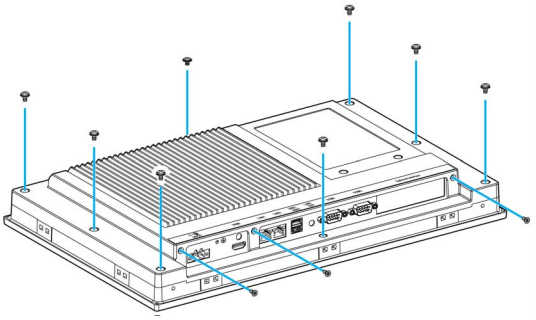
Failure to follow these instructions will result in death or serious injury.

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 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	Remove the 11 screws: 
4	Lift the back plate up to remove it.
5	Insert the interface module in the slot and fasten it to the Industrial Personal Computer with 2 screws. **NOTE:** The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).
6	Insert the mini PCIe card into the expansion card connector and secure in place using the filler panel screw:  **NOTE:** When using a mini PCIe card with an external cable attached, install a clamp or other device to secure the cable. **NOTE:** The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).

Step	Action
7	Replace the back plate. Secure the back plate to the Industrial Personal Computer using the 11 screws:  **NOTE:** The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).

⚠ 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 they do not fall inside the Industrial Personal Computer chassis.

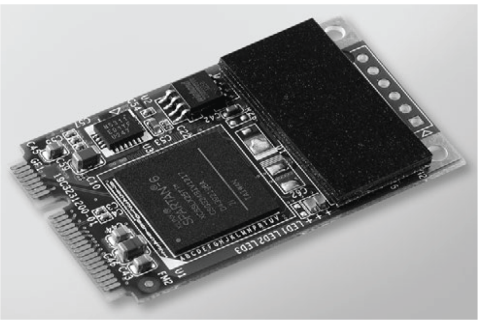
Failure to follow these instructions can result in injury or equipment damage.

NVRAM Card Description

Introduction

The PFXZPBMPNR2 is categorized as industrial storage or memory cards for the mini PCIe slot.

The figure shows the NVRAM card:



NVRAM Card Description

The table provides the technical data of the NVRAM card:

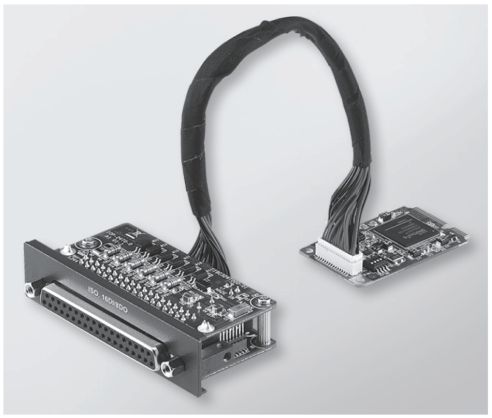
Features	Values
General	
Bus type	Mini PCIe card revision 1.2
Power consumption	3.3 Vdc at 150 mA
Memory	
Size	2 MB
Read/write speed	6 MB/s
Environment	
Operation temperature Storage temperature	-20...60 °C (-4...140 °F) -40...85 °C (-40...185 °F)
Relative humidity	5...95 %, non-condensing
Maximum magnetic field immunity during writing	8000 A/m
Maximum magnetic field immunity during read or standby	8000 A/m

16DI/8DO Interface Module Description

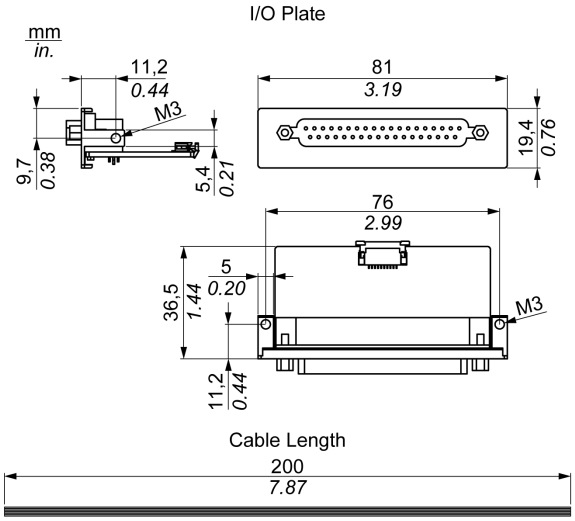
Introduction

The PFXZPBMPX16Y82 is categorized as digital input/output module. It can be associated with a DIN rail terminal card. It is all compatible with the mini PCIe card.

The figure shows the 16DI/8DO interface module:



The figure shows the dimensions of the 16DI/8DO interface module:



16DI/8DO Interface Module

The table provides technical data for the 16DI/8DO interface module:

Element	Characteristics
General	
Bus type	PCIe mini card revision 1.2
Connectors	1 x socket D-Sub 37-pin
Power consumption	Typical: 400 mA at 3.3 Vdc, maximum: 520 mA at 3.3 Vdc

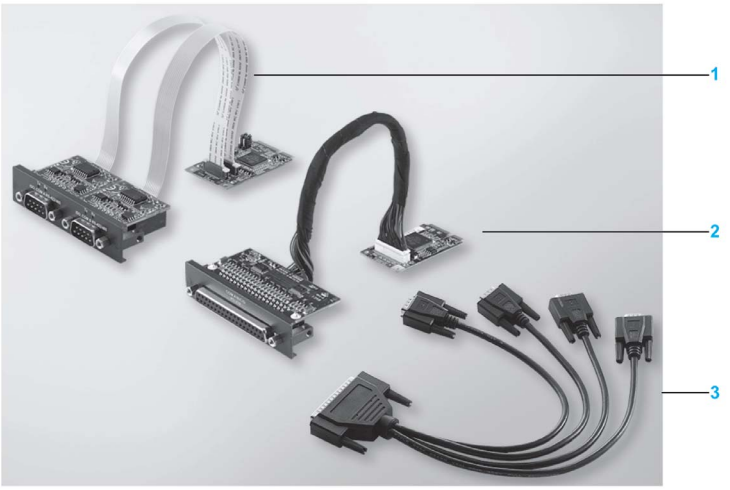
Element	Characteristics
Isolated digital input	
Input channels	16
Input voltage (wet contact)	Logic 0: 0...3 Vdc, logic 1: 10...30 Vdc
Input voltage (dry contact)	Logic 0: open, logic 1: shorted to GND
Input current	10 Vdc at 2.97 mA, 20 Vdc at 6.35 mA
Input resistance	5 KΩ
Interrupt capable channels	2, IDI0 and IDI8
Isolation protection	2,500 Vdc
Over voltage protection	70 Vdc
ESD protection	4 kV (contact, 8 kV (air)
Opto-isolator response	50 μs
Isolated digital output	
Output channels	8
Output type	MOSFET
Output voltage	5...30 Vdc
Sink current	100 mAc
Isolation protection	2,500 Vdc
Opto-isolator response	50 μs
Counter	
Channels	2
Resolution	32 bit
Maximum input frequency	5...30 Vdc
Environment	
Operation temperature Storage temperature	-20...60 ° C (-4...140 ° F) -40...85 ° C (-40...185 ° F)
Relative humidity:	5...95 %, non-condensing

RS-232/422/485 Interface Module Description

Introduction

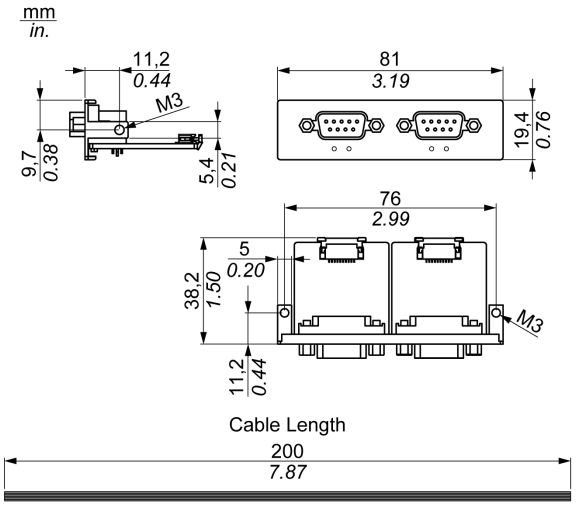
The PFXZPBMPR series are categorized as communication modules. They are all compatible with the PCIe mini card including isolated / non-isolated RS-232/422/485 communication cards for automation control.

The figure shows the RS-232/422/485 interface modules:

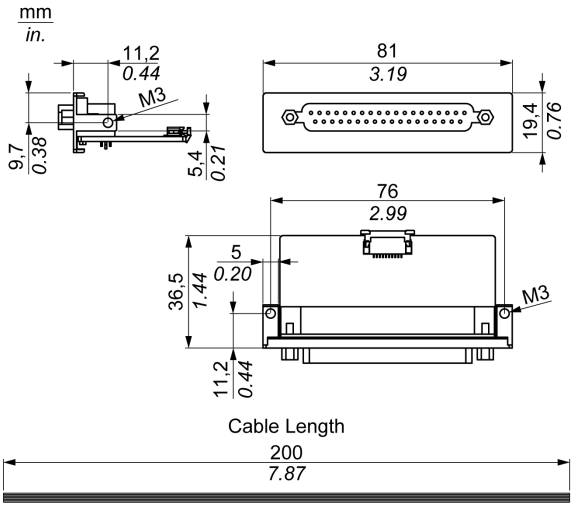


1 2 x RS-232/422/485 interface module
2 4 x RS-232/422/485 interface module
3 1 x interface cables

The following figure shows the dimensions of the 2 x RS-232/422/485 interface module:



The following figure shows the dimensions of the 4 x RS-232/422/485 interface module:



Serial Interface

The table provides technical data for the serial interfaces:

Element	Characteristics			
Part number	**PFXZPBMPR42P2**	**PFXZPBMPR22P2**	**PFXZPBMPR44P2**	**PFXZPBMPR24P2**
General				
Bus type	Mini PCIe card revision 1.2			
Type	2 x RS-422/485, electrically isolated	2 x RS-232, electrically isolated	4 x RS-422/485, electrically non-isolated	4 x RS-232, electrically non-isolated
Connectors	2 x D-Sub 9-pin, plug		1 x D-Sub 37-pin, socket	
Power consumption	3.3 Vdc at 400 mA		3.3 Vdc at 500 mA	
Communication				
Data bits	5, 6, 7, 8			
FIFO	128 bytes			
Flow control	RTS/CTS Xon/Xoff		RTS/CTS (not supported) Xon/Xoff	RTS/CTS Xon/Xoff
Parity	None, odd, even, Mark and space			
Speed	50 bps...921.6 kbps	50 bps...230.4 kbps	50 bps...921.6 kbps	50 bps...230.4 kbps
Stop bits	1, 1.5, 2			
Transfer rate				
Transfer rate RS-232	Maximum 115 kpps with cable length ≤10 m Maximum 64 kpps with cable length ≤15 m			
Transfer rate RS-422/485	Maximum 115 kpps with cable length ≤1200 m			
Protection				
Isolation ESD EFT Surge	2000 Vdc 15 KV 2500 V 1000 Vdc			

Element	Characteristics			
Part number	**PFXZPBMPR42P2**	**PFXZPBMPR22P2**	**PFXZPBMPR44P2**	**PFXZPBMPR24P2**
Environment				
Operation temperature Storage temperature	-20...60 °C (-4...140 °F) -40...85 °C (-40...185 °F)			
Relative humidity:	5...95 %, non-condensing			

Cable Serial Interface

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

Element	Characteristics	
Signal lines	Cable cross section RS-232 Cable cross section RS-422 Cable cross section RS-485 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 Protective earth ground ≤82 Ω/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 Protective earth ground ≤59 Ω/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, via a 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 serial port not isolated have the signal ground (SG) and the functional ground terminals connected inside the panel.

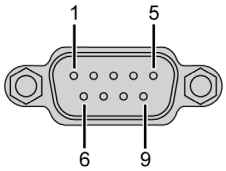
⚠ ⚠ DANGER

ELECTRIC SHOCK

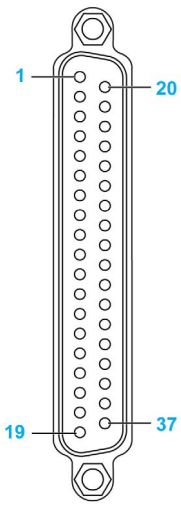
- Make a direct connection between the ground connection screw and ground.
- Do not connect other devices to ground through the ground connection screw of this device.
- Install all cables according to local codes and requirements. If local codes do not require grounding, follow a reliable guide such 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		
	RS-232	**RS-422/485**	
1	DCD	TxD-/Data-	D-Sub 9-pin plug connector: 
2	RxD	TxD+/Data+	
3	TxD	RxD+	
4	DTR	RxD-	
5	GND	GND/VEE	
6	DSR	RTS-	
7	RTS	RTS+	
8	CTS	CTS+	
9	RI	CTS-	

The table shows the D-Sub 37-pin assignments:

Pin	Assignment		
	RS-232	**RS-422/485**	
1	N.C.	N.C.	D-Sub 37-pin socket connector: 
2	DCD3	TxD3-/Data3-	
3	GND	GND/VEE3	
4	CTS3	N.C.	
5	RxD3	TxD3/Data3	
6	RI4	N.C.	
7	DTR4	RxD4-	
8	DSR4	N.C.	
9	RTS4	N.C.	
10	TxD4	RxD4	
11	DCD2	TxD2-/Data2-	
12	GND	GND	
13	CTS2	N.C.	
14	RxD2	TxD2/Data2	
15	RI1	N.C.	

Pin	Assignment		
	RS-232	RS-422/485	
16	DTR1	RxD1-	
17	DSR1	N.C.	
18	RTS1	N.C.	
19	TxD1	RxD1	
20	RI3	N.C.	
21	DTR3	RxD3\	
22	DSR3	N.C.	
23	RTS3	N.C.	
24	TxD3	RXD3	
25	DCD4	TxD4-/Data4-	
26	GND	GND/VEE4	
27	CTS4	N.C.	
28	RxD4	TxD4/Data4+	
29	RI2	N.C.	
30	DTR2	RxD2\	
31	DSR2	N.C.	
32	RTS2	N.C.	
33	TxD2	RxD2	
34	DCD1	TxD1-/Data1-	
35	GND	GND/VEE1	
36	CTS1	N.C.	
37	RxD1	TxD1/Data1+	

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.

RS-485 Interface Specificity

NOTE: All the pins of the RS-422 default interface 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.

NOTE: When using RS-422/485 communication with PLCs, you may need to reduce the transmission speed and increase the TX Wait time.

Ethernet Interface Module Description

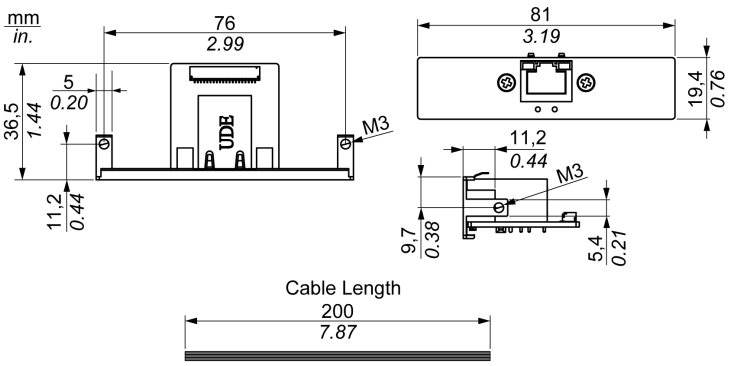
Introduction

The PFXZPBMPRE2 is categorized as industrial communication with IEEE protocol modules. It is all compatible with the mini PCIe card.

Overview

The figure shows the Ethernet interface module:

The figure shows the dimensions of the Ethernet interface module:



Ethernet Interface Module Description

The table provides technical data for the Ethernet interface module:

Features	Values
General	
Bus type	Mini PCIe card revision 1.2
Connectors	1 x RJ45 GbE half-/full-duplex
Power consumption	Max. 9 W at 3.3 V
Communication	
Speed	10/100/1000 base-TX, auto-negotiation
Support	9K jumbo frames, hardware-based support for precise time synchronization over Ethernet, wake-on-LAN

Features	Values
Protection	
Isolation ESD EFT Surge	1500 Vdc 4 KV (contact),8 KV (air) 1000 V 1000 Vdc
Environment	
Operation temperature Storage temperature	-20...60 °C (-4...140 °F) -40...85 °C (-40...185 °F)
Relative humidity:	5...95 %, non-condensing

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.

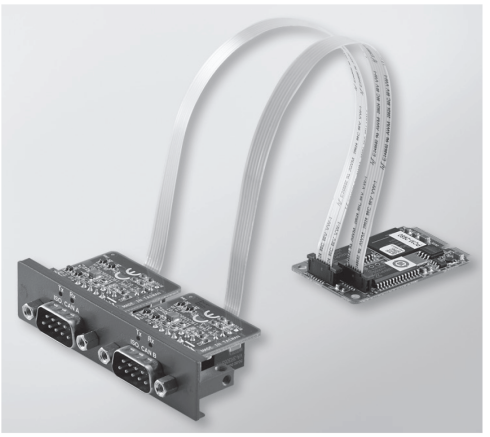
Failure to follow these instructions can result in injury or equipment damage.

CANopen Interface Module Description

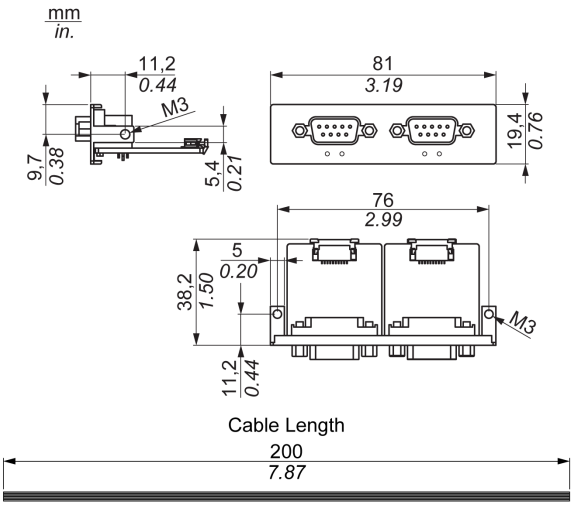
Introduction

The PFXZPBMPCANM2 is categorized as industrial communication with fieldbus protocol modules. It is all compatible with the mini PCIe card.

The figure shows the CANopen interface module:



The figure shows the dimensions of the CANopen interface module:



CANopen Interface Module Description

The table provides technical data for the CANopen interface module:

Features	Values
General	
Bus type	Mini PCIe card revision 1.2
Connector	2 x plug D-Sub 9-pin
Power consumption	400 mA at 5 Vdc

Features	Values
Communication	
Protocol	CAN 2.0 A/B
Signal support	CAN_H, CAN_L
Speed	1 Mbps
CAN frequency	16 MHz
Termination resistor	120 Ω (selected by jumper)
Protection	
Isolation ESD EFT Surge	2500 Vdc 15 KV 2500 V 1000 Vdc
Environment	
Operation temperature Storage temperature	-20...60 °C (-4...140 °F) -40...85 °C (-40...185 °F)
Relative humidity:	5...95 %, non-condensing

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.

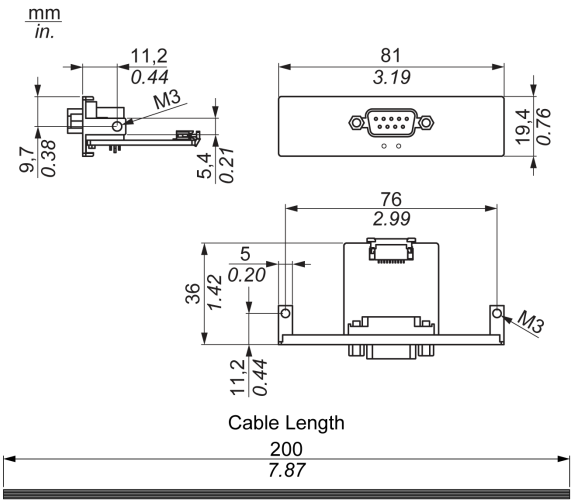
PROFIBUS DP Master Interface Module Description

Introduction

The PFXZPBMPPBM2 is categorized as industrial communication with fieldbus protocol modules. It is all compatible with the mini PCIe card.

The figure shows the PROFIBUS DP master interface module:

The figure shows the dimensions of the PROFIBUS DP master interface module:



PROFIBUS DP Master Interface Module Description

The table provides technical data for the PROFIBUS DP master interface module:

Features	Values
General	
Bus type	Mini PCIe card revision 1.2
Connector	1 x socket D-Sub 9-pin
Power consumption	650 mA at 3.3 Vdc

Features	Values
Communication	
Protocol	PROFIBUS DP V1
Signal support	RxD/TxD-P, RxD/TxD-N
Speed	9600...12 Mbps
Termination resistor	120 Ω (provided by PROFIBUS connector)
Protection	
Isolation ESD	2500 Vdc 15 KV
Environment	
Operation temperature Storage temperature	-20...60 °C (-4...140 °F) -40...85 °C (-40...185 °F)
Relative humidity:	5...95 %, non-condensing

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.

PROFIBUS Specification

The table provides the PROFIBUS DP specification:

Features	PROFIBUS slave	PROFIBUS master
Slave max.	–	125
Cyclic data max.	488 bytes (IOCR)	7,168,244 bytes/slave
Acyclic read/write	6,240 bytes	
DPV1 Class 1,2	240 bytes	
Signal support	Yes	
Configuration data	244 bytes	
Application-specific parameters	237 bytes	

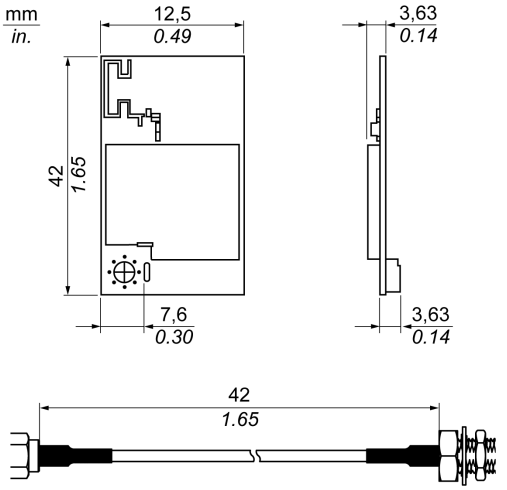
Wi-Fi Interface Card Description

Introduction

The PFXZPBPFWF2 is categorized as a local area wireless for USB-equipped wireless embedded systems. It does not use the mini PCIe slot. Wi-Fi direct support to connect Wi-Fi devices to each other with no need for a wireless access point.

The figure shows the Wi-Fi interface card:

The figure shows the dimensions of the Wi-Fi interface module:



NOTE: The interface is mounted on a USB cable available within the product. The antennas are mounted directly on the product to locations in the bottom *(see page 22)*. They can also be mounted remotely using intermediate cables.

Wi-Fi Interface Card Description

The table provides technical data for the Wi-Fi interface card:

Element	Characteristics
General	
Standard conformance	802.11 a, 802.11b, 802.11 g, 802.11 n
Frequency range	USA: 2.4...2.483 GHz 5.15...5.35 GHz 5.47...5.725 GHz 5.725...5.825 GHz Europe: 2.4...2.483 GHz 5.15...5.35 GHz 5.47...5.725 GHz Japan: 2.4...2.497 GHz 5.15...5.35 GHz 5.47...5.725 GHz China: 2.4...2.483 GHz 5.725...5.85 GHz
Antenna connector	2 x U.FL connectors
Power consumption	410 mA at 5 Vdc
Communication	
Signal	2 x Tx / 2 x Rx
Channel spacing	5 MHz
Host interface	4-pin USB 2.0 pin-header (pin 1: 5 Vdc, pin 2: D-, pin 3: D+, pin 4: GND)
Operation distance	30 Mbps at 50 m (164 ft)
Modulation technique	DSS with CCK, DQPSK, DBPSK OFDM with BPSK, QPSK, 16QAM, 64QAM
Mac protocol	CSMA / CA with ACK architecture 32-bit MAC
Security	64 / 128-bit WEP, WPA, WPA2, TKIP, AES, WAPI
Environment	
Operation temperature Storage temperature	0...60 °C (32...140 °F) -20...80 °C (-4...176 °F)
Relative humidity:	15...95 %, non-condensing

Wi-Fi Interface Cable Description

The table provides technical data for the Wi-Fi interface cable and antenna:

Part number	Characteristics
PFXZPBCBAN52	Remote Wi-Fi antenna cable 5 m (16.4 ft)

Part III
Installation

Subject of this Part

This part describes the product installation.

What Is in This Part?

This part contains the following chapters:

Chapter 9
System Monitor

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** interface provides remote monitoring, a features that helps you to access multiple clients through a single console for remote device management. The **System Monitor** immediately recognizes equipment and provides real-time equipment maintenance, which improve system stability and reliability.

Remote Monitoring monitors the system status of remote devices. The monitored items include hard disk temperature, hard drive health, network connection, system/CPU temperature and system voltages.

Remote Monitoring also provides support for function logs so that managers can regularly check the status of their remote devices.

The **System Monitor** can display messages when thresholds are exceeded.

System Monitor Requirements

Operating system requirements:

Operating system
Windows Embedded Standard 7 (WES7P) SP1 64 bits MUI
Windows 7 Ultimate SP1 64 bits
Windows Embedded 8.1 Industry 64 bits MUI

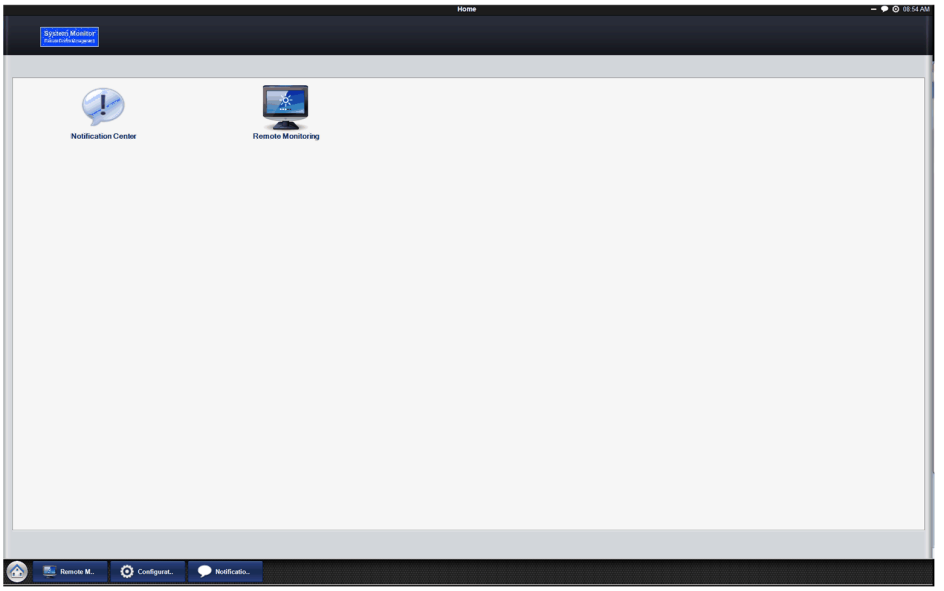
Software requirements:

Description	Software
Framework	Microsoft.NET Framework version 2.0 or higher
Driver	Pro-face Software API

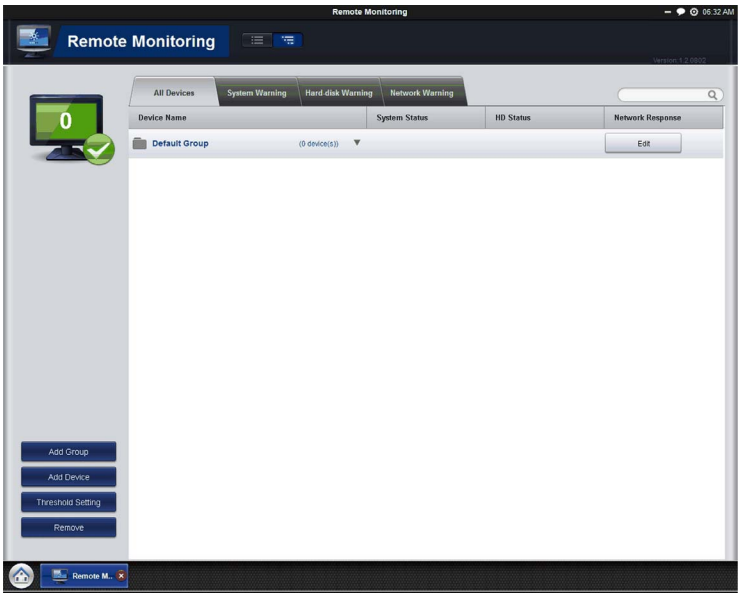
System Monitor Console

The **System Monitor** console acts as a server for the clients. Devices that run on the **System Monitor** console display the health and status information from **System Monitor** clients. The console has to be made available by the client over a network.

To launch the **System Monitor** console, click **Windows Start Menu** →**All Programs** →**Pro-face** →**System Monitor**

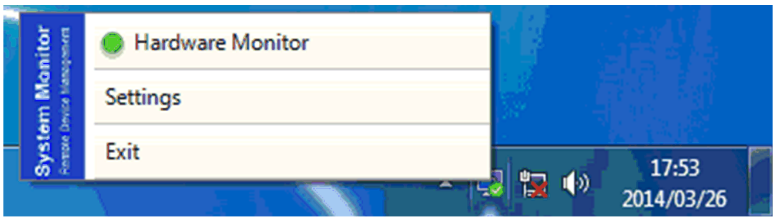
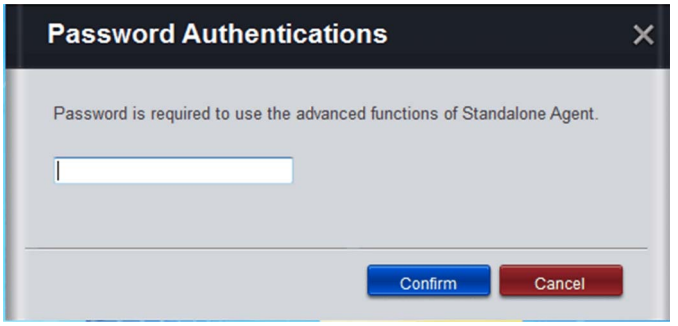
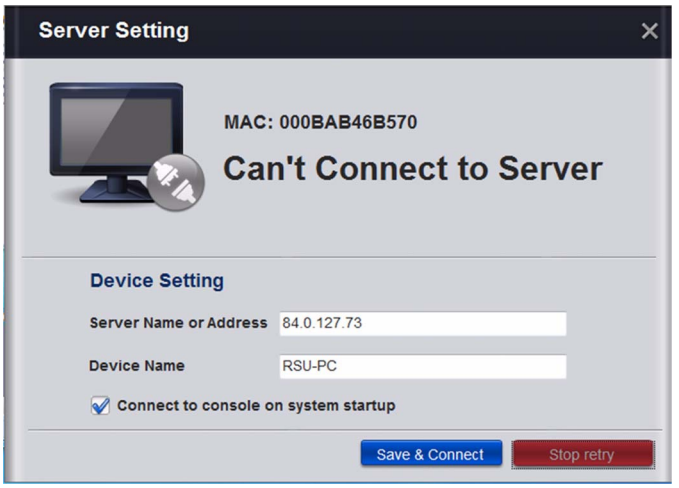


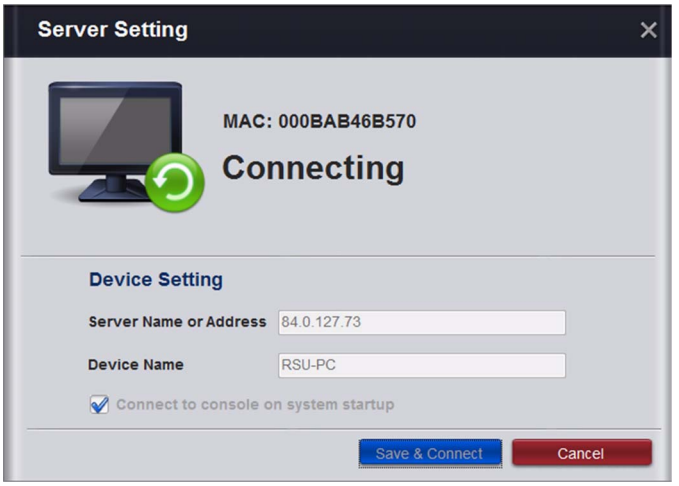
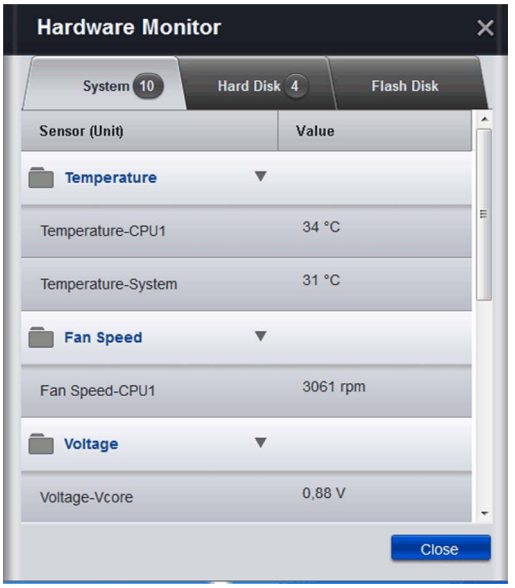
Click **Remote Monitoring** application:



System Monitor Agent

This procedure describes the **System Monitor Stand Alone Agent** general user interface:

	Description
1	The **System Monitor** stand alone agent automatically starts when the system starts. To enter a new server IP address, open the **System Monitor Agent**, click the icon in the toolbar: 
2	Enter your **Password Authentications**: 
3	Enter your server IP address. Your server is the device which has **System Monitor** console running. Name the device gives the possibility to recognize it in multiple client configurations: 

	Description
4	Click **Save & Connect** to connect the agent to the **System Monitor** console server: 
5	To see the **Hardware Monitor**, open the **System Monitor Agent**, click the icon in the toolbar: 

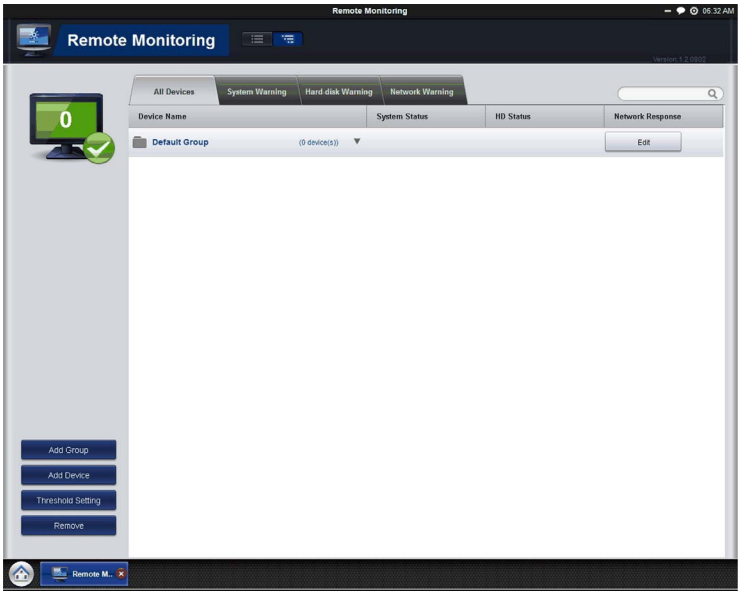
Using System Monitor

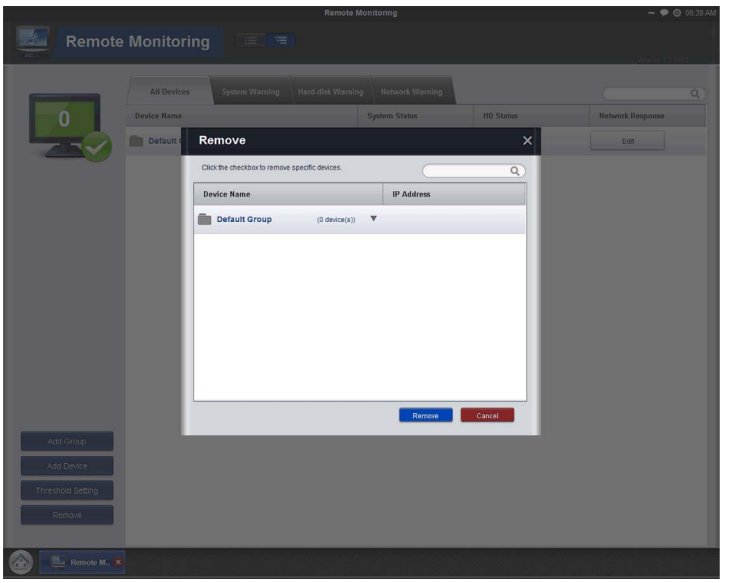
Overview

System Monitor is for remote device management.

Using System Monitor

This procedure describes the **System Monitor** general user interface:

	Description
1	Search bar: You can search for a device by device name. The list view shows the result instantly.  **Hierarchical** or **Flat Viewing Mode**: click the buttons on the right to the application name to switch between hierarchical or flat viewing mode. In the hierarchical mode, the devices can be divided into different groups for easier management; in flat viewing mode, all the devices are shown in the same page to have the overview of all the devices.
2	**Group Tab**: according to the information or functionality they are divided into several tabs. The tabs also display the number of current devices.
3	**Sorting**: click on the column header to sort all the important information. Default is to sort by device name.
4	**Device item**: shows all device items.
5	**Status count**: this shows the values that users care most about.
6	**Extended function**: for each user, every remote application has its own customized functions.

	Description
7	Remove devices: If a device is offline for some time and you do not want it to show up, click the **Remove Device** button to remove it. **NOTE:** If the device comes online, it shows up again. 

Configuration

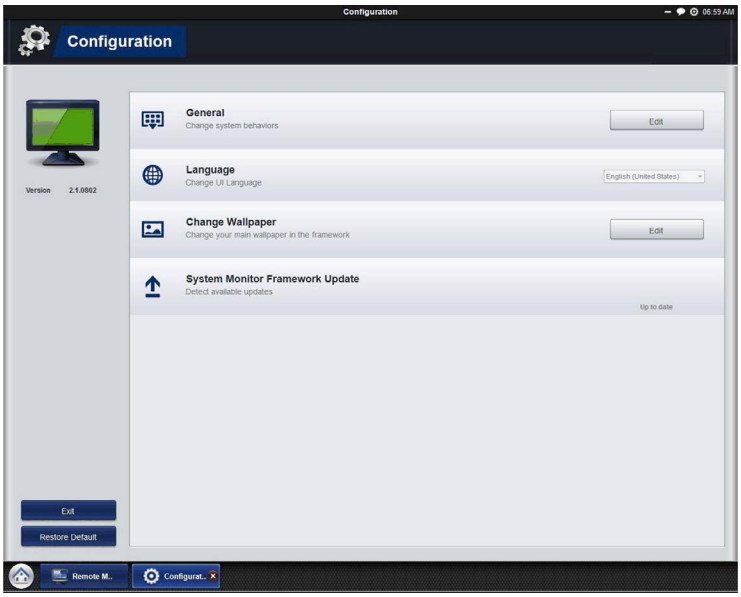
You can set configuration such as auto start up, language selection, wallpaper and update.

General (Change system behaviors): click **Edit** to set **System Monitor** to appear in the system tray and then set it to appear automatically in the system tray when the OS starts up.

Language (Change User Interface Language)

Change Wallpaper (Change your main wallpaper in the framework): click **Edit** to select your own wallpaper on the main screen.

System Monitor Console Framework Update (Detect available updates): when the console connects to the internet and finds a new update on the server, the **Update** icon is enabled and allows you to update online. Sometimes, the updater will ask you to reboot this device when the update is complete.



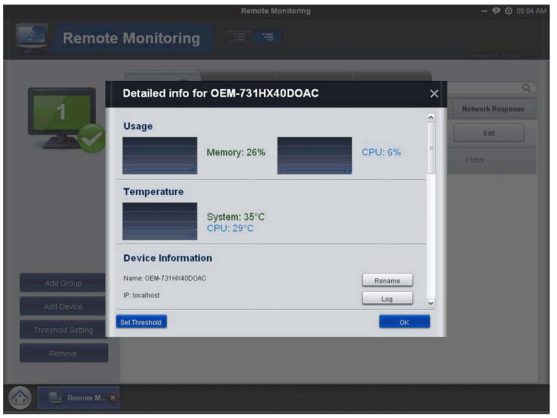
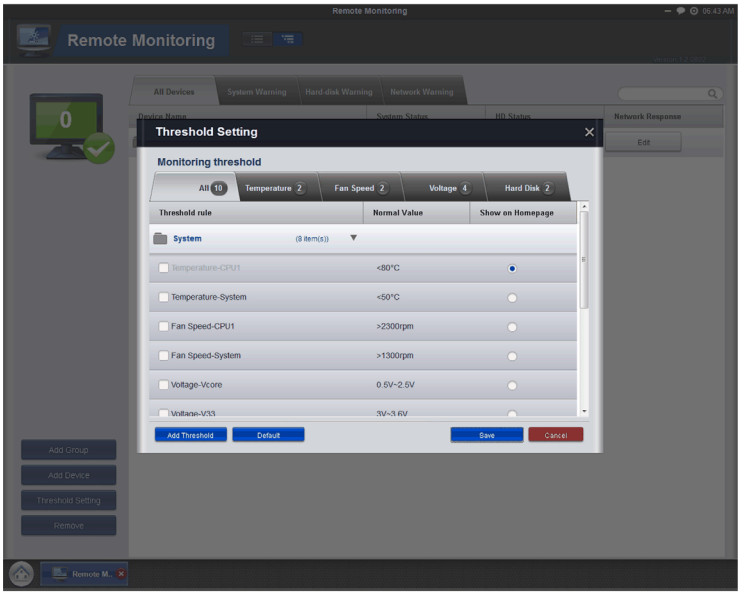
Using Remote Monitoring

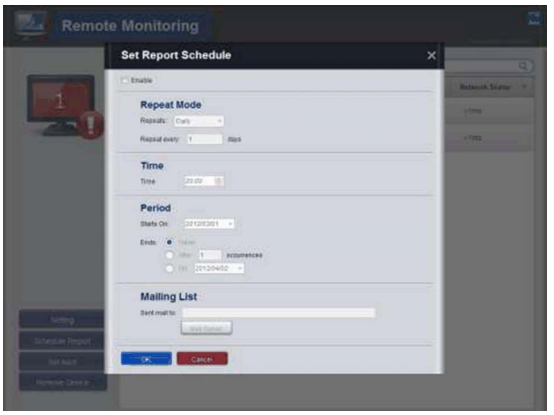
Remote Monitoring

The **Remote Monitoring** application monitors the system status of remote devices, this includes hard disk temperatures, hard drive health, network connection, system/CPU temperatures, system/CPU fan speeds and system voltages. Email alarms and function logs are generated so that managers can regularly keep track of their remote devices.

This procedure shows to access the **Remote Monitoring** application:

	Description
1	Click **Remote Monitoring** icon to run the application. Main application screen.  **Add Group**: create group name and edit description then add device(s) to a specific group. **Add Device**: click **Add Device** to add devices. Click Search to scan for device(s) on the LAN and select the devices which you wanted then add it/them. **Threshold Setting**: monitoring threshold contains four items: **Temperature**, **Fan Speed**, **Voltage**, and **Hard Disk**. In addition to the defaults, managers can increase or decrease items from this page. When the status higher or lower than threshold, the number color will change to red for warning. **Remove**: if you have determined that your device or group is not online, click **Remove** to remove it from the list. **Update All Agent**: console detect agent's update status, once one of your agents on device list is not up to date, the icon **Update All Agents** icon will show on the top of extended function, and you can update all agents by clicking it. **Manage device of group**: click **Edit** on the device bar to add or remove device(s). Click **Edit** to edit group name and related description.

	Description
2	**Detailed device status**: click device to get detailed information contained several items: CPU/Memory Usage, System Temperature, CPU Temperature, Device MAC Address, Motherboard Model, BIOS version, Processor Model, Memory Capacity, OS version, System Status, Storage Status and Network Status. 
3	**Monitoring threshold settings** The **Setting** window can be used to monitor threshold setting, this contains 4 items: Temperature, fan speed, voltage, and hard disk. In addition to this, managers can increase or decrease items in this page. 

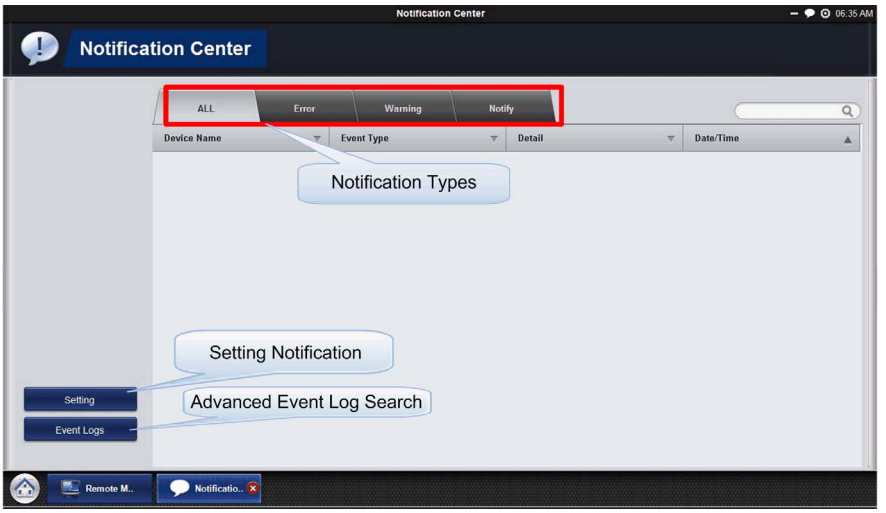
	Description
4	**Set report schedule** The main feature for this is to set up a schedule and the running report status. The function is based on the information that you set in the **Set Report Schedule** window. If you want to use the schedule and the repeat functions, follow the step-by-step instructions: Click the **Schedule Report** button to start, and set the repeat mode, time, and mailing list recipient then press the **OK** button. 

Using Notification Center

Notification Center Monitoring

The **Notification Center** application manages the messages with 3 different types: Error, Warning, and Notify.

This procedure shows the **Notification Center** application:

	Description
1	Click **Notification Center** icon to run the application. Main application screen.  **All**: list latest 500 logs in 5 pages, and allow search bar to search the latest 500 event logs. **Setting**: shows advanced notification center settings.
2	**Event Logs**: click the **Event Logs** icon to search the log. **Search**: you can search all logs here within a period by keyword. **Export**: log supports to be exported for your searching result.

Chapter 10
Software API

Intelligent Management for Embedded Platform

Description

This **Software API** is a micro controller that provides embedded features for system integrators. Embedded features have been moved from the OS/BIOS level to the board level to increase reliability and to simplify integration. **Software API** runs whether the operating system is running or not; it can count the boot times and running hours of the device, monitor device health, and provide an advanced watchdog to handle errors found as they happen. **Software API** also comes with a secure and encrypted EEPROM for storing main security keys or other customer defined information. All the embedded functions are configured through an **API** (application programming interface) or by a **DEMO** tool. Pro-face provides this suite of **Software API** and the underlying drivers required. Also a set of user-friendly, intelligent, and integrated interfaces speed development, enhance security, and offer add-on value for Pro-face platforms.

Chapter 11
Maintenance

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 take:

- 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.

Before Reinstallation

Hardware required:

- Recover media.
- Optional external DVD drive, compatible with DVD+R DL format, and with USB connection.

Setting up the hardware:

- Shut down Windows® in an orderly fashion and remove all power from the device.
- Disconnect all external peripherals.

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

Reinstallation

Refer to the procedure in the leaflet provided with the recovery media.

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 DC unit is designed to use 24 Vdc.

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

⚠ DANGER

RISK OF EXPLOSION IN HAZARDOUS LOCATION

Do not use this product in hazardous locations.

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.

Lithium Battery

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

⚠ DANGER

EXPLOSION, FIRE, OR CHEMICAL HAZARD

- The battery must always be replaced with identical type.
- For battery replacement, contact the field services department.
- Do not recharge, disassemble, heat above 100 °C (212 °F), or incinerate.
- Recycle or properly dispose of used batteries.

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

Appendices

Subject of this Part

This part provides the accessories for the Magelis Industrial Personal Computer products.

What Is in This Appendix?

The appendix contains the following chapters:

Appendix A
Accessories

Accessories for the Industrial Personal Computer

Available Accessories

Accessories are available as options. The table shows the list of accessories available for the Industrial Personal Computer:

Reference	Description
Interfaces	
PFXZPBMPNR2	NVRAM mini PCIe
PFXZPBMPR42P2	2 x RS-422/485 isolated
PFXZPBMPR44P2	4 x RS-422/485
PFXZPBMPR24P2	4 x RS-232
PFXZPBMPR22P2	2 x RS-232 isolated
PFXZPBMPRE2	1 x Ethernet Gigabit IEEE1588
PFXZPBMPX16Y82	16 x DI / 8 x DO
PFXZPBMPPBM2	1 x PROFIBUS DP master with MRAM
PFXZPBMPCANM2	2 x CANopen
PFXZPBPFWF2	Wi-Fi card and 2 x antennas
PFXZPBCBAN52	Remote Wi-Fi antenna cable 5 m
Drives	
PFXZPBHDD502	Hard disk drive 500 GB blank
PFXZPBHDD1002	Hard disk drive 1 TB blank
PFXZPESSD81	SSD 80 GB MLC
PFXZPESSD161	SSD 160 GB MLC
PFXZPBSSD242	SSD 240 GB MLC
PFXZPECFA162	CFast 16 GB
Accessories	
PFXZPBCNDC2	DC power connectors (5 pieces)
PFXZPPAF12P2	Installation fastener (12 pieces)
PFXZPPDSP152	Protective sheet W15” (5 pieces)
PFXZPPDSP192	Protective sheet W19” (5 pieces)
PFXZPPWG152	Gasket for W15”’
PFXZPPWG192	Gasket for W19”
PFXZPSPUAC3	AC power module

Appendix B
After-sales Service

After-sales Service

Information

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