



NP-6113 Series user manual

1.0

2023-12-6



Automation PC

Distribution list:

Name/ Group	Company
EA	NODKA

Reviews/Approvals:

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Author:	EA	
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These limits are designed to provide reasonable protection against harmful interference when operating the system in a commercial environment. This equipment generates, uses and can radiate radio frequency energy. If not installed and used correctly in accordance with the manual instructions, it may cause harmful interference to radio communications. However, even if it is installed and used according to the manual instructions, there is no guarantee that interference will not occur. If this equipment does cause harmful interference to radio or television reception, the user can check by turning the equipment off and on. When this equipment causes harmful interference, the user can take the following measures to solve the interference problem:

- 1 Adjust the direction or position of the receiving antenna;
- 2 Increase the distance between the device and the receiver;
- 3 Plug the power connector of this device into a power outlet that uses a different circuit than the receiver;
- 4 If you need technical support, please consult the dealer or experienced radio technicians;

Technical support and service

1. For the latest information and documentation about this product, please visit Nodka's official website www.nodka.com.
2. If users need technical support, please contact the local distributor or sales representative customer service center. Before conducting technical consultation, users must collect the following product information completely:
 - Product name and serial number;
 - description of additional peripheral equipment;
 - Description of user software (operating system, version, application software, etc.);
 - A complete description of the problem with the product;
 - The complete content of each error message;

Safety instructions

1. Before installing, wiring, operating, and inspecting this product, you should carefully read this manual and the related manuals introduced in this manual, and operate it correctly with full attention to safety.
2. Please keep this user manual properly for future reference.
3. Before cleaning the device with a damp cloth, unplug the power cord from the outlet. Please do not use liquids or detergent sprays to clean the device.

4. For equipment that uses a power cord, there must be an easily accessible power outlet near the equipment.
5. Please ensure that the device is placed on a reliable flat surface before installation. Accidental dropping may cause damage to the device.
6. Before you connect the device to the power socket, please confirm whether the voltage of the power socket meets the requirements.
7. Please arrange the power cord in a location where people are not likely to trip over it, and do not cover the power cord with any debris.
8. Heed all warning and caution labels on the equipment.
9. If the device will not be used for a long time, please disconnect it from the power socket to prevent the device from being damaged by excessive voltage fluctuations.
10. Please do not let any liquid flow into the device to avoid fire or short circuit.
11. Please do not open the device yourself. To ensure your safety, before opening the device, all external power supplies used by the system must be disconnected and the device must be opened by a certified professional engineer with sufficient electrical knowledge.

If you encounter the following situations, please have it repaired by professionals:

 - The power cord or plug is damaged;
 - There is liquid flowing into the device;
 - The device does not work properly, or you cannot make it work properly through the user manual;
 - The device is dropped or damaged;
 - The equipment has obvious appearance damage;
12. Please do not store the device in an environment that exceeds our recommended temperature range, that is, no lower than -30°C or higher than 80°C, otherwise the device may be damaged.

History:

Version	Date	Author	Description
1.0.0	2023-12-6	EA	First release.

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1 Introduction

This chapter provides necessary information of the product such as the features and manuals before actual use.

1.1 Related Manuals

The manuals related to the product are listed below, please read them as necessary along with this document before actual use.

Name	Purpose	Contents	How to get
User manual	Must read when operating the product.	Describes the hardware features and settings	Download from Nodka website.
SDK user manual	Must read when developing the IO functions	Describes the API functions and usage	Download from Nodka website.

1.2 Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these symbols to operate the equipment safely.

Symbol	Description
	WARNING WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	DANGER DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	NOTE NOTE provide the reader with additional information or refer to detailed sources of information.

1.3 Production Description

NP-6113 and its derivatives are a low-power fanless book type industrial computer in the Automation PC family. They are the COMLAC modular design which consists of CPU module, carrier board and add-on board, the add-on board is also very flexible to be customized to fit the special requirement.

- The independent CPU module is convenient for replacement and upgrade according to particular requirement, as well as cost down control.
- Customised functional add-on board according to your particular requirement.

NP-6113 series are widely used in the field of 3C manufacturing, pharmaceuticals, packaging, mechanical inspection equipment, robotics, motion control, intelligent transportation and so on.

2 Product Introduction

This chapter describes product component and their functions, pin assignment of each connector in detail.

2.1 NP-6113

The NP-6113 is a basic model which support Intel® Celeron® J6412 processors, one Gigabit LAN onboard, two PoE LAN ports, two DB9 serial ports, four USB ports, and are widely used in vision control, robot control, motion control, intelligent gateway and other automation control fields.

2.1.1 Features

- ◆ 1 x RTL8111H GbE LAN controller
- ◆ 2 x Intel GbE PoE LAN controller, Max 15W per channel
- ◆ 2 x USB3.0, 2 x USB2.0, 1x USB 2.0 Type-A onboard for dongle
- ◆ 1 x RS232/485, RS485 supports automatic data flow control; 1 x RS232
- ◆ 2 x miniPCle slot can be used to extended Wifi, 3G/4G modules
- ◆ Support Wall-mounted or DIN-Rail mounted
- ◆ -20 ~ 60°C wide temperature environment

2.1.2 Product Dimensions

Unit: mm

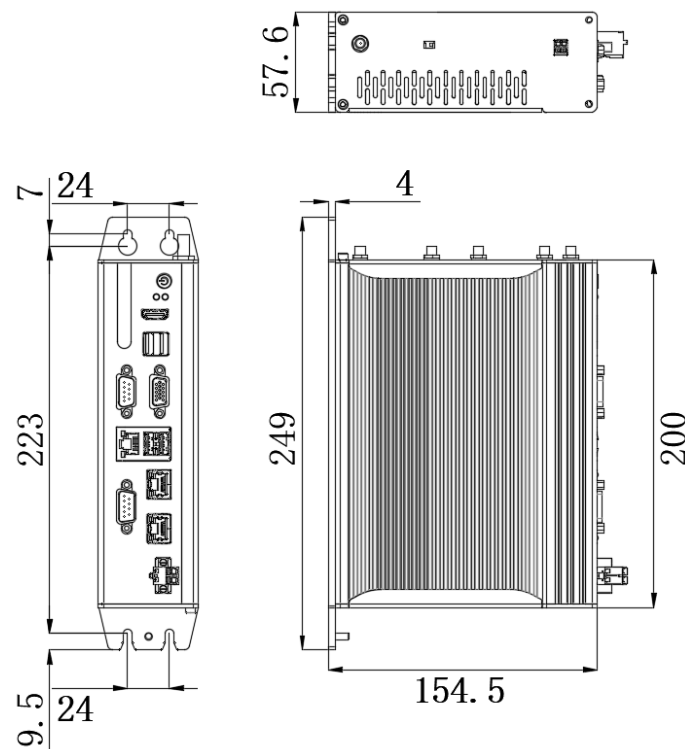


Figure 1 Dimension of NP-6113

2.1.3 Product Specifications

Model Name		NP-6113-J6412
System	CPU	Intel® Celeron J6412, 2.0~2.6GHz, 4 cores/4 threads, 1.5MB L2 cache
	TDP	10W
	BIOS	AMI UEFI 64Mbit
	Memory	1 x SO-DIMM DDR4-2400MHz (max. 32GB)
	Storage	1 x mSATA bay
	USB	2 x USB3.0, 2 x USB2.0
		1 x USB2.0 Type A on the board for USB dongle
	COM	1 x RS232/485, selectable to support RS232 or RS485 mode by the switch, 1 x RS232
	Ethernet	2 x Intel GbE PoE LAN controller (LAN1、LAN2)
		1 x RTL8111H GbE LAN controller (LAN3)
	VGA	Support up to 1920 x 1080 @60Hz
	HDMI	Support up to 3840 x 2160 @60Hz
	Expansions	2 x Full-size miniPCle slots, but only one with SIM card slot
	Watch Dog	1~255 levels programmable
OS Support	Remote switch	1 x Remote switch
	Microsoft Windows	Windows 10
Power	Linux	Ubuntu, CentOS, Debian
	Voltage Input	DC12~24V ±10%, overcurrent, overvoltage and polarity inverse protection
Chassis	Power Consumption	Max. 90W
	Structure	Aluminum-magnesium alloy box, Fanless, Wall-mounted or DIN-Rail mounted
	Dimensions	(L)200mm x (W)154.5mm x (H)57.6mm
Environment	Net Weight	1.9Kg
	Work Temperature	-20°C ~ 60°C (-4°F~140°F) with air flow (SSD)
	Storage Temperature	-40°C ~ 80°C (-40°F ~ 176°F) with air flow (SSD)
	Relative Humidity	5~95% (Non-condensing)
	Operating Vibration	5~500Hz, 1.5Grms@with SSD, Follow IEC60068-2-64
	Operating Shock	20G peak acceleration(11ms duration) with SSD, Follow IEC60068-2-27
EMC		CE/FCC Class A

2.1.4 Description of Interfaces

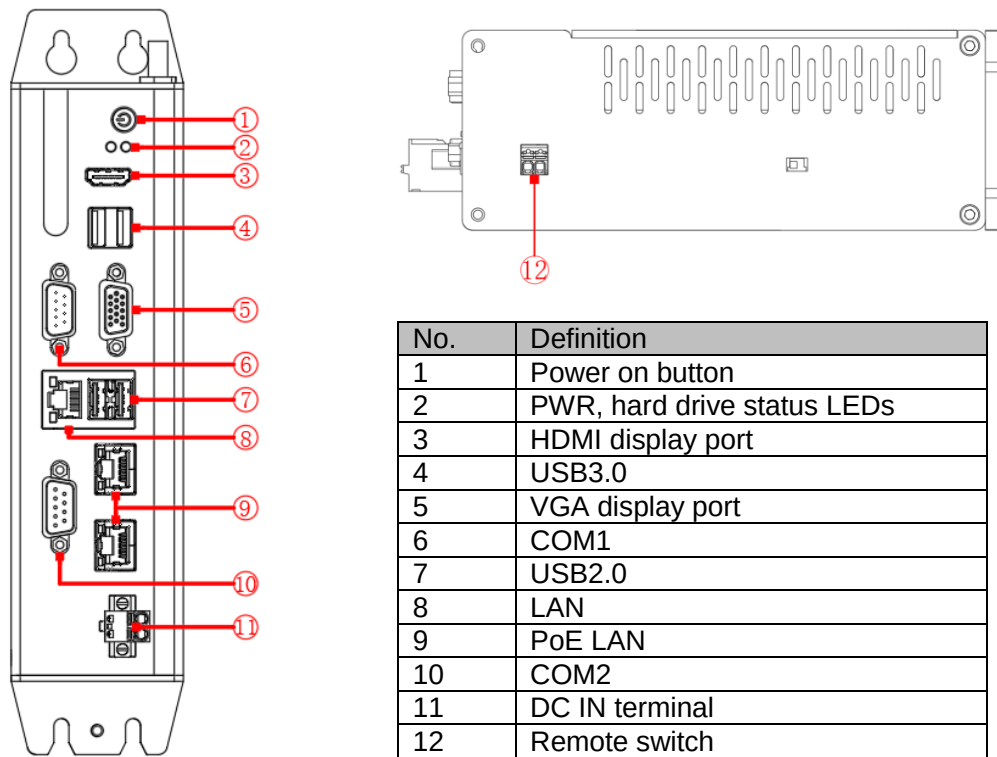


Figure 2 Interfaces of NP-6113

2.1.4.1 Power button

The product provides a power button with power led on the front, which can be used to turn on or turn off the PC in the case of power supply is connected.

2.1.4.2 Status Leds

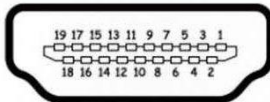
The product provides two status leds on the front to indicate the status of the power and the storage disk operation.

LED	Status	Description
Power Led	off	The product is power off
	on(Green)	The product is power on
Disk Led	blink(Yellow)	The disk is reading or writing

2.1.4.3 Display ports

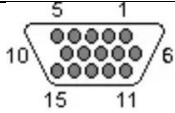
NP-6113 supports both VGA and HDMI display ports.

■ Pin definition of HDMI connector:

HDMI TYPE-A Connector			
			
Pin No.	Signals	Pin No.	Signals
1	TMDS DATA 2+	11	TMDS CLOCK SHIELD
2	TMDS DATA 2 SHIELD	12	TMDS CLOCK-
3	TMDS DATA 2-	13	N.C.
4	TMDS DATA 1+	14	GND

5	TMDS DATA 1 SHIELD	15	DDC CLOCK
6	TMDS DATA 1-	16	DDC DATA
7	TMDS DATA 0+	17	GND
8	TMDS DATA 0 SHIELD	18	+5V PWR
9	TMDS DATA 0-	19	HOT PLUG DETECT
10	TMDS CLOCK+		

■ Pin definition of VGA connector:

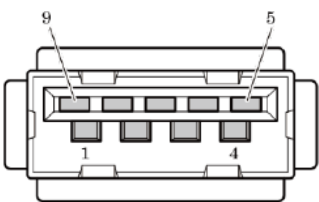
DB-15 Connector			
Pin No.	Signal	Pin No.	Signal
1	RED	2	GREEN
3	BLUE	4	N.C.
5	GND	6	RGND
7	GGND	8	BGND
9	+5V	10	GND
11	N.C.	12	SDA
13	H SYNC	14	V SYNC
15	SCL		

2.1.4.4 USB

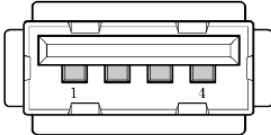
The product provides four USB TYPE-A ports on the front, two USB3.0 ports and two USB2.0 ports. One USB TYPE-A port on the board can be used to install USB dongle.

2.1.4.4.1 USB on the front

■ Pin definition of USB3.0 port:

	Pin No.	Signals
	1	VCC5
	2	DATA-
	3	DATA+
	4	GND
	5	SSRX-
	6	SSRX+
	7	GND
	8	SSTX-
	9	SSTX+

■ Pin definition of USB2.0 port:

	Pin No.	Signals
	1	VCC5
	2	DATA-
	3	DATA+
	4	GND

2.1.4.4.2 USB2.0 on board

The product provides a USB2.0 type-A port on board which can be used for USB dongle. When installing the USB dongle, you need to open the chassis according to the following instructions.

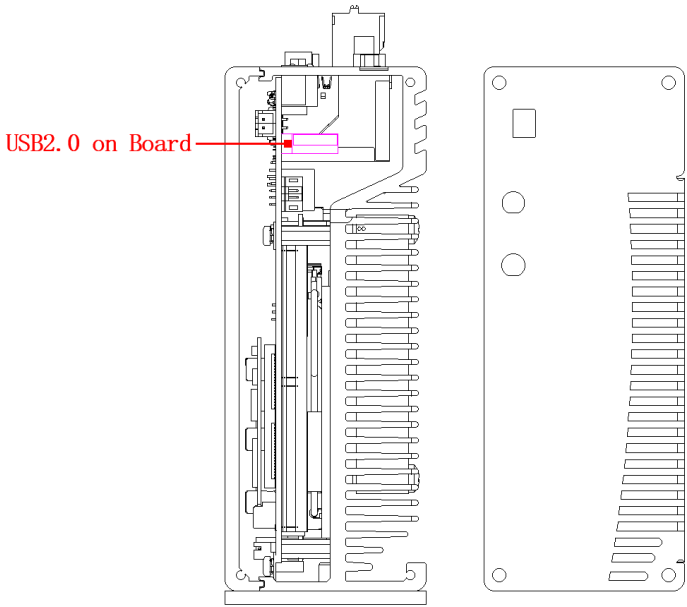
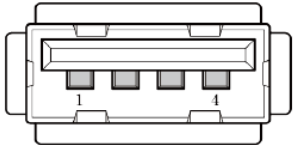


Figure 3 USB2.0 on board

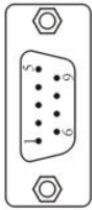
■ Pin definition of USB2.0 port on board:

	Pin No.	Signals
	1	VCC5
	2	DATA-
	3	DATA+
	4	GND

2.1.4.5 COM Ports

NP-6113 has two COM ports (DB9 male terminal) on the front, they are COM1 and COM2. The COM1 can support RS232 or RS485 mode (selected through the DIP switch). The COM2 only supports RS232 mode.

■ Pin definition:

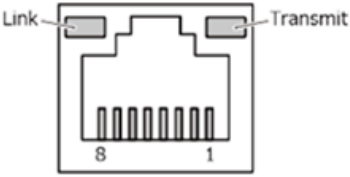
 DB9 Male Terminal	Pin No.	Signal	
		RS232	RS485
	1	N.C.	B
	2	RXD	A
	3	TXD	N.C.
	4	N.C.	N.C.
	5	GND	GND
	6	N.C.	N.C.
	7	N.C.	N.C.
	8	N.C.	N.C.
	9	N.C.	N.C.

2.1.4.6 Ethernet

2.1.4.6.3 PoE LAN

The product provides two PoE GbE Lan controllers using standard RJ45 connectors, LAN1 and LAN2. The maximum power of each channel is 15W.

■ Pin definition of PoE LAN connector:

	Pin No.	Signal	
		100BASE-TX	1000BASE-T
	1	TX+	TRD+(0)
	2	TX-	TRD-(0)
	3	RX+	TRD+(1)
	4	N.C.	TRD+(2)
	5	N.C.	TRD-(2)
	6	RX-	TRD-(1)
	7	N.C.	TRD+(3)
	8	N.C.	TRD-(3)

There are two status leds in each RJ45 connector indicating the status of the link and transmit separately. Link led is on when link successfully, and when the network is working in the 1000Mbps, the transmit led is blinking in orange color and in green color when working in the other speed.

Type	Parameters
Network Type	1000BASE-T/100BASE-TX/10BASE-T
Transmission Speed*	1000M/100M/10Mbps
Maximum Cable Distance	100m/segment
NIC Type	Intel® Ethernet Controller

*When the transmission speed is 1000Mbps, a network cable of at least CAT 5e is required.

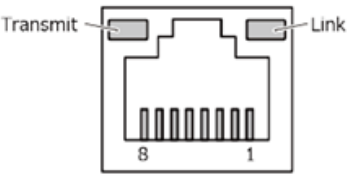


1. PoE LAN cable 1-2 are positive, 3-6 are negative and cannot be shorted;
2. No crossover PoE LAN cable allowed;
3. CAT-6 or higher PoE LAN cable recommended.

2.1.4.6.4 LAN

In addition, the product provides one GbE Lan controllers using standard RJ45 connectors.

■ Pin definition of RJ45 connector:

	Pin No.	Signals	
		100BASE-TX	1000BASE-T
	1	TX+	TRD+(0)
	2	TX-	TRD-(0)
	3	RX+	TRD+(1)
	4	N.C.	TRD+(2)
	5	N.C.	TRD-(2)
	6	RX-	TRD-(1)
	7	N.C.	TRD+(3)
	8	N.C.	TRD-(3)

There are two status leds in the RJ45 connector indicating the status of the link and transmit separately. Transmit led is on when link successfully, and when the network is working in the 1000Mbps, the link led is blinking in orange color and in green color when working in the other speed.

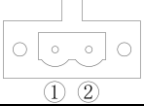
Items	Parameters
Network type	1000BASE-T/100BASE-TX/10BASE-T
Transmission speed*	1000M/100M/10M bps
Max. network path length	100m/segment

* Operation at 1000Mbps requires a category 5e or greater cable.

2.1.4.7 Power

There is a 2-pin power input terminals on the front. It supports DC12V-24V input.

■ Pin definition of DC IN connector:

	Pin No.	Signal	Pin No.	Signal
	1	GND	3	DC 12~24V

In order to make the machine can be used more reliably, it is recommended to add a DC power filter between power supply and IPC when the field environment is not good, and ensure that the filter can be well grounded.

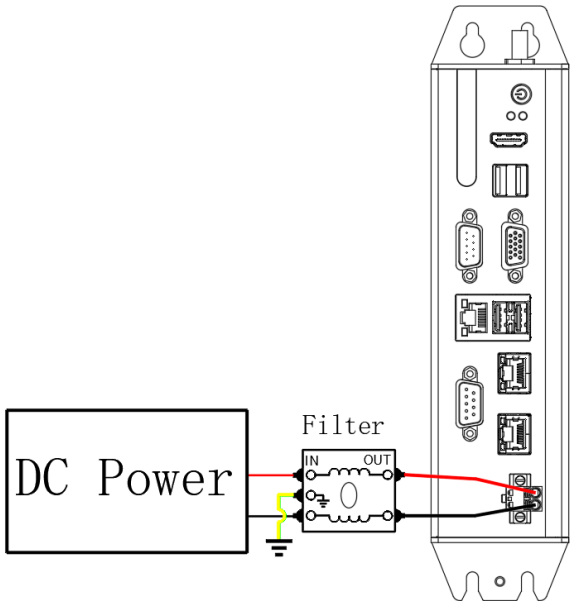


Figure 4 Power filter wiring diagram



1. Must check whither the voltage output of the power supply matches the PC DC input before connecting to the PC.
2. Must check the positive and negative pole marks on the housing before connecting to the power.
3. Must turn off the power before inserting or removing the boards or cables.
4. PE should be well grounded when operating.
5. Must do not connect AC power supply to the PC directly.

2.1.4.8 Remote switch

On the top of the product, there is a remote on-off connector through which the machine can be powered on or off remotely.

	Pin No.	Signal
	1	GND
	2	Power_ON

2.2 NP-6113-16I16O

The NP-6113-16I16O is a product combined by NP-6113 basic module and 16I16O add-on board, in addition to the functions supported by the NP-6113 basic module, 16 channels of digital inputs, 16 channels of digital output are extended in the 16I16O add-on board. The signal type of the digital output channels can be set to NPN or PNP by the switch on the top.

2.2.1 Features

- ◆ 1 x RTL8111H GbE LAN controller
- ◆ 2 x Intel GbE PoE LAN controller, Max 15W per channel
- ◆ 1 x GbE LAN controller (Optional, which can be extended by the miniPCle slot)
- ◆ 2 x USB3.0, 2 x USB2.0, 1x USB 2.0 Type-A onboard for dongle
- ◆ 1 x RS232/485, RS485 supports automatic data flow control; 1 x RS232
- ◆ 16 x DI, 16 x DO
- ◆ 2 x miniPCle slot can be used to extended Wifi, 3G/4G modules
- ◆ Support Wall-mounted or DIN-Rail mounted
- ◆ -20 ~ 60°C wide temperature environment

2.2.2 Product Dimensions

Unit: mm

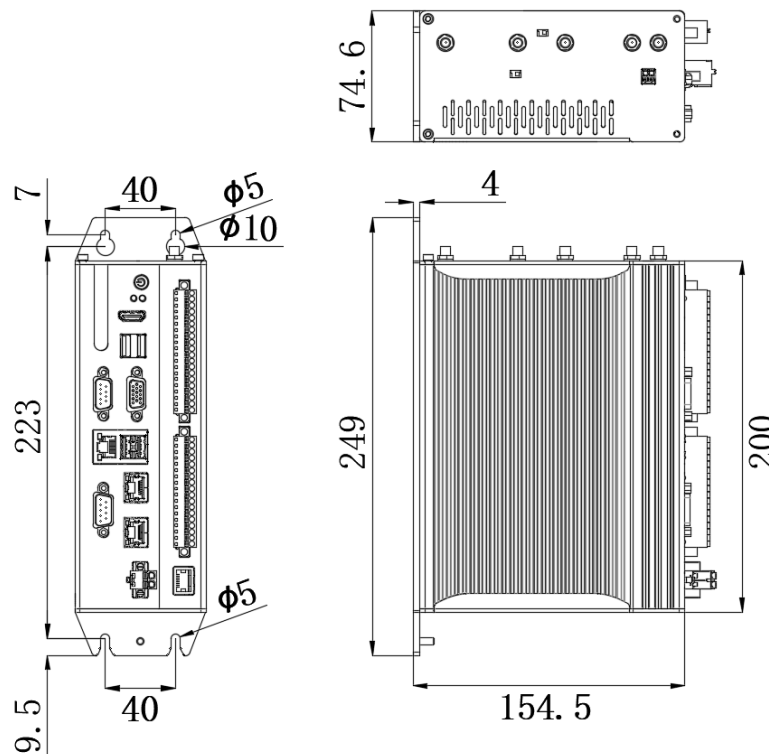
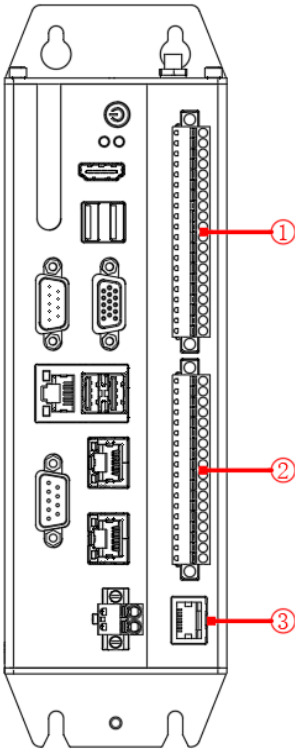


Figure 5 Dimension of NP-6113-16I16O

2.2.3 Product Specifications

Model Name		NP-6113-16I16O-J6412
System	CPU	Intel® Celeron J6412, 2.0~2.6GHz, 4 cores/4 threads, 1.5MB L2 cache
	TDP	10W
	BIOS	AMI UEFI 64Mbit
	Memory	1 x SO-DIMM DDR4-2400MHz (up to 32GB)
	Storage	1 x mSATA bay
	USB	2 x USB3.0, 2 x USB2.0
		1 x USB2.0 Type A on the board for USB dongle
	COM	1 x RS232/485, selectable to support RS232 or RS485 mode by the switch, 1 x RS232
	Ethernet	2 x Intel GbE PoE LAN controller(LAN1、 LAN2)
		1 x RTL8111H GbE LAN controller(LAN3)
	Extended LAN	1 x GbE LAN controller (Optional, which can be extended via the miniPCle slot)
	VGA	Support up to 1920 x 1080 @60Hz
	HDMI	Support up to 3840 x 2160 @60Hz
	Expansions	2 x Full-size PCIe Mini slots, there is only one SIM card slot (one of them will be used to extend LAN port when LAN4 is enabled)
	DIO	16 x DI NPN/PNP
		16 x DO{NPN/PNP}, I _{max} . 500mA
	Watch Dog	1~255 levels programmable
	Remote switch	1 x Remote switch
OS Support	Microsoft Windows	Windows 10
	Linux	Ubuntu, CentOS, Debian
Power	Voltage Input	DC12~24V ±10%, overcurrent, overvoltage and polarity inverse protection
	Power Consumption	Max. 90W
Chassis	Structure	Aluminum-magnesium alloy box, Fanless, Wall-mounted or DIN-Rail mounted
	Dimensions	(L)200mm x (W)154.5mm x (H)74.6mm
	Net Weight	2.15Kg
Environment	Work Temperature	-20°C ~ 60°C (-4°F~140°F) with air flow (SSD)
	Storage Temperature	-40°C ~ 80°C (-40°F~176°F) with air flow (SSD)
	Relative Humidity	5~95% (Non-condensing)
	Operating Vibration	5~500Hz, 1.5Grms@with SSD, Follow IEC60068-2-64
	Operating Shock	20G peak acceleration(11ms duration) with SSD, Follow IEC60068-2-27
	EMC	CE/FCC Class A

2.2.4 Description of Interfaces



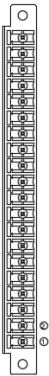
No.	Definition
1	DO
2	DI
3	Extended LAN

Figure 6 Interfaces of NP-6113-16I16O

2.2.4.1 DO

The 16I16O add-on board provides 16 isolated DO channels. All of the DO channels can be configured as NPN or PNP by a switch on the top. The maximum output current of a single channel is 500mA. When the external inductive load is connected, a diode is needed for discharge.

■ Pin definition of DO connector:

	Pin No.	Signal	Description	Pin No.	Signal	Description
	20	24+	Digital output 24V+	19	GND	Digital output 24V-
	18	Y0	Digital output 0	17	Y1	Digital output 1
	16	Y2	Digital output 2	15	Y3	Digital output 3
	14	Y4	Digital output 4	13	Y5	Digital output 5
	12	Y6	Digital output 6	11	Y7	Digital output 7
	10	Y8	Digital output 8	9	Y9	Digital output 9
	8	Y10	Digital output 10	7	Y11	Digital output 11
	6	Y12	Digital output 12	5	Y13	Digital output 13
	4	Y14	Digital output 14	3	Y15	Digital output 15
	2	24+	Digital output 24V+	1	GND	Digital output 24V-

➤ NPN connection way:

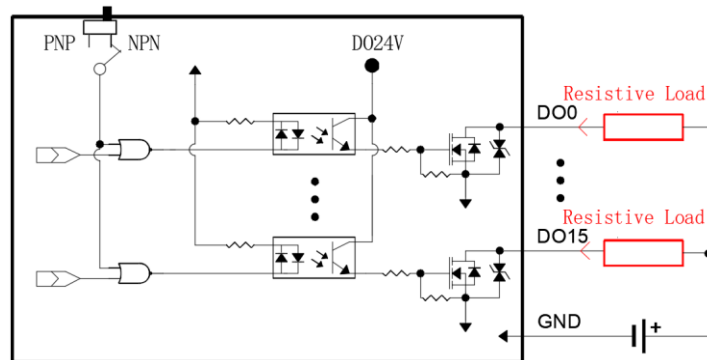


Figure 7 Wiring of resistive load

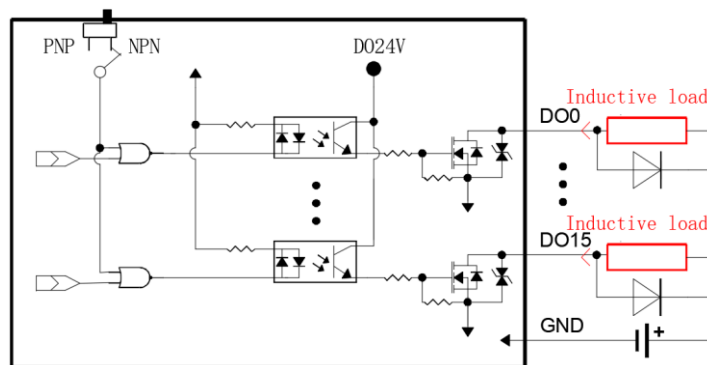


Figure 8 Wiring of inductive load

➤ PNP connection way:

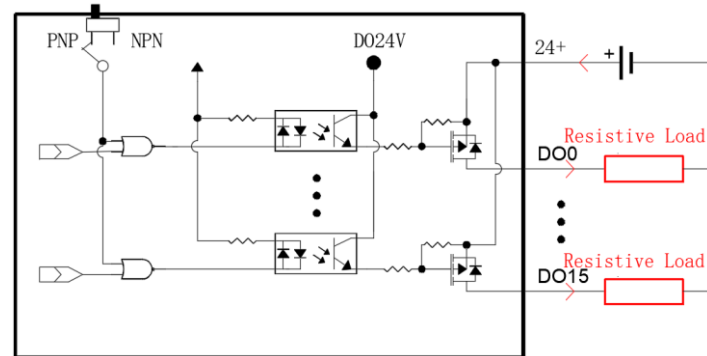


Figure 9 DO Wiring of resistive load

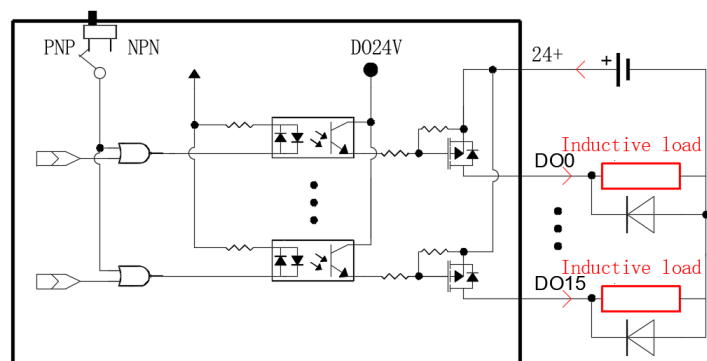


Figure 10 DO Wiring of inductive load



1. DO output current <500mA;
2. DO load voltage <30VDC;
3. Positive and negative power supply terminals cannot be connected to the DO signal terminal and DOGND directly.

2.2.4.2 DI

The 16I16O add-on board provides 16 isolation digital inputs (isolation voltage: 3750Vrms). The voltage ranges from DC12V to 24V, and the maximum voltage cannot be exceeded to the maximum of DC30V.

■ Pin definition of DI connector:

Pin No.	Signal	Description	Pin No.	Signal	Description
18	XCOM	Digital input COM	17	XGND	Digital input GND
16	X0	Digital input 0	15	X1	Digital input 1
14	X2	Digital input 2	13	X3	Digital input 3
12	X4	Digital input 4	11	X5	Digital input 5
10	X6	Digital input 6	9	X7	Digital input 7
8	X8	Digital input 8	7	X9	Digital input 9
6	X10	Digital input 10	5	X11	Digital input 11
4	X12	Digital input 12	3	X13	Digital input 13
2	X14	Digital input 14	1	X15	Digital input 15

➤ NPN connection in wet contact way:

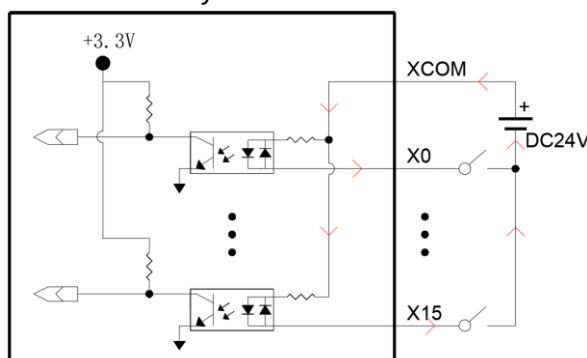


Figure 11 DI NPN wiring solution

➤ PNP connection in wet contact way:

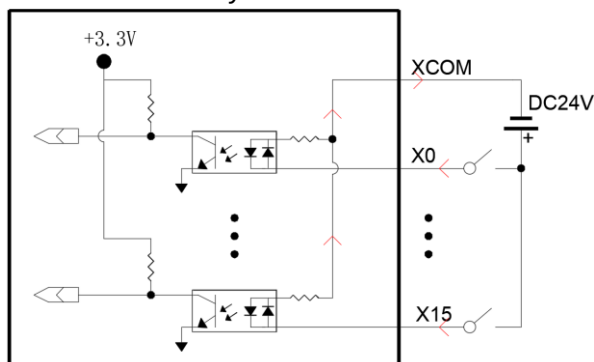


Figure 12 DI PNP wiring solution

➤ NPN connection in dry contact way:

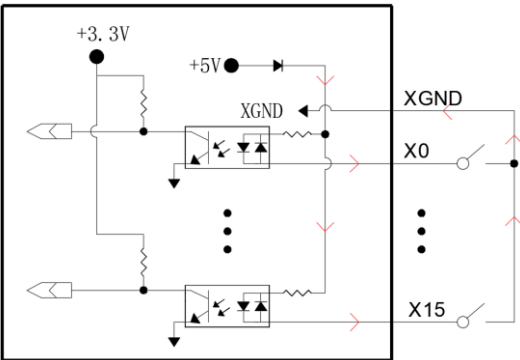


Figure 13 DI NPN wiring solution

2.2.4.3 Extended LAN

LAN4 is an additional reserved GbE Ethernet interface to be extended via miniPCIE slot. there will be only one miniPCIE slot left on the board to extend the other interfaces when the LAN4 is enabled.

■ Pin definition of LAN4 connector RJ45:

Pin No.	Signal	
	100BASE-TX	1000BASE-T
1	TX+	TRD+(0)
2	TX-	TRD-(0)
3	RX+	TRD+(1)
4	N.C.	TRD+(2)
5	N.C.	TRD-(2)
6	RX-	TRD-(1)
7	N.C.	TRD+(3)
8	N.C.	TRD-(3)

There are two status leds in the RJ45 connector indicatting the status of the link and transmit separately. Transmit led is on when link successfully, and when the network is working in the 1000Mbps, the link led is blinking in orange color and in green color when working in the other speed.

Type	Parameters
Network Type	1000BASE-T/100BASE-TX/10BASE-T
Transmission Speed*	1000M/100M/10Mbps
Maximum Cable Distance	100m/segment
NIC Type	Intel® Ethernet Controller/ Realtek Ethernet Controller

*When the transmission speed is 1000Mbps, a network cable of at least CAT 5e is required.

2.3 NP-6113-MVS

The NP-6113-MVS is a product combined by NP-6113 basic module and MVS add-on board, in addition to the functions supported by the NP-6113 basic module, one RS485, eight channels of digital inputs, eight channels of digital output and four channels of light control are extended in the MVS add-on board.

The product is widely used in vision control, robot control, motion control and other automation control fields.

2.3.1 Features

- ◆ 1 x RTL8111H GbE LAN controller
- ◆ 2 x Intel GbE PoE LAN controller, Max 15W per channel
- ◆ 2 x USB3.0, 2 x USB2.0, 1x USB 2.0 Type-A onboard for dongle
- ◆ 1 x RS232, 1 x RS232/485, 1 x RS485, RS485 supports automatic data flow control;
- ◆ 8 x DI, 8 x DO
- ◆ 4 x PWM light control, support the hard trigger
- ◆ VGA and HDMI dual display ports
- ◆ 2 x miniPCIe slot can be used to extended Wifi, 3G/4G modules
- ◆ Support Wall-mounted or DIN-Rail mounted
- ◆ -20 ~ 60°C wide temperature environment

2.3.2 Product Dimensions

Unit: mm

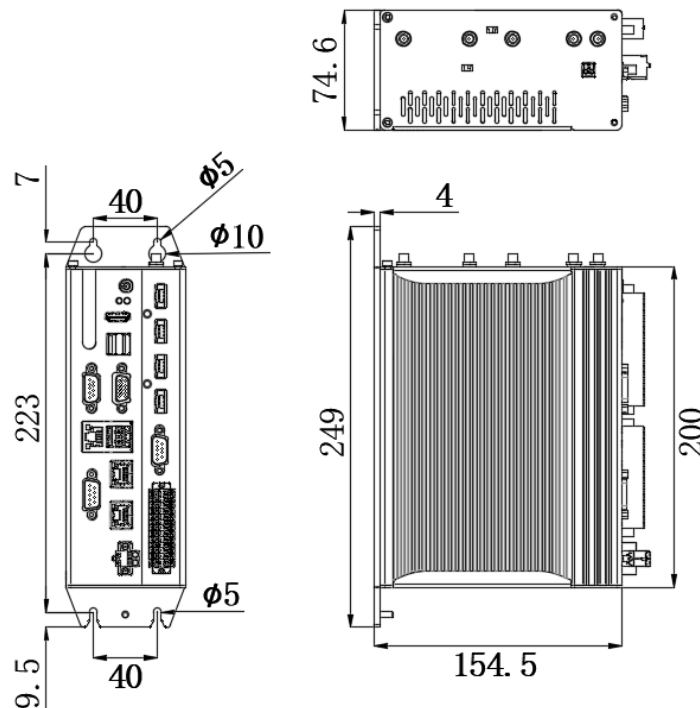
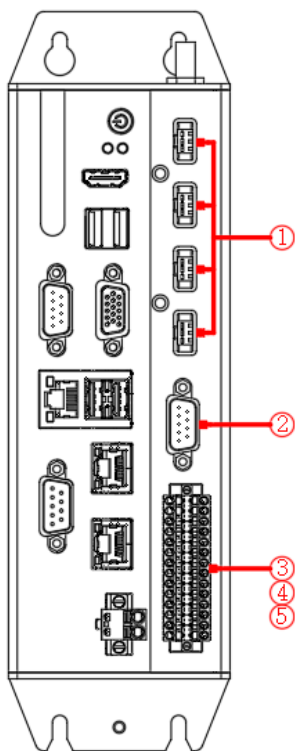


Figure 14 Dimension of NP-6113-MVS

2.3.3 Product Specifications

Model Name		NP-6113-MVS-J6412
System	CPU	Intel® Celeron J6412, 2.0~2.6GHz, 4 cores/4 threads, 1.5MB L2 cache
	TDP	10W
	BIOS	AMI UEFI 64Mbit
	Memory	1 x SO-DIMM DDR4-2400MHz (up to 32GB)
	Storage	1 x mSATA bay
	USB	2 x USB3.0, 2 x USB2.0 , 1 x USB2.0 Type A on the board for USB dongle
	COM	1 x RS232/485, selectable to support RS232 or RS485 mode by the switch, 1 x RS232, 1 x RS485
	Ethernet	2 x Intel GbE PoE LAN controller (LAN1、LAN2)
		1 x RTL8111H GbE LAN controller (LAN3)
	VGA	Support up to 1920 x 1080 @60Hz
	HDMI	Support up to 3840 x 2160 @60Hz
	Expansions	2 x Full-size miniPCle slots, but only one with SIM card slot
	DIO	8 x DI(NPN/PNP)
		8 x DO (NPN), I _{max} . 500mA
		4 x Light PWM control channels which support hard trigger input.
	Watch Dog	1~255 levels programmable
	Remote switch	1 x Remote switch
OS Support	Microsoft Windows	Windows 10
	Linux	Ubuntu, CentOS, Debian
Power	Voltage Input	DC12~24V ±10%, overcurrent, overvoltage and polarity inverse protection
	Power Consumption	Max. 230W
Chassis	Structure	Aluminum-magnesium alloy box, Fanless, Wall-mounted or DIN-Rail mounted
	Dimensions	(L)200mm x (W)154.5mm x (H)74.6mm
	Net Weight	2.15Kg
Environment	Work Temperature	-20°C ~ 60°C (-4°F~140°F) with air flow (SSD)
	Storage Temperature	-40°C ~ 80°C (-40°F ~ 176°F) with air flow (SSD)
	Relative Humidity	5~95% (Non-condensing)
	Operating Vibration	5~500Hz, 1.5Grms@with SSD, Follow IEC60068-2-64
	Operating Shock	20G peak acceleration(11ms duration) with SSD, Follow IEC60068-2-27
	EMC	CE/FCC Class A

2.3.4 Description of Interfaces



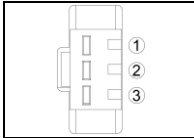
No.	Definition
1	PWM Light control output
2	RS485
3	DI
4	DO
5	PWM Light control triggerInput

Figure 15 Interfaces of NP-6113-MVS

2.3.4.1 CHx PWM light source control output

The MVS add-on board provides four channels of PWM light control, the maximum output current for per channel is 1A, and the dimming level is 100. Kindly pay attention to the PC power supply input must be DC24V when using light control function. Each channel has its own external hard trigger input. The reference wiring solutions are as follows:

■ Pin definition:

	Pin No.	Signal
	1	CH-
	2	N.C.
	3	CH+

PWM light control output :

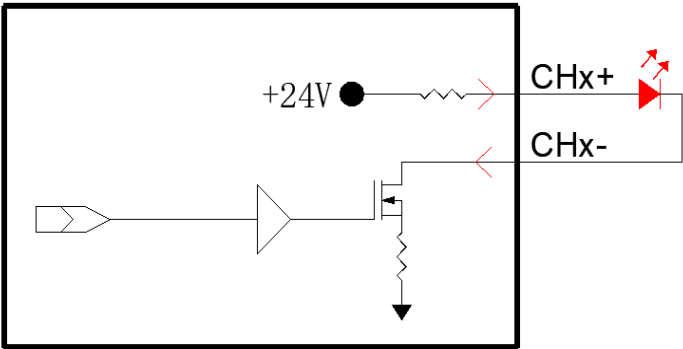


Figure 16 Wiring of Light source

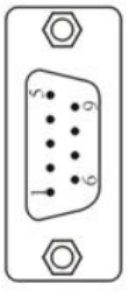


1. Must be use DC24V power supply when use PWN light control function;
2. The power supply cannot be less than the total power consumption of the full load and the light;
3. The positive and negative PWM outputs cannot be shorted.

2.3.4.2 RS485

The MVS add-on board has one extended RS485 by a DB9 male connector, which is connected to COM4 internally.

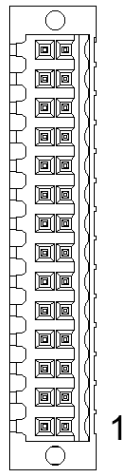
■ Pin definition of RS485 connector:

 DB9 male	Pin No.	Signal RS485
	1	B
	2	A
	3	N.C.
	4	N.C.
	5	GND
	6	N.C.
	7	N.C.
	8	N.C.
	9	N.C.

2.3.4.3 DIO

The MVS add-on board provides eight channels of isolated DI, eight channels of isolated DO, four channels of light PWM control hard trigger input within one phoenix threading connector.

■ Pin definition of the DIO connector:

	Pin No.	Signal	Description	Pin No.	信号	Description
	28	LCom	Common end of Light control trigger input	27	LCom	Common end of Light control trigger input
	26	TR1	Light control channel 1 trigger input	25	TR2	Light control channel 2 trigger input
	24	TR3	Light control channel 3 trigger input	23	TR4	Light control channel 4 trigger input
	22	DOGND	DO GND	21	DOGND	DO GND
	20	DO0	Digital output channel 0	19	DO1	Digital output channel 1
	18	DO2	Digital output channel 2	17	DO3	Digital output channel 3
	16	DO4	Digital output channel 4	15	DO5	Digital output channel 5
	14	DO6	Digital output channel 6	13	DO7	Digital output channel 7
	12	DICOM	Common end of digital input channel	11	DICOM	Common end of digital input channel
	10	DIGND	DI GND	9	DIGND	DI GND
	8	DI0	Digital input channel 0	7	DI1	Digital input channel 1
	6	DI2	Digital input channel 2	5	DI3	Digital input channel 3
	4	DI4	Digital input channel 4	3	DI5	Digital input channel 5
	2	DI6	Digital input channel 6	1	DI7	Digital input channel 7

2.3.4.3.1 DI

The MVS add-on board provides eight isolated digital inputs (isolation voltage 3750Vrms), the maximum allowable voltage cannot be exceeded DC30V. Because of the internal circuit adopts bidirectional optocoupler isolation, it is compatible with PNP and NPN wiring solution. The reference wiring diagrams are as follows:

- NPN connection in wet contact way:

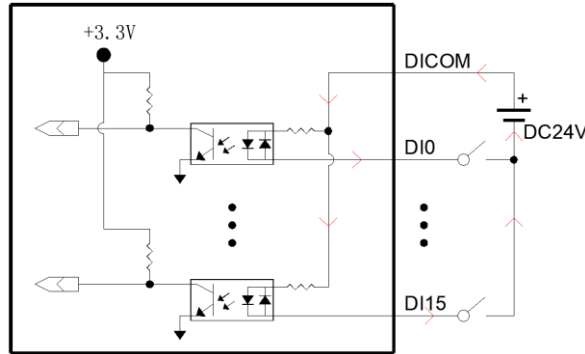


Figure 17 DI NPN wiring solution

- PNP connection in wet contact way:

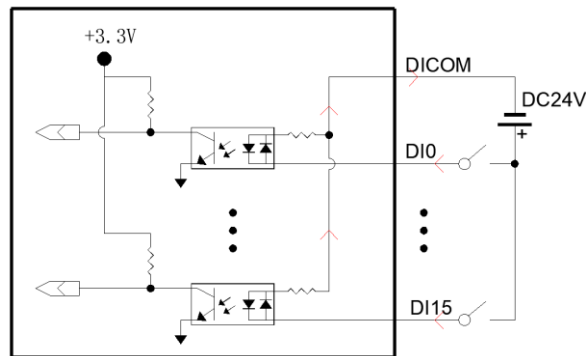


Figure 18 DI PNP wiring solution

- NPN connection in dry contact way:

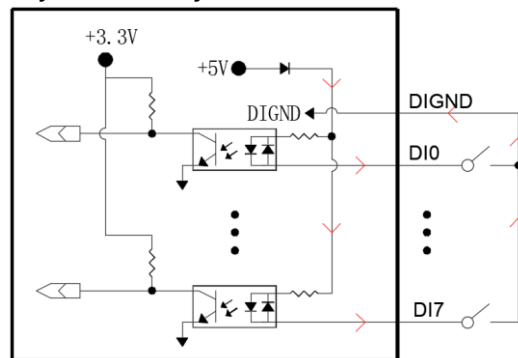


Figure 19 DI NPN wiring solution

2.3.4.3.2 DO

The MVS add-on board provides eight channels of digital output, transistor output, I_{max} : 500mA, V_{max} : 50V. Please remind that when an external inductive load is connected, a diode needs to be connected in parallel for current leakage.

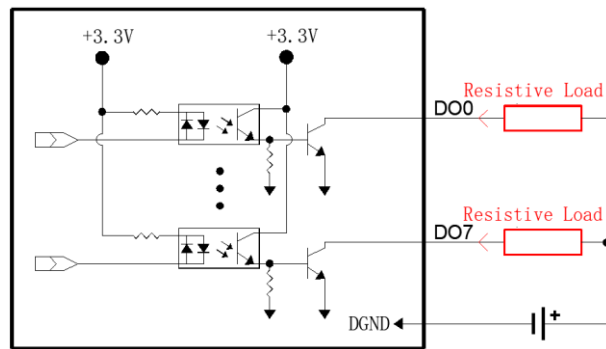


Figure 20 Wiring of resistive load

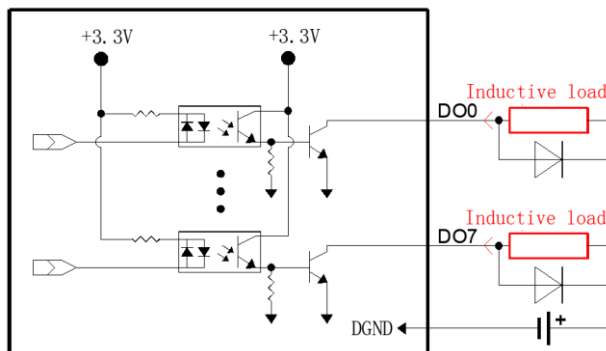


Figure 21 Wiring of inductive load



1. DO output current <500mA;
2. DO load voltage <50VDC;
3. Positive and negative power supply terminals cannot be connected to the DO signal terminal and DOGND directly.

2.3.4.3.3 Light control external trigger input

- NPN connection in wet contact way

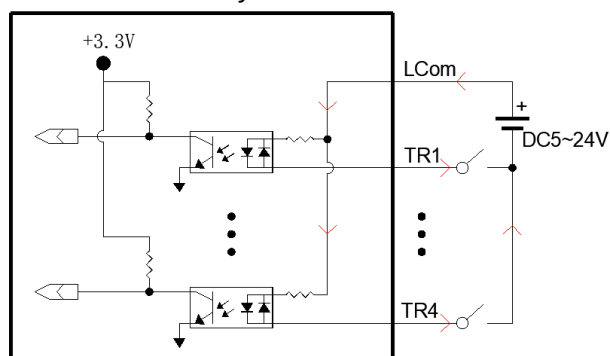


Figure 22 NPN wiring solution

- PNP connection in wet contact way:

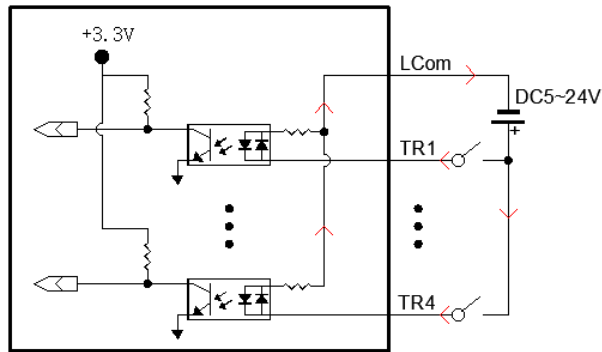


Figure 23 PNP wiring solution

- NPN connection in dry contact way:

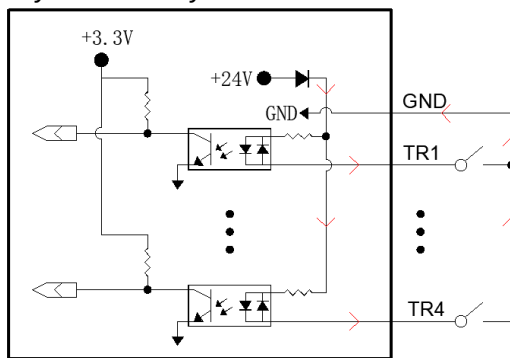


Figure 24 NPN wiring solution



When using an external hard trigger signal for light control, the light controller needs to be set to hard trigger or hard switch mode in the software.

2.4 NP-6113-MVS-L1

The NP-6113-MVS-L1 is a product that extends one LAN based on the NP-6113-MVS platform via the miniPCle slot. The LAN controller is depending on the miniPCle expansion card. For the other functionalities on the MVS add-on board, please refer to the sector of NP-6113-MVS.

2.4.1 Features

- ◆ 1 x RTL8111H GbE LAN controller
- ◆ 2 x Intel GbE PoE LAN controller, Max 15W per channel
- ◆ 1 x GbE LAN controller, the controller is depend on the miniPCle card.
- ◆ 2 x USB3.0, 2 x USB2.0, 1x USB 2.0 Type-A onboard for dongle
- ◆ 1 x RS232, 1 x RS232/485, 1 x RS485, RS485 supports automatic data flow control;
- ◆ 8 x DI, 8 x DO
- ◆ 4 x PWM light control which support the hard trigger.
- ◆ VGA and HDMI dual display ports
- ◆ 1 x miniPCle slot can be extended to Wifi, 3G/4G modules
- ◆ Support Wall-mounted or DIN-Rail mounted
- ◆ -20 ~ 60°C wide temperature environment

2.4.2 Product Dimensions

Unit: mm

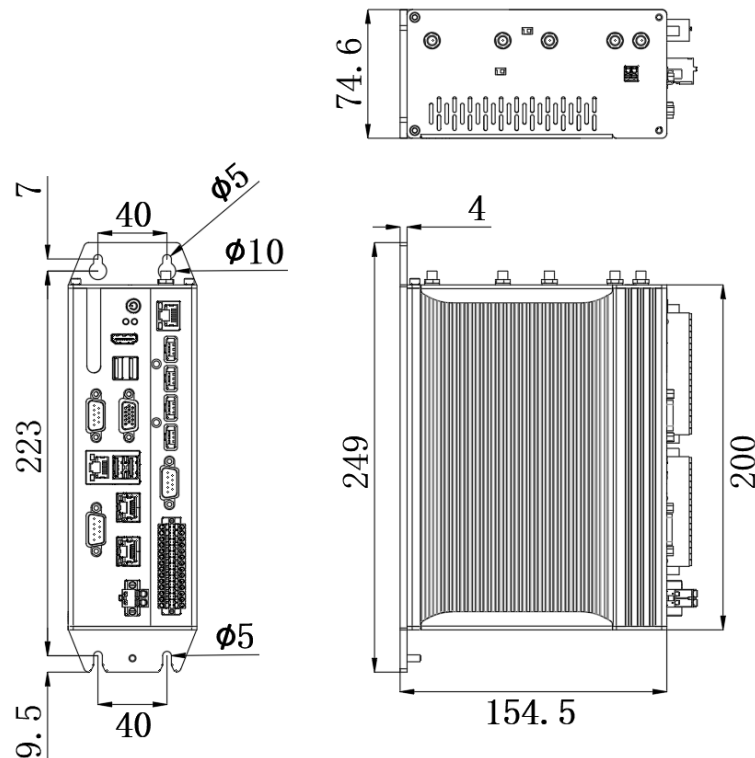
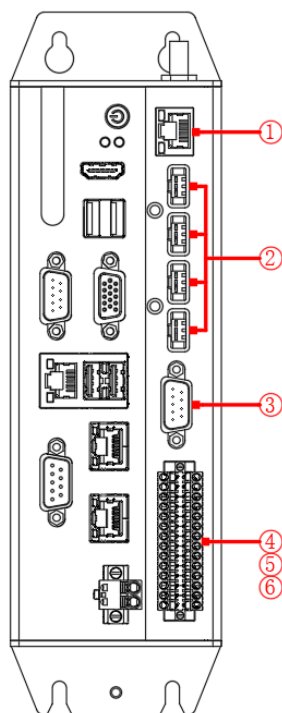


Figure 25 Dimension of NP-6113-MVS-L1

2.4.3 Product Specifications

Model Name		NP-6113-MVS-L1-J6412
System	CPU	Intel® Celeron J6412, 2.0~2.6GHz, 4 cores/4 threads, 1.5MB L2 cache
	TDP	10W
	BIOS	AMI UEFI 64Mbit
	Memory	1 x SO-DIMM DDR4-2400MHz (up to 32GB)
	Storage	1 x mSATA bay
	USB	2 x USB3.0, 2 x USB2.0 , 1 x USB2.0 Type A on the board for USB dongle
	COM	1 x RS232/485, selectable to support RS232 or RS485 mode by the switch, 1 x RS232, 1 x RS485
	Ethernet	2 x Intel GbE PoE LAN controller (LAN1、 LAN2)
		1 x RTL8111H GbE LAN controller (LAN3)
	Extended LAN	1 x GbE LAN controller(LAN4), extended via miniPCle slot
	VGA	Support up to 1920 x 1080 @60Hz
	HDMI	Support up to 3840 x 2160 @60Hz
	Expansions	1 x Full-size miniPCle slot with one SIM card slot
	DIO	8 x DI (NPN/PNP)
		8 x DO(NPN), I _{max} . 500mA
		4 x Light PWM control, support hard trigger input
OS Support	Watch Dog	1~255 levels programmable
	Remote switch	1 x Remote switch
Power	Microsoft Windows	Windows 10
	Linux	Ubuntu, CentOS, Debian
Power	Voltage Input	DC12~24V ±10%, overcurrent, overvoltage and polarity inverse protection
	Power Consumption	Max. 230W
Chassis	Structure	Aluminum-magnesium alloy box, Fanless, Wall-mounted or DIN-Rail mounted
	Dimensions	(L)200mm x (W)154.5mm x (H)74.6mm
	Net Weight	2.15Kg
Environment	Work Temperature	-20°C ~ 60°C (-4°F~140°F) with air flow (SSD)
	Storage Temperature	-40°C ~ 80°C (-40°F ~ 176°F) with air flow (SSD)
	Relative Humidity	5~95% (Non-condensing)
	Operating Vibration	5~500Hz, 1.5Grms@with SSD, Follow IEC60068-2-64
	Operating Shock	20G peak acceleration(11ms duration) with SSD, Follow IEC60068-2-27
	EMC	CE/FCC Class A

2.4.4 Description of Interfaces



No.	Definition
1	Extended LAN4
2	PWM Light control output
3	RS485
4	DI
5	DO
6	PWM Light control trigger input

Figure 26 Interfaces of NP-6113-MVS-L1

2.4.4.1 Extended LAN

Additional GbE Ethernet LAN4 is extended via miniPCIe slot. Therefore, there is one miniPCIe slot left on the board to extend the other interfaces.

■ Pin definition of LAN connector:

Pin No.	Signal	
	100BASE-TX	1000BASE-T
1	TX+	TRD+(0)
2	TX-	TRD-(0)
3	RX+	TRD+(1)
4	N.C.	TRD+(2)
5	N.C.	TRD-(2)
6	RX-	TRD-(1)
7	N.C.	TRD+(3)
8	N.C.	TRD-(3)

There are two status leds in the RJ45 connector indicatting the status of the link and transmit separately. Transmit led is on when link successfully, and when the network is working in the 1000Mbps, the link led is blinking in orange color and in green color when working in the other speed.

Type	Parameters
Network Type	1000BASE-T/100BASE-TX/10BASE-T
Transmission Speed*	1000M/100M/10Mbps
Maximum Cable Distance	100m/segment
NIC Type	Intel® Ethernet Controller/ Realtek Ethernet Controller

*When the transmission speed is 1000Mbps, a network cable of at least CAT 5e is required.

2.5 NP-6113-L4

The NP-6113-L4 is a product combined by NP-6113 basic module and L4 add-on board, in addition to the functions supported by the NP-6113 basic module, four LAN ports are extended by the two miniPCle slots, eight channels of digital inputs, eight channels of digital output are extended in the L4 add-on board, and for the specifications of the DI and DO, please refer to the section of DIO in the NP-6113-MVS chapter.

The product is widely used in vision control, robot control, motion control and other automation control fields.

2.5.1 Features

- ◆ 1 x RTL8111H GbE LAN controller
- ◆ 2 x Intel GbE PoE LAN controller, Max 15W per channel
- ◆ 4 x GbE LAN controllers which are extended by the two miniPCle slots
- ◆ 2 x USB3.0, 2 x USB2.0, 1x USB 2.0 Type-A onboard for dongle
- ◆ 1 x RS232, 1 x RS232/485, 1 x RS485, RS485 supports automatic data flow control;
- ◆ 8 x DI, 8 x DO
- ◆ VGA and HDMI dual display ports
- ◆ Support Wall-mounted or DIN-Rail mounted
- ◆ -20 ~ 60°C wide temperature environment

2.5.2 Product Dimensions

Unit: mm

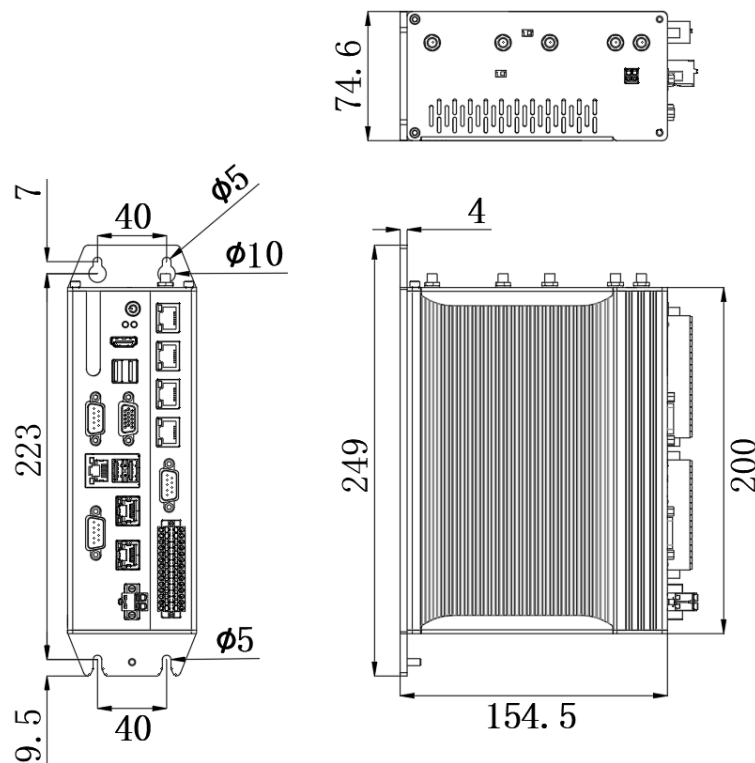


Figure 27 Dimension of NP-6113-L4

2.5.3 Product Specifications

Model Name		NP-6113-L4-J6412
System	CPU	Intel® Celeron J6412, 2.0~2.6GHz, 4 cores/4 threads, 1.5MB L2 cache
	TDP	10W
	BIOS	AMI UEFI 64Mbit
	Memory	1 x SO-DIMM DDR4-2400MHz (up to 32GB)
	Storage	1 x mSATA bay
	USB	2 x USB3.0, 2 x USB2.0 , 1 x USB2.0 Type A on the board for USB dongle
	COM	1 x RS232/485, selectable to support RS232 or RS485 mode by the switch, 1 x RS232, 1 x RS485
	Ethernet	2 x Intel GbE PoE LAN controller (LAN1、 LAN2)
		1 x RTL8111H GbE LAN controller (LAN3)
	Extended LAN	4 x GbE LAN controllers (LAN4~LAN7), (the controller is depending on the miniPCIe expansion card)
	VGA	Support up to 1920 x 1080 @60Hz
	HDMI	Support up to 3840 x 2160 @60Hz
	DIO	8 x DI(NPN/PNP)
		8 x DO(NPN), I _{max} . 500mA
	Watch Dog	1~255 levels programmable
	Remote switch	1 x Remote switch
OS Support	Microsoft Windows	Windows 10
	Linux	Ubuntu, CentOS, Debian
Power	Voltage Input	DC12~24V ±10%, overcurrent, overvoltage and polarity inverse protection
	Power Consumption	Max. 120W
Chassis	Structure	Aluminum-magnesium alloy box, Fanless, Wall-mounted or DIN-Rail
	Dimensions	(L)200mm x (W)154.5mm x (H)74.6mm
	Net Weight	2.15Kg
Environment	Work Temperature	-20°C ~ 60°C (-4°F~140°F) with air flow (SSD)
	Storage Temperature	-40°C ~ 80°C (-40°F ~ 176°F) with air flow (SSD)
	Relative Humidity	5~95% (Non-condensing)
	Operating Vibration	5~500Hz, 1.5Grms@with SSD, Follow IEC60068-2-64
	Operating Shock	20G peak acceleration(11ms duration) with SSD, Follow IEC60068-2-27
	EMC	CE/FCC Class A

2.5.4 Description of Interfaces

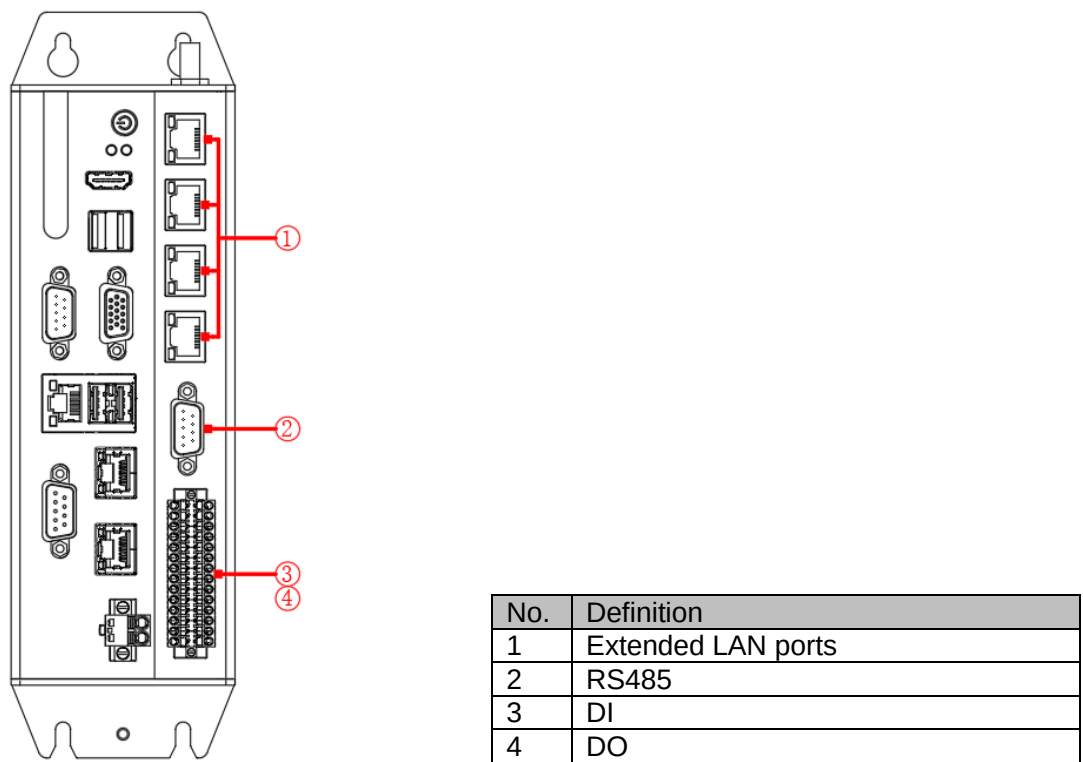


Figure 28 Interfaces of NP-6113-L4

2.5.4.1 Extended LAN

LAN4~LAN7 are extended by the two miniPCIE slots on the board. Therefore, there is no miniPCIE slot on the board to extend the other interfaces.

■ Pin definition of LAN connector:

Pin No.	Signal	
	100BASE-TX	1000BASE-T
1	TX+	TRD+(0)
2	TX-	TRD-(0)
3	RX+	TRD+(1)
4	N.C.	TRD+(2)
5	N.C.	TRD-(2)
6	RX-	TRD-(1)
7	N.C.	TRD+(3)
8	N.C.	TRD-(3)

There are two status leds in each RJ45 connector indicatting the status of the link and transmit separately. Transmit led is on when link successfully, and when the network is working in the 1000Mbps, the link led is blinking in orange color and in green color when working in the other speed.

Type	Parameters
Network Type	1000BASE-T/100BASE-TX/10BASE-T
Transmission Speed*	1000M/100M/10Mbps
Maximum Cable Distance	100m/segment
NIC Type	Intel® Ethernet Controller/ Realtek Ethernet Controller

*When the transmission speed is 1000Mbps, a network cable of at least CAT 5e is required.

2.5.4.2 RS485

Please refer to the RS485 sector in NP-6113-MVS chapter.

2.5.4.3 DIO

Please refer to the DIO sector in NP-6113-MVS chapter, but ignore the light control hard trigger input signals in the connector.

2.6 NP-6113-L2

The NP-6113-L2 is designed for the PLC, process control and industrial automation industry and extends additional two LAN ports via one miniPCIe slot.

2.6.1 Features

- ◆ 1 x RTL8111H GbE LAN controller
- ◆ 2 x Intel GbE PoE LAN controller, Max 15W per channel
- ◆ 2 x GbE LAN controller (the controllers are depend on the expansion card)
- ◆ 2 x USB3.0, 2 x USB2.0, 1x USB 2.0 Type-A onboard for dongle
- ◆ 1 x RS232/485, RS485 supports automatic data flow control; 1 x RS232
- ◆ VGA and HDMI dual display ports
- ◆ 1 x miniPCIe slot can be extended to Wifi, 3G/4G modules
- ◆ Support Wall-mounted or DIN-Rail mounted
- ◆ -20 ~ 60°C wide temperature environment

2.6.2 Product Dimensions

Unit: mm

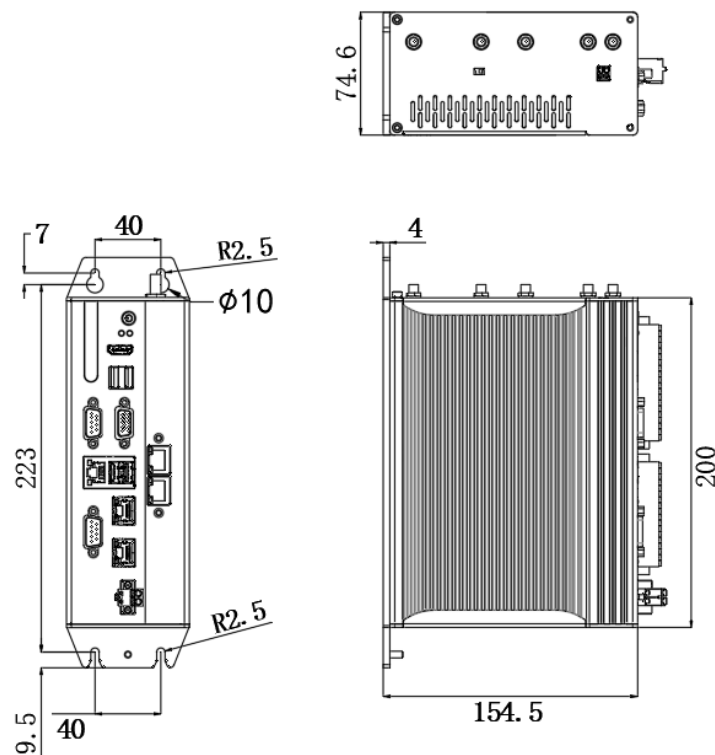
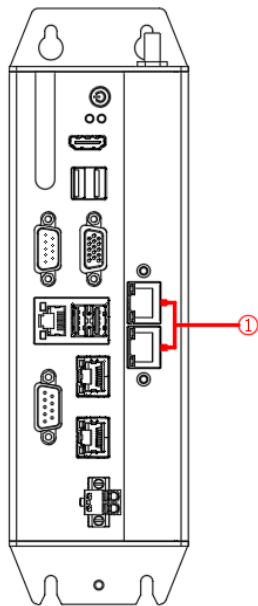


Figure 29 Dimension of NP-6113-L2

2.6.3 Product Specifications

Model Name		NP-6113-L2-J6412
System	CPU	Intel® Celeron J6412, 2.0~2.6GHz, 4 cores/4 threads, 1.5MB L2 cache
	TDP	10W
	BIOS	AMI UEFI 64Mbit
	Memory	1 x SO-DIMM DDR4-2400MHz (up to 32GB)
	Storage	1 x mSATA bay
	USB	2 x USB3.0, 2 x USB2.0 , 1 x USB2.0 Type A on the board for USB dongle
	COM	1 x RS232/485, selectable to support RS232 or RS485 mode by the switch, 1 x RS232
	Ethernet	2 x Intel GbE PoE LAN controller
		1 x RTL8111H GbE LAN controller
	Extended LAN	2 x GbE LAN controllers (the controller is depending on the miniPCle expansion card)
	VGA	Support up to 1920 x 1080 @60Hz
	HDMI	Support up to 3840 x 2160 @60Hz
	Expansions	1 x Full-size miniPCle slot with one SIM card slot
	Watch Dog	1~255 levels programmable
OS Support	Remote switch	1 x Remote switch
	Microsoft Windows	Windows 10
Power	Linux	Ubuntu, CentOS, Debian
	Voltage Input	DC12~24V ±10%, overcurrent, overvoltage and polarity inverse protection
Chassis	Power Consumption	Max. 90W
	Structure	Aluminum-magnesium alloy box, Fanless, Wall-mounted or DIN-Rail mounted
	Dimensions	(L)200mm x (W)154.5mm x (H)74.6mm
Environment	Net Weight	2.15Kg
	Work Temperature	-20°C ~ 60°C (-4°F~140°F) with air flow (SSD)
	Storage Temperature	-40°C ~ 80°C (-40°F ~ 176°F) with air flow (SSD)
	Relative Humidity	5~95% (Non-condensing)
	Operating Vibration	5~500Hz, 1.5Grms@with SSD, Follow IEC60068-2-64
	Operating Shock	20G peak acceleration(11ms duration) with SSD, Follow IEC60068-2-27
EMC		CE/FCC Class A

2.6.4 Description of Interfaces



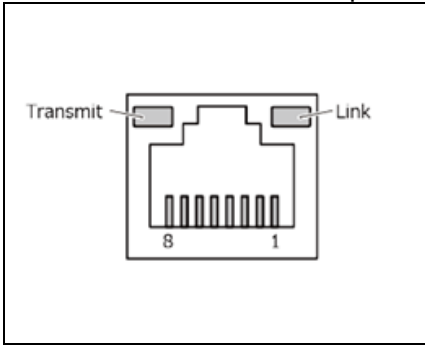
No.	Definition
1	Extended LAN4 and LAN5

Figure 30 Interfaces of NP-6113-L2

2.6.4.1 Extended LAN

Additional two GbE Ethernet RJ45 interfaces are extended via a miniPCIe slot, they are LAN4 and LAN5.

■ The definitions of RJ45 pins are as follows:

	Pin No.	Signal	
		100BASE-TX	1000BASE-T
	1	TX+	TRD+(0)
	2	TX-	TRD-(0)
	3	RX+	TRD+(1)
	4	N.C.	TRD+(2)
	5	N.C.	TRD-(2)
	6	RX-	TRD-(1)
	7	N.C.	TRD+(3)
	8	N.C.	TRD-(3)

There are two status indicators in each RJ45 connector, links status on the right side, data transmission status on the left side. The Link light is green and always on when the network is connected normally; the Transmit light flashes green when 100 megabit data is being transferred; the Transmit light flashes orange when gigabit data is being transferred.

Type	Parameters
Network Type	1000BASE-T/100BASE-TX/10BASE-T
Transmission Speed*	1000M/100M/10Mbps
Maximum Cable Distance	100m/segment
NIC Type	Intel® Ethernet Controller/ Realtek Ethernet Controller

*When the transmission speed is 1000Mbps, a network cable of at least CAT 5e is required.

2.7 NP-6113-CAN2

NP-6113-CAN2 is designed for the PLC, AGV, Service robot and AGV controller applications. Two independent CAN bus ports(DB9 female) are extended via a miniPCIe slot, 120 ohm resistors on the board can be set via DIP switches on the expansion CAN card.

2.7.1 Key Features

- ◆ 1 x RTL8111H GbE LAN controller
- ◆ 2 x Intel GbE PoE LAN controller, Max 15W per channel
- ◆ 2 x USB3.0, 2 x USB2.0, 1x USB 2.0 Type-A onboard for dongle
- ◆ 1 x RS232/485, RS485 supports automatic data flow control; 1 x RS232
- ◆ 2 x CAN bus 2.0 A/B
- ◆ 1 x miniPCIe slot can be extended to Wifi, 3G/4G modules
- ◆ VGA and HDMI dual display ports
- ◆ Support Wall-mounted or DIN-Rail mounted
- ◆ -20 ~ 60°C wide temperature environment

2.7.2 Product Dimensions

Unit: mm

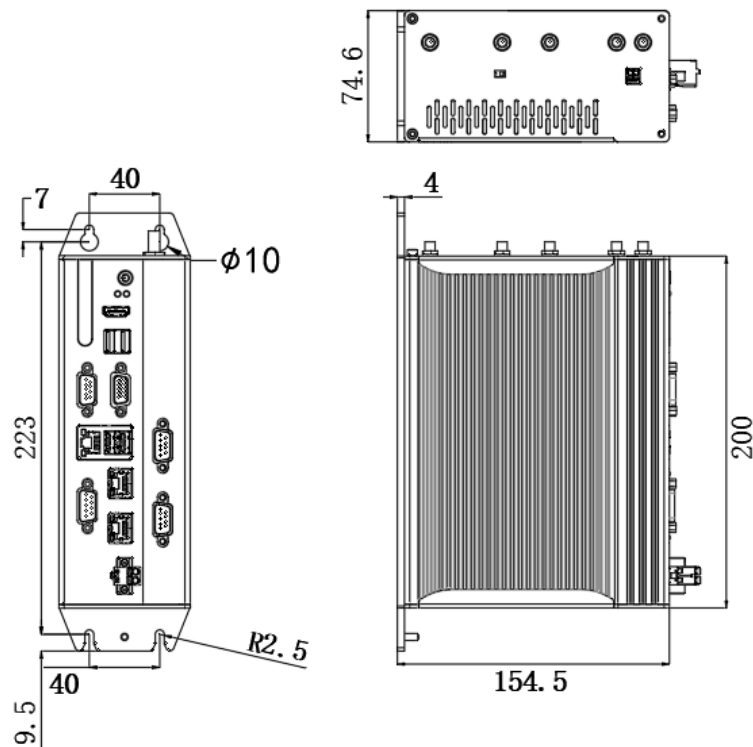
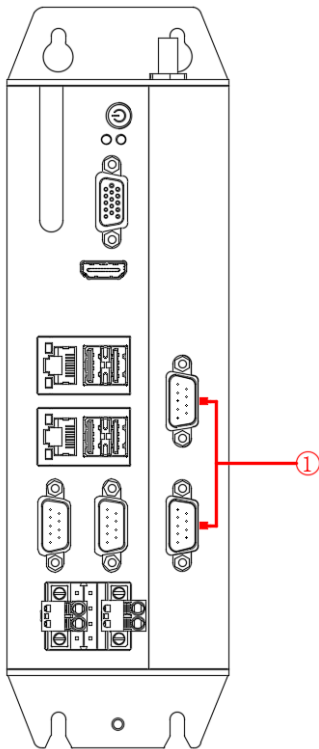


Figure 31 Dimension of NP-6113-CAN2

2.7.3 Product Specifications

Model Name		NP-6113-CAN2-J6412
System	CPU	Intel® Celeron J6412, 2.0~2.6GHz, 4 cores/4 threads, 1.5MB L2 cache
	TDP	10W
	BIOS	AMI UEFI 64Mbit
	Memory	1 x SO-DIMM DDR4-2400MHz (up to 32GB)
	Storage	1 x mSATA bay
	USB	2 x USB3.0, 2 x USB2.0 , 1 x USB2.0 Type A on the board for USB dongle
	COM	1 x RS232/485, selectable to support RS232 or RS485 mode by the switch, 1 x RS232
	Ethernet	2 x Intel GbE PoE LAN controller
		1 x RTL8111H GbE LAN controller
	CAN	2 x CAN Bus 2.0 A/B
	VGA	Support up to 1920 x 1080 @60Hz
	HDMI	Support up to 3840 x 2160 @60Hz
	Expansions	1 x Full-size miniPCle slot with one SIM card slot
	Watch Dog	1~255 levels programmable
	Remote switch	1 x Remote switch
OS Support	Microsoft Windows	Windows 10
	Linux	Ubuntu, CentOS, Debian
Power	Voltage Input	DC12~24V ±10%, overcurrent, overvoltage and polarity inverse protection
	Power Consumption	Max. 90W
Chassis	Structure	Aluminum-magnesium alloy box, Fanless, Wall-mounted or DIN-Rail mounted
	Dimensions	(L)200mm x (W)154.5mm x (H)74.6mm
	Net Weight	2.15Kg
Environment	Work Temperature	-20°C ~ 60°C (-4°F~140°F) with air flow (SSD)
	Storage Temperature	-40°C ~ 80°C (-40°F ~ 176°F) with air flow (SSD)
	Relative Humidity	5~95% (Non-condensing)
	Operating Vibration	5~500Hz, 1.5Grms@with SSD, Follow IEC60068-2-64
	Operating Shock	20G peak acceleration(11ms duration) with SSD, Follow IEC60068-2-27
	EMC	CE/FCC Class A

2.7.4 Description of Interfaces



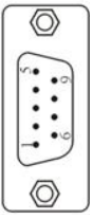
No.	Definition
1	CAN bus 2.0 A/B interface

Figure 32 Interfaces of NP-6113-CAN2

2.7.4.1 CAN Bus

Two channels of CAN2.0 A/B bus are extended via a miniPCle slot on the board.

■ The definitions of DB9 male interface are as follows:

DB9 male interface	Pin No.	Signal
		CAN BUS
	1	N.C.
	2	CAN_L
	3	GND
	4	N.C.
	5	N.C.
	6	GND
	7	CAN_H
	8	N.C.
	9	N.C.

3 System Setup

This chapter mainly introduces how to setup hardware components drivers.

3.1.1 Hardware Setup

3.1.1.1 Attaching wall-mounted part

Use 2 or 4 screws on the back to attach the wall-mounted part, please refer to the below figure.

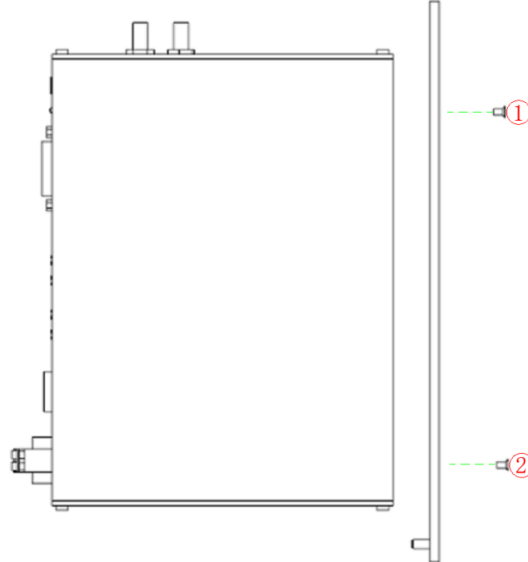


Figure 33 Attach the wall-mount part



1. Do not tighten screws with excess force.
2. Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 5-6 kgf·cm.

3.1.1.2 Attaching DIN-Rail mounted part

Use 4 screws on the back to attach the DIN-Rail mounted part, please refer to the below figure.

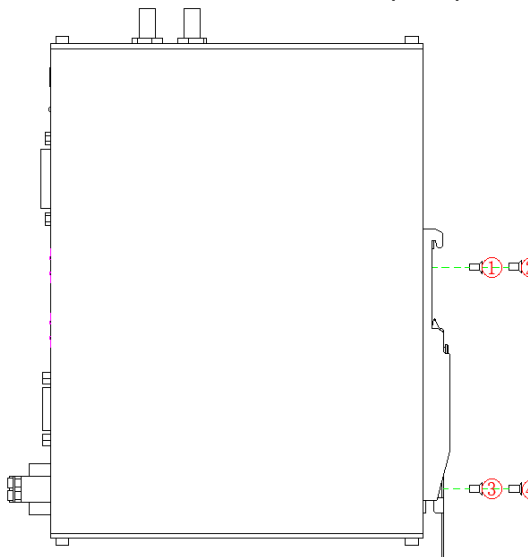


Figure 34 Attach DIN-Rail mounted part



1. Do not tighten screws with excess force.
2. Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 5-6 kgf·cm.

3.1.1.3 SSD Setup

1. Unscrew four screws(①~④) in the aluminum radiator.
2. Remove the aluminum radiator(⑤).
3. Then you can install or uninstall the SSD(⑥).

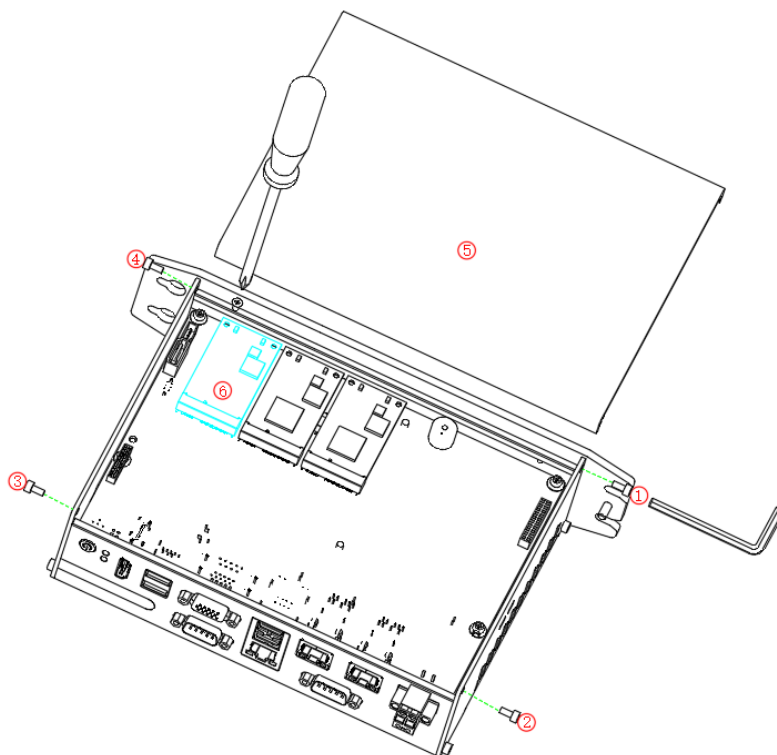


Figure 35 SSD Setup



:

1. Must disconnect the power supply before operating.
2. Pay attention to electrostatic discharge.
3. Do not tighten screws with excess force.

3.1.1.4 MiniPICE Setup

1. Unscrew four screws(①~④) in the aluminum radiator.
2. Remove the aluminum radiator(⑦).
3. Then you can install or uninstall the miniPICE(⑧ or ⑩).

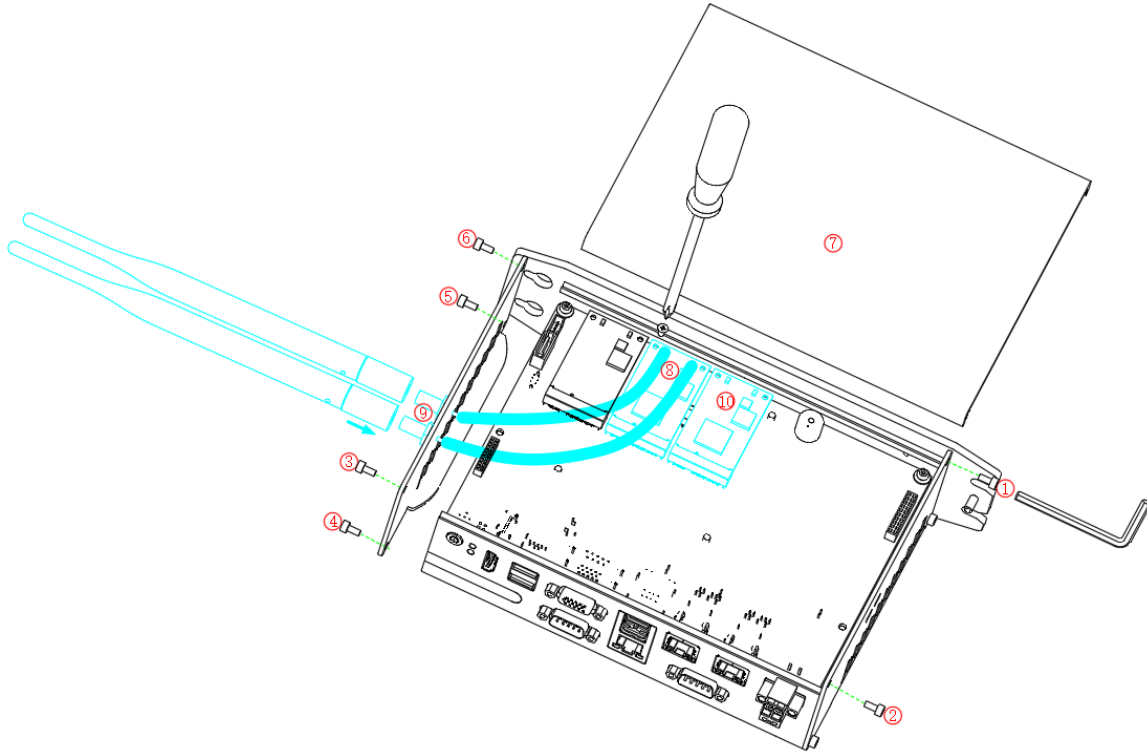


Figure 36 miniPCIE Setup

3.1.1.5 USB dongle Setup

1. Unscrew four screws(①~④) in the aluminum radiator.
2. Remove the aluminum radiator(⑤).
3. Then you can install or uninstall the USB device(⑦).

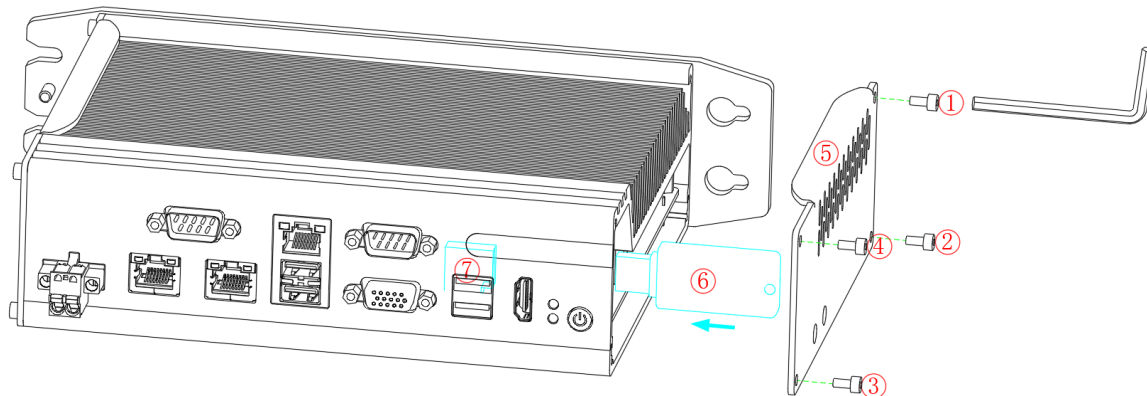


Figure 37 USB dongle Setup

3.1.2 Driver Setup

1. Download the driver install files from Nodka website or ask for support from your local distributor.
2. Install the driver software according to the installation wizard.

4 Safety and Maintenance

Please follow the precautions described in this chapter, otherwise may cause device damaged.

4.1 Safety Precautions

Please follow the safety precautions described in this section below.

4.1.1 General Safety Precautions

Please ensure that the following safety precautions are followed:

- Follow electrostatic precautions if you open the device;
- When installing, moving or modifying the device, ensure that the power is switched off and the power cable is disconnected;
- It is forbidden to use more than the specified voltage as this may cause a fire or electric shock;
- Electric shock may occur if the device chassis is opened while the device is running;
- Do not drop or insert any debris into the device vents;
- If large quantities of dust, water or liquid enter the device, disconnect the power supply and contact the supplier;
- The following are prohibited:
 - It is forbidden to drop the device on a hard surface;
 - It is forbidden to knock or apply excessive force to the device;
 - It is forbidden to use the device in places where the rated environment exceeds the standard.

4.1.2 ESD Precautions

Failure to take ESD precautions during device installation may result in damage to the device or injury to the user. Electrostatic discharge (ESD) can cause damage to the components of a device. Dry climates are more prone to ESD. Therefore, the following anti-static precautions need to be strictly followed when opening the equipment:

- Wearing anti-static bracelet;
- Personally well grounded: When handling electronic components, grounded conductive substances should be touched frequently;
- Using anti-static mats: Electronic components should be operated on anti-static mats, which can reduce the possibility of ESD damage.
- Touch only the edges of electronic components: operate by holding the edge of electronic components.

4.1.3 Product Disposal

Disposal of used batteries must be in accordance with local environmental regulations.

- Outside the European Union:

If you want to dispose the used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.

- Within the European Union:

EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (right) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your display products, please follow the guidance of your local authority, or ask the shop where you purchased the product. The mark on electrical and electronic products only applies to the current European Union Member States. Please follow the national guidelines for electrical and electronic product disposal.



4.2 Maintenance and Cleaning Precautions

Please follow the guidelines below when maintaining or cleaning the product.

4.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the product, please read the details below:
Never spray or squirt liquids directly onto any other components.

- The interior does not require cleaning. Keep fluids away from the interior.
- Be careful not to damage the small, removable components inside.
- Turn off before cleaning.
- Never drop any objects or liquids through the openings.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning.
- Avoid eating, drinking and smoking nearby.
- Fans are regularly cleaned of dust.

4.2.2 Cleaning Tools

Some components may only be cleaned using special tool for the safety. In such case, the product will be explicitly mentioned in the cleaning tips.
Below is a list of items to be used for cleaning.

- **Cloth** – Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended.
- **Water or rubbing alcohol** – A cloth moistened with water or rubbing alcohol should be used;
- **Using solvents** – The use of solvents is not recommended as they may damage the plastic parts.
- **Vacuum cleaner** – Using a vacuum specifically designed for computers is one of the best methods of cleaning. Dust and dirt can restrict the airflow and cause circuitry to corrode.
- **Cotton swabs** - Cotton swabs moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas.
- **Foam swabs** - Whenever possible, it is best to use lint free swabs such as foam swabs for cleaning.

5 Q&A

This section explains and illustrates common problems that users may encounter when using the product.

5.1 Dital IO Electrical Wiring Diagram

The blow sections can be refered to by the field electrical engineer.

5.1.1 Remote Electrical Wiring Diagram

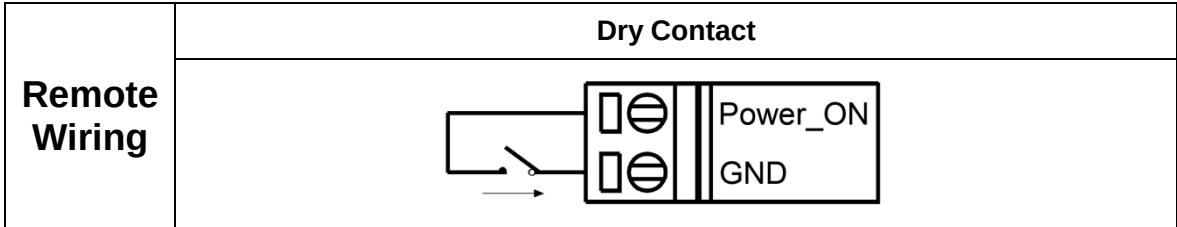


Figure 38 Remote wiring

5.1.2 16I16O Electrical Wiring Diagram

5.1.2.1 DI Electrical Wiring Diagram

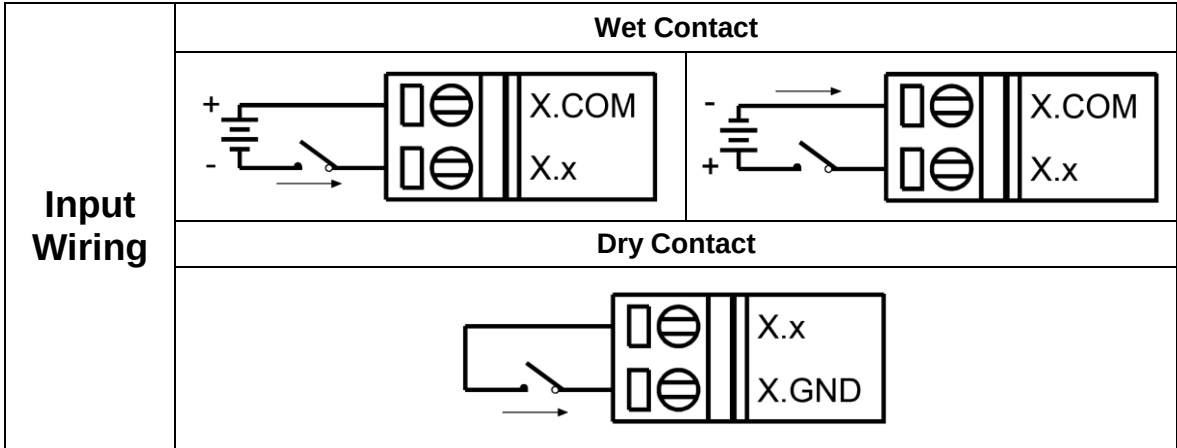


Figure 39 16I16O DI wiring

5.1.2.2 DO Electrical Wiring Diagram

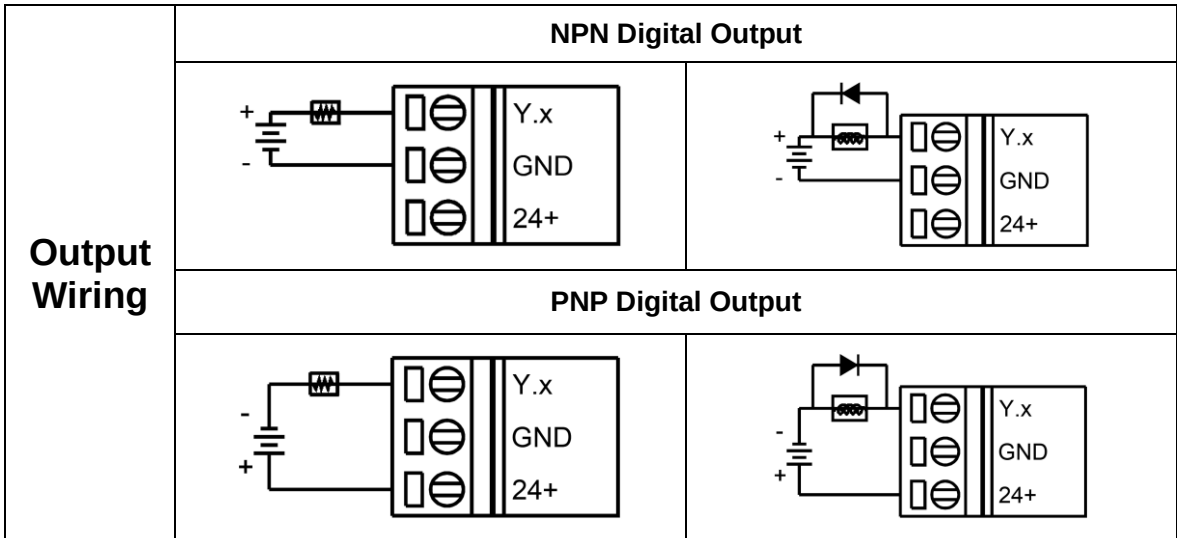


Figure 40 16I16O DO wiring

5.1.3 MVS/MVS-L1/L4 Electrical Wiring Diagram

5.1.3.1 DI Electrical Wiring Diagram

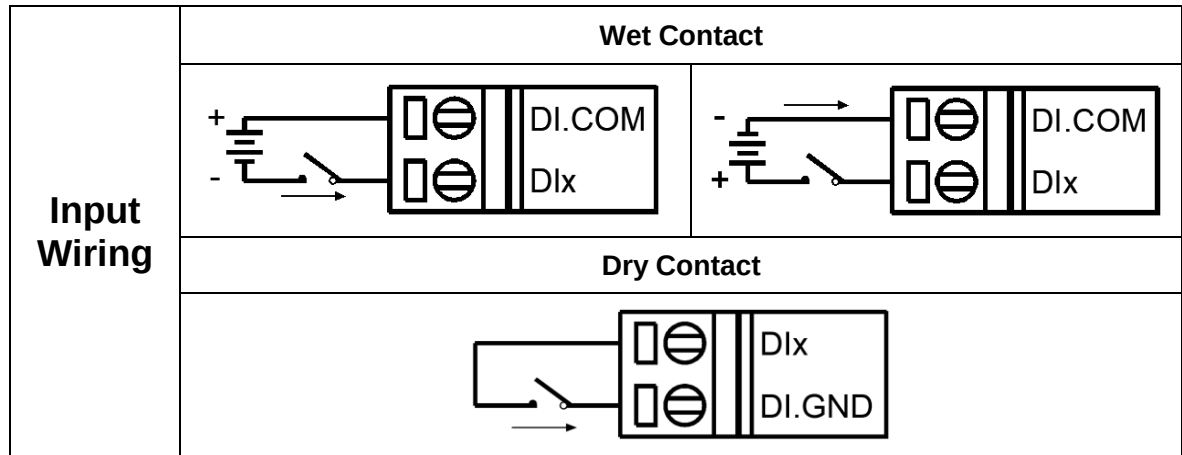


Figure 41 MVS/MVS-L1/L4 DI wiring

5.1.3.2 DO Electrical Wiring Diagram

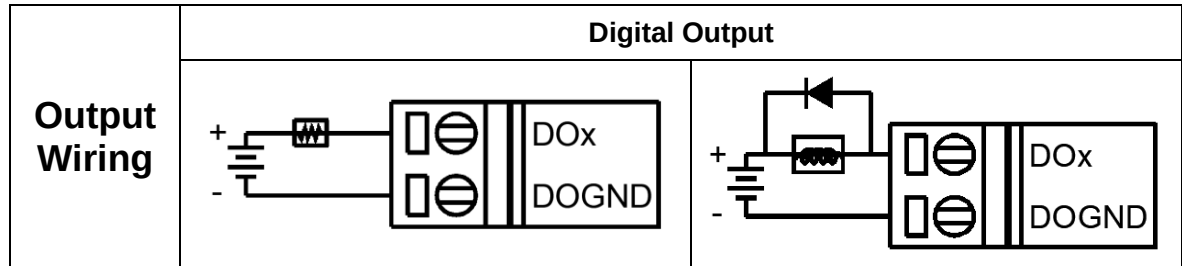


Figure 42 MVS/MVS-L1/L4 DO wiring

5.1.3.3 Light Control Electrical Wiring Diagram

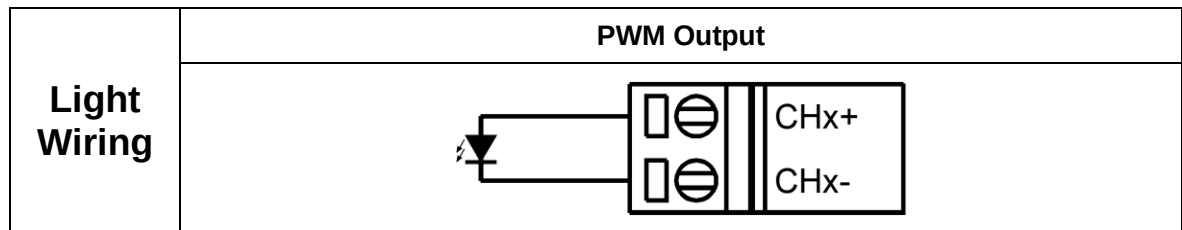
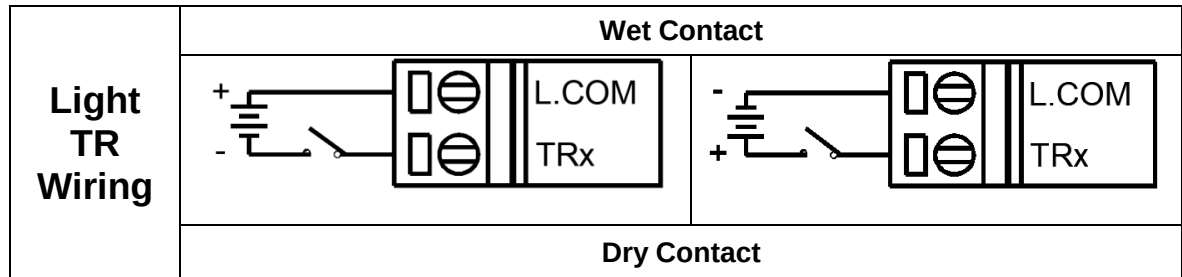


Figure 43 MVS/MVS-L1 Light source wiring

5.1.3.4 Light Control External Hard Trigger Electrical Wiring Diagram



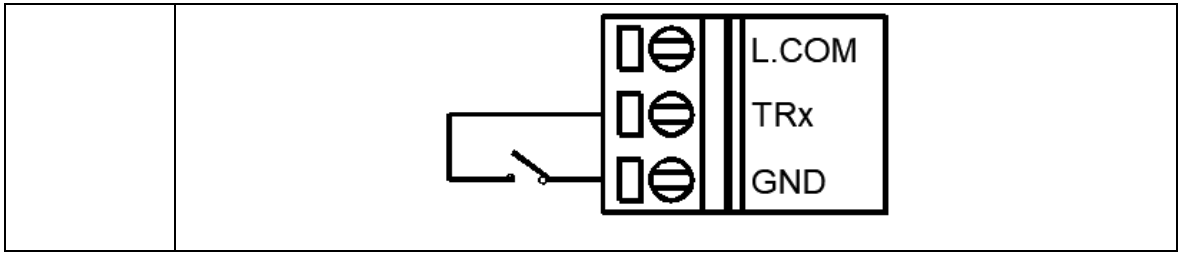


Figure 44 MVS/MVS-L1/ Light source trigger wiring

5.2 How to test the DO using multimeter

When DO works as OC gate output, its internal equivalent is a triode circuit controlled by the base. You can adjust the multimeter to the buzzer position, with the red probe connected to DOx and the black probe connected to DOGND. Then turn on the DOx in the application, and the multimeter buzzer will be on if the DO is on, otherwise multimeter buzzer will not be on.

5.3 Technical Support and Services

For documentation and related drivers, please visit Nodka’s website “www.nodka.com” or contact your local distributors for support and service.