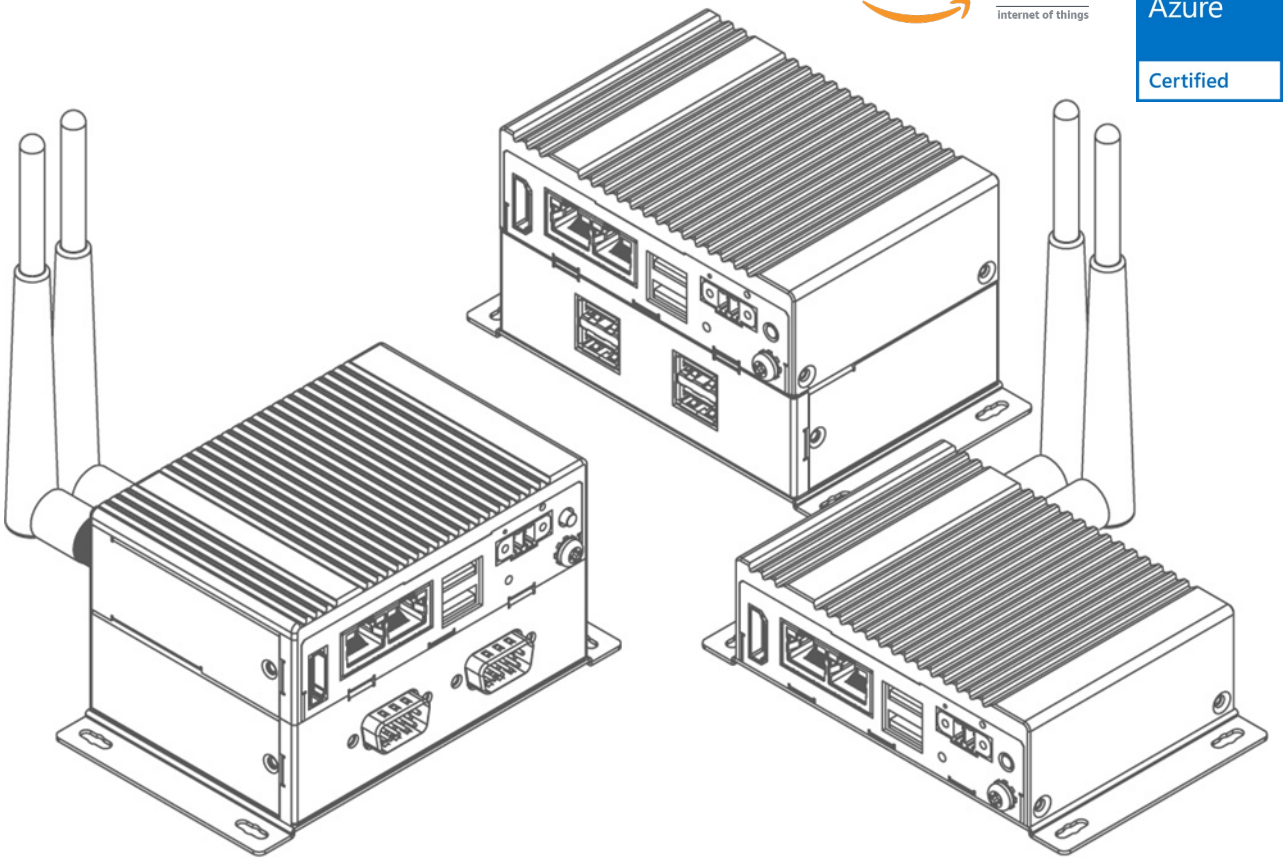
IoT Gateway

Intel® Elkhart Lake Celeron® N6211, 1.2 GHz Processor



EAC Mini EACIEK20

Quick Start Guide

Version 1.0
Document Part Number: 91521110111M

Please read these instructions carefully before using this product, and save this manual for future use.

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Preface

Copyright Notice

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Trademark Acknowledgement

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Disclaimer

We reserve the right to make changes, without notice, to any product, including circuits and/or software described or contained in this manual in order to improve design and/or performance. We assume no responsibility or liability for the use of the described product(s) conveys no license or title under any patent, copyright, or masks work rights to these products, and make no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified. Applications that are described in this manual are for illustration purposes only. We make no representation or guarantee that such application will be suitable for the specified use without further testing or modification.

Warranty

Our warranty guarantees that each of its products will be free from material and workmanship defects for a period of one year from the invoice date. If the customer discovers a defect, we will, at his/her option, repair or replace the defective product at no charge to the customer, provide it is returned during the warranty period of one year, with transportation charges prepaid. The returned product must be properly packaged in its original packaging to obtain warranty service. If the serial number and the product shipping data differ by over 30 days, the in-warranty service will be made according to the shipping date. In the serial numbers the third and fourth two digits give the year of manufacture, and the fifth digit means the month (e. g., with A for October, B for November and C for December).

For example, the serial number 1W17Axxxxxxxx means October of year 2017.

Customer Service

We provide a service guide for any problem by the following steps: First, visit the website of our distributor to find the update information about the product. Second, contact with your distributor, sales representative, or our customer service center for technical support if you need additional assistance.

You may need the following information ready before you call:

- Product serial number
- Software (OS, version, application software, etc.)
- Detailed description of the problem
- The exact wording of error messages

In addition, free technical support is available from our engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products.

Advisory Conventions

Four types of advisories are used throughout the user manual to provide helpful information or to alert you to the potential for hardware damage or personal injury. These are Notes, Important, Cautions, and Warnings. The following is an example of each type of advisory.

Note:
A note is used to emphasize helpful information

Important:
An important note indicates information that is important for you to know.

Caution
A Caution alert indicates potential damage to hardware and explains how to avoid the potential problem.

Warning!
An Electrical Shock Warning indicates the potential harm from electrical hazards and how to avoid the potential problem.

Alternating Current
The Protective Conductor Terminal (Earth Ground) symbol indicates the potential risk of serious electrical shock due to improper grounding.

Safety Information

Warning!
Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Warning!
During heavy loading in 50°C environment, the top side of the EAC Mini may be over 70°C. Please do not touch these parts with your bare hands.

Caution
Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

Safety Precautions

For your safety carefully read all the safety instructions before using the device. All cautions and warnings on the equipment should be noted. Keep this user manual for future reference.

Caution
Do not cover the openings!

Let service personnel to check the equipment in case any of the following problems appear:

- The power cord or plug is damaged.
- Liquid has penetrated into the equipment.
- The equipment has been exposed to moisture.
- The equipment does not work well or you cannot get it to work according to the user manual.
- The equipment has been dropped and damaged.
- The equipment has obvious signs of breakage.

- Do not leave this equipment in an uncontrolled environment where the storage temperature is below -20°C (-4°F) or above 60°C (140°F). It may damage the equipment.

Caution

Use the recommended mounting apparatus to avoid risk of injury.

Warning!

Only use the connection cords that come with the product. When in doubt, please contact the manufacturer.

Warning!

Always ground yourself against electrostatic damage to the device.

Important Information

Federal Communications Commission Radio Frequency Interface Statement

This device complies with part 15 FCC rules.

Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class "B" digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at him own expense.

European Union

This equipment is in conformity with the requirement of the following EU legislations and harmonized standards. Product also complies with the Council directions.

Electromagnetic Compatibility Directive (2014/30/EU)

- EN55035: 2017
  - IEC61000-4-2: 2008
  - IEC61000-4-3: 2006+A1:2007+A2:2010
  - IEC61000-4-4: 2012
  - IEC61000-4-5: 2014+A1:2017
  - IEC61000-4-6: 2013/COR1:2015
  - IEC61000-4-8: 2009
  - IEC61000-4-11: 2004+A1:2017
- EN 55032: 2015
- EN61000-3-2:2014
- EN61000-3-3:2013

Low Voltage Directive (2014/35/EU)

- EN 62368-1:2014

Chapter 1: Introduction

Congratulations on purchasing Winmate® EAC Mini EACIEK20 IoT Gateway.

The EAC Mini EACIEK20 is a compact industrial IoT Gateway with low power consuming Intel® Elkhart Lake processor. The EAC Mini provides great expansion including one M.2 2242 Key B slot for SSD or Wi-Fi / Bluetooth. Expansion module offers great options from additional USB ports to WWAN, CANBus, 16Channel Digital I/O, etc. Wireless connectivity and all necessary input and output ports allow the EAC Mini to send data from manufacturing facilities directly to cloud server.

Abundant I/O ports and expansion module with more than thirty different combinations make EAC Mini suitable for smart factory and machine automation applications.

1.1 Features

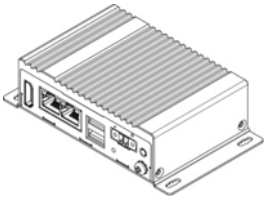
Winmate® EAC Mini IoT Gateway offers the following features:

- Intel® Celeron® N6211 (1.5M Cache, up to 3.0GHz)
- Intel® Celeron® N6210 (1.5M Cache, up to 2.6GHz) (Optional)
- Fanless cooling system
- Compact size 100 x 70 x 31 mm (w/o mounting bracket)
- Expansion module with 30+ combinations, including 4G/3G/Wi-Fi/ Bluetooth
- Various mounting options: desk, wall, VESA, din-rail
- Suitable for smart factory applications
- Microsoft Azure Certified for IoT
- AWS Iot Greengrass Certified
- Expansion Module
  30+ combinations, ex:
  - WWAN Expansion Board (Single SIM Slot)
  - 3-port RS232/422/485 w/ isolation
  - 16-Channel Digital I/O w/ isolation
  - 2-port CANBUS w/ isolation
  - 3 -port USB 2.0
  - 2-port RS232/422/485 w/ isolation
  - 2-port Giga-LAN
  - WWAN Expansion Board (Dual SIM Slot)

1.2 Package Contents

Carefully remove the box and unpack your device. Please check if all the items listed below are inside your package. If any of these items are missing or damaged contact us immediately.

Standard factory shipment list:

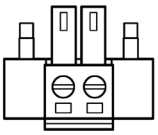


EAC Mini IoT Gateway

Varies by product specifications

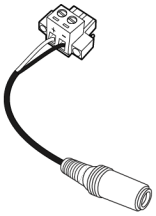
Quick Start Guide (Hardcopy)

P/N: 91521110111M



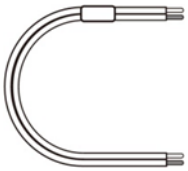
2 pin Terminal Block for Power

P/N: 604540605D02



Terminal Block 2 pin to 2.5Ø Female Adapter Cable

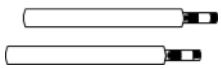
P/N: 94J602G020K2



Open Wire Cable

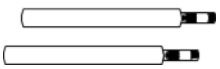
P/N: 94EL02X020E0

Your package may include optional accessories based on your order:



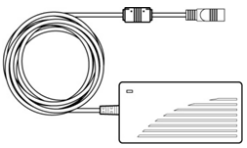
WLAN External Antenna

P/N: 397SM000000S



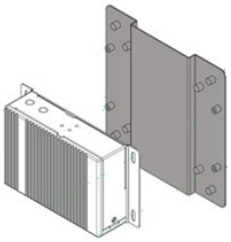
WWAN External Antenna

P/N: 397SM000000Q



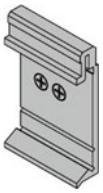
AC Adapter 12V/ 36W

P/N: 922D036W12V6



VESA Mounting Kit

P/N: 98K000A0009A



DIN Rail Mounting Kit

P/N: 98K000A00099

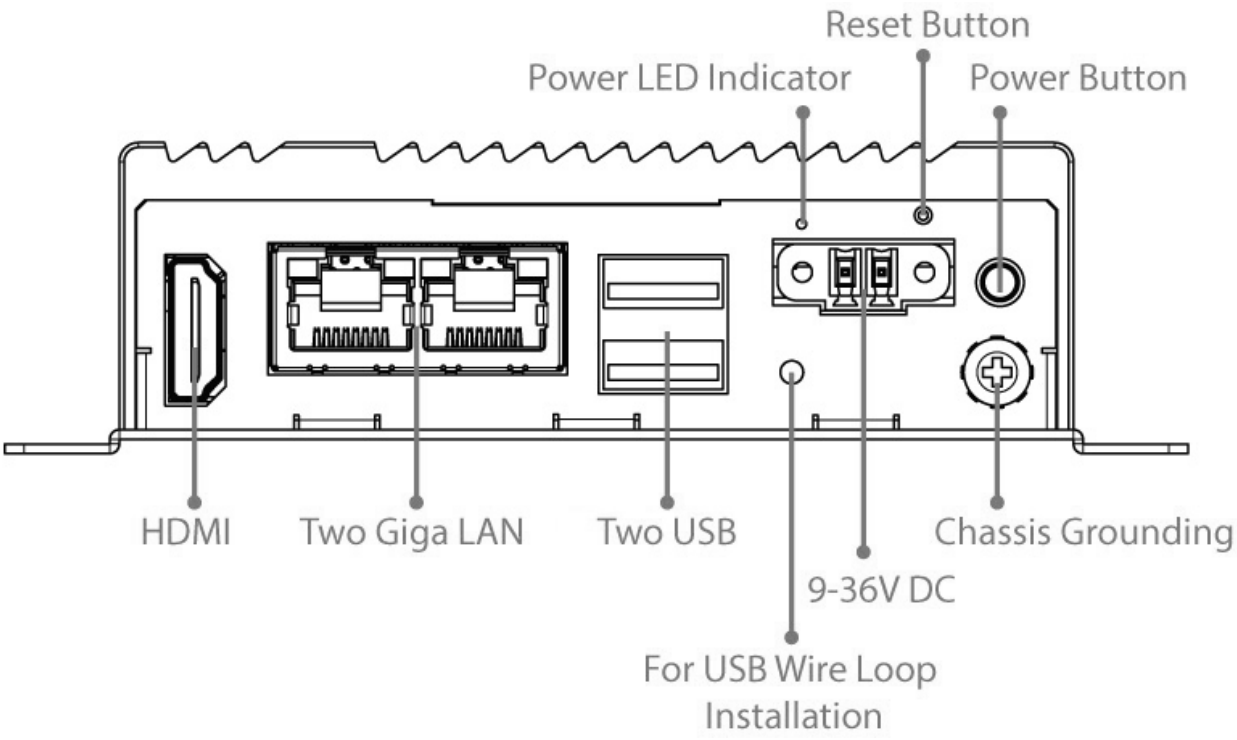
1.3 Hardware Specifications

		Model Name
		EACIEK20
System Specification	CPU	Intel® Celeron® N6211 (1.5M Cache, up to 3.0GHz) Intel® Celeron® N6210 (1.5M Cache, up to 2.6GHz) (Optional)
	Graphics Engine	Intel® UHD Graphics
	BIOS	Insyde UEFI
	Watchdog Timer	Programmable 256 levels, timer interval 1 to 255 sec.
	Memory	1 x 3200MT/s 4GB LPDDR4 1 x 3200MT/s 8GB LPDDR4 (Optional)
Storage	eMMC	eMMC: Onboard 32 GB eMMC: Onboard 64 GB (Optional) eMMC: Onboard 128 GB (Optional)
	M.2 SATA	M.2 SSD 128GB (Optional) M.2 SSD 256GB (Optional) M.2 SSD 512GB (Optional)
Expansion	M.2	1 x M.2 2242 Key B slot for SSD or WiFi
	USB Wafer	2 x USB Wafer
External I/O	USB	2 x USB3.2 Gen2x1 (TypeA)
	Ethernet	2 x Giga LAN RJ45 Connector
	HDMI	1 x HDMI 2.0
Power Management	Power Supply	9V to 36V DC, 2-Pin Terminal Block
	Grounding Protection	Chassis Grounding
Buttons and LED Indicators	LED Indicator	1 x Power
	Button	1 x Power Button 1 x Reset Button
Mechanical Specification	Dimensions	100 (W) x 70 (H) x 31(D) mm (One layer) 100 (W) x 70 (H) x 61(D) mm (Double layer)
	Weight	0.6 kg (One layer), 0.7 kg (double layer)
	Mounting	Desk Mounting (Default) Wall Mounting (Default) VESA Mounting (Optional) DIN-Rail Mounting (Optional)
	Cooling	Fanless
	Enclosure	Metal
Environment	Operating Temp.	0~55° C
	Storage Temp.	-15~70° C
	Operating Humidity	10~90% RH
	Shock	Operating, IEC 60068-2-27

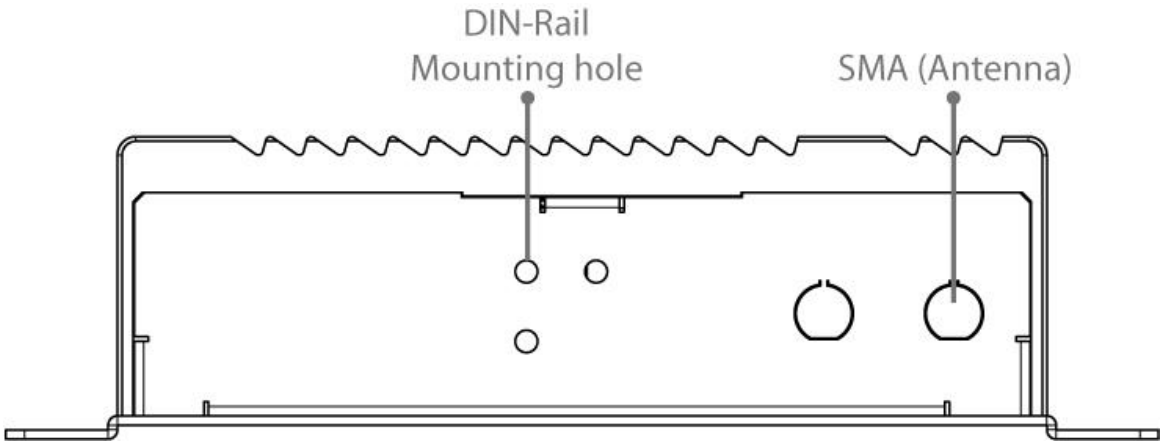
	Vibration	Operating, IEC 60068-2-64
	IP Rating	IP30
Operating System	OS	Windows 11 IoT Enterprise (64 bit) (Optional) Windows 10 IoT Enterprise (64 bit) Optional) Linux Ubuntu 22.04 (Optional)
Certificate	EMC & Safety	CE, FCC
	IoT	Microsoft Azure Certified for IoT AWS Iot Greengrass Certified

1.4 Description of Parts

Front Side



Rear Side



1.5 LED Indicators

The EAC Mini IoT Gateway provides one HDD and one Power LED indicators located on the front for status monitoring.

LED Type	Status	Description
Power	On	Power is on
	Off	Power is off

Chapter 2: Mounting

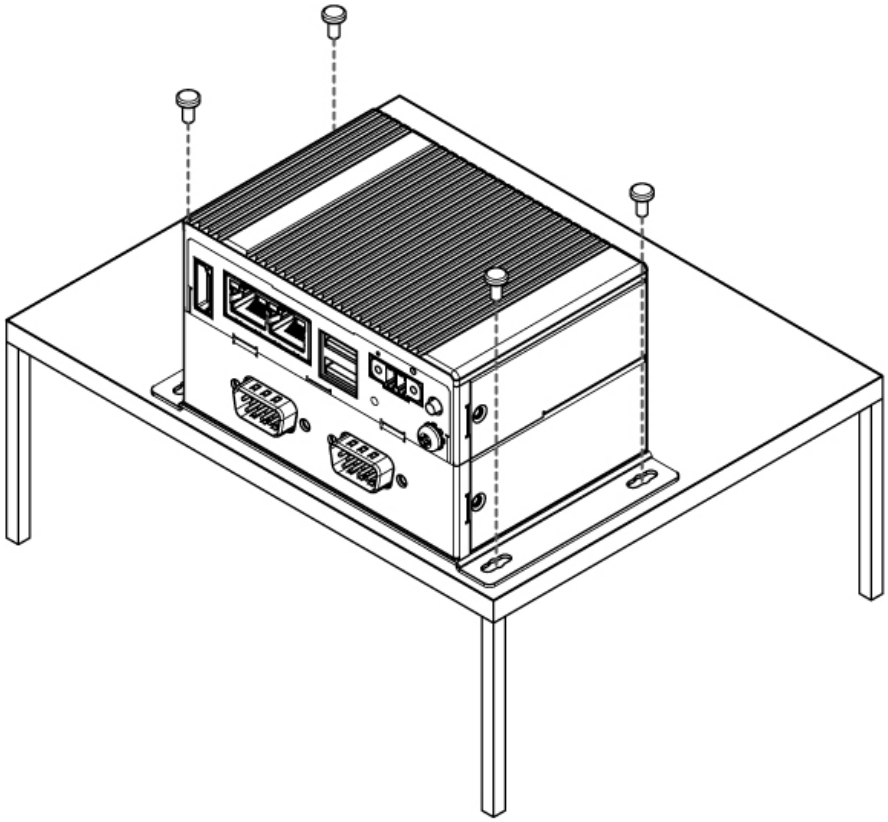
The EAC Mini supports five types of mounting: wall and desk mounting by default, and optional VESA, DIN-rail, Pole mounting solutions. You can purchase mounting kit from Winmate as an optional accessory.

2.1 Wall/ Desk Mount

L-shape mounting brackets for wall/ desk mounting are supplied with the EAC Mini. Before mounting the unit to the wall, attach L-shape mounting brackets to the EAC Mini (supplied by Winmate).

Mounting Instruction:

❶ Place the EAC Mini on the fixture (ex. table) and fasten four M3 screws to secure the unit to the fixture.



2.2 DIN-Rail Mount

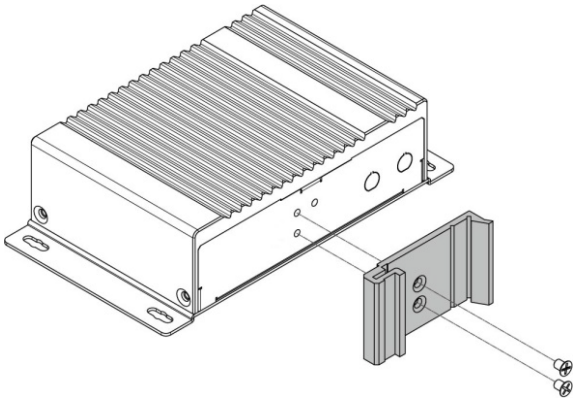
You can purchase DIN-Rail mounting kit from Winmate as an optional accessory.

DIN-Rail Mounting Kit
Part Number: 821118551400

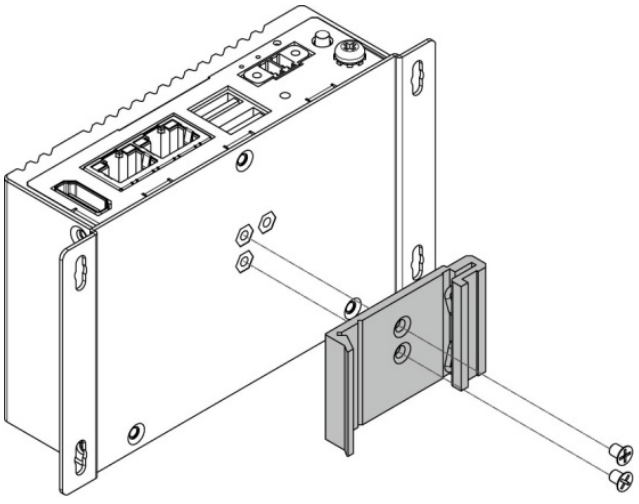
Mounting Instruction:

❶ Fasten screws to secure DIN-rail mounting bracket to the EAC Mini.

Rear Side

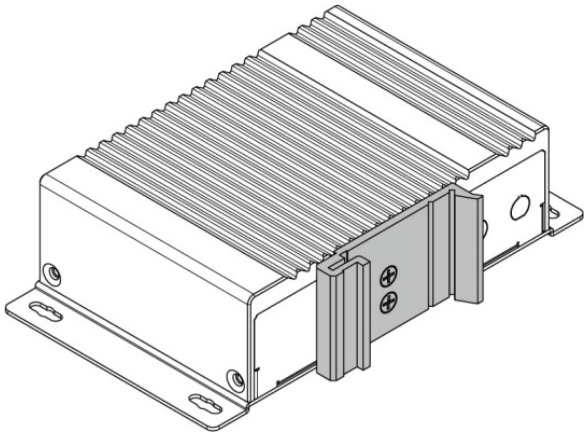


Bottom Side

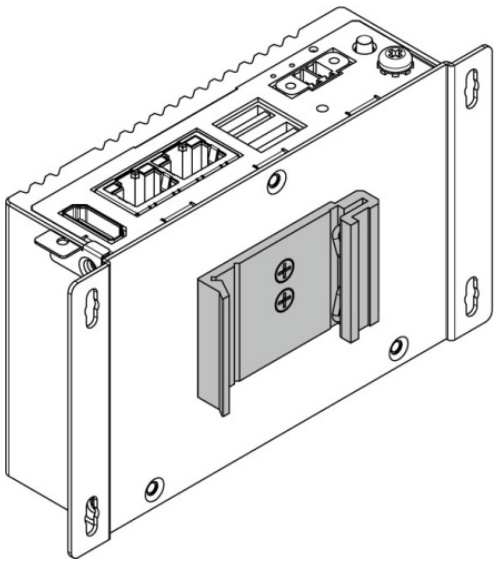


❷ Place the EAC Mini with the DIN-Rail bracket on the DIN-Rail.

Rear Side



Bottom Side



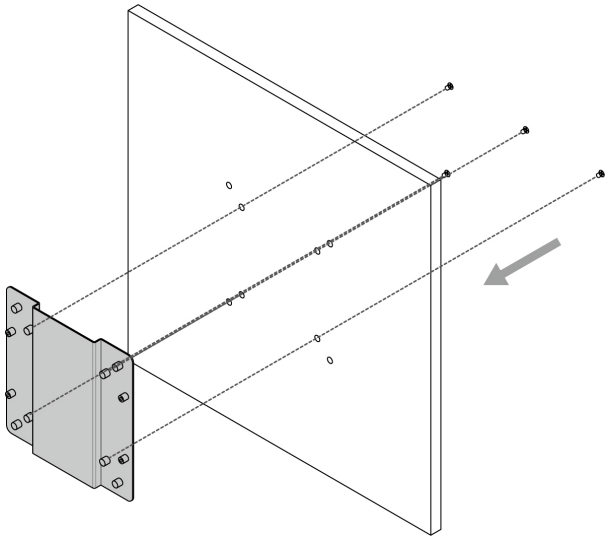
2.3 VESA Mount

You can purchase VESA mounting kit from Winmate as an optional accessory.

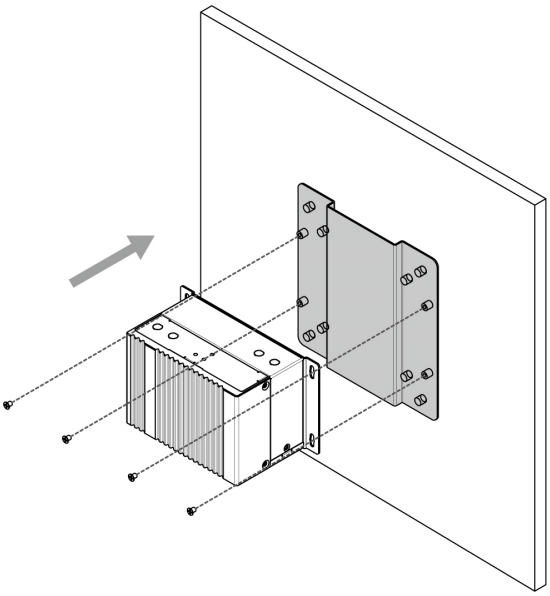
VESA Mounting Kit
Part Number: 821118561001

Mounting Instruction:

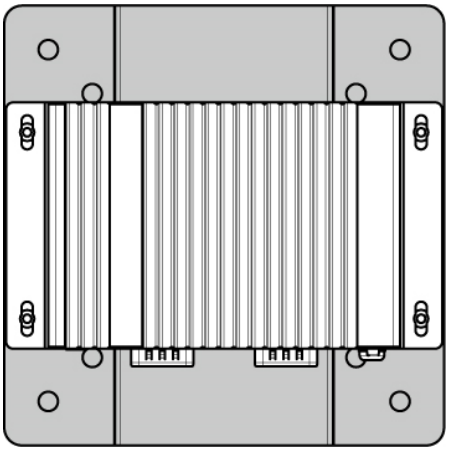
❶ Mark the location of the screw holes on the fixture (ex. wall). Align the VESA mounting bracket with the screw location and screw VESA plate from the rear side of the fixture.



❷ Place the EAC Mini on the VESA mounting bracket and fasten screws to secure and the EAC Mini to the VESA plate.



❸ You have completed VESA mounting installation. Connect other peripherals if needed.



Chapter 3: Hardware Installation

This section explains how to install hardware on the EAC Mini EACIEK20.

Caution
Always remove the power cord before installing the hardware.

3.1 M.2 2242 Key B SSD Installation

To insert M.2 2242 Key B SSD:

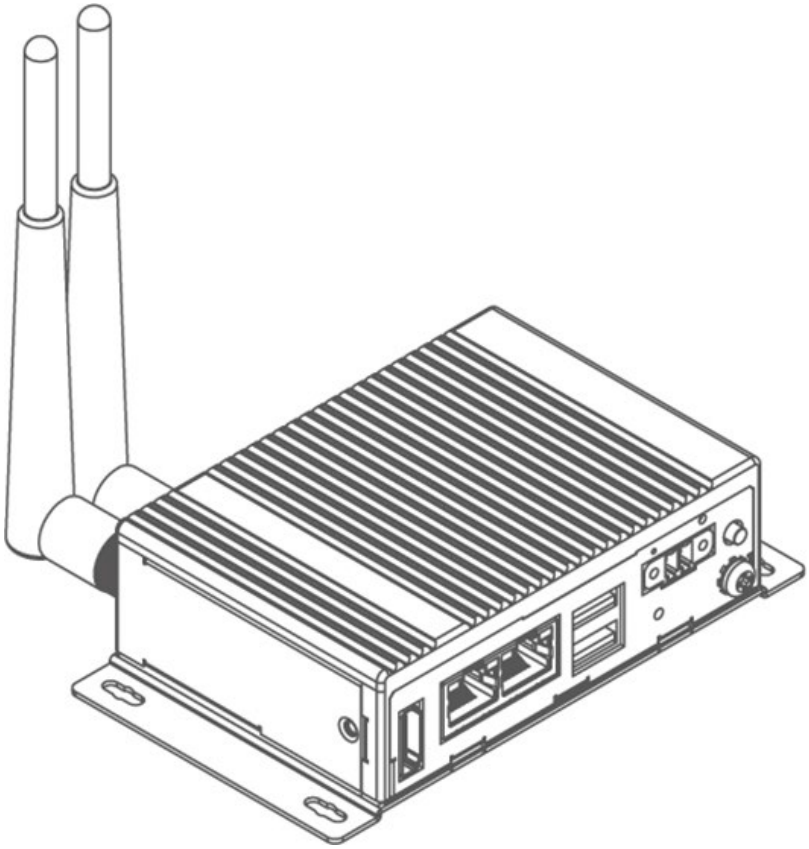
1. Unscrew the three screws on the bottom cover.
2. Plug in M.2 SSD card with into the M.2 slot.
3. Screw one screw on board to fix M.2 SSD.
4. Screw back the bottom cover.

3.2 External Antenna Installation

Notice that external antenna is an optional feature of the EAC Mini EACIEK20.

To install external SMA antenna:

1. Remove the rubber cap on the SMA connector before installing the antenna.
2. Align the antenna with the SMA connector located on the rear side of the EAC Mini and fasten it as shown on the picture.
3. Adjust the position of external antenna for better signal.

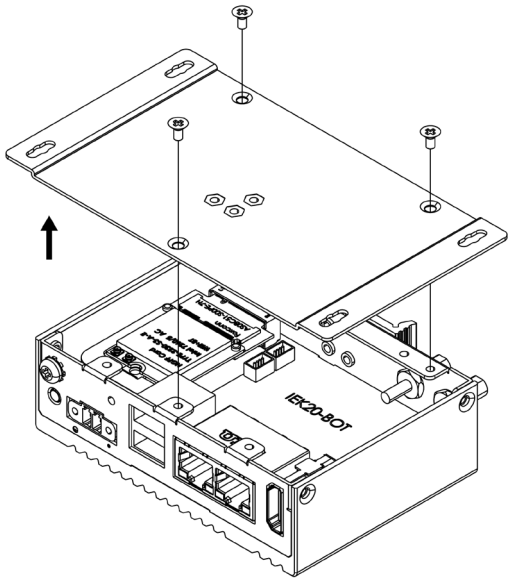


3.3 Expansion Module Installation

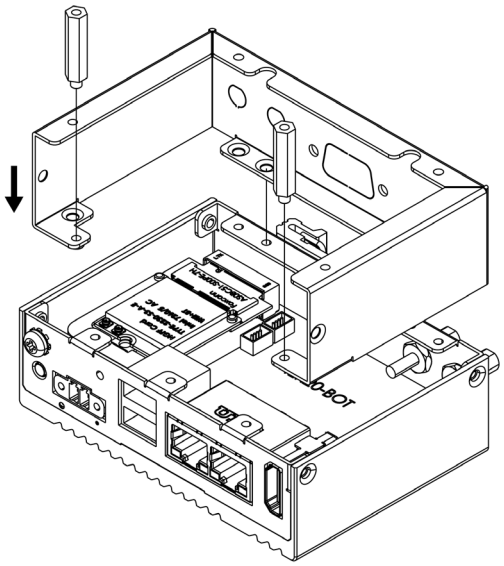
Notice that expansion module is an optional feature of the EAC Mini EACIEK20.

To install expansion module:

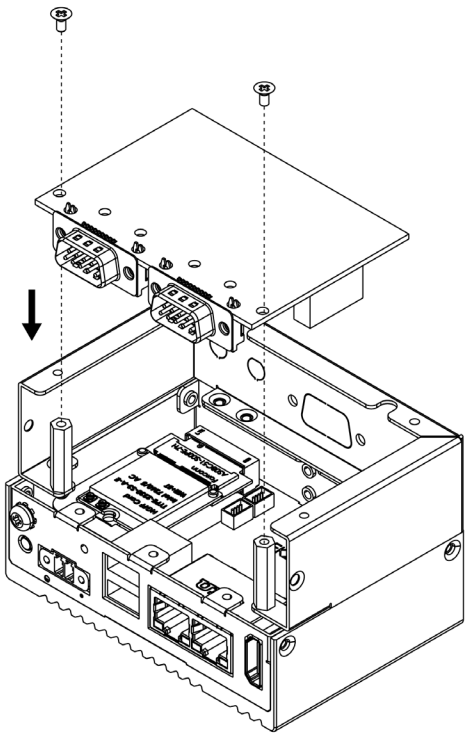
❶ Unscrew the three screws, and remove the bottom cover.



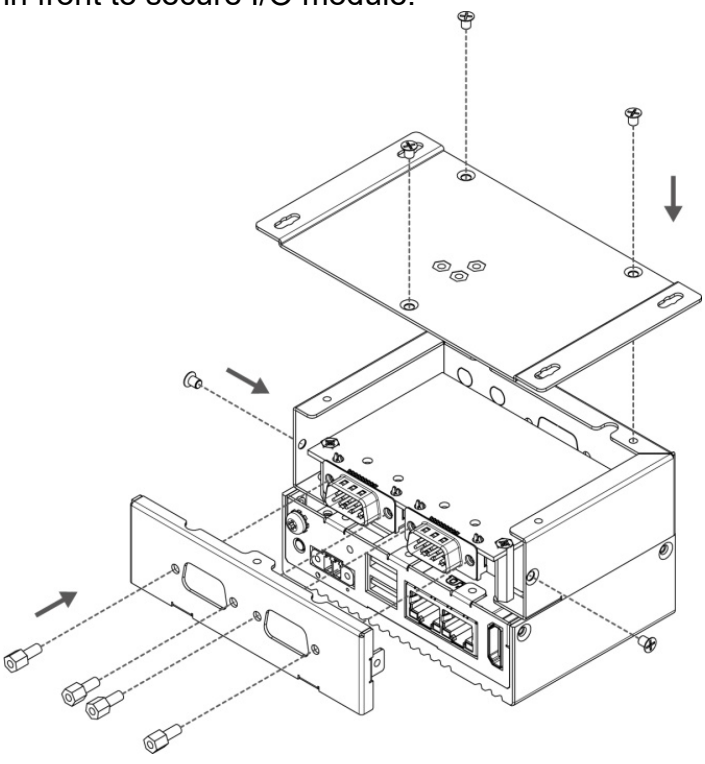
❷ Attach the 2nd layer module bracket and install four copper pillars



❸ Attach the 2nd layer I/O module, and fasten four screws.

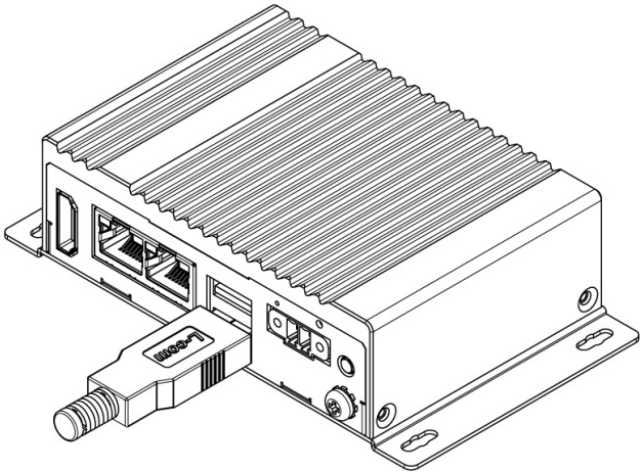


❹ Fasten three screws to screw back the bottom cover; fasten two screws on the side of the module bracket; fasten copper pillars/ screws in front to secure I/O module.

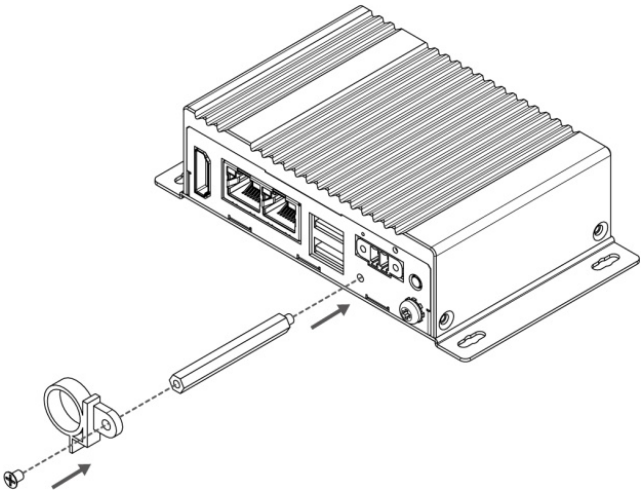


3.4 USB Wire Loop Installation

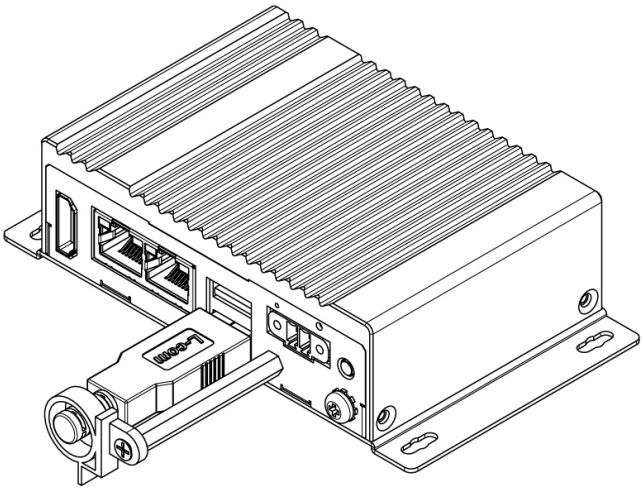
❶ Insert USB to the USB slot.



❷ Install copper pillar, USB wire loop, and fasten one screw to secure the USB to the EAC Mini EACIEK20.



❸ You have finished the USB Wire Loop installation.



3.5 Connecting the Power

The DC power supply connector of the EAC Mini IoT Gateway is on the front panel. The DC power input for the EAC Mini allows a voltage input range from 9 V DC to 36 V DC.

Warning!

Ensure voltage and polarity is compliant with the DC input. Improper input voltage or polarity can cause system damage.

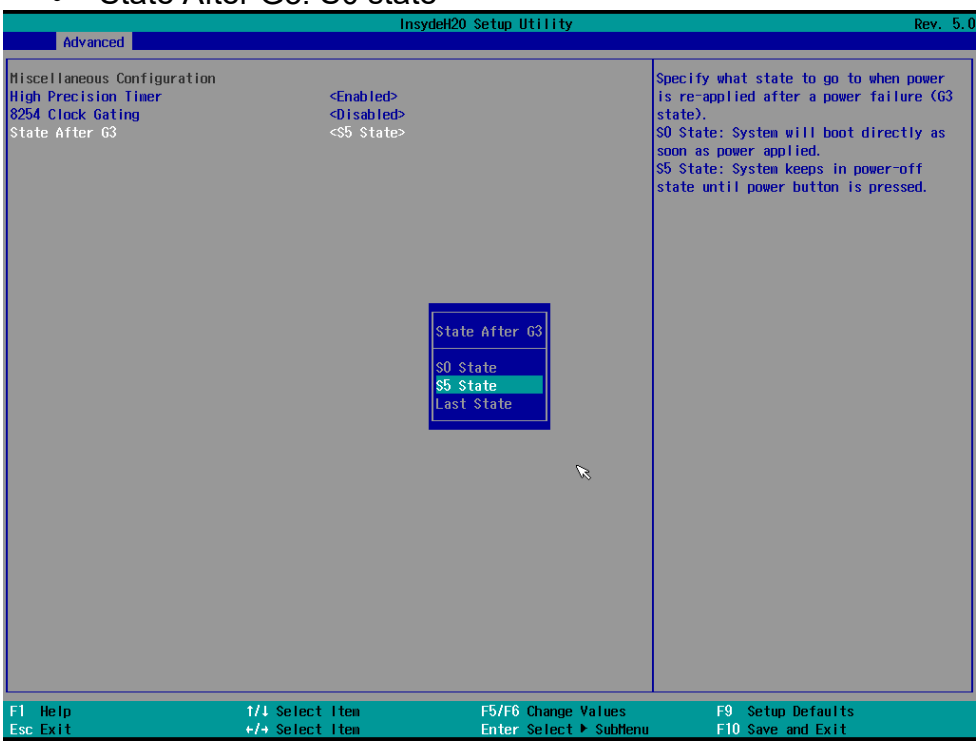
3.5.1 Connecting the Power

Connect EAC Mini to 9-36V DC. The power source can either be from a power adapter or an in-house power source.

Note:

If EAC Mini will start to open and go into Windows when you plug the power, you can follow the BIOS setting.

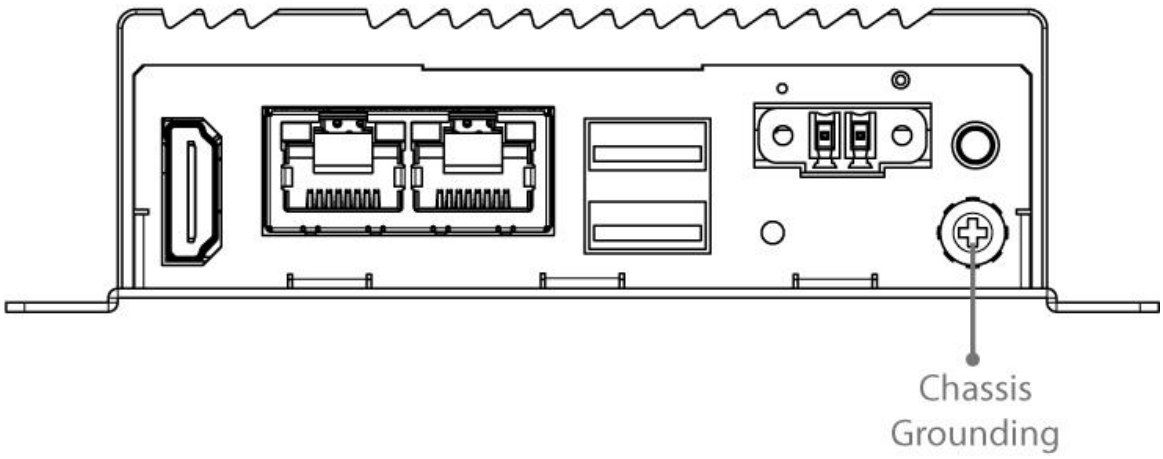
- State After G3: S0 state



To learn more about BIOS setting, please follow Chapter 4 of the IoT Gateway EACIEK20 User Manual.

3.5.2 Chassis Grounding

EAC Mini provides EMI protection and a stable grounding base. Use chassis grounding point located on the front.



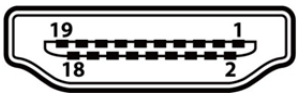
3.6 External Connectors

The following sections give you information about EAC Mini EACIEK20standard connectors and pin assignments.

3.6.1 HDMI Connector

Plug HDMI signal cable to the HDMI connector of the EAC Mini EACIEK20, and plug the other end to the monitor.

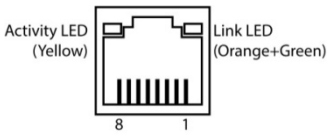
Pin Assignment and signal names for HDMI connector



Pin No.	Signal Name	Pin No.	Signal Name
1	HDMI_RX2+	2	GND
3	HDMI_RX2-	4	HDMI_RX1+
5	GND	6	HDMI_RX1-
7	HDMI_RX0+	8	GND
9	HDMI_RX0-	10	HDMI_RXC+
11	GND	12	HDMI_RXC-
13	HDMI_CON_CEC	14	NC
15	HDMI_CON_SCL	16	HDMI_CON_SDA
17	HDMI_CON_CABLE	18	+5V_HDMI
19	HDMI_CON_HP		

3.6.2 Ethernet Connector

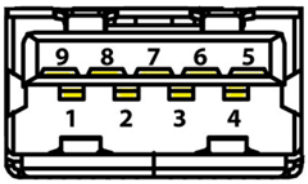
The EAC Mini EACIEK20 has two Ethernet connectors located on the front. Ethernet ports provide a standard RJ45 connector with LED indicators on the front side to show its Active/ Link status and Speed status.



Pin No.	Signal Name	Pin No.	Signal Name
1	TX1+	2	TX1-
3	TX2+	4	TX3+
5	TX3-	6	TX2-
7	TX4+	8	TX4-

3.6.3 USB Connector

The EAC Mini EACIEK20 provides two USB3.2 Gen2x1 Type-A connectors. Use USB3.2 Gen2x1 Type-A connector to connect external devices such as mouse or keyboard to the box computer.



Pin No.	Signal Name	Pin No.	Signal Name
1	+5V	2	USB_D-
3	USB_D+	4	GND
5	STDA_SSRX-	6	STDA_SSRX+
7	GND	8	STDA_SSTX-
9	STDA_SSTX+		

3.6.4 Power Connector

DC power source input is a 2 pin terminal block connector. Power Input is 9V to 36V DC in.

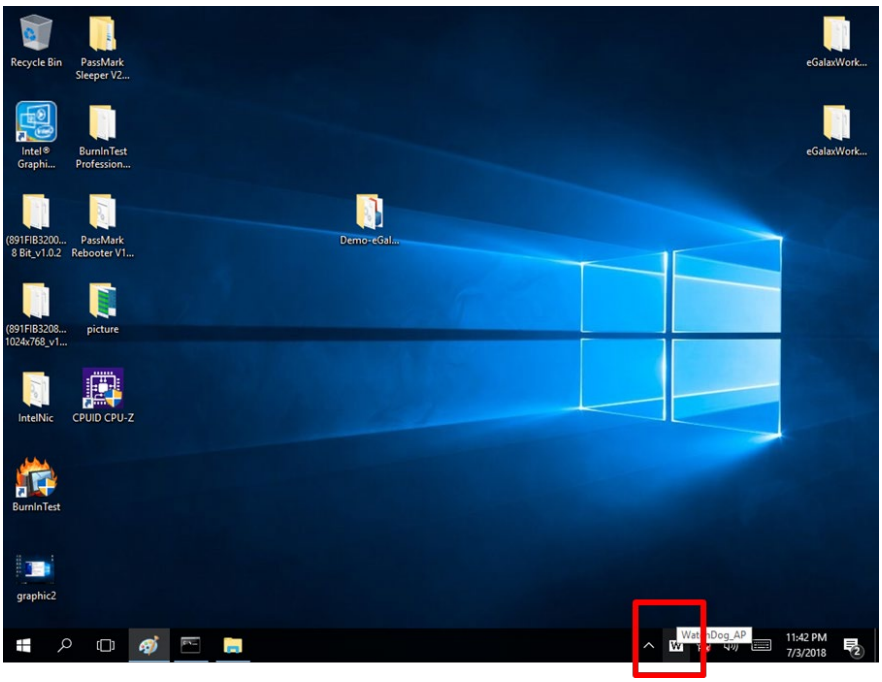
Chapter 4: Getting Started

4.1 How to Enable Watchdog

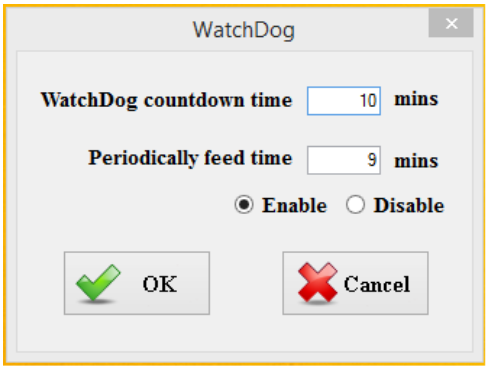
To enable Watchdog, you need to download Winmate Watchdog utility. Find more information on Watchdog in “Watchdog Guide” that you can download from Winmate Download Center.

To enable watchdog in Watchdog AP follow the instructions below:

1. On the right bottom side of the desktop screen, click **triangle button** to show hidden icons.
2. Click icon to open Watchdog utility.



3. In Watchdog utility window set countdown time and periodically feed time, or disable watchdog.



Example:

Every 10 min watchdog will monitor the system, in case any error occurs the system will restart automatically when the countdown time reaches 0.

Every 9 min watchdog timer will be reset to 10 min.

Setting	Description
Watchdog Countdown Time	The system automaticity restarts when this countdown time reaches zero. *Default: 10 min*
Periodically Feed Time	To set a cycle time to automatically reset watchdog timer. *Default: 9 min*
Enable / Disable	Enable or disable watchdog. *Default: Enable*

4.2 Using Recovery Wizard to Restore Computer

Note:
Before starting the recovery process, make sure to backup all user data. The data will be lost after the recovery process.

Important:
Before starting the recovery process, remove the PCI/ PCIe card and CFast card.

To enable quick one-key recovery procedure:

1. Connect the computer to the power source. Make sure the computer stays plugged in to power source during the recovery process.
2. Turn on the computer, and when the boot screen shows up, press **Tab+ F6** to initiate the Recovery Wizard.
3. The following screen shows the Recovery Wizard. Click **Recovery** button to continue.

4. A warning message about data loss will show up. Make sure the data is backed up before recovery, and click **Yes** to continue.

5. Wait the recovery process to complete. During the recovery process, a command prompt will show up to indicate the percent of recovery process complete. After complete the recovery process, please restart your computer manually.

Appendix

Appendix A: Order Information

EAC Mini EACIEK20 IoT Gateway available in the following configurations:

Model Name	Configuration
EACIEK20-100-A432	Intel N6211, 4G RAM, 32GB eMMC, 2 x USB3.2 Gen2x1, 2 x LAN, 1 x HDMI
EACIEK20-101-A432	Intel N6211, 4G RAM, 32GB eMMC, 2 x USB3.2 Gen2x1, 2 x LAN, 1 x HDMI, Wi-Fi (Client)
EACIEK20-102-A432	Intel N6211, 4G RAM, 32GB eMMC, 2 x USB3.2 Gen2x1, 2 x LAN, 1 x HDMI, 4G (With microSD card and micro SIM-card slot)
EACIEK20-119-A432	Intel N6211, 4G RAM, 32GB eMMC, 2 x USB3.2 Gen2x1, 2 x LAN, 1 x HDMI, M.2 SSD expansion

Additional order options:

Item	Specifications
AC Adapter	AC Adapter 12V/36W (P/N 9220123C6000)
Mounting	VESA Mounting Kit (P/N 821118561001) DIN-Rail Mounting Kit (P/N 821118551400)
External Antenna	WLAN External Antenna (P/N 397SM000000S) WWAN External Antenna (P/N 397SM000000Q)
Expansion Module	EACWSLT-222: 4G EACWSLT-231: 3-port RS232/422/485 w/ isolation EACWSLT-232 : 16-Channel Digital I/O w/ isolation EACWSLT-233 : 2-port CANBUS w/ isolation EACWLST-234 : 3-port USB 2.0 EACWLST-235 : 2-port RS232/422/485 w/ isolation EACWLST-236: 2-port Giga LAN EACWLST-237: 4G with Dual SIM

Appendix B: Software Developer Support

You can download drivers and Software Development Kit (SDK) and Drivers from Winmate Download Center.

Winmate Download Center

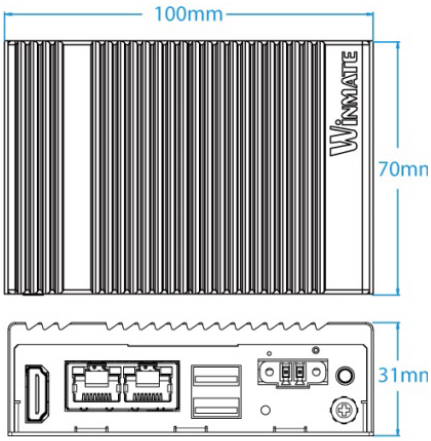
http://www.winmate.com/>Support > Download Center > IoT Gateway > EAC Mini EACIEK20

Appendix C: Mechanical Dimensions

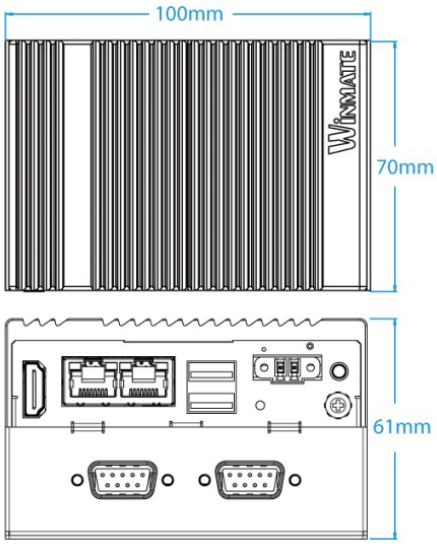
All dimensions are shown in mm (millimeters).

Unit without mounting bracket

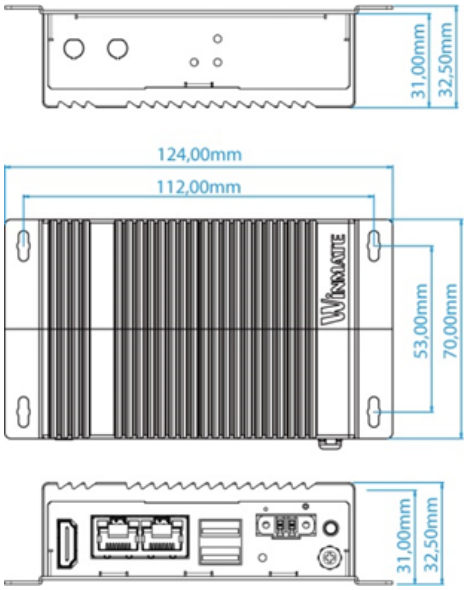
Standard



With Expansion Module



Unit with mounting bracket



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