

NP-6111-JH4 series User Manual

1.1 NP-6111-JH4

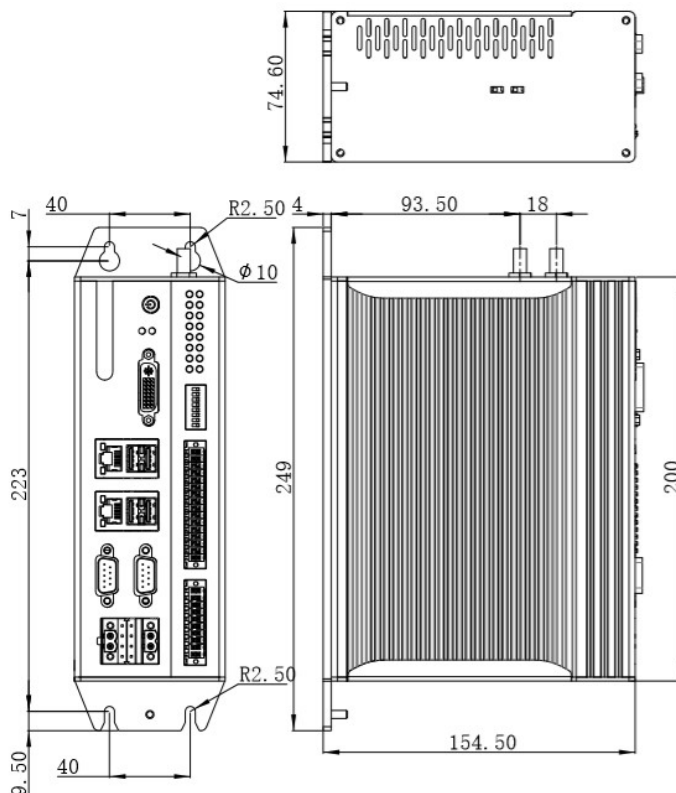
NP-6111-JH4 is designed for PLCs, process control and intelligent gateways with Intel Celeron, Atom series low-power processor, with multiple 485 and DI/DO extensions and access to DI/DO via Modbus RTU protocol.

1.1.1 Key Features

- ◆ 2 x Intel Gbe Lan controller
- ◆ 4 x USB3.0, 1x USB2.0 Type-A on board for dongle
- ◆ 2 x RS232/485, RS485 supports automatic data flow control
- ◆ 8 x isolated DI, 4 x Relay DO (normally open)
- ◆ 1x mini PCIe slot can be extended to Wifi, 3G/4G
- ◆ DC12 ~ 24V wide voltage input, with overcurrent, overvoltage and reverse connection protection
- ◆ Book-type or DIN-Rail mounting options
- ◆ Fully enclosed structure, no cable design, sturdy aluminum profile chassis with fan embedded.

1.1.2 Dimensions

Unit:mm

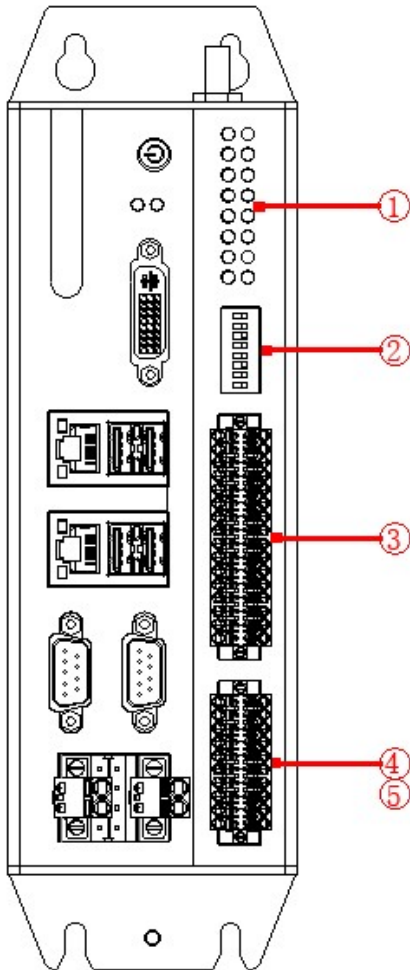


Dimension of NP-6111-JH4

1.1.3 Specifications

Model		NP-6111-JH4-J1900	NP-6111-JH4-E3845	NP-6111-JH4-J3455	
System	CPU	Intel® Celeron J1900, 2.0GHz, 4 cores/4 threads, 2MB L2 cache	Intel® Atom E3845, 1.91GHz, 4 cores/4 threads, 2MB L2 cache	Intel® Celeron J3455, 1.5~2.3GHz, 4 cores/4 threads, 2MB L2 cache	
	TDP	10W			
	BIOS	AMI UEFI 64Mbit			
	Memory	1 x SO-DIMM DDR3L-1333MHz (max. 8GB)			
	Storage	1 x mSATA bay			
	USB	1 x USB3.0, 3 x USB2.0		2 x USB3.0, 2 x USB2.0	
		1 x USB2.0 Type A on the board for USB dongle			
	COM	2 x COM(DB-9), selectable to support RS232 or RS485 mode by the switch, 8 x RS485(Phoenix Contators), RS485 support auto flow control,(ESD protection for RS232: Air gap ±8KV, Contact ±6KV)			
	DI	8 x DI NPN/PNP, isolated 2500 Vrms			
	DO	4 x Relay DO, Normally Open, 30VDC(I _{max} : 1.0A)/60VDC(I _{max} : 0.3A)/125VAC(I _{max} : 0.5A)			
	Ethernet	2 x Intel GbE LAN controller			
	DVI-D	Support up to 1920 x 1080 @ 60Hz			
	Expansions	1 x Full-size PCIe Mini slot with SIM card holder(with USB signal)			
	Watch Dog	1~255 levels programmable			
OS	Microsoft Windows	Windows 7, Windows 7 Embedded, Windows 10 IoT			
	Linux	Ubuntu, CentOS, Debian			
Power	Voltage Input	DC12~24V ±10%,overcurrent,overvoltage and polarity inverse protection			
	Power Consumption	Max. 45W			
Chassis	Structure	Aluminum-magnesium alloy BOX with fan embedded to assist cooling,Wall-mounted or DIN-Rail fixing style.			
	Dimensions	(L)200mm x (W)154.5mm x (H)74.6mm			
	Net Weight	2.1Kg			
Environ ment	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			

1.1.4 Connectors Definition



No.	Definition
1	Serial port transceiver status light
2	RS485 resistance dipswitch
3	RS485
4	DI
5	DO

NP-6111-JH4 Connectors Definition

1.1.4.1 RS485 COM Port

JH4 expansion board has 8 channels of isolated RS485 (COM3~COM10), which can be used via dip switches. The 8 channels of RS485 are connected via 32-pin phoenix terminals.

32 pin phoenix terminals are defined as follows

Pin No.	Signal	Description	Pin No.	Signal	Description
32	GND8	COM10 RS485 GND	31	GND8	COM10 RS485 GND
30	B8	COM10 RS485 Data-	29	A8	COM10 RS485 Data+
28	GND7	COM9 RS485 GND	27	GND7	COM9 RS485 GND
26	B7	COM9 RS485 Data-	25	A7	COM9 RS485 Data+
24	GND6	COM8 RS485 GND	23	GND6	COM8 RS485 GND
22	B6	COM8 RS485 Data-	21	A6	COM8 RS485 Data+
20	GND5	COM7 RS485 GND	19	GND5	COM7 RS485 GND
18	B5	COM7 RS485 Data-	17	A5	COM7 RS485 Data+
16	GND4	COM6 RS485 GND	15	GND4	COM6 RS485 GND
14	B4	COM6 RS485 Data-	13	A4	COM6 RS485 Data+
12	GND3	COM5 RS485 GND	11	GND3	COM5 RS485 GND
10	B3	COM5 RS485 Data-	9	A3	COM5 RS485 Data+
8	GND2	COM4 RS485 GND	7	GND2	COM4 RS485 GND
6	B2	COM4 RS485 Data-	5	A2	COM4 RS485 Data+
4	GND1	COM3 RS485 GND	3	GND1	COM3 RS485 GND
2	B1	COM3 RS485 Data-	1	A1	COM3 RS485 Data+

1. COM3~COM10 RS485 setting

Pin	Function
8	When ON, COM10 enables 120 ohm termination resistors, OFF is not available
7	When ON, COM9 enables 120 ohm termination resistors, OFF is not available
6	When ON, COM8 enables 120 ohm termination resistors, OFF is not available
5	When ON, COM7 enables 120 ohm termination resistors, OFF is not available
4	When ON, COM6 enables 120 ohm termination resistors, OFF is not available
3	When ON, COM5 enables 120 ohm termination resistors, OFF is not available
2	When ON, COM4 enables 120 ohm termination resistors, OFF is not available
1	When ON, COM3 enables 120 ohm termination resistors, OFF is not available

2. COM3~COM10 RS485 data transceiver status light

LED	Function
Tx8 Rx8	COM10 Tx8 blinks when sending data, Rx8 blinks when receiving data
Tx7 Rx7	COM9 Tx7 blinks when sending data, Rx7 blinks when receiving data
Tx6 Rx6	COM8 Tx6 blinks when sending data, Rx6 blinks when receiving data
Tx5 Rx5	COM7 Tx5 blinks when sending data, Rx5 blinks when receiving data
Tx4 Rx4	COM6 Tx4 blinks when sending data, Rx4 blinks when receiving data
Tx3 Rx3	COM5 Tx3 blinks when sending data, Rx3 blinks when receiving data
Tx2 Rx2	COM4 Tx2 blinks when sending data, Rx2 blinks when receiving data
Tx1 Rx1	COM3 Tx1 blinks when sending data, Rx1 blinks when receiving data

1.1.4.2 IO Signal terminals

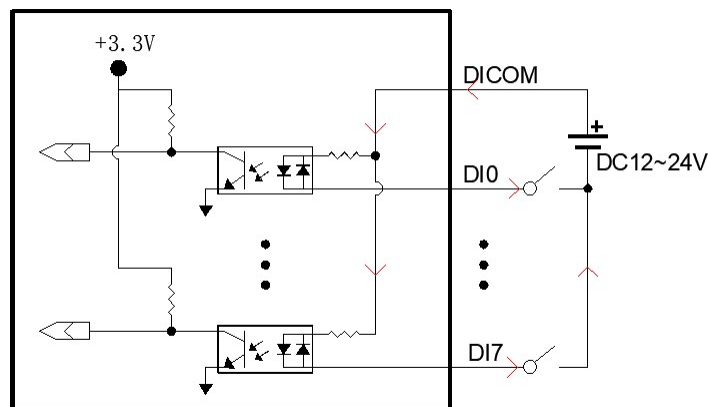
JH4 with 20-pin phoenix terminals for 8 isolated DI and 4 relay outputs, The DI supports wet contact or NPN access and the user can access the status of the DI/DO via Modbus RTU communication protocol, which are defined as follows.

Pin No.	Signal	Description	Pin No.	Signal	Description
20	DOCOM3	Relay output channel 3 common	19	DO3	Relay output channel 3
18	DOCOM2	Relay output channel 2 common	17	DO2	Relay output channel 2
16	DOCOM1	Relay output channel 1 common	15	DO1	Relay output channel 1
14	DOCOM0	Relay output channel 0 common	13	DO0	Relay output channel 0
12	DICOM	Digital input common	11	DICOM	Digital input common
10	DIGND	Digital input ground common	9	DIGND	Digital input ground common
8	DI7	Digital input channel 7	7	DI6	Digital input channel 6
6	DI5	Digital input channel 5	5	DI4	Digital input channel 4
4	DI3	Digital input channel 3	3	DI2	Digital input channel 2
2	DI1	Digital input channel 1	1	DI0	Digital input channel 0

1.1.4.2.1 DI

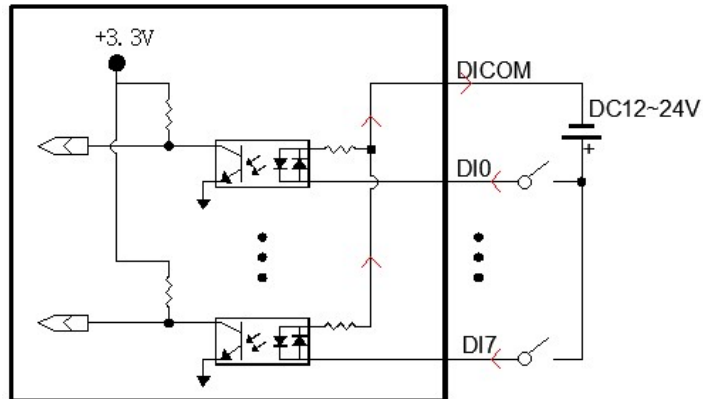
JH4 provides 8 opto-isolated digital inputs (isolation voltage 3750Vrms), with an opto-coupler conduction voltage of DC12V~24V, maximum voltage not exceeding DC30V. options with PNP and NPN wiring methods. The wiring diagram are as follows: :

- NPN connection in wet contact way:



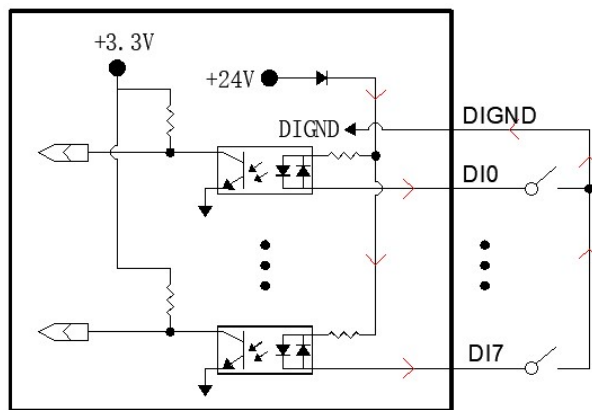
DI NPN connection in wet contact

- PNP connection in wet contact way:



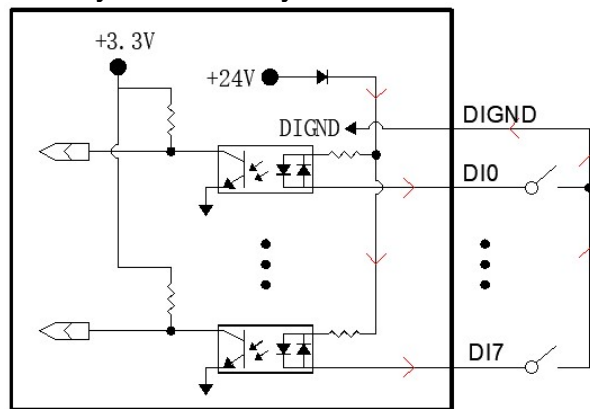
DI PNP connection in wet contact

- NPN connection in dry contact way:



DI NPN connection in dry contact

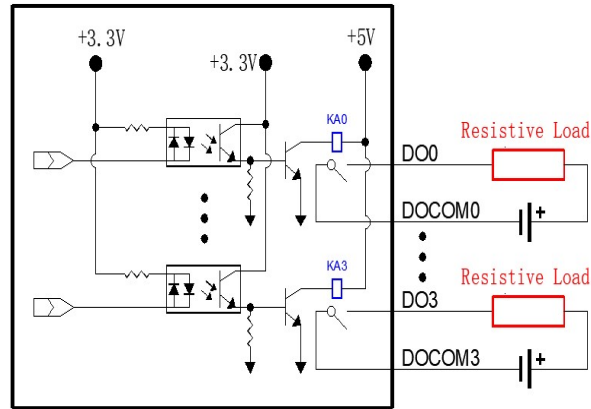
- PNP connection in dry contact way:



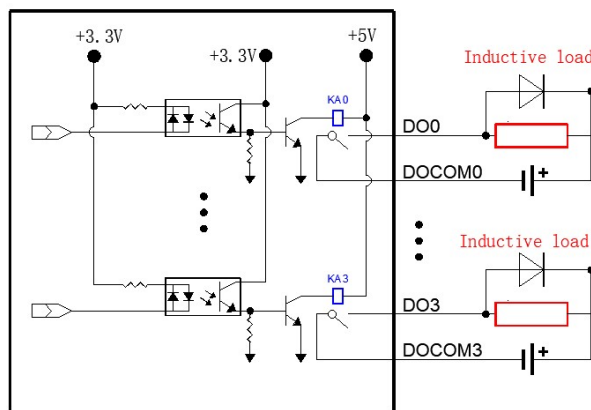
DI PNP connection in dry contact

1.1.4.2.2 DO

JH4 provides 4 normally open relay outputs, Relay size: 30VDC (max. current: 1.0A) / 60VDC (max. current: 0.3A) / 125VAC (max. current: 0.5A). For inductive loads a discharge diode must be connected in parallel between the output signal and DOGND.



DO Resistive load wiring diagram



DO Inductive load wiring diagram



The DO output load can't exceed the maximum allowable current and voltage of the relay, otherwise the relay will be damaged

1.1.4.2.3 Modbus RTU Register Definitions:

For easy access to the DIO, JH4's DIO supports the Modbus RTU protocol and the DO has a hot start output state hold function. When using Modbus RTU communication, the JH4 is a slave device. Its device address is 1 by default and is accessed by the host via COM11.

1. Communication parameters

- Baud rate: 115200
- Data bit: 8bit
- Stop bit: 1bit
- Parity check bit: None

The communication parameters are displayed using a 16-bit holding register, using 0x every 4 bits to indicate a parameter setting (0xPMRB), and:

P(Parity) means parity check, P=1 means no parity bit,
P=2 means odd parity bit P=3 means even parity bit

M: Communication mode, 0: RTU

R(Reserve): Retain default values, 0: 1 stop bit, 8 data bits

B(Baudrate): Baud rate index, Refer to the following table:

Baud rate	Set values					
	No parity bit		Odd parity bit		Even parity bit	
	Hexadecimal	Decimal	Hexadecimal	Decimal	Hexadecimal	Decimal
9600	0x1001	4097	0x2001	8193	0x3001	12289
19200	0x1002	4098	0x2002	8194	0x3002	12290
38400	0x1003	4099	0x2003	8195	0x3003	12291
57600	0x1004	4100	0x2004	8196	0x3004	12292
76800	0x1005	4101	0x2005	8197	0x3005	12293
115200	0x1006	4102	0x2006	8198	0x3006	12294

PS: Default communication parameter 0x1006: RTU communication mode, baud rate 115200, 1 stop bit, 8 data bits, no parity bits

2. Hot start function settings

The hot start function requires the setting of the 3rd function code, register 12. If you write 1 to the register will enable hot start, the device will automatically save the output state and the last output state will be maintained when the device is restarted. If you write 0 to the register, a cold start is used and the output status is not saved and will default to the cold start state after restart.

3. 4 way relay output setting

The 4 digital outputs are implemented via 4 A-type relays as output channels. The output settings can be set via registers 1 to 4 of the 1st function code. Write 1 enables, write 0 does not enable, registers 1 to 4 correspond to each of the 4 output relays. For uniform control, set register 21 for function code 3, Refer to the following table for set values and output states:

D07	D06	D05	D04	D03	D02	D01	D00	Set value
X	X	X	X	0	0	0	0	0x0000
X	X	X	X	0	0	0	1	0x0001
X	X	X	X	0	0	1	0	0x0002
X	X	X	X	0	0	1	1	0x0003
X	X	X	X	0	1	0	0	0x0004
X	X	X	X	0	1	0	1	0x0005
X	X	X	X	0	1	1	0	0x0006
X	X	X	X	0	1	1	1	0x0007
X	X	X	X	1	0	0	0	0x0008
X	X	X	X	1	0	0	1	0x0009
X	X	X	X	1	0	1	0	0x000A
X	X	X	X	1	0	1	1	0x000B
X	X	X	X	1	1	0	0	0x000C
X	X	X	X	1	1	0	1	0x000D
X	X	X	X	1	1	1	0	0x000E
X	X	X	X	1	1	1	1	0x000F

PS: The set command must not be bigger than 0x00FF, otherwise it is invalid. x means the current product does not support

4. 8 digital inputs and filter function setting:

The digital input status can be read in the 2nd function code registers 1 to 8 respectively, a value of 1 means there is an input, a value of 0 means there is no input. To read all 8 DI states, read the 23rd register of the 3rd function code, the corresponding bit is 1 if there is an input, otherwise it is 0.

Each input channel is equipped with a special register for setting the filter time. DI0~DI7 Corresponding to the filter time setting registers for the 3rd function code, registers 31~38 Filter time unit is ms, the maximum is not more than 20ms, otherwise the setting is invalid.

5. DO Control Register

Function Code: 01/05

NO.	Address	Signal	Remark
1	00001	DO0	Write 1 to open the relay,write 0 to close it
2	00002	DO1	Write 1 to open the relay,write 0 to close it
3	00003	DO2	Write 1 to open the relay,write 0 to close it
4	00004	DO3	Write 1 to open the relay,write 0 to close it

6. DI Input register

Function Code: 02

NO.	Address	Signal	Remark
1	10001	DI0	1 with input,0 is no input
2	10002	DI1	1 with input,0 is no input
3	10003	DI2	1 with input,0 is no input
4	10004	DI3	1 with input,0 is no input
5	10005	DI4	1 with input,0 is no input
6	10006	DI5	1 with input,0 is no input
7	10007	DI6	1 with input,0 is no input
8	10008	DI7	1 with input,0 is no input

7. Parameter register

Function Code: 03/06

NO	Address	Description of data	Read/write	Remark
1	40001	Device ID	Read only	
2	40002	Device name character 1	Read only	
3	40003	Device name character 2	Read only	
4	40004	Device name character 3	Read only	
5	40005	Device name character 4	Read only	
6	40006	Device name character 5	Read only	
7	40007	Device hardware version number	Read only	
8	40008	Device hardware release number	Read only	
9	40009	Device firmware master version number	Read only	
10	40010	Device firmware compilation version number	Read only	
11	40011	Communication parameter	Read only	
12	40012	Hot start setting	Read/write	

13	40013	Reserved	-	
14	40014	Reserved	-	
15	40015	Reserved	-	
16	40016	Reserved	-	
17	40017	Reserved	-	
18	40018	Reserved	-	
19	40019	Reserved	-	
20	40020	Reserved	-	
21	40021	DO's output	Read/write	DO status acquisition and output control
22	40022	Reserved	-	
23	40023	Input status of DI	Read only	Each bit represents 1 input
24	40024	Reserved	-	
25	40025	Reserved	-	
26	40026	Reserved	-	
27	40027	Reserved	-	
28	40028	Reserved	-	
29	40029	Reserved	-	
30	40030	Reserved	-	
31	40031	DI0 filter time	Read/write	Unit ms,no filtering when 0,Max.20ms
32	40032	DI1 filter time	Read/write	Unit ms,no filtering when 0,Max.20ms
33	40033	DI2 filter time	Read/write	Unit ms,no filtering when 0,Max.20ms
34	40034	DI3 filter time	Read/write	Unit ms,no filtering when 0,Max.20ms
35	40035	DI4 filter time	Read/write	Unit ms,no filtering when 0,Max.20ms
36	40036	DI5 filter time	Read/write	Unit ms,no filtering when 0,Max.20ms
37	40037	DI6 filter time	Read/write	Unit ms,no filtering when 0,Max.20ms
38	40038	DI7 filter time	Read/write	Unit ms,no filtering when 0,Max.20ms
39	40039	Reserved	-	
40	40040	Reserved	-	