

Magelis IIoT Core Box

HMIBSC

HMIPCCX2X

User Manual

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www.schneider-electric.com



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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 Schneider Electric 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.

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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, service, 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 Schneider Electric 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.

DANGER

HAZARD OF ELECTRIC SHOCK

- Do not open product.
- Product to be serviced by qualified people only.

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

WARNING

UNAUTHENTICATED ACCESS AND SUBSEQUENT UNAUTHORIZED MACHINE OPERATION

- Evaluate whether your environment or your machines are connected to your critical infrastructure and, if so, take appropriate steps in terms of prevention, based on Defense-in-Depth, before connecting the automation system to any network.
- Limit the number of devices connected to a network to the minimum necessary.
- Isolate your industrial network from other networks inside your company.
- Protect any network against unintended access by using firewalls, VPN, or other, proven security measures.
- Monitor activities within your systems.
- Prevent subject devices from direct access or direct link by unauthorized parties or unauthenticated actions.
- Prepare a recovery plan including backup of your system and process information.

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

About the Book



At a Glance

Document Scope

This manual describes the configuration and usage of the Box PC IIoT, part of the range of Magelis Industrial PC, for its cataloged and configured product offers.

The Box PC IIoT are designed to operate in an industrial environment.

1 Cataloged product offer:

- HMIBSCEA53D1L0T - IIoT Edge Box Core eMMC DC Linux TPM
 - 12...24 Vdc
 - ARM-A53 processor
 - 1 GB RAM
 - 8 GB eMMC
 - TPM module
 - Linux Yocto
 - mini PCIe and M.2 slots for optional interface
- HMIBSCEA53D1L01 - IIoT Edge Box Core eMMC DC Linux
 - 12...24 Vdc
 - ARM-A53 processor
 - 1 GB RAM
 - 8 GB eMMC
 - Linux Yocto
 - mini PCIe and M.2 slots for optional interface
- HMIBSCEA53D1L0A - IIoT Edge Box Core eMMC DC Linux
 - 12...24 Vdc
 - ARM-A53 processor
 - 2 GB RAM
 - 64 GB eMMC
 - Linux Yocto
 - mini PCIe and M.2 slots for optional interface
 - Conformal coating

NOTE: The part number for your unit may not be included in the user manual. Commercial part numbers listed in the user manual are for products available when the user manual was published. New part numbers may be added to the product range.

New and existing cataloged part numbers are always composed of a prefix (HMI), followed by a serial arrangement of 12 alphanumeric characters. Each one of the twelve characters matches with one characteristic of the cataloged Box PC IIoT, such as storage device size, storage device type, memory size, and bundled software.

Use the following legend to identify the features that correspond with each character of the part number:

Character number	Prefix	1	2	3	4	5	6	7	8	9	10	11	12
Range name	HMI												
iPC family		B											
Type			S										
Version	IIoT Edge Box			C									
Drive	eMMC				E								
CPU type	ARM-A53					A	5	3					
Power supply	DC								D				
Expansion slots	1 mini PCIe with optional interface									1			
Operating system	Linux										L		
Bundled software	None											0	
Hardware iteration	Initial												1
	Conformal coating												A

2 Configured product offer:

In addition to the catalog offer, other configurations may be available in some countries.

These configured offers use a fixed method of identification. The configured part numbers are always composed of an arrangement of 20 alphanumeric characters. The first 6 characters are always **HMIPCC**. The remaining 14 characters match with one characteristic of the configured Box PC IIoT, such as storage device size, storage device type, memory size, and bundled software.

The configured offers have similar characteristics and functionalities as the cataloged offer described in this manual.

In addition to this part number, a configuration number is printed on the product label.

The configuration number format is as follows:

Character number	Prefix (1-6)	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Part number	HMI PCC														
Form factor	Edge Box Core A53	X													
Product generation	Second generation			2											
Modular displays	None			B											
Box PC IIoT	Box ARM Core DC 1 GB, eMMC 8 GB				7										
	Box ARM Core DC 2 GB, eMMC 64 GB				8										
CPU type	ARM-A53					X									

Character number	Prefix (1-6)	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Power supply	DC						D								
RAM	1 GB							1							
	2 GB							2							
Operating system	Linux Yocto								Y						
Storage device	eMMC (soldered)									4					
Optional interfaces	None										0				
	Interface - M.2 2 x analog input										Y				
	Interface - mini PCIe 8 x analog input										Z				
	Cellular 4G for US										M				
	Cellular 4G for EU /ASIA										N				
	TPM module										L				
Second storage	None											N			
	SD Card industrial grade 16 GB											5			
	SD Card industrial grade 64 GB											6			
Software bundle	None												N		
Reserved	None													0	
Reserved	None														0

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

Validity Note

The technical characteristics of the devices described in the present document also appear online. To access the information online:

Step	Action
1	Go to the Schneider Electric home page www.schneider-electric.com .
2	In the Search box type the reference of a product or the name of a product range. - Do not include blank spaces in the reference or product range. - To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the Product Datasheets search results and click on the reference that interests you. If you entered the name of a product range, go to the Product Ranges search results and click on the product range that interests you.
4	If more than one reference appears in the Products search results, click on the reference that interests you.

Step	Action
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click Download XXX product datasheet .

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

Registered trademarks

Linux®, Yocto Project® are registered trademarks of Linux Foundation in the United States and/or other countries.

Intel®, Cortex®, ARM® are registered trademarks of Intel corporation.

Hazardous Location

The Box PC IIoT (HMIBSC) are not classified for used in hazardous locations.

 **DANGER**

POTENTIAL FOR EXPLOSION IN HAZARDOUS LOCATION
Do not use these products 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 Magelis Industrial PC must be individually and thoroughly tested for proper operation before being placed into service.

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

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

NOTE: The Box PC IIoT are 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 described in the previous warning messages. Examples of such changes include:

- System Linux
- IIoT
- Operating system
- Installed hardware
- Installed software

NOTE: The Operating System includes security protection for SD card. When using some device, system may experience issue. Resolution is available here: http://www.schneider-electric.com/en/faqs/index?page=content&id=FA290340&actp=search&viewlocale=en_US&searchid=1469171130324#highlight

WARNING

UNINTENDED EQUIPMENT OPERATION

Use only Schneider Electric software with the devices described in this manual.

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

Chapter 1

Important Information

General

This chapter describes specific aspects related to the operation of the Magelis Box iPC.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
FCC Radio Frequency Interference Statement for USA.	14
Certifications and Standards	15

FCC Radio Frequency Interference Statement for USA.

Federal Communications Commission (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 Magelis Industrial PC in such a manner that it does not radiate sufficient electromagnetic energy to cause interference in nearby devices.
- Install and test the Magelis Industrial PC to ensure that the electromagnetic energy generated by nearby devices does not interfere with the Magelis Industrial PC's operation.

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

FCC RF Radiation Exposure Statement

- This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

WARNING

ELECTROMAGNETIC / INTERFERENCE

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

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

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

Certifications and Standards

Introduction

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

NOTE: Always refer to the markings on the product to confirm the certifications.

Certifications

- Underwriters Laboratories Inc., UL 60950, and CSA 60950 (Information Technology Equipment).
- CCC, RCM, and EAC certification. Refer to product markings.

Compliance Standards

Schneider Electric tested this product for compliance with the following compulsory standards:

- United States:
 - Federal Communications Commission, FCC Part 15, Class A
- Europe: CE
 - 2014/53/EU RED Directive, based on EN 301 489-1/-17
In complement, the products have been tested according IEC 60950 and EN 61000-6-2 / EN 61000-6-4
- Australia: RCM
 - Standard AS/NZS CISPR11

RF Certifications

Introduction

Schneider Electric submitted this product for independent testing and qualification by third-party agencies. These agencies have certified this product as meeting the following countries/geographical zones regulations.

CAUTION

EXPOSURE TO RADIO FREQUENCY RADIATION

- This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.
- A separation distance of at least 20 cm (0.79 in) must be maintained between the antenna of this device and all persons.

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

RF certifications

- **RED** for Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK
- **FCC RF** for USA
- **IC** for Canada
- **SRRC** for China
- **TELEC** for Japan
- **RCM** for Australia, New Zealand

The detailed documentation for these certifications can be found @ <https://www.se.com>

If your country is not in this list, in case of issue, please contact our support to troubleshoot:
<https://www.se.com>

Qualification Standards

Schneider Electric voluntarily tested this product to additional standards. The additional tests performed, and the standards under which the tests were conducted, are identified in the environmental characteristics.

Hazardous Substances

This product is compliant with:

- WEEE, Directive 2012/19/EU
- RoHS, Directive 2011/65/EU, and 2015/863/EU
- RoHS China, Standard GB/T 26572
- REACH regulation EC 1907/2006

NOTE: Documentation about sustainable development is available on Schneider Electric website (Product Environmental Profile and End of Life Instruction, RoHS, and REACH certificates).

End of Life (Waste Electrical and Electronic Equipment)

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 (European Directive 2012/19/EU).

Refer to the section Maintenance to extract cells and batteries from the product. These batteries do not contain a weight percentage of heavy metals over the threshold (European Directive 2006/66/CE).

Batteries comply with UN recommendations and IATA requirements.

European (CE) Compliance

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 intended, and in connection with approved third-party products.

Canadian Notice

This device contains license-exempt transmitter/receiver that comply with Innovation, Science and Economic Development Canada's license-exempt RSS. Operation is subject to the following two conditions:

- This device may cause interference.
- This device may accept any interference, including interference that may cause undesired operation of the device.

Chapter 2

Physical Overview

Subject of this Chapter

This chapter provides a physical overview of the Box PC IIoT.

What Is in This Chapter?

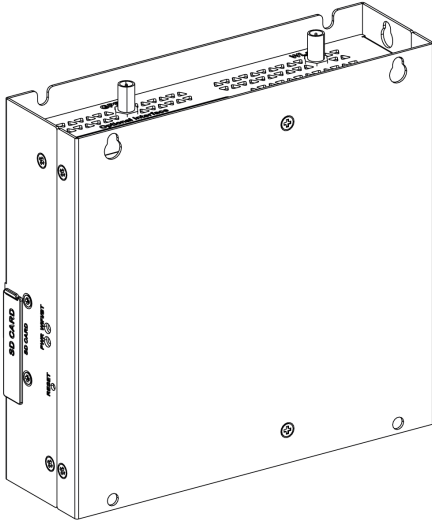
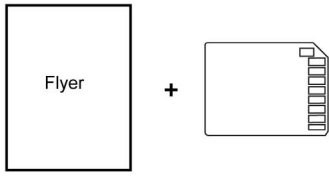
This chapter contains the following topics:

Topic	Page
Package Contents	20
Description	22

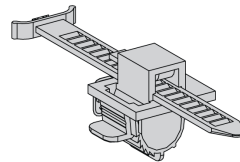
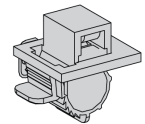
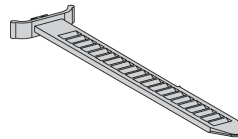
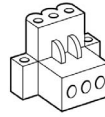
Package Contents

Items of The Box PC IIoT

The following items are included in the package of the Box PC IIoT. Before using the Box PC IIoT, confirm that all items listed here are present:

Box PC IIoT	
● Recovery media containing the software required to reinstall the operating system. Additional drivers are in the recovery media ● Chinese user manual ● "Before using this product" flyer ● Chinese RoHS flyer	

- 1 x DC terminal block: 3-pin power connector
- 1 x wire for chassis ground
- 2 X Flexible HDMI/USB lockers
- 1 x GPIO terminal block
- 4 x screws and 4 x washers



The Box PC IIoT has been carefully packed, with special attention to quality. However, should you find anything damaged or missing, contact your local distributor immediately.

Description

Introduction

During operation, the surface temperature of the heat sink may exceed 70 °C (158 °F).

⚠ WARNING

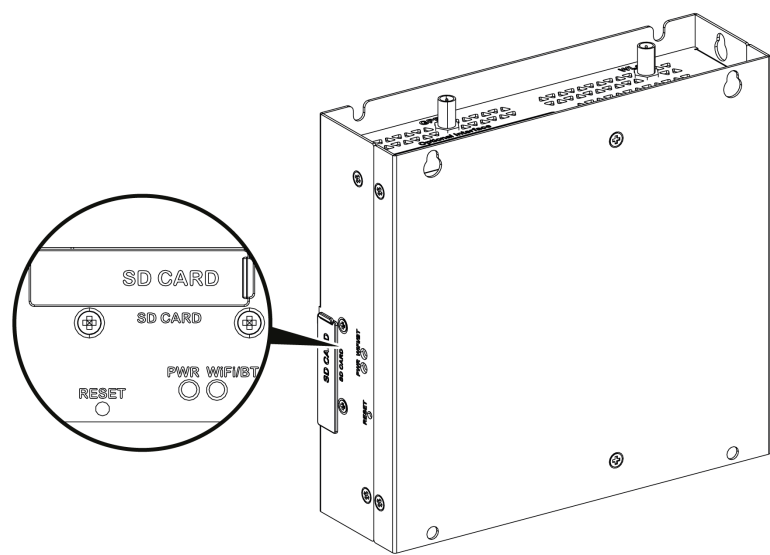
RISK OF BURNS

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.

Standard Description

Overview

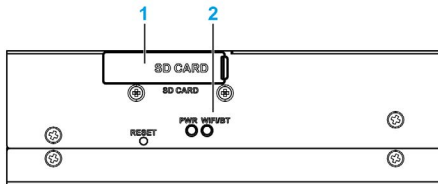


Reset button and LEDs

The table describes the meaning of the status LEDs:

Marking	Color	State	Meaning
PWR	Green	On	Active (user operates OS) (state S0).
WiFi/BT	Green	Off	No WiFi/BT data transmission.
		On	Data transmission.

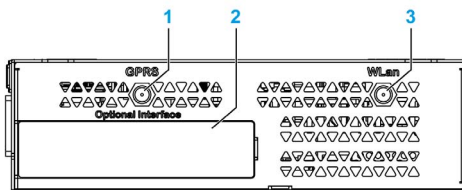
Front View



- 1 SD card socket
- 2 LEDs and reset button

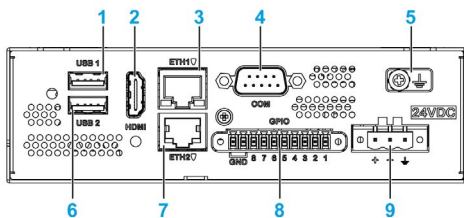
NOTE: The regular installation of the default OS has to be made with the SD card.

Top View



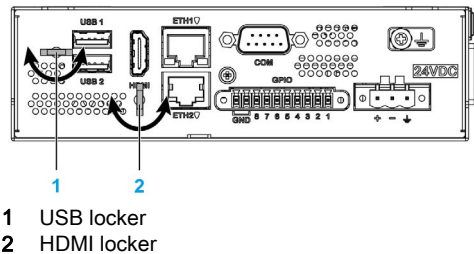
- 1 SMA connector for the GPRS/4G external antenna
- 2 Optional interface
- 3 SMA connector for the WLAN external antenna

Bottom View



- 1 USB1 (USB 2.0)
- 2 HDMI port
- 3 ETH1 (10/100/1000 Mb/s)
- 4 COM port RS-232 (default), RS-232/422/485 (non-isolated)
- 5 Ground connection pin
- 6 USB2 (USB 2.0)
- 7 ETH2 (10/100/1000 Mb/s)
- 8 GPIO
- 9 DC power connector

HDMI and USB Locker



Chapter 3

Characteristics

Subject of this Chapter

This chapter lists the product characteristics.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Box iPC Characteristics	26
Power Supply Characteristics	29
Environmental Characteristics	30

Box iPC Characteristics

Characteristics

Element	Characteristics
Processor	ARM-A53 Qualcomm ARM® Cortex®-A53 Qualcomm Snapdragon 410 (APQ8016) Quad core up to 1.2 GHz
Memory	1 GB or 2 GB, LPDDR3: maximum transfer data rate 533 MHz, 1066 MTs
Storage memory	8 GB or 64 GB, eMMC: maximum raw transfer rate 200 MBps
Buzzer	No
Cooling method	Natural air flow
Weight	1 kg (2.2 lbs)

Serial Interface

Element	Characteristics
Type	RS-232 (default), RS-422/485 (non-isolated)
Transfer rate	Maximum 115.2 kbps
Connection	D-Sub 9-pin, plug

NOTE: The serial interface COM port default setting is with RS-232. Refer to the software configuration ([see page 117](#)) to set RS-422 or RS-485.

USB Interface

Element	Characteristics
Type	USB 2.0
Transfer rate	Low speed (1.5 Mb/s), full speed (12 Mb/s), high speed (480 Mb/s)
Current load	Maximum 0.5 A per connection
Connection	Type A

Ethernet Interface

Element	Characteristics
Type	RJ45
Speed	10/100/1000 Mb/s base-T
Ethernet controller	Supporting IEEE1588

HDMI Port

Element	Characteristics
HDMI	1920 x 1080 at 60 Hz, HDCP 1.3
Encode	30 fps 720 p (H.264 Baseline/MPEG-4) 30 fps 1080 p (MPEG-4/H.264/VP8/H.263)
Decode	30 fps 1080 p (MPEG-4/H.264/H.263/DivX/MPEG2/VC1/Soreson/VP8)

GPIO

The general-purpose input/output (GPIO) has eight channels with digital input and output (DIO). The characteristic is 3.3 Vdc TTL.

Wi-Fi

WCN3620 802.11 b/g/n 2.4 GHz.

Bluetooth

WCN3620 Bluetooth 4.1.

SD Socket

SD 3.0, max raw transfer rate 104 MBps, support SD,SDHC,SDXC (Standard SD: 32 x 24 mm).

mini_PCIe Card

USB 2.0: max raw transfer rate 480 MBps.

M.2 Card

M.2 2230 key.E (cannot support storage), USB 2.0: max raw transfer rate 480 MBps.

Conformal Coating (HMIBSCEA53D100A - IIoT Edge Box iPC - Base Unit)

Conformal coating is used for assembly process on:

- Single motherboard

Board coating scope excludes:

- connectors
- screw holes (standoffs)
- chipsets
- RTC battery
- dip switches
- labels

NOTE: The conformal coating is available according to the product configuration

Power Supply Characteristics

Box PC IIoT DC Power Supply

Element	Characteristics
Rated voltage	24 Vdc (12...24 Vdc)
Inrush current	0.43 A
Power consumption	16 W

Environmental Characteristics

Characteristics

Characteristics	Value
Degree of protection	IP 40
Pollution degree	For use in pollution degree 2 environment
Operating temperature	0...50 °C (32...122 °F) Optional interface installed: limited to 45 °C (113 °F)
Operating temperature for horizontal mounting	0...50 °C (32...122 °F) mini PCIe installed: limited to 45 °C (113 °F)
Storage temperature	0...50 °C (32...122 °F)
Operating altitude	2,000 m (6,560 ft) max
Random vibration	5...500 Hz: 2 G _{rms}
Storage humidity	10...95 % RH at 40 °C (104 °F), no condensation

Chapter 4

Installation

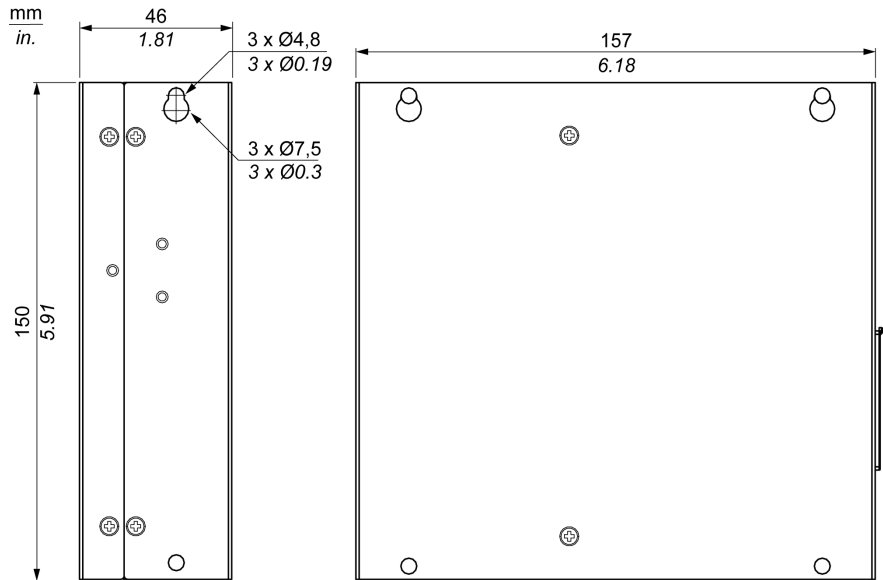
What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Dimensions	32
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Dimensions

Dimensions



Dimensional Tolerances

The table indicates the general tolerance for the dimensions:

Nominal measurement range	General tolerance acc. DIN ISO 2768 medium
up to 6 mm (up to 0.236 in)	±0.1 mm (±0.004 in)
6...30 mm (0.236...1.181 in)	±0.2 mm (±0.0078 in)
30...80 mm (1.181...3.149 in)	±0.25 mm (±0.0098 in)
80...180 mm (3.149...7.08 in)	±0.3 mm (±0.012 in)

Installation

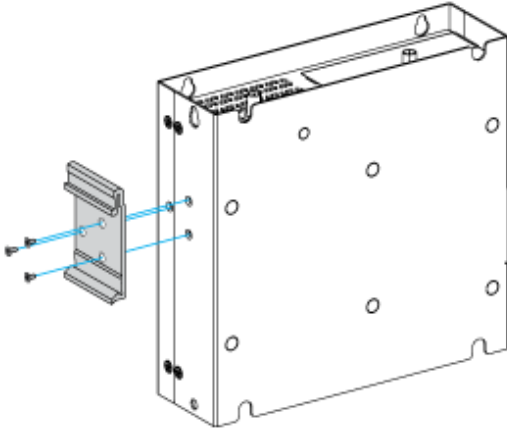
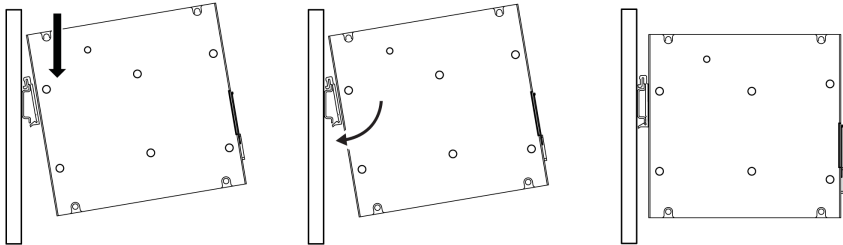
Installation of the Box PC IoT

Follow these steps for installation:

Step	Action
1	Remove the power and confirm that the power supply is disconnected from its power source.
2	Wall mounting: Fasten the Box PC IoT on the cabinet with four M4 hex screws (8 mm (0.31 in)). Book mounting: Fasten the Box PC IoT on the cabinet with two M4 hex screws (8 mm (0.31 in)). NOTE: The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in). Horizontal mounting: Fasten the Box PC IoT with four M4 hex screws (8 mm (0.31 in)): NOTE: • The horizontal mounting is allowed with a temperature derating. See Environmental Characteristics (see page 30). • For correct heat dissipation when horizontal mounting, the marking is at the bottom. • Use screw driver less than 4.5 mm for Hex socket cap screws provided. • The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).

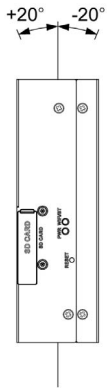
Installation Din-Rail Mounting of the Box PC IIoT

Follow these steps for installation:

Step	Action
1	Remove the power and confirm that the power supply is disconnected from its power source.
2	Fasten the Din-rail bracket (HMIYADBMODIN11) to the Box PC IIoT with three M3 screws (6 mm (0.23 in)): 
3	Hook the Box PC IIoT with bracket on the mounting rail: 

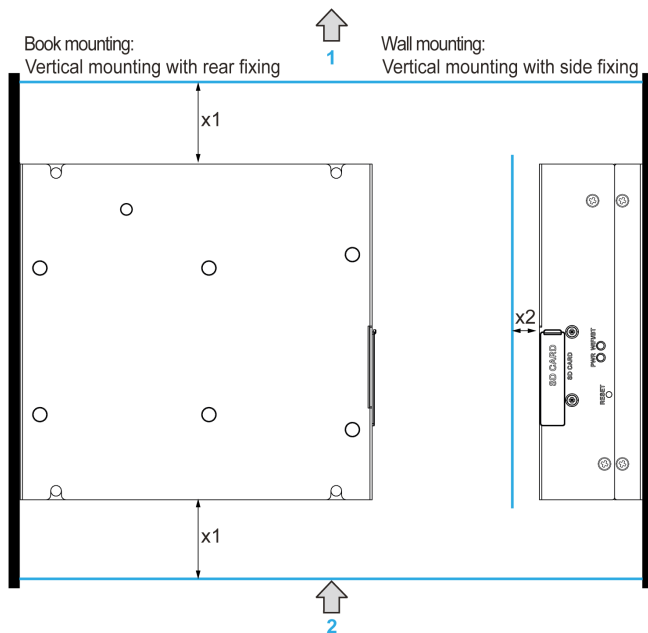
Mounting Orientation

The figure shows the allowed mounting orientation for the Box PC IIoT:



Spacing Requirements

In order to provide sufficient air circulation, mount the Box PC IoT so that the spacing on the top, bottom, and side is as follows:

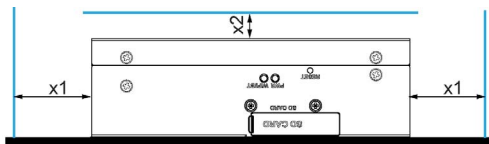


1 Air out

2 Air in

x1 > 100 mm (3.93 in)

x2 > 50 mm (1.96 in)



x1 > 100 mm (3.93 in)

x2 > 50 mm (1.96 in)

Chapter 5

Connections

Subject of This Chapter

This chapter describes the connection of the Box iPC 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:

Topic	Page
Grounding	38
Connecting the DC Power Cord	41
AC Power Supply Module Description	43
AC Power Supply Module Installation	46
UPS Module - Description and Installation	52
Interface Connections	62

Grounding

Overview

The grounding resistance between the Box PC IIoT 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.

The table shows the maximum length for the wires:

Wire cross-section	Maximum line length
1.3 mm ² (AWG 16)	30 m (98 ft)
	60 m (196 ft) round trip

Grounding Procedure



WARNING

UNINTENDED EQUIPMENT OPERATION

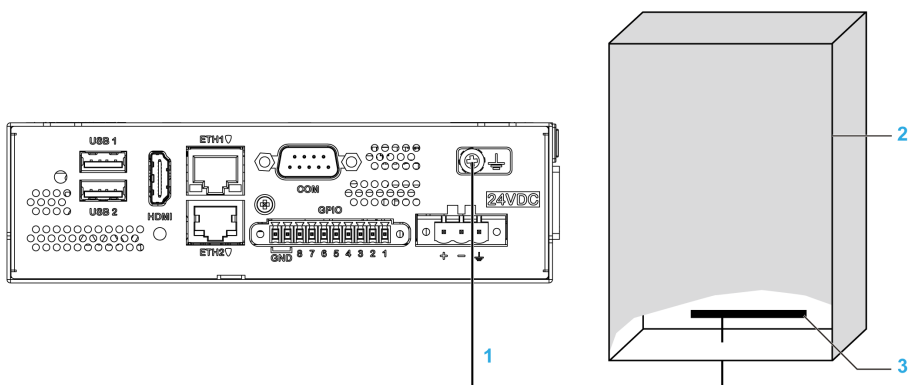
- Use only the authorized grounding configurations shown below.
- Confirm that the grounding resistance is 100 Ω or less.
- Test the quality of your ground connection before applying power to the device. Excessive noise on the ground line can disrupt operations of the Magelis Industrial PC.

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

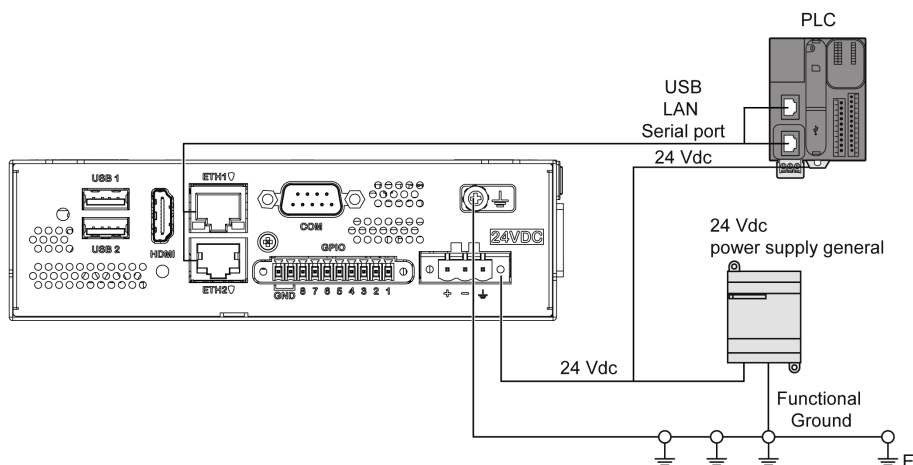
The Box PC IIoT ground have 2 connections:

- DC Supply voltage
- Ground connection pin

The Box PC IIoT connections:



- 1 Ground connection pin (functional ground connection pin)
- 2 Switching cabinet
- 3 Grounding strip



When grounding, follow this procedure:

Step	Action
1	Ensure all of the following is done for the 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 Box PC IIoT to the cabinet. ● Connect the I/O to the controller if needed. ● Connect the power supply to the Box PC IIoT.
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 Box PC IIoT.
4	Use 1.3 mm ² (AWG 16) wire to make the ground connection. Create the connection point as close to the Box PC IIoT as possible and make the wire as short as possible.

Grounding I/O Signal Lines

The Box PC IIoT (HMIBSC) are not classified for use in hazardous locations.

 **DANGER**

POTENTIAL FOR EXPLOSION IN HAZARDOUS LOCATION

Do not use these products 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 Box PC IIoT.

 **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 Magelis Industrial PC 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 Box iPC, first ensure that the power cord is disconnected from the DC power supply.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Remove all power from the device before removing any covers or elements of the system, and prior to installing or removing any accessories, hardware, or cables.
- Unplug the power cable from both the Magelis Industrial PC 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 Magelis Industrial PC. The DC unit is designed to use 24 Vdc input.

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 in the environment.
- 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 of the Box iPC

The table below describes how to connect the power cord to the DC terminal block:

Step	Action
1	Remove all power from the Box iPC and confirm that the DC power supply is disconnected from its power source.
2	Remove the terminal block from the power connector on the Box iPC and connect the power cord to the terminal block: Use copper wire rated for 75 °C (167 °F) with a section of 0.75 to 2.5 mm² (AWG 18 to AWG 14) and use 2.5 mm² 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).

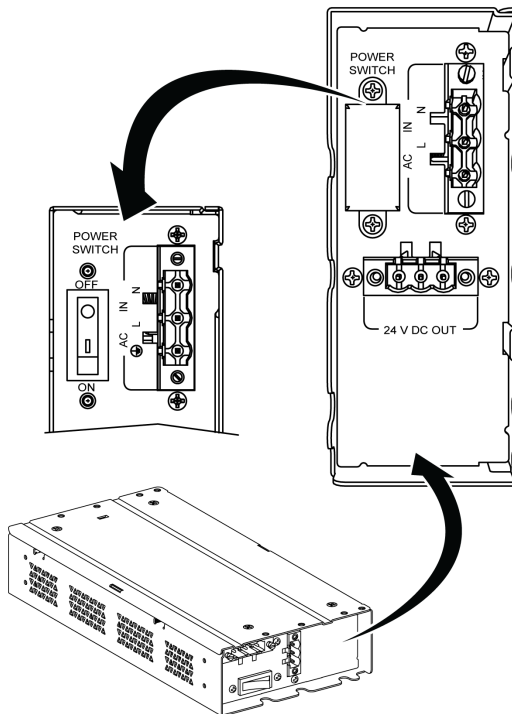
AC Power Supply Module Description

Overview

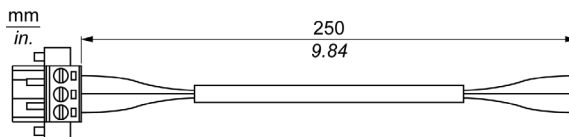
The AC power supply modules HMIYMMAC1 (100 W) or HMIYPSOMAC1 (60 W) can optionally be used with the Box iPC to be operated with 100...240 Vac.

AC Power Supply Module (HMIYMMAC1) Description

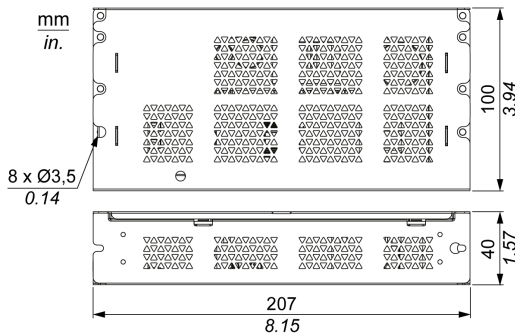
The figure shows the AC power supply module:



The figure shows the DC power cable of the AC power supply module:



The figure shows the dimensions of the AC power supply module:

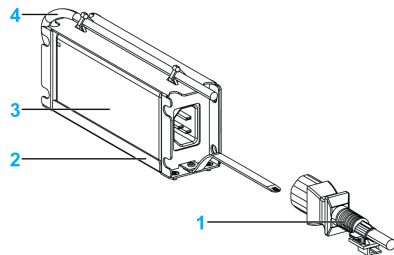


The table gives the technical data of the AC power supply module (PV02):

Features	Values
Nominal input voltage	100...240 Vac
Frequency	47...63 Hz
Power switch	Yes
Internal fuse	3.15 A
Nominal output voltage	24 Vdc
Output current	5.5 A maximum
Operation temperature	-20...55 °C (-4...131 °F)
Weight	0.795 kg (1.75 lb)

AC Power Supply Module (HMIYPSOMAC1) Description

This figure shows the AC power supply module:

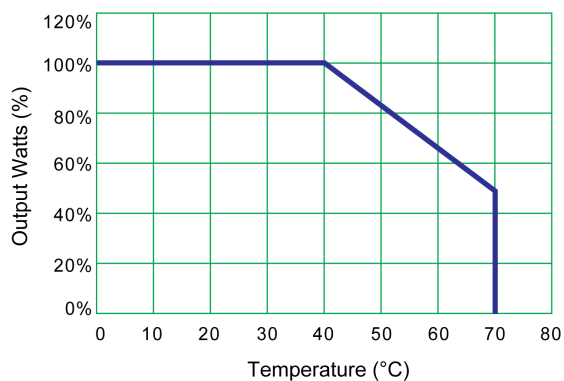


- 1 AC power cord
- 2 Mounting bracket
- 3 AC power supply
- 4 DC power cord

The table provides technical data for the AC power supply module:

Element	Characteristics
Input	90...260 Vac / 47...63 Hz / 1.6 A at 100 Vac
Output	24 Vdc / 2.62 A maximum
Inrush current	70 A at 230 Vac
Environment	
Operation temperature	0...70 °C (32...158 °F), see derating curve
Storage temperature	-40...85 °C (-40...185 °F)
Relative humidity:	0...95 %, non-condensing

Operation temperature of the AC power supply derating curve:



AC Power Supply Module Installation

Installing the AC Power Supply Module (HMIYMMAC1)

Before installing an AC power supply module (HMIYMMAC1), shut down the operating system 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 Magelis Industrial PC and the power supply.
- Always use a properly rated voltage sensing device to confirm that 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 Magelis Industrial PC. The AC unit is designed to use 100...240 Vac input.

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

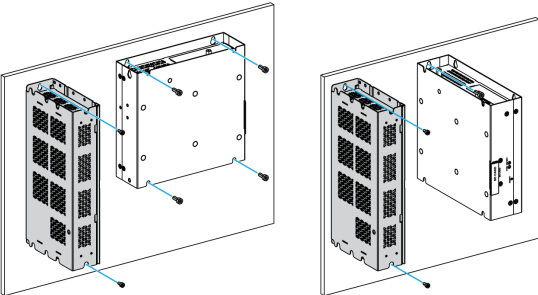
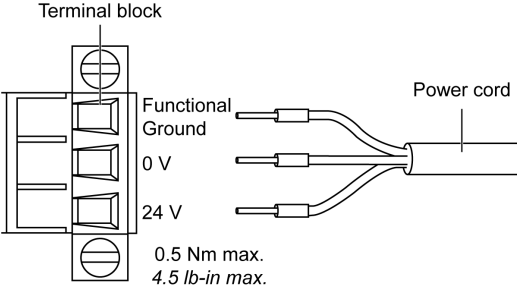
CAUTION

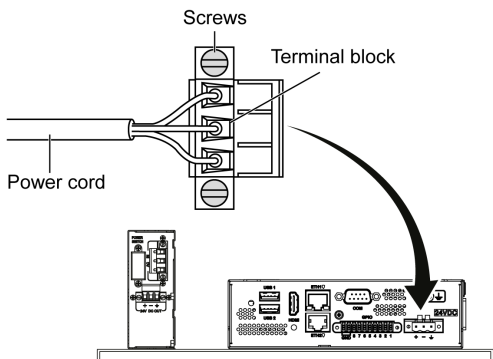
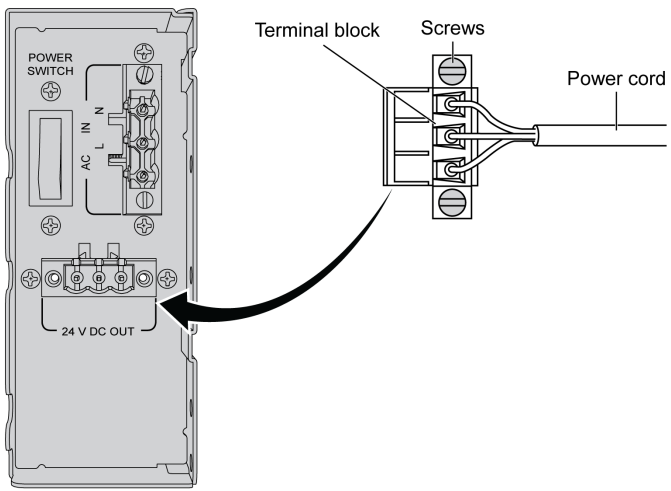
OVERTORQUE AND LOOSE HARDWARE

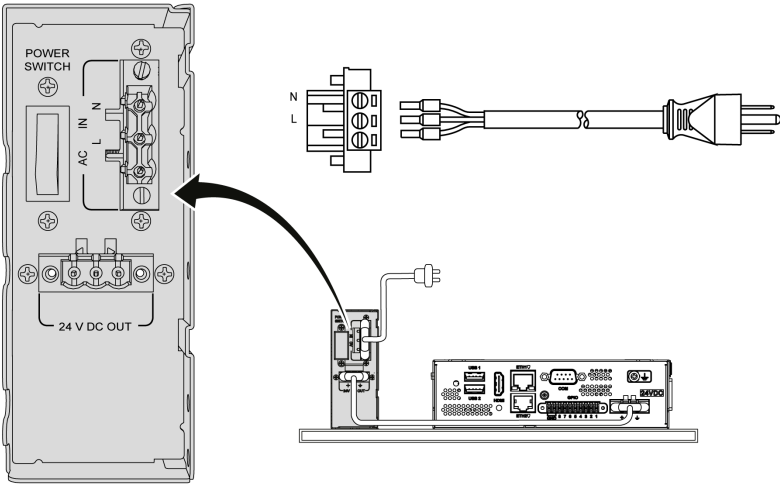
- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the installation fastener.
- When fastening or removing screws, ensure that they do not fall inside the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

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

Follow these steps when installing the AC power supply module (HMIYMMAC1):

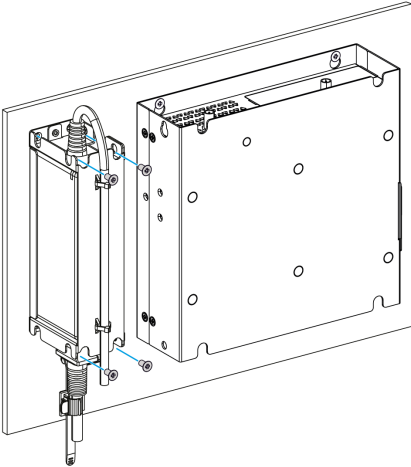
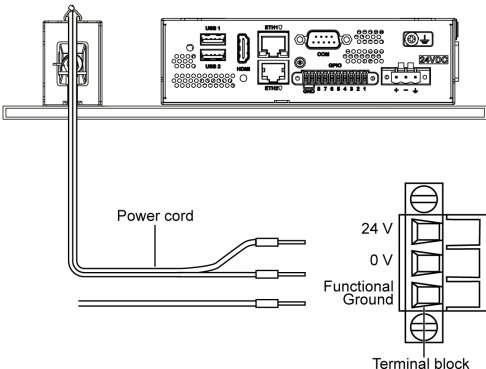
Step	Action
1	Remove the power from the Box PC IIoT and confirm that the power adapter has been disconnected from its power source.
2	Mount the AC power supply module on the cabinet with two screws (the power switch cover and the AC IN connector have to be removed):  1 Wall mounting 2 Book mounting NOTE: The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).
3	Remove the terminal block from the power connector on the Box PC IIoT and connect one side of the DC power cable to the terminal block: 

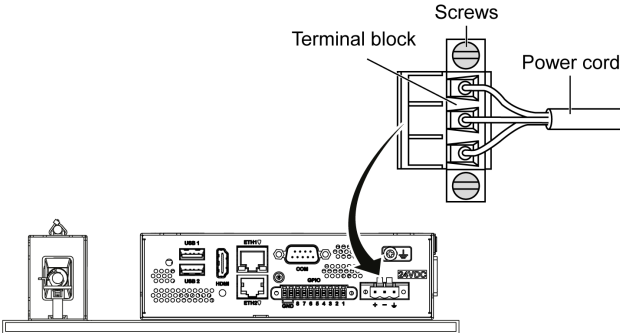
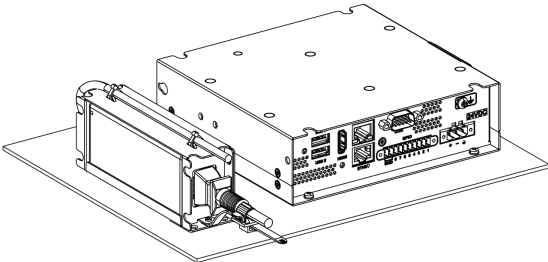
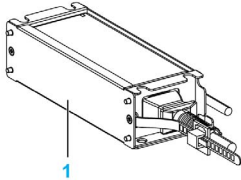
Step	Action
4	Place the terminal block in the power connector of the Box PC IoT and tighten the screws:  NOTE: The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).
5	Connect the other side of DC power cable with the terminal block attached to 24 V DC OUT of the AC power supply module and tighten the screws:  Use copper wire rated for 75 °C (167 °F) with a section of 0.75 to 2.5 mm² (AWG 18 to AWG 14).

Step	Action
6	Connect the AC power cable with the terminal block attached to AC IN of the AC power supply module from its power source: 

Installing the AC Power Supply Module (HMIYPSOMAC1)

Follow these steps when installing the AC power supply module (HMIYPSOMAC1):

Step	Action
1	Remove all power from the Box PC IIoT and confirm that the power adapter is disconnected from its power source.
2	The AC power supply module is mounted to the cabinet with four screws M3 x 6:  NOTE: The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).
3	Remove the terminal block from the power connector on the Box PC IIoT and connect the power cord to the terminal block:  Connect the black wire with the 0 V and the red wire with the 24 V of the terminal block. Use 2.5 mm² copper wire to make the ground connection of the terminal block.

Step	Action
4	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).
5	Put on the clip through the mounting bracket and the power cord together:  Press the clip to fasten the power cord:  1 Mounting bracket
6	Connect the AC power cable of the AC power supply module from its power source.

UPS Module - Description and Installation

Overview

⚠ DANGER

EXPLOSION, FIRE, OR CHEMICAL HAZARD

Handling and storage:

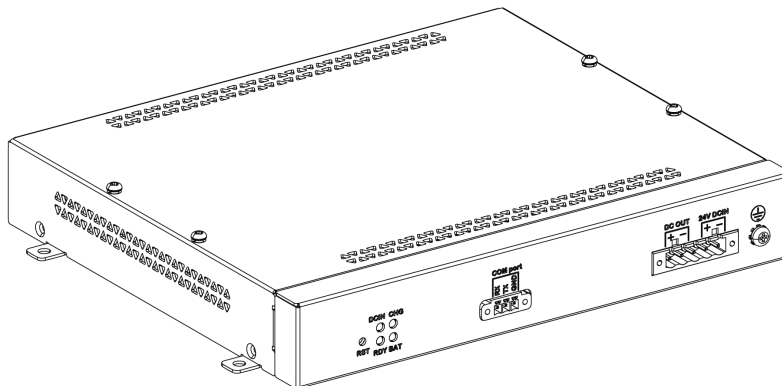
- Store in cool, dry and ventilated rooms with impermeable surfaces and appropriate containment in case of leakage.
- Protect from adverse weather conditions and keep separate from incompatible materials during storage and transport.
- A sufficient supply of water must be located nearby.
- Damage to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

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

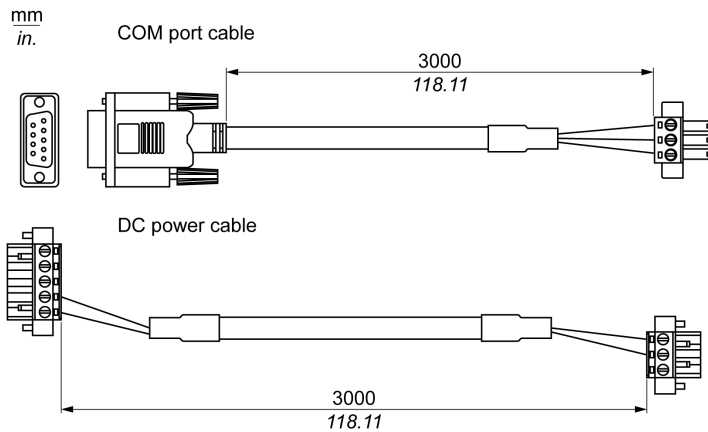
The uninterrupted power supply (UPS) option (HMIYMUPSKT1) includes a battery cell, a charger circuit, and a power path switch circuit. When battery capacity is not full, the charger circuit charges the battery cell automatically.

NOTE: If the UPS is configured and is activated in IIoT, the UPS is available.

The figure shows the UPS module:



The figure shows the UPS module cables:



The main features of the UPS option are:

- Long-lasting, maintenance-free rechargeable batteries
- Communication via integrated interfaces

UPS Principle

With the optional UPS module, the Box PC IIoT completes write operations even when it is turned off while write operations are being executed. When the UPS module detects a power off, it switches to battery operation immediately without interruption.

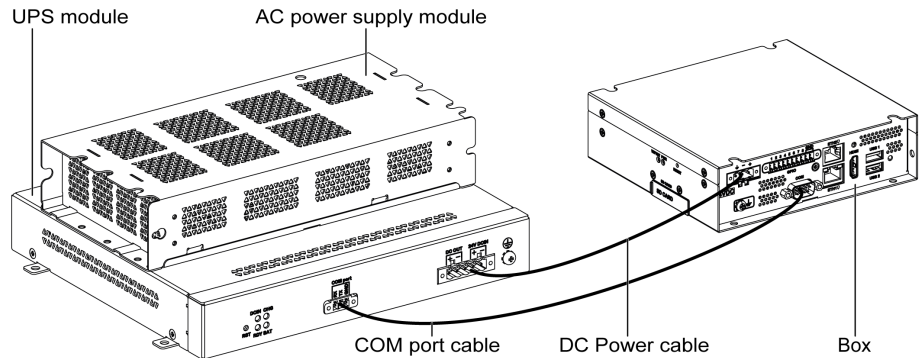
NOTE:

- The connected monitor is not handled by the UPS and shut-off when the power is exhausted.

There are two configurations for UPS module:

- UPS module: The power source of the UPS module is from DC input power.
- UPS and AC power supply modules: The power source of the module is from AC input power.

This figure shows the UPS module (HMIYMUPSKT1) with the AC power supply module (HMIYMMAC1) and the Box PC IIoT with the **COM port** cable and the **DC power** cable of the UPS cable kit (HMIYCABUPS31):



The Box PC IIoT can get battery information from the COM port.

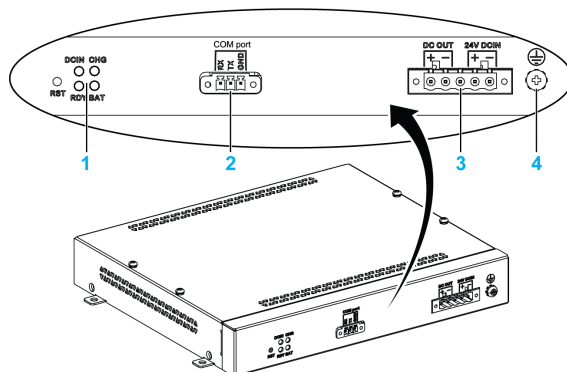
The table describes the additional modules for the UPS:

Input power	UPS	Additional modules	Reference
DC	No	–	–
	Yes	UPS module / UPS cables	HMIYMUPSKT1 / HMIYCABUPS31
AC	No	AC power supply module	HMIYMMAC1
	Yes	UPS module / UPS cable and AC power supply module	HMIYMUPSKT1 / HMIYCABUPS31 and HMIYMMAC1

UPS Module Description

The UPS module is subject to wear and should be replaced regularly, depending on the battery status. This information is displayed by **iloT**. The **Health** status shows when the battery needs to be changed.

The figure shows the UPS module (HMIYMUPSKT1):

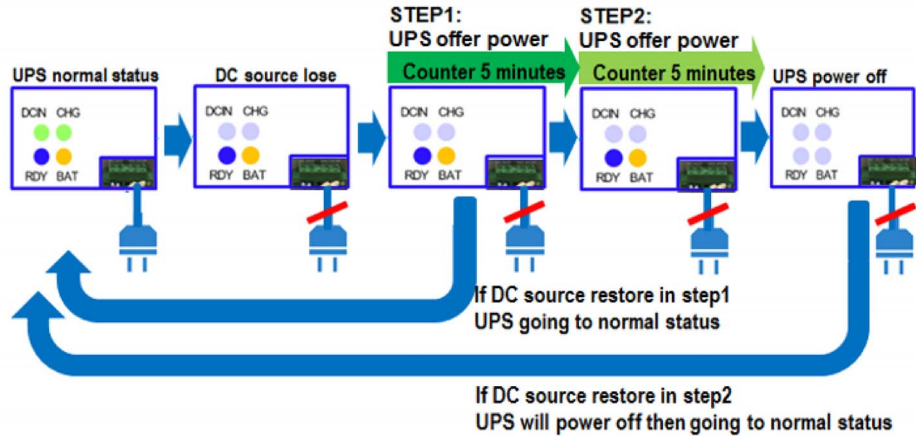


- 1 LEDs ([DCIN / CHG / RDY / BAT]) and reset button ([RST])
- 2 Communication port connector ([COM port / PWR])
- 3 DC power connector ([DC OUT / 24V DCIN])
- 4 Ground connection pin

The table describes the meaning of the status indicator:

Marking	Color	State	Meaning
DCIN	Green	ON	The input source is OK.
		1 Hz Flashing	DCIN loss up to 5 minutes.
		OFF	DCIN loss.
CHG	Green	0.5 Hz Flashing	The temperature of the battery is > 60 °C (remains flashing until the temperature is < 55 °C).
		1 Hz Flashing	The battery is charging.
		OFF	The battery capacity is over 90 % (charging not required).
RDY	Blue	ON	The UPS module is ready.
		OFF	The UPS module is not functioning.
BAT	Yellow	ON	The battery is ready.
		0.5 Hz Flashing	The temperature of the battery is > 60 °C (remains flashing until the temperature is < 55 °C) or less than 15 % charge.
		OFF	The battery is not detected.

UPS working flow:



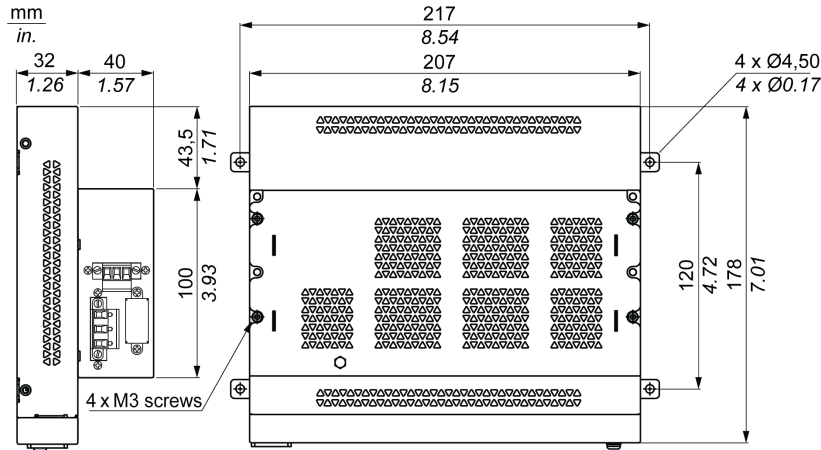
NOTE: The button **RST** is used to reset the UPS module.

The table shows the technical data of the UPS module:

Features	Values
UPS	
Input voltage	18...36 Vdc
Output voltage	24 Vdc
Output current	3 A
Communication port	COM port / RS-232 (non-Isolated)
Back-up time	10 minutes (battery 70 % full)
Operating temperature	0...45 °C (32...113 °F)
Mounting	Horizontal mounting
Battery cells	
Capacity:	27.5 Wh (2.73 Ah, 4S1P)
Maximum discharger current	9 A (if discharged at high rate and high temperature frequently, the battery life will be shortened)
Charging current (max)	1 A
Operating voltage	12...16 Vdc
Cycle life of recharging	300 times
Operating temperature	Charge: 0...45 °C (32...113 °F) Discharge: 0...60 °C (32...140 °F)

Features	Values
Typical recharge time at low battery	4 hours
Weight	1.15 Kg (2.53 lbs)

The figure shows the dimensions of the UPS module (HMIYMUPSKT1) equipped with the optional AC power supply module (HMIYMMAC1):



Installing Instructions

Before installing the UPS system, shut down the operating system in an orderly fashion and remove the 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 Magelis Industrial PC and the power supply.
- Always use a properly rated voltage sensing device to confirm that 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 Magelis Industrial PC. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc input. Always check whether your device is AC or DC powered before applying power.

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

CAUTION

OVERTORQUE AND LOOSE HARDWARE

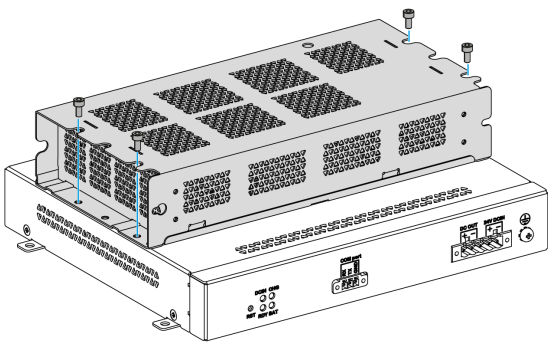
- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the installation fastener.
- When fastening or removing screws, ensure that they do not fall inside the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

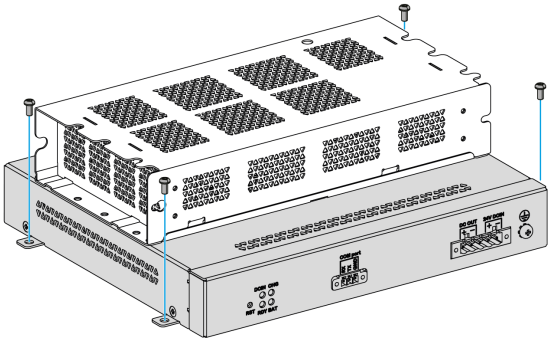
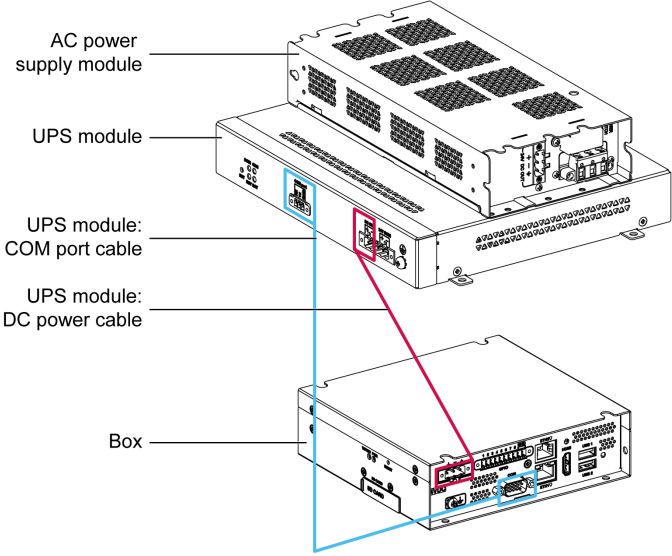
Failure to follow these instructions can result in injury or equipment damage.

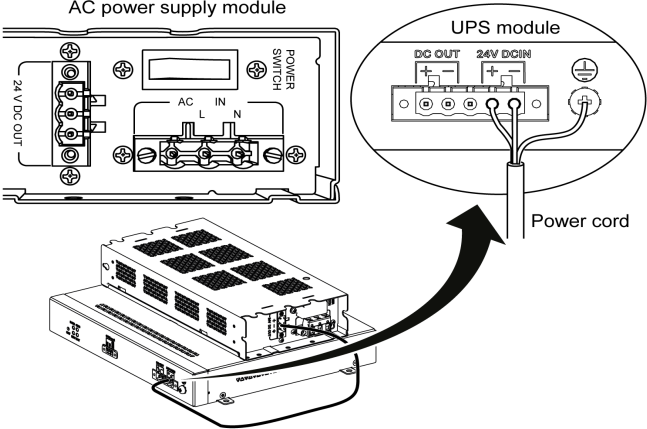
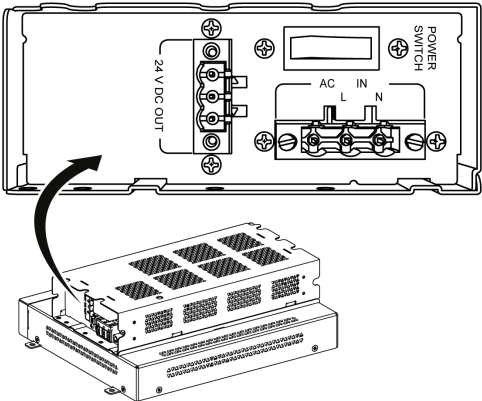
By adding the charging circuit in the Box PC IIoT housing, installation is reduced to merely attaching the connection cable to the UPS module mounted next to the Box PC IIoT.

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

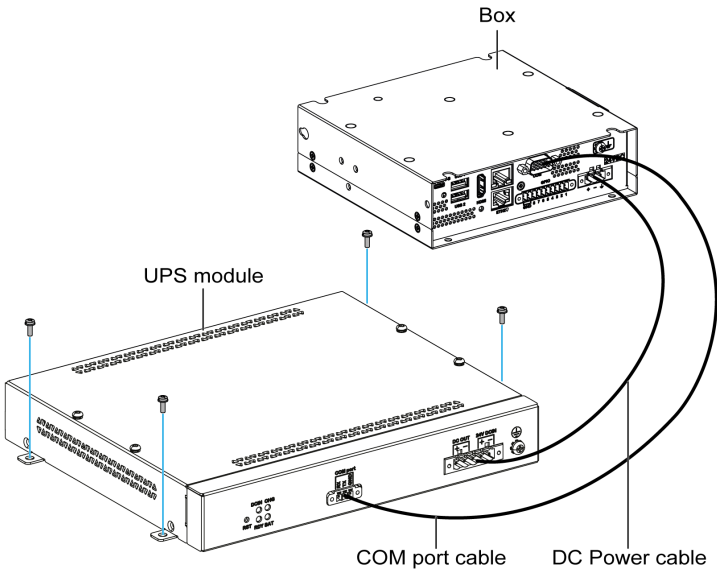
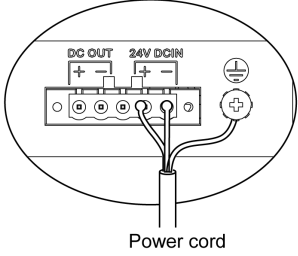
Follow the steps when installing the UPS module equipped with the optional AC power supply module:

Step	Action
1	Disconnect the power supply of the Box PC IIoT.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Mount the AC power supply module on the UPS module with the four screws supplied: 

Step	Action
4	Install the UPS module (HMIYMUPSKT1). The installation requires four x M5 screws and four washers: 
5	Connect the two UPS cables (HMIYCABUPS31) to the UPS module. Be sure to use the correct connection terminals.
6	Connect the DC power cable of the UPS module to the DC power connector of the Box PC IloT. Connect the COM port cable of the UPS module to the [COM] port of the Box PC IloT:  Tighten the connected cables in the screw clamps.

Step	Action
7	Connect the AC power supply module ([24V DCOUT]) to the DC power cable ([24V DCIN]) of the UPS module: 
8	Connect the AC power cable ([AC IN]) of the AC power supply module: 

Follow the steps when installing the UPS module without the optional AC power supply module:

Step	Action
1	Disconnect the power supply of the Box PC IIoT.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Install the UPS module (HMIYMUPSKT1). The installation requires four x M5 screws and four washers. Connect the two UPS cables (HMIYCABUPS31) to the UPS module. Connect the DC power cable to the DC power connector of the Box PC IIoT and connect the communication cable (COM port) to the COM port RS-232 of the Box PC IIoT:  Tighten the connected cables in the screw clamps.
4	Connect the DC power supply ([24V DCIN]) of the UPS module from its power source:  Power cord

Interface Connections

Introduction

The Box PC IIoT are not classified hazardous locations.

DANGER

POTENTIAL FOR EXPLOSION IN HAZARDOUS LOCATION

Do not use these products 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 in the environment.
- 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 the Box PC IIoT 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 Box PC IIoT, it is possible that the cable can be at a different electrical potential than the panel, even if both are connected to ground.

NOTE: The Box PC IIoT can get UPS information from COM port.

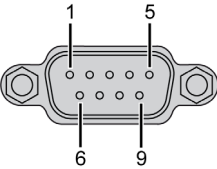
DANGER

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.

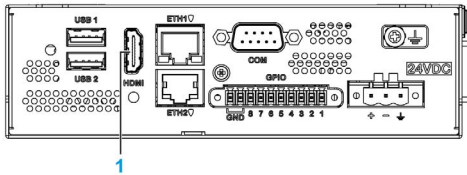
The table shows the D-Sub 9-pin assignments (COM):

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

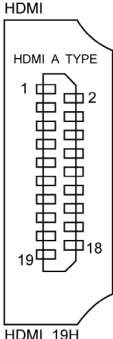
Any excessive weight or stress on communication cables may disconnect the equipment.

HDMI Port

The figure shows the HDMI port:



1 HDMI port

Pin number	Description	Pin number	Description	HDMI port
Pin1	HDMI_TD2+	Pin11	GND	
Pin2	GND	Pin12	HDMI_CLK-	
Pin3	HDMI_TD2-	Pin13	HDMI_CEC	
Pin4	HDMI_TD1+	Pin14	NC	
Pin5	GND	Pin15	HDMI_DDC_SCL	
Pin6	HDMI_TD1-	Pin16	HDMI_DDC_SDA	
Pin7	HDMI_TD0-	Pin17	GND	
Pin8	GND	Pin18	POWER	
Pin9	HDMI_TD0-	Pin19	HDMI_HPD	
Pin10	HDMI_CLK+			

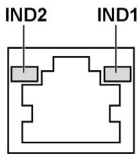
GPIO

Pin number	Description	Pin number	Description	GPIO terminal block
Pin1	GPIO1	Pin6	GPIO6	
Pin2	GPIO2	Pin7	GPIO7	
Pin3	GPIO3	Pin8	GPIO8	
Pin4	GPIO4	GND	GND	
Pin5	GPIO5	GND	GND	



Ethernet Interface Connector Status LEDs

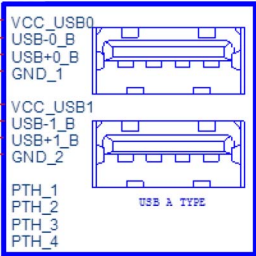
The figure shows the RJ45 connector status LEDs:



The table describes the RJ45 connector status LED:

Label	Description	LED		
		Color	Status	Description
IND1	Ethernet link	Green/Yellow	Off	Link at 10 Mb/s
			Solid yellow	Link at 100 Mb/s
			Solid green	Link at 1000 Mb/s
IND2	Ethernet activity	Green	Off	No activity
			On	Transmitting or receiving data

USB Interface

Pin number	Description	Pin number	Description	USB port
Pin1	USB power	Pin5	USB power	
Pin2	USB_0+	Pin6	USB_1+	
Pin3	USB_0-	Pin7	USB_1-	
Pin4	GND	Pin8	GND	

Chapter 6

Hardware Modifications

Subject of This Chapter

This chapter describes the hardware modifications for the Magelis Box iPC.

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
6.1	Before Modifications	68
6.2	Box iPC and Storage Modifications	70
6.3	Optional Cards and Optional Interfaces	73

Section 6.1

Before Modifications

Before Making Modifications

Introduction

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 Magelis Industrial PC 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 Magelis Industrial PC. The DC unit is designed to use 24 Vdc input.

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

The Box PC IIoT (HMIBSC) are not classified for use in hazardous locations.

DANGER

POTENTIAL FOR EXPLOSION IN HAZARDOUS LOCATION

Do not use these products in hazardous locations.

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

During operation, the surface temperature of the heat sink may exceed 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 installation fastener.
- When fastening or removing screws, ensure that they do not fall inside the Magelis Industrial PC chassis.

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

 CAUTION**STATIC SENSITIVE COMPONENTS**

Magelis Industrial PC 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 6.2

Box iPC and Storage Modifications

SD Card Installation

Introduction

The Box PC IIoT operating system views the SD card as a hard disk. Proper handling and care of the SD card helps extend the life of the card. Familiarize yourself with the card before attempting to insert or remove the card.

Before installing or removing an SD card, shut down the operating system in an orderly fashion and remove the power from the device.



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 Magelis Industrial PC and the power supply.
- Always use a properly rated voltage sensing device to confirm that 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 Magelis Industrial PC. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc input. Always check whether your device is AC or DC powered before applying power.

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

 CAUTION**MEMORY CARD DAMAGE AND DATA LOSS**

- Remove all power before making any contact with an installed memory card.
- Use only memory cards sold by Schneider Electric as accessory for this product. The performance of the Magelis Industrial PC 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.

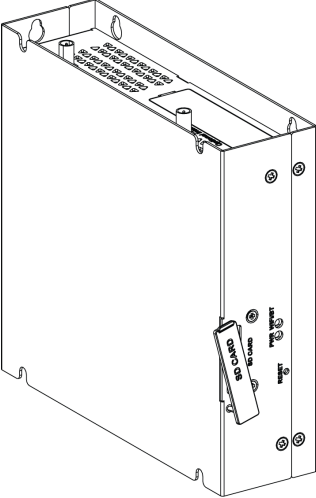
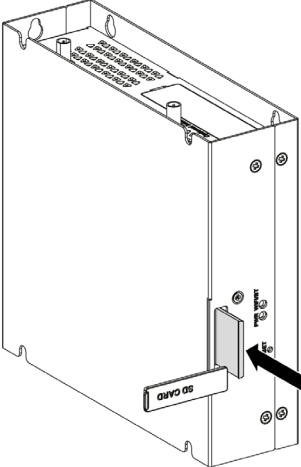
NOTICE**ELECTROSTATIC DISCHARGE**

Take the necessary protective measures against electrostatic discharge before attempting to remove the Box PC IIoT cover.

Failure to follow these instructions can result in equipment damage.

Inserting the SD Card

The procedure describes how to insert the SD card.

Step	Action
1	Remove the cover of the SD card slot: 
2	Insert the SD card into the card slot. Press the SD card slot firmly into the Box PC IIoT. Replace the cover: 

Section 6.3

Optional Cards and Optional Interfaces

Overview

This section describes the optional cards, optional interfaces, and their installation.

What Is in This Section?

This section contains the following topics:

Topic	Page
Optional Interface Installation	74
2 x Analog Input Interface Description	81
8 x Analog Input Interface Description	84
4G Cellular Description	86
Cyber Security TPM Module Description	88

Optional Interface Installation

Introduction

Before installing or removing an interface, shut down the operating system in an orderly fashion and remove the power from the device.

**DANGER**

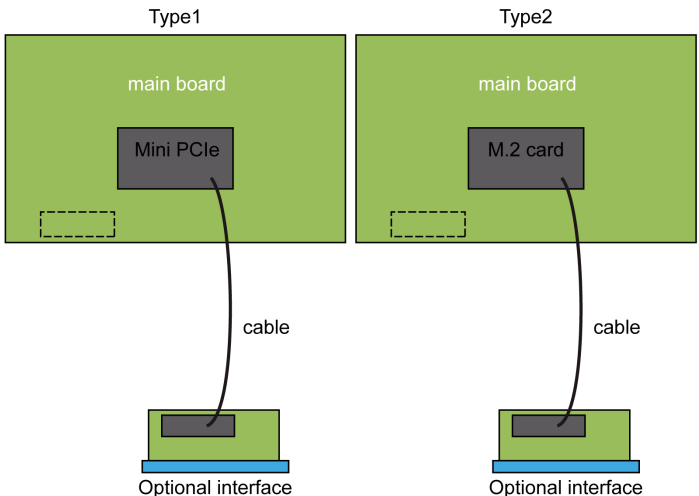
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- 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 Magelis Industrial PC and the power supply.
- Always use a properly rated voltage sensing device to confirm that 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 Magelis Industrial PC. The AC unit is designed to use 100...240 Vac input. The DC unit is designed to use 24 Vdc input. Always check whether your device is AC or DC powered before applying power.

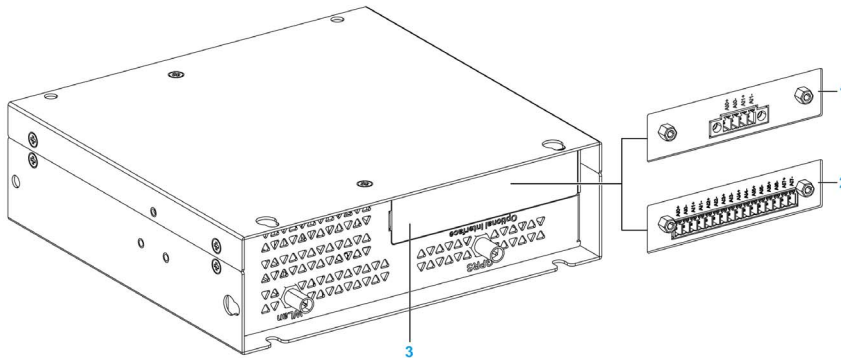
Failure to follow these instructions will result in death or serious injury.

Optional Interface Types

The figure shows the interface types (top view):



The figure shows the available interfaces:



- 1 2 x AI interface
- 2 8 x AI interface
- 3 Optional interface

The table shows the type and the interface part numbers:

Designation	Part number	Interface	mini PCIe slot	M.2 slot	Interface plate	Pin header from system
2 AI interface (M.2)	HMIYBIN2AIM21	2 x analog input	–	1	1	–
8 AI interface (mini PCIe)	HMIYMIN8AI1	8 x analog input	1	–	1	–
4G cellular for EU/ASIA	HMIYMIN4GEU1	4G cellular for EU/Asia and antenna	1	–	–	–
4G cellular for US	HMIYMIN4GUS1	4G cellular for US and antenna	1	–	–	–
TPM module	HMIYBINLTPM201	–	–	–	–	1

Compatibility Table

Configurations	2 AI interface (M.2)	8 AI interface (mini PCIe)	4G cellular
	HMIYBIN2AIM21	HMIYMIN8AI1	HMIYMIN4GEU1/HMIYMIN4GUS1
1	Yes	No	No
2	No	Yes	No
3	No	No	Yes
4	Yes	No	Yes

NOTE:

- The Box PC IIoT only have one M.2 2230 slot and one mini PCIe slot. The mini PCIe slot only can support either 4G cellular or 8 x AI optional interface module. Therefore, 8 x AI optional interface module cannot be installed together with 4G cellular.
- The 2 x AI optional interface module can be supported together with 4G cellular (with inner GPRS SMA connector, not through 4G optional interface).
- The Box PC IIoT only have one optional interface slot, therefore, 2 x AI optional interface module cannot be used together with 8 x AI optional interface module.
- The 16DI/8DO optional interface module (HMIYMINIO1) is not supported on Box PC IIoT, because no Linux Yocto driver support.

Interface Installation

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

The Box PC IIoT are not classified for use in hazardous locations.

DANGER

POTENTIAL FOR EXPLOSION IN HAZARDOUS LOCATION

Do not use these products 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 Magelis Industrial PC cover.

Failure to follow these instructions can result in equipment damage.

⚠ CAUTION

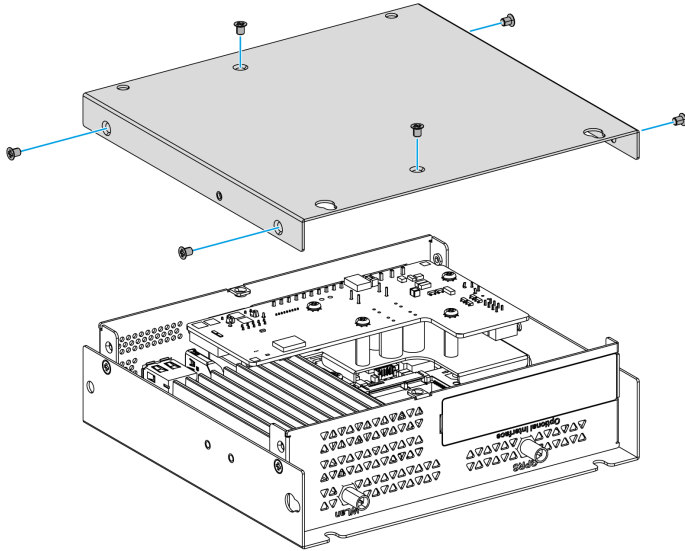
OVERTORQUE AND LOOSE HARDWARE

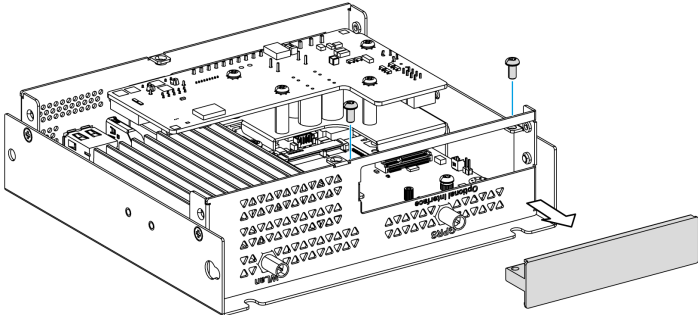
- Do not exert more than 0.5 Nm (4.5 lb-in) of torque when tightening the installation fastener, enclosure, accessory, or terminal block screws. Tightening the screws with excessive force can damage the installation fastener.
- When fastening or removing screws, ensure that they do not fall inside the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

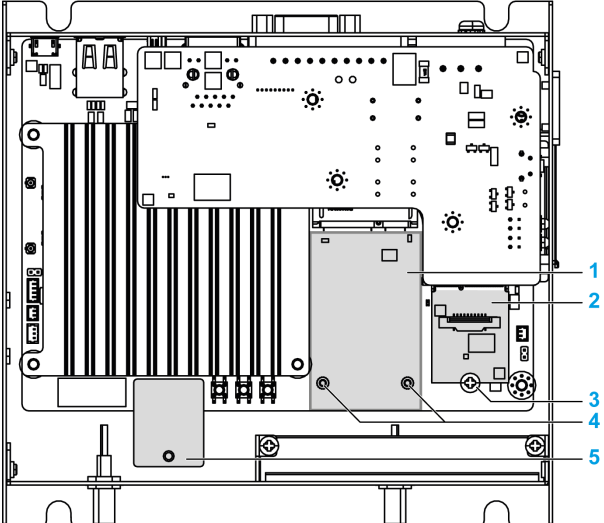
Failure to follow these instructions can result in injury or equipment damage.

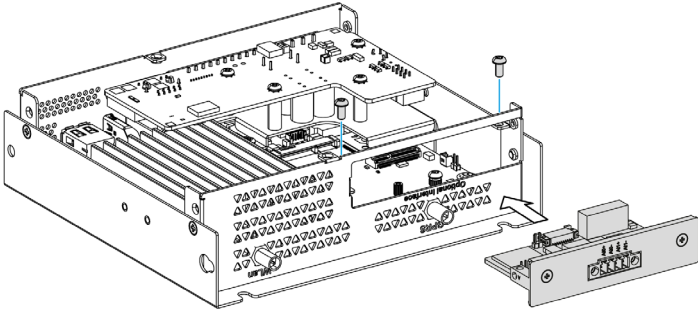
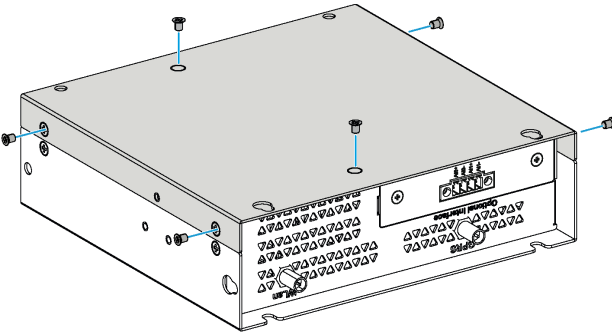
NOTE: Remove the power before attempting this procedure.

The table describes how to install an interface:

Step	Action
1	Disconnect the power cord from the Box PC IIoT.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Unscrew the six screws from the cover and remove it: 

Step	Action
4	Remove the plate: 

Step	Action
5	4G cellular or 8 x analog input interface: Insert the mini PCIe card into the expansion card connector of the Box PC IIoT and fasten it with two screws. 2 x analog input interface: Insert the M.2 card into the expansion card connector of the Box PC IIoT and fasten it with one screw. TPM module: Insert the module to the pin header.  1 mini PCIe card with the 4G cellular or 8 x analog input interface 2 M.2 card with the 2 x analog input interface 3 1 x screw size M3 (included in accessory Box PC IIoT) 4 2 x screw size M2 (included in accessory Box PC IIoT) 5 TPM module NOTE: - When using a mini PCIe card with an external cable attached, install a clamp or other device to secure the cable. - The requirement of Phillips screw driver is type size 2. The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).

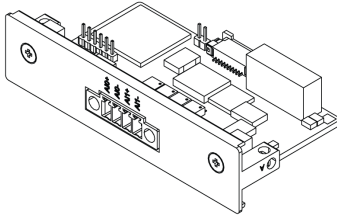
Step	Action
6	Insert the interface in the slot of the Box iPC and fasten it with two screws:  NOTE: The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).
7	Replace the cover and fasten it with six screws:  NOTE: The recommended torque to tighten these screws is 0.5 Nm (4.5 lb-in).

2 x Analog Input Interface Description

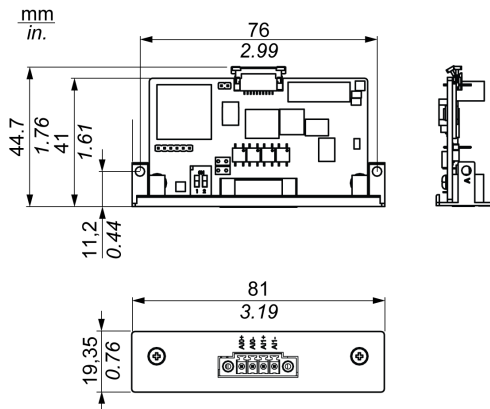
Introduction

The HMIYBIN2AIM21 is categorized as an analog input module. It is compatible with the M.2 card.

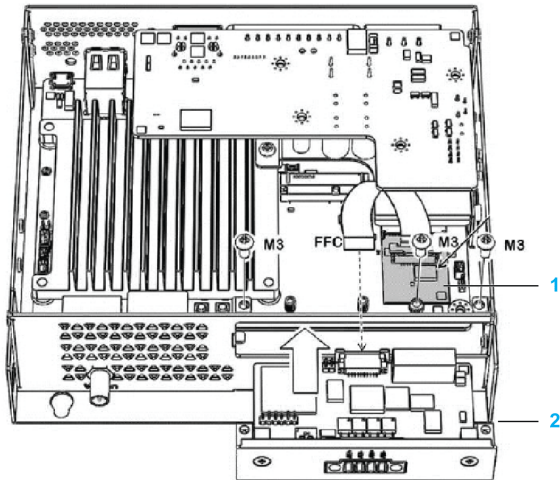
The figure shows the 2 AI interface:



The figure shows the dimensions:



The figure shows the 2 AI interface with the M.2 card installation:



- 1 M.2 card
- 2 2 x AI interface

NOTE: Connect the cable to M.2 card first.

Characteristics

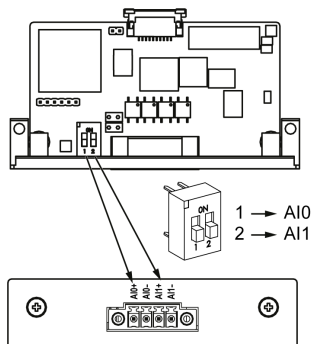
The table shows technical data:

Element	Characteristics
Input channel	2 (differential)
Input impedance	100 K Ω (voltage) 120 Ω (current)
Input type	0...10 Vdc 4...20 mA
Accuracy	$\pm 0.1\%$ or better (voltage) at 25 °C $\pm 0.2\%$ or better (current) at 25 °C
Resolution	16 bits
Calibration	Auto calibration
Sampling rate	10 sample/second
Isolation	2000 Vdc
Common mode rejection (CMR) at 50/60 Hz	90 dB
Normal mode rejection (NMR) at 50/60 Hz	67 dB

Element	Characteristics
Span drift	± 25 ppm
Zero drift	$\pm 6 \mu\text{V}$
Common-mode voltage	350 Vdc

Switch Setting

The switch on 2ch-AI module to modify to voltage or current:



For AI0 and AI1, the switch is pushed to:

- Off - voltage
- On - current

NOTE: By default, the switches are in off state.

Cable Routing

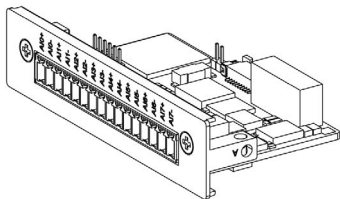


8 x Analog Input Interface Description

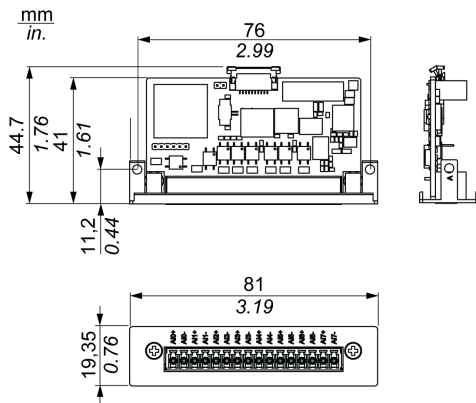
Introduction

The HMIYMIN8A11 is categorized as an analog input module. It is compatible with the mini PCIe card.

The figure shows the 8 analog input interface:



The figure shows the dimensions:



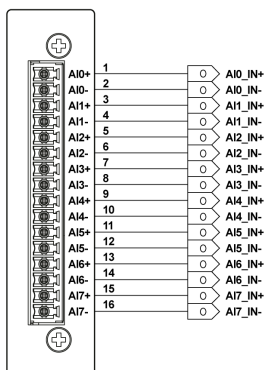
Characteristics

The table shows technical data:

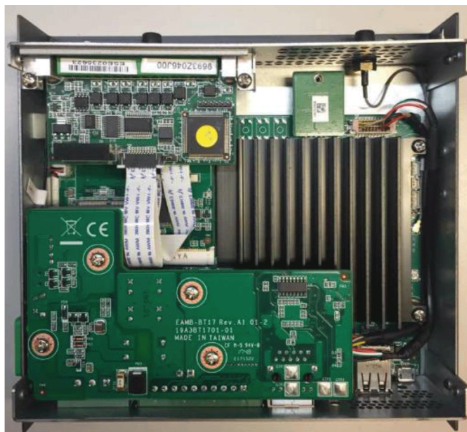
Element	Characteristics
Input channel	8 (differential)
Input range	0...10 V
Input type	0...10 Vdc
Accuracy	± 0.1% or better (voltage) at 25 °C
Resolution	16 bits
Calibration	Auto calibration

Element	Characteristics
Sampling rate	10 sample/second for total channels (when eight channels are activated, average 1 sample/second per channel)
Span drift	±25 ppm

8 Analog Input Connections



Cable Routing



4G Cellular Description

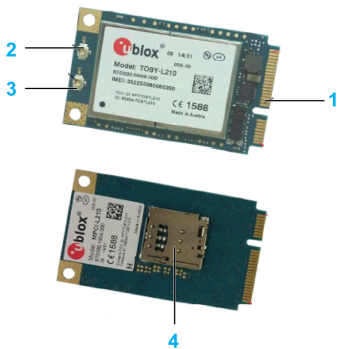
Introduction

The HMIYMIN4GEU1 and HMIYMIN4GUS1 are categorized as industrial communication modules.

The HMIYMIN4GEU1 is mini PCIe GPRS 4G for Europe and Asia frequencies. The kit including external antenna.

The HMIYMIN4GUS1 is mini PCIe GPRS 4G for North America frequencies. The kit including external antenna.

This figure shows the mini PCIe 4G cellular:



- 1 mini PCIe connector
- 2 RF main antenna connector (use this for connection to the Box PC IIoT)
- 3 RF diversity antenna connector
- 4 SIM holder

NOTE: You can use the SIM holder (micro SIM 3FF, 12 x 15 mm) slot on 4G module to get 4G access.

Description

The table shows technical data:

Features	Values
4G/LTE	Cat. 4 (150 Mbit/s downlink, 50 Mbit/s uplink)
	3GPP rel. 9
	Bands: 2, 4, 5, 7, 17 for North America
	Bands: 1, 3, 5, 7, 8 for Europe and Asia
	All channel bandwidths: 1.4...20 MHz
	MIMO 2 x 2
	Rx diversity