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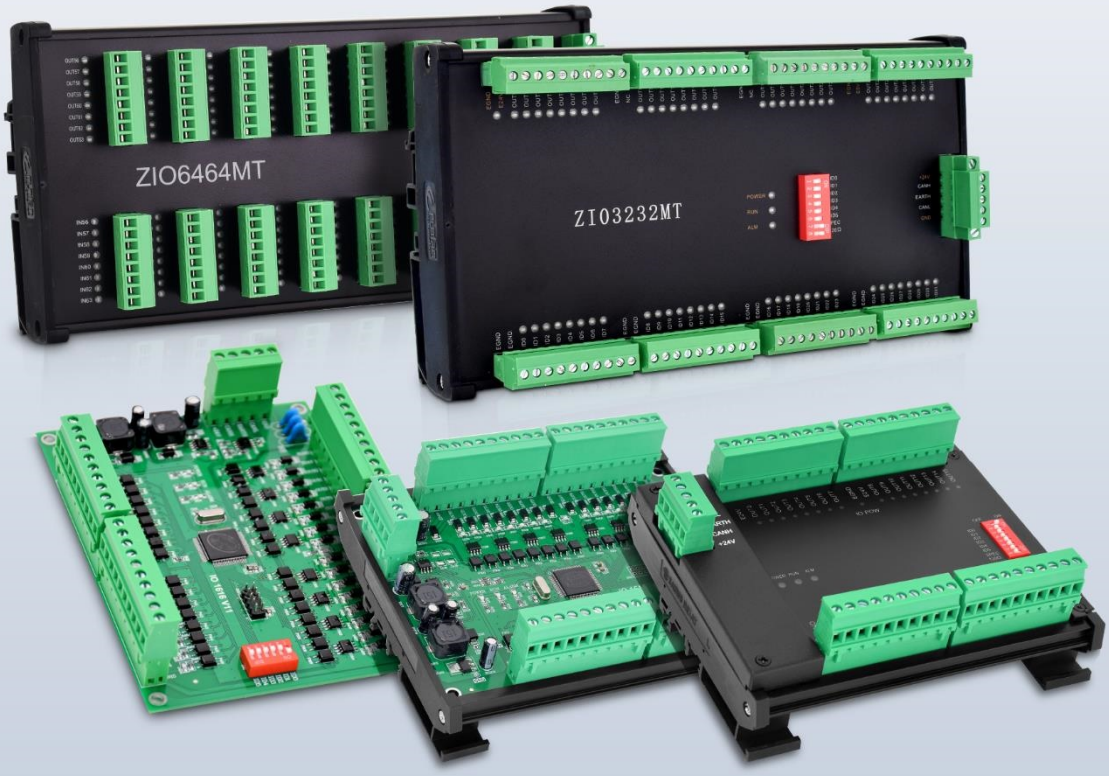
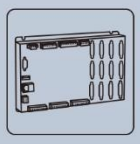
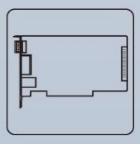
DO THE BEST TO USE MOTION CONTROL

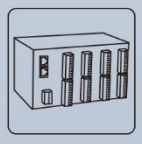
ZIO Bus Expansion Module




Vision Motion Controller


Motion Controller


Motion Control Card


IO Expansion Module


HMI

Foreword

The motion controller provides rich interface, and it has excellent motion control performance, which can meet the expansion requirements of various projects.

For details about the ZMC controller software and the introduction and routine of each command, please refer to the ZBASIC software manual.

Information contained in this manual is only for reference. Due to improvements in design and functions and other aspects, Zmotion Technology reserves the final interpretation! Subject to change without notice!

Pay attention to safety when debugging the machine!

Please be sure to design an effective safety protection device in the machine, and add an error handling program in the software, otherwise Zmotion has no obligation or responsibility for the loss caused.

In order to ensure the safe, normal and effective use of the product, please be sure to read this product manual carefully before installing and using the product.

Safety Statement

- This chapter describes the safety precautions required for the correct use of this product. Before using this product, please read the instructions for use and correctly understand the relevant information on safety precautions.
- This product should be used in an environment that meets the design specifications, otherwise it may cause equipment damage or personal injury, and malfunctions or component damage caused by failure to comply with relevant regulations are not within the scope of product quality assurance.
- Zmotion will not take any legal responsibility for personal safety accidents and property losses caused by failure to comply with the contents of this manual or illegal operation of products.

Safety Level Definition

According to the level, it can be divided into " Danger " and " Caution ". Failure to operate as required may result in moderate injury, minor injury or equipment damage.

Please keep this guide in a safe place for reading when needed, and be sure to hand this manual to the end user.

Install	
 Danger	◆ When the controller is disassembled, all external power supplies used by the system should be disconnected before operation, otherwise it may cause misoperation or damage to the equipment. ◆ It is forbidden to use in the following places: places with dust, oil fume, conductive dust, corrosive gas and flammable gas; places exposed to high temperature, condensation, wind and rain; places with vibration and shock. Electric shock, fire and misuse can cause product damage and deterioration.
 Notice	◆ Avoid metal shavings and wire ends falling into the hardware circuit board during installation. ◆ After installation, ensure that there are no foreign objects on the hardware circuit board. ◆ When installing, make it tightly and firmly with the mounting frame.

	◆ Improper installation of the controller may result in misoperation, failure and fire.
Wiring	
 Danger	◆ The specifications and installation methods of the external wiring of the equipment shall comply with the requirements of local power distribution regulations. ◆ When wiring, all external power supplies used by the system should be disconnected before operation. ◆ When powering on and running after the wiring work is completed, the terminals attached to the product must be installed. ◆ Cable terminals should be well insulated to ensure that the insulation distance between cables will not be reduced after the cables are installed on the terminal block.
 Notice	◆ Avoid metal shavings and wire ends falling into the hardware circuit board during installation. ◆ The cable connection should be carried out correctly on the basis of confirming the type of the connected interface. ◆ It should be confirmed that the cables pressed into the terminals are in good contact. ◆ Do not bundle the control wires and communication cables with the main circuit or power supply wires, etc., and the distance between the wires should be more than 100 mm, otherwise noise may cause malfunction. ◆ If the controller is not installed properly, it may cause electric shock or equipment failure or malfunction.

CONTENT

Chapter I Introduction

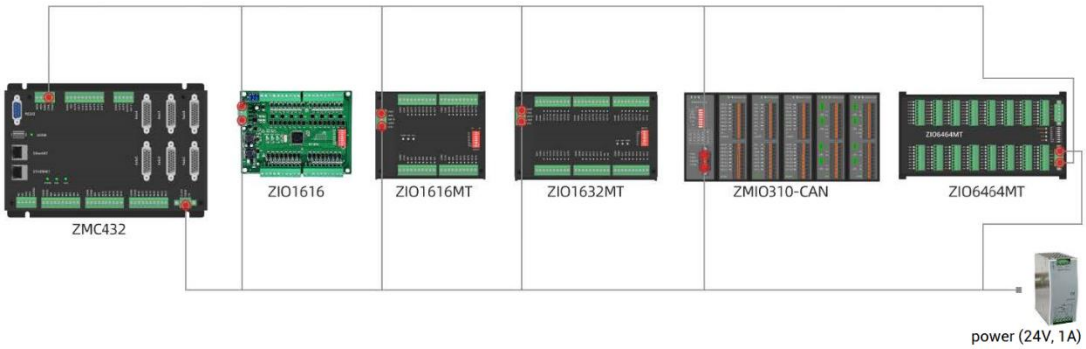
1.1. Product Introduction

ZIO series expansion modules use CAN bus to connect to controllers, when IO and other resources are not enough, an expansion module can be used to expand more resources. And controller can link with multiple ZIO series expansion modules or ZMIO310-CAN series expansion modules through CAN bus at the same time, and CAN expansion modules are distinguished through DIP. The resources of expansion module can be accessed by IO No. and axis No. after mapping controller program.

1.2. Function Features

- Digital expansion: there are 16 inputs and 16 outputs, 32 inputs and 32 outputs, 64 inputs and 64 outputs, etc., and there are several valid models, such as, PCB type, module type or modular cover type.
- Analog expansion: 8 inputs and 2 outputs, resolution is 12-bit, 0-10V.
- Axes expansion: one expansion module can expand 2 pulse axes at most.
- Some models are with IO state indication lights, which are convenient to check IO status.

1.3. System Architecture



1.4. Order Information

Model	Axis	IN	OUT	AD	DA	IO Type	Remark
ZIO0808	-	8	8	-	-	NPN	Model with module --ZIO0808M
ZIO0016	-	0	16	-	-	NPN	Model with module --ZIO0016M
ZIO1608	-	16	8	-	-	NPN	Model with module --ZIO1608M
ZIO1616	-	16	16	-	-	NPN	Model with module --ZIO1616M
ZIO1616-PNP	-	16	16	-	-	PNP	Model with module --ZIO1616M-PNP
ZIO1632	-	16	32	-	-	NPN	Model with module --ZIO1632M Model with Module & Cover --ZIO1632MT
ZIO16082	2	16	8	-	-	NPN	Model with module --ZIO16082M
ZIO6464MT	-	64	64	-	-	NPN	-
ZIO6464MT-PNP	-	64	64	-	-	PNP	-
ZIO3232MT	-	32	32	-		NPN	-
ZAIO0802	-	-	-	8	2	NPN	Model with module --ZAIO0802M

1.5. Work Environment

Item		Parameters
Work Temperature		-10℃-55℃
Work relative Humidity		10%-95% non-condensing
Storage Temperature		-40℃ ~ 80℃ (not frozen)
Storage Humidity		Below 90%RH (no frost)
vibration	Frequency	5-150Hz
	Displacement	3.5mm(directly install)(<9Hz)
	Acceleration	1g(directly install)(>9Hz)
	Direction	3 axial direction
Shock (collide)		15g, 11ms, half sinusoid, 3 axial direction
Degree of Protection		IP20

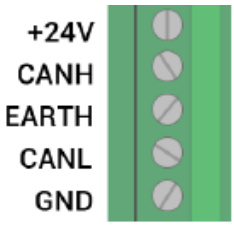
Chapter II Power, CAN, DIP Switch

2.1. Power input & CAN Communication Interface

The main power supply input adopts a 5Pin (there are all 3 terminals) screw-type pluggable wiring terminal. And this 5Pin terminal is shared by main power of expansion module and CAN communication.

IO power input is on digital IO output terminal, power is supplied by 24V DC power.

→ Terminal Definition:

Terminal	Name	Type	Function
	+24V	Input	Power 24V input
	CANH	Input/output	CAN differential data +
	EARTH	Earthing	Shield (safely and regularly grounding)
	CANL	Input/output	CAN differential data -
	GND	Input	Power ground
Note: Please supply +24V power and E24V power separately, that is, it is not recommended to use one power supply. Use two 24V outputs or use one power supply that can supply 2 isolated 24V power.			

Terminal	Name	Type	Function
	EGND	Input	IO power ground
	E24V	Input	Power 24V input
Note: Please supply +24V power and E24V power separately, that is, it is not recommended to use one power supply. Use two 24V outputs or use one power supply that can supply 2 isolated 24V power.			

2.1.1. Power Specification

→ Specification (Main power)

Item	Description
Voltage	DC24V (-5%~5%)
Current to open	≤0.5A
Current to work	≤0.4A
Anti-reverse connection	YES
Overcurrent Protection	YES

→ Specification (IO power)

Item	Description		
IO type	NPN Type	PNP Type	
Voltage	DC24V (-5%~5%)	DC24V (-5%~5%)	
Current to work	≤0.5A	ZIO1616-PNP ≤5A	ZIO6464MT-PNP ≤20A
Anti-reverse connection	YES	YES	YES
Overcurrent Protection	YES	YES	YES

3.1.2. CAN Communication Specification & Wiring

The CAN interface of the controller adopts the standard CAN communication protocol, which mainly includes three ports, CANL, CANH and the public end. And it supports connecting CAN expansion modules and main controllers.

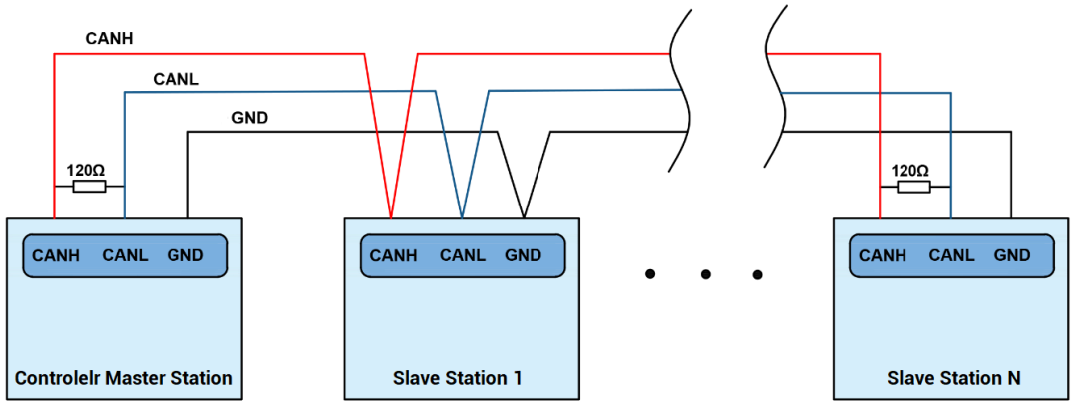
→ Specification

Item	Description
Max Communication Rate (bps)	1M
Terminal Resistor	120Ω
Topology	Daisy chain connection structure

The number of nodes can be extended	Up to 16
Communication Distance	Longer communication distance, lower communication rate, max 100m is recommended.

→ Wiring Reference

Connect the CANL and CANH of the standard CAN module to the CANL and CANH of the other side correspondingly. And public ends of the CAN bus communication both parties are connected together. In CAN bus left and right sides, connect a 120Ω resistor respectively (please see below graphic).



→ Wiring Notes:

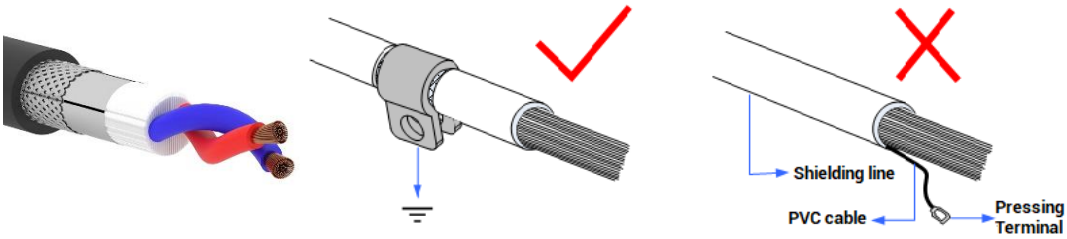
- As above, the daisy chain topology is used for wiring (the star topology structure cannot be used). When the use environment is ideal and there are less nodes, the branch structure also can be used.
- Please connect a 120Ω terminal resistor in parallel to each end of the CAN bus for matching the circuit impedance and ensuring communication stability.
- Please be sure to connect the public ends of each node on the CAN bus to prevent the CAN chip from burning out.
- Please use STP (Shielded Twisted Pair), especially in bad environments, and make

sure the shielding layer is fully grounded.

- When on-site wiring, pay attention to make the distance between strong current and weak current, it is recommended for the distance to be more than 20cm.
- It should be noted that the equipment grounding (chassis) on the entire line must be good, and the grounding of the chassis should be connected to the standard factory ground pile.

→ Cable Requirements:

Shielded Twisted Pair, and the shielded cable is grounded.



3.1.3. Basic Usage Method

(1) Please follow the above wiring instructions to do power and CAN bus module wiring correctly.

(2) DIP switch assigns IO address and communication speed ratio. Assign the initial IO to the expansion module through the expansion module DIP switch 1-4, the first four DIP values are 0, the corresponding digital IO starting address is 16. The first four DIP values are 1, the corresponding digital IO starting address is 32, and so on. For details, refer to the "DIP Switch Description". DIP switch 5-6 to set the speed rate (the default rate of both the controller and the expansion module is 500kBPS), the terminal expansion module needs to turn ON the 8th bit of the DIP switch, that is, connect to a 120-ohm resistor.

(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

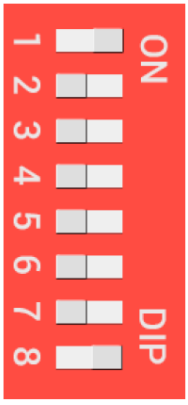
(5) After all the settings are completed, it is time to communicate, in “State the controller"--“CAN nodes", it will show information of expansion module.

Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

(6) Note that the "speed" settings of each node on the CAN bus must be consistent, and the "address" settings cannot cause conflicts, otherwise the "ALM" alarm light will be on, and the communication establishment will fail or the communication will be disordered.

2.2. DIP Switch Description

The CAN bus expansion module generally has an 8-bit DIP switch, dial ON to take effect, and the meaning of the DIP is as follows:

DIP Switch	DIP Code	Name	Description
	1	ID0	CAN address dial code
	2	ID1	CAN address dial code
	3	ID2	CAN address dial code
	4	ID3	CAN address dial code
	5	ID4	CAN speed dial code
	6	ID5	CAN speed dial code
	7	SPEC	Special function reserved
	8	120Ω	CAN 120Ω resistor dial code

1-4: they are used for ZCAN expansion module IO address mapping, the corresponding value is 0-15.

5-6: CAN communication speed, corresponding value is 0-3, four different speeds are optional.

7: special functions reserved (the bit 7 of ZIO3232MT is used to enable front 6-bit, when bit 7 is dialed as ON, front 6-bit take effect, when OFF, front 6-bit don't take effect).

8: 120 ohm resistor, dial ON that means a 120 ohm resistor is connected between CANL and CANH.

Use CANIO_ADDRESS to configure CAN address and CAN communication speed, CAN ID address corresponds to expansion IO No. range. The IO numbers of the entire control system cannot be repeated, and existed numbers must be avoided when mapping resources. And the DIP switch must be dialed well before power-on, if re-dial after power-on, it is invalid. It needs to be powered on again to take effect.

Dial 1-4 to select the CAN address, and the controller sets the IO number range of the corresponding expansion module according to the CAN DIP address. When each is dialed as OFF, the corresponding value is 0, when it is ON , it corresponds to a value of 1, and the address combination value = dial 4 × 8 + dial code 3 × 4 + dial code 2 × 2+ dial code 1.

The distribution of digital IO numbers corresponding to different dial IDs is as follows:

DIP 1-4 Combination Value	Starting IO No.	End IO No.
0	16	31
1	32	47
2	48	63
3	64	79
4	80	95
5	96	111
6	112	127
7	128	143
8	144	159
9	160	175
10	176	191
11	192	207
12	208	223
13	224	239
14	240	255
15	256	271

The allocation of digital IO numbers corresponding to different dial code IDs is as follows:

DIP 1-4 combination value	Starting AD No.	End AD No.	Starting DA No.	End DA No.
0	8	15	4	7
1	16	23	8	11
2	24	31	12	15
3	32	39	16	19
4	40	47	20	23
5	48	55	24	27
6	56	63	28	31
7	64	71	32	35
8	72	79	36	39
9	80	87	40	43
10	88	95	44	47
11	96	103	48	51
12	104	111	52	55
13	112	119	56	59
14	120	127	60	63
15	128	135	64	67

Dial code 5-6 to select CAN bus communication speed, speed combination value = dial code 6 × 2 + dial code 5×1, the combined value range is 0-3.

The corresponding speeds are as follows:

DIP 5-6 combination value	CANIO_ADDRESS high 8-bit value	CAN communication speed
0	0 (corresponds to decimal 128)	500KBPS (default value)
1	1 (corresponds to decimal 256)	250KBPS
2	2 (corresponding to decimal 512)	125KBPS
3	3 (corresponding to decimal 768)	1MBPS

CAN communication speed ratio configured by each node on CAN bus must be consistent.

The controller side sets the CAN communication speed through the CANIO_ADDRESS command. There are also four speed parameters that can be selected. The communication speed must be consistent with the communication speed of the expansion module that corresponds to the combination value, and then they can

communicate with each other.

The factory default communication speed is 500 KBPS on both sides, there is no need to set this, unless you need to change the speed.

The CANIO_ADDRESS command is a system parameter, and it can set the master-slave end of CAN communication. The default value of the controller is 32, that is, CANIO_ADDRESS=32 is the master end, and the slave end is set between 0-31.

The CAN communication configuration can be viewed in the "State the Controller" window.

There are 8 dial codes on IO board whose hardware version is above V1.3, 1-4 are to set CAN address, 5-6 are to set CAN speed, 7 means reserved, 8 means 120ohm resistor. Dial ON, the resistor is connected. For old versions, there is no bit 7 and bit 8, one 120ohm resistor is needed to connect externally.

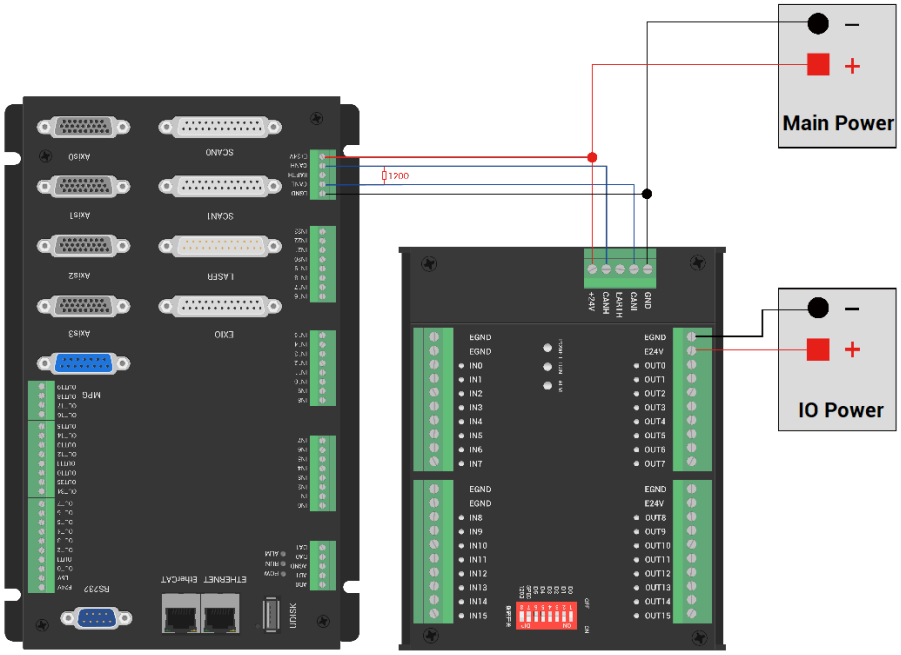
2.3. Expansion Module Wiring

The ZIO digital expansion module is powered by a dual power supply. Except the main power supply, an additional IO power supply is required to supply independent power for the IO. Both the main power supply and the IO power supply use 24V DC power supply. For ZAIO0802 analog module uses a single power supply, it only needs to connect to the main power supply.

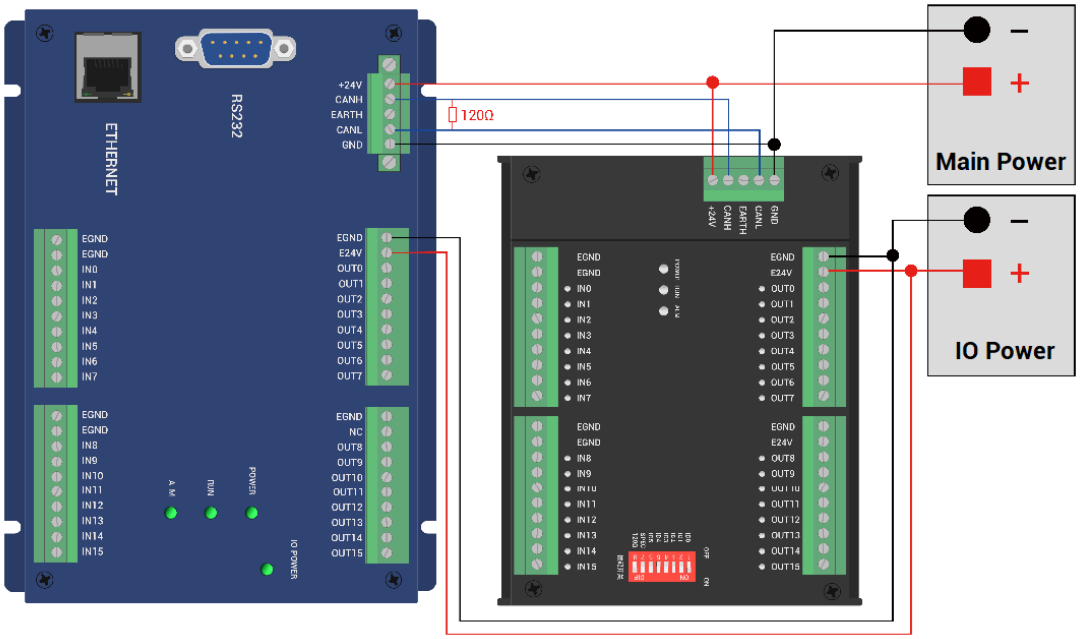
To prevent interference, separate the IO power supply from the main power supply.

Please select the expansion module according to the requirements, and select IO mapping or axis mapping according to the resources of the expansion module.

2.3.1. Single-Power Controller & Module Wiring



2.3.2. Dual-power Controller & Module Wiring



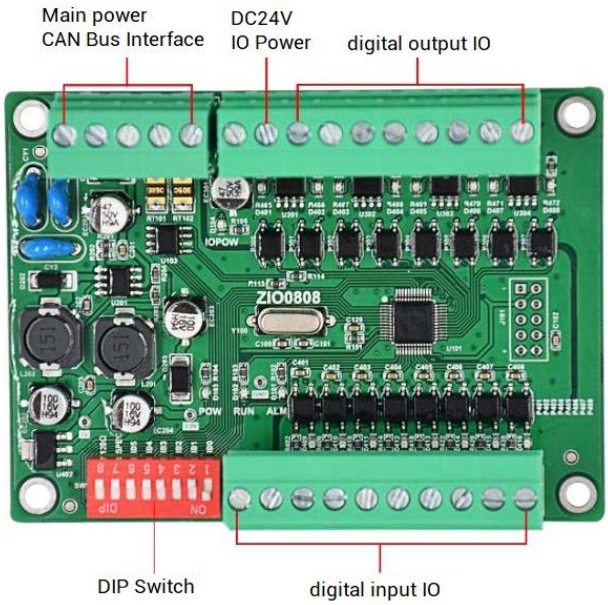
→ Wiring Note:

- ✧ When connecting multiple ZIO expansion modules on the CAN bus, a 120-ohm resistor needs to be connected in parallel between the CANL and CANH terminals, for the ZIO expansion module that is with 8-digit dialing codes, the terminal resistor can be realized by dialing the code (DIP).
- ✧ The maximum output current of output can reach 300mA, when the load exceeds the power, it is necessary to add relay.
- ✧ It is recommended that the internal power supply 24V and the external digital IO power supply 24V should be separately powered, and two 24V power supplies can be used, or a power supply that can provide two isolated 24V outputs. When the touch screen is connected through a serial port, the power supply of the touch screen is provided by the internal power supply 24V.
- ✧ Both sides of the CAN bus communication must ensure that the corresponding GND is connected or the main power supply of the controller and the main power supply of the expansion module use the same power supply.
- ✧ When the controller and the expansion module are powered by different power supplies, the ground of the main control power supply of the controller should be connected to the GND of the power supply of the expansion module, otherwise the CAN may be burned.

Chapter III Digital IO Expansion Module

3.1. ZIO0808

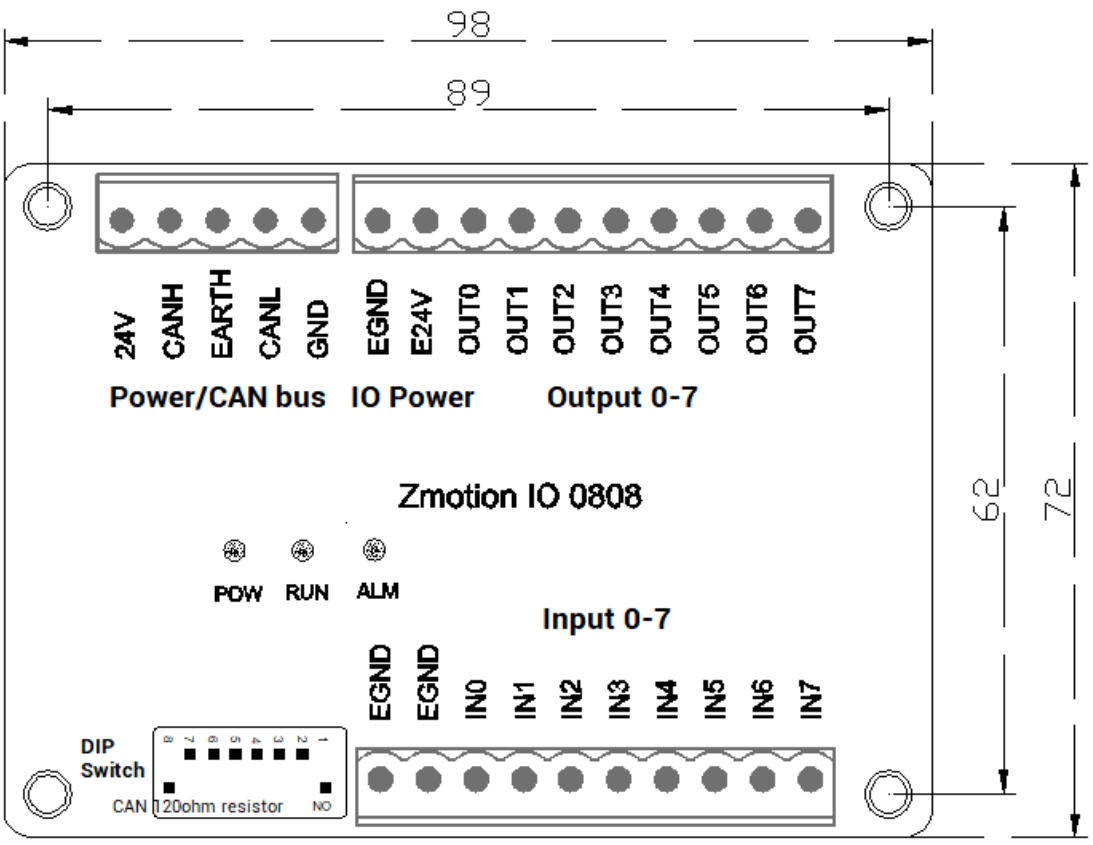
3.1.1. Interface Definition



Mark	Interface	Number	Description
IO POWER	Status Indication Led	1	IO power indicator: it lights when IO power conducted.
POWER		1	Power indicator: it lights when power is conducted.
RUN		1	Run indicator: it lights when runs normally
ALM		1	Error indicator: it lights when runs abnormally
Main power	Power communication terminal	1	24V DC power supplies power for expansion module to control communication circuit.
CAN bus		1	Connect to CAN expansion module or main controller
IO power	Digital output terminal	1	24V DC power supplies for IO.
Digital IO output		8	NPN leakage type
Digital input terminal		8	NPN type
DIP Switch		1	8 dial codes, CAN communication parameters can be customized when it is used by expansion module.

3.1.2. Hardware Installment

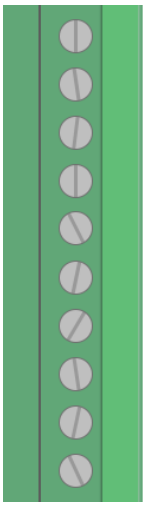
ZIO0808 expansion module adopts the horizontal installation method of screw fixing, and each expansion module should be installed with 4 screws for fastening.



→ Unit: mm →Installment Hole Diameter: 4.5mm →height: 35mm

3.1.3. IN Digital Input

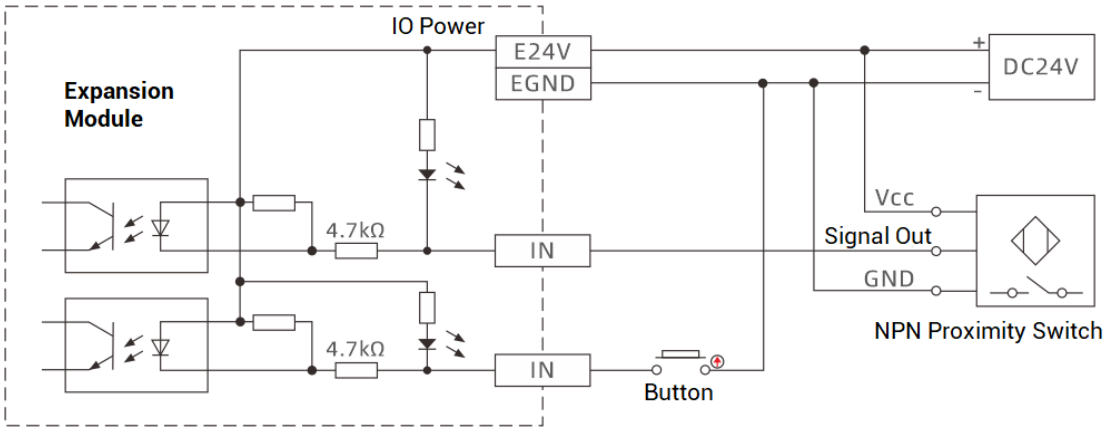
→ Wiring Definition

Terminal	Name	Type	Function 1
	EGND	/	IO power ground
	EGND	/	IO power ground
	IN0	NPN type, digital input	Input 0
	IN1		Input 1
	IN2		Input 2
	IN3		Input 3
	IN4		Input 4
	IN5		Input 5
	IN6		Input 6
	IN7		Input 7

→ Specification

Item	Digital Input (IN0-7)
Input mode	NPN type, it is triggered when there is low-electric level input
Frequency	< 5kHz
Impedance	4.7KΩ
Voltage level	DC24V
The voltage to open	<14.5V
The voltage to close	>14.7V
Minimal current	-1.8mA (negative)
Max current	-6mA (negative)
Isolation mode	optoelectronic isolation
Note: the above parameters are standard values when the voltage of controller power supply (E24V port) is 24V.	

→ Wiring Reference



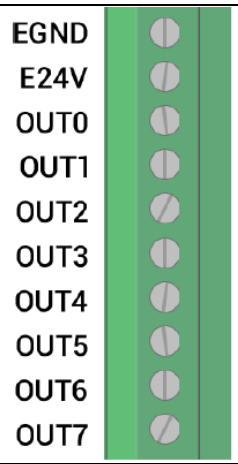
→ Wiring Note:

- The wiring principle of digital input IN (0-7) is shown in the figure above. The external signal source can be an optocoupler, a key switch or a sensor, etc., all can be connected as long as the requirements on output of electric level can be achieved.
- For the public end, please connect the "EGND" port on IO power supply to the "COM" terminal of the external input device. If the signal area power supply of the external device and the power supply of the controller are in the same power supply system, this connection also can be omitted.

3.1.4. OUT Digital Output

→ Wiring Definition

Terminal	Name	Type	Function 1
	EGND	/	IO power ground / IO Public End
	E24V	/	IO power input DC24V
	OUT0	NPN leakage type, digital output	Output 0
	OUT1		Output 1
	OUT2		Output 2
	OUT3		Output 3

	OUT4		Output 4
	OUT5		Output 5
	OUT6		Output 6
	OUT7		Output 7

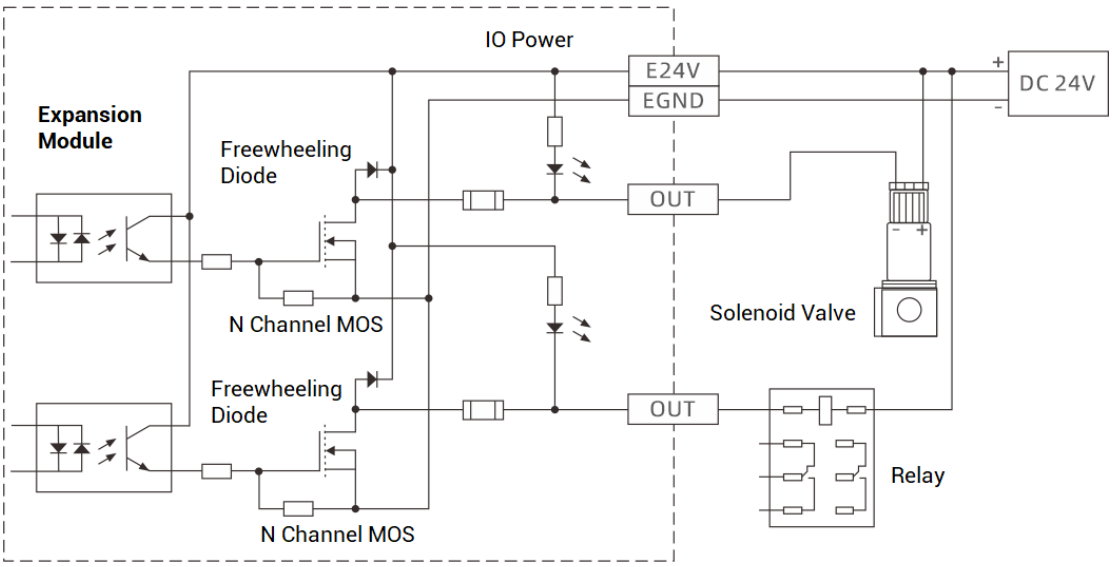
→ Specification

Item	Digital Output (OUT0-7)
Output mode	NPN leakage type, it is 0V when outputs
Frequency	< 8kHz
Voltage level	DC24V
Max output current	+300mA
Max leakage current when off	25μA
Respond time to conduct	12μs
Respond time to close	80μs
Overcurrent protection	Support
Isolation method	optoelectronic isolation

Note:

- ✧ The times in the form are typical based on the resistive load, and may change when the load circuit changes.
- ✧ Due to the leak-type output, the shutdown of the output will be obviously affected by the external load circuit, and the output frequency should not be set too high in the application. It is recommended to be lower than 8HKz. If there needs higher speed, please contact us to adjust parameter or custom hardware.

→ Wiring Reference



→ Wiring Note:

- The wiring principle of digital output OUT (0-7) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device. If the DC power supply of the external device and the controller power supply are in the same power supply system, this connection can also be omitted.

3.1.5. Expansion Module Usage

(1) Please follow the above wiring instructions to do power, CAN, and IO signal wiring correctly.

(2) Assign IO address and communication speed ratio through DIP switch.

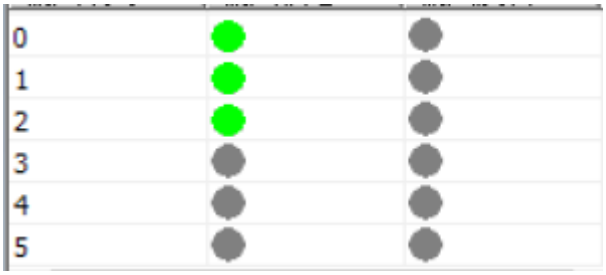
(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

(5) After all the settings are completed, it is time to communicate, in “State the controller"--“CAN nodes", it will show information of expansion module.

Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

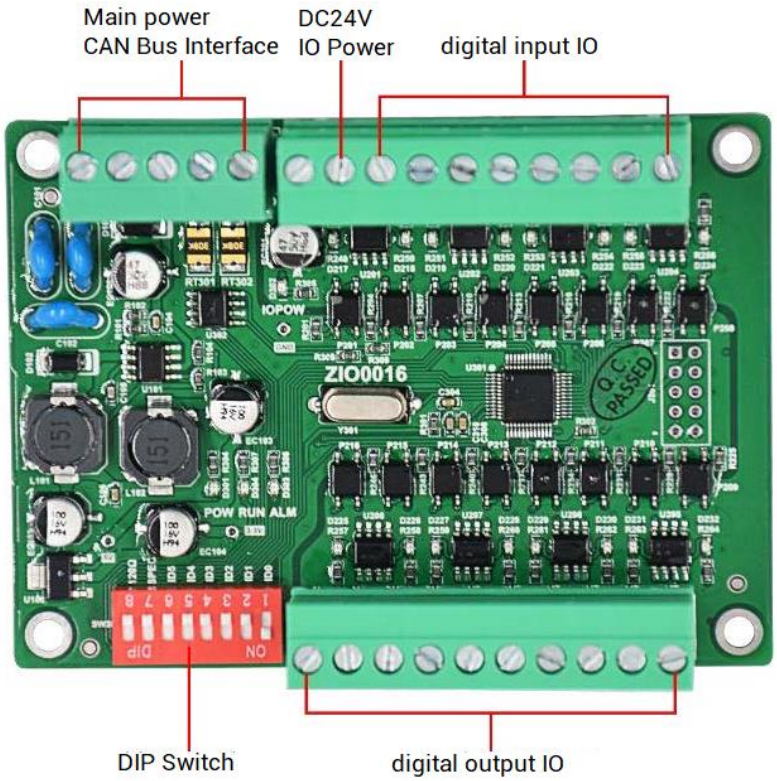
(6) State values of relative input ports can be read directly through “IN” command, also, it can be read through “ZDevelop/View/In". Please refer to “ZBasic" for details.



(7) Open or close output port directly through “OP" command, also, it can be opened or closed through “ZDevelop/View/Op". Please refer to “ZBasic" for details.

3.2. ZIO0016

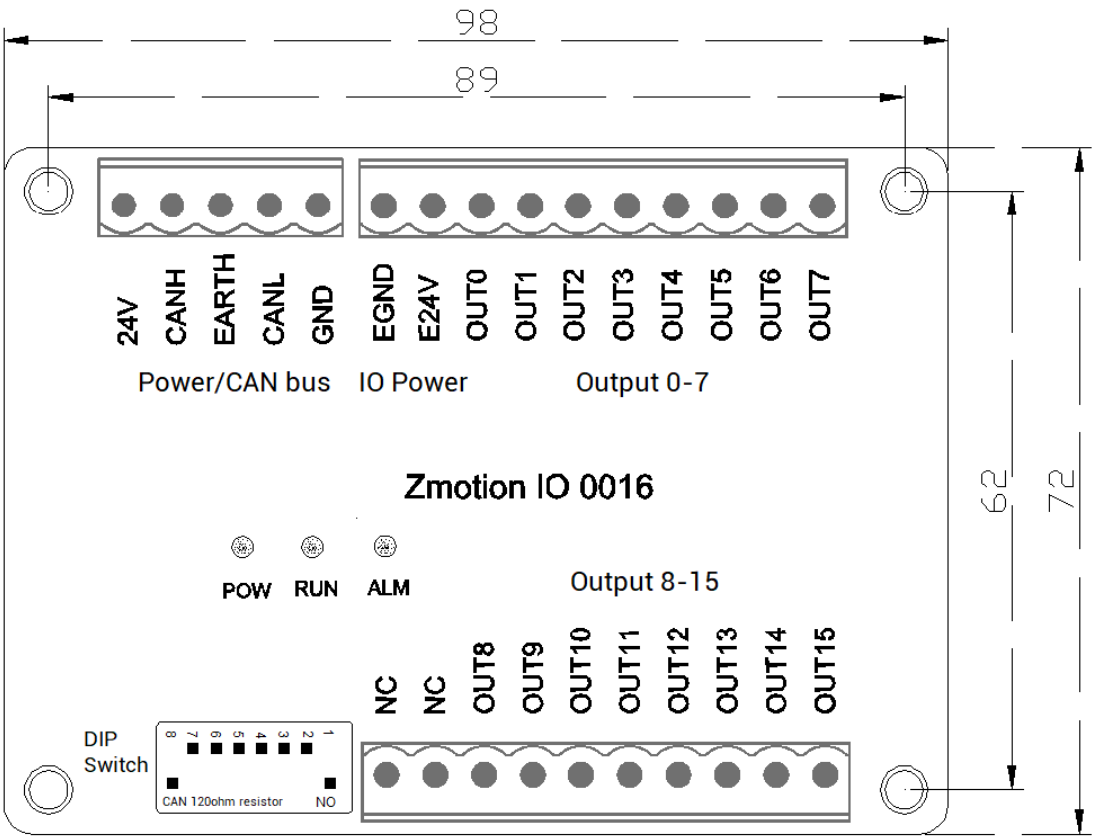
3.2.1. Interface Definition



Mark	Interface	Number	Description
IO POWER	Status Indication Led	1	IO power indicator: it lights when IO power conducted.
POWER		1	Power indicator: it lights when power is conducted.
RUN		1	Run indicator: it lights when runs normally
ALM		1	Error indicator: it lights when runs abnormally
Main power	Power communication terminal	1	24V DC power supplies power for expansion module to control communication circuit.
CAN bus		1	Connect to CAN expansion module or main controller
IO power	Digital output terminal	1	24V DC power supplies for IO.
Digital IO output		16	NPN leakage type.
DIP Switch		1	8 dial codes, CAN communication parameters can be customized when it is used by expansion module.

3.2.2. Hardware Installment

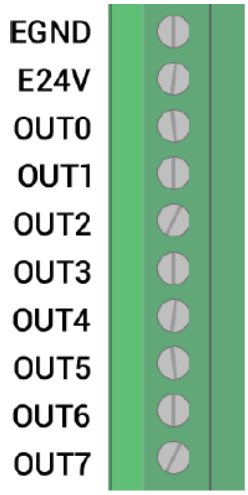
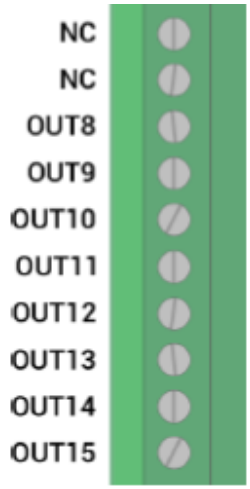
ZIO0016 expansion module adopts the horizontal installation method of screw fixing, and each expansion module should be installed with 4 screws for fastening.



→ Unit: mm →Installment Hole Diameter: 4.5mm →height: 35mm

3.2.3. OUT Digital Output

→ Wiring Definition

Terminal	Name	Type	Function 1
	EGND	/	IO power ground / IO Public End
	E24V	/	IO power input DC24V
	OUT0	NPN leakage type, digital output	Output 0
	OUT1		Output 1
	OUT2		Output 2
	OUT3		Output 3
	OUT4		Output 4
	OUT5		Output 5
	OUT6		Output 6
	OUT7		Output 7
	NC	/	Reserved
	NC	/	Reserved
	OUT8	NPN leakage type, digital output	Output 8
	OUT9		Output 9
	OUT10		Output 10
	OUT11		Output 11
	OUT12		Output 12
	OUT13		Output 13
	OUT14		Output 14
	OUT15		Output 15

→ Specification

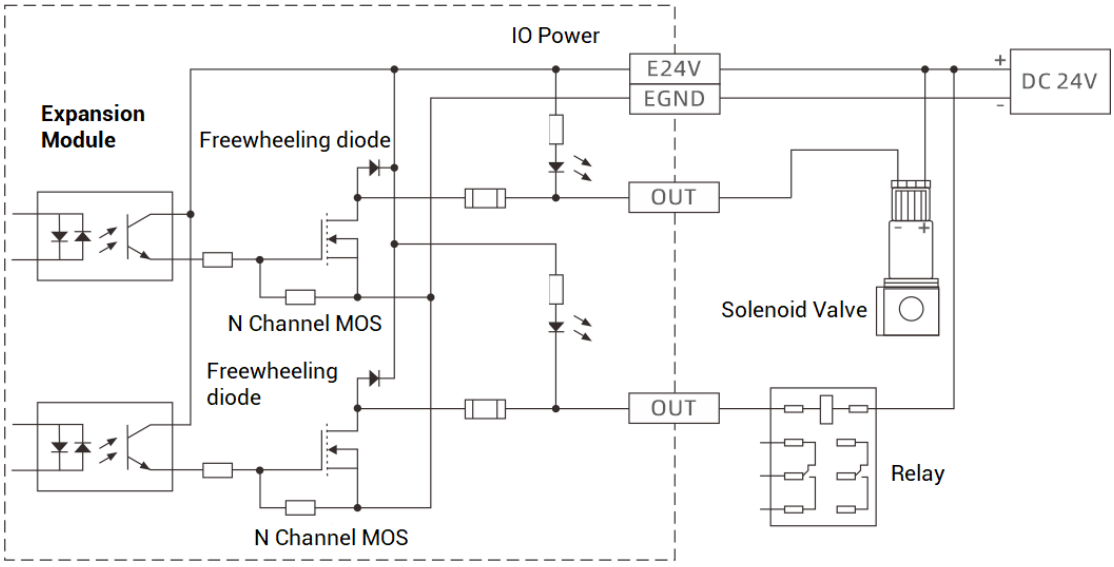
Item	Digital Output (OUT0-15)
Output mode	NPN leakage type, it is 0V when outputs
Frequency	< 8kHz
Voltage level	DC24V
Max output current	+300mA
Max leakage current when off	25μA

Respond time to conduct	12μs
Respond time to close	80μs
Overcurrent protection	Support
Isolation method	optoelectronic isolation

Note:

- ✧ The times in the form are typical based on the resistive load, and may change when the load circuit changes.
- ✧ Due to the leak-type output, the shutdown of the output will be obviously affected by the external load circuit, and the output frequency should not be set too high in the application. It is recommended to be lower than 8HKz. If there needs higher speed, please contact us to adjust parameter or custom hardware.

→ Wiring Reference



→ Wiring Note:

- The wiring principle of digital output OUT (0-15) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device. If the DC power supply of the external device and the controller power supply are in the same power supply system, this connection can also be omitted.

3.2.4. Expansion Module Usage

(1) Please follow the above wiring instructions to do power, CAN, and IO signal wiring correctly.

(2) Assign IO address and communication speed ratio through DIP switch.

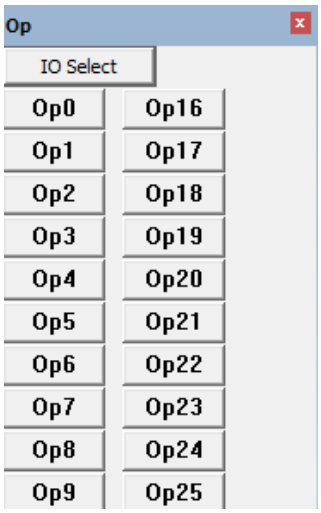
(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

(5) After all the settings are completed, it is time to communicate, in “State the controller"--“CAN nodes", it will show information of expansion module.

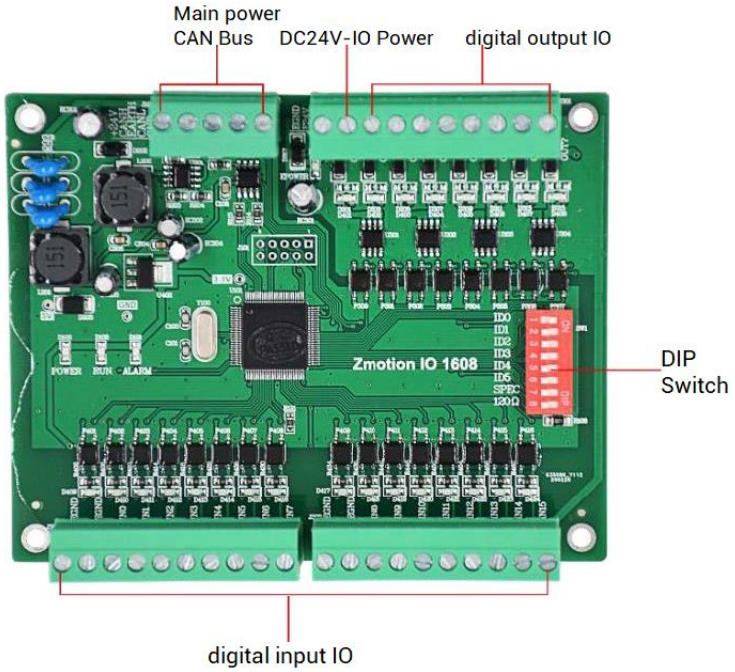
Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

(6) Open or close output port directly through “OP" command, also, it can be opened or closed through “ZDevelop/View/Op". Please refer to “ZBasic" for details.



3.3. ZIO1608

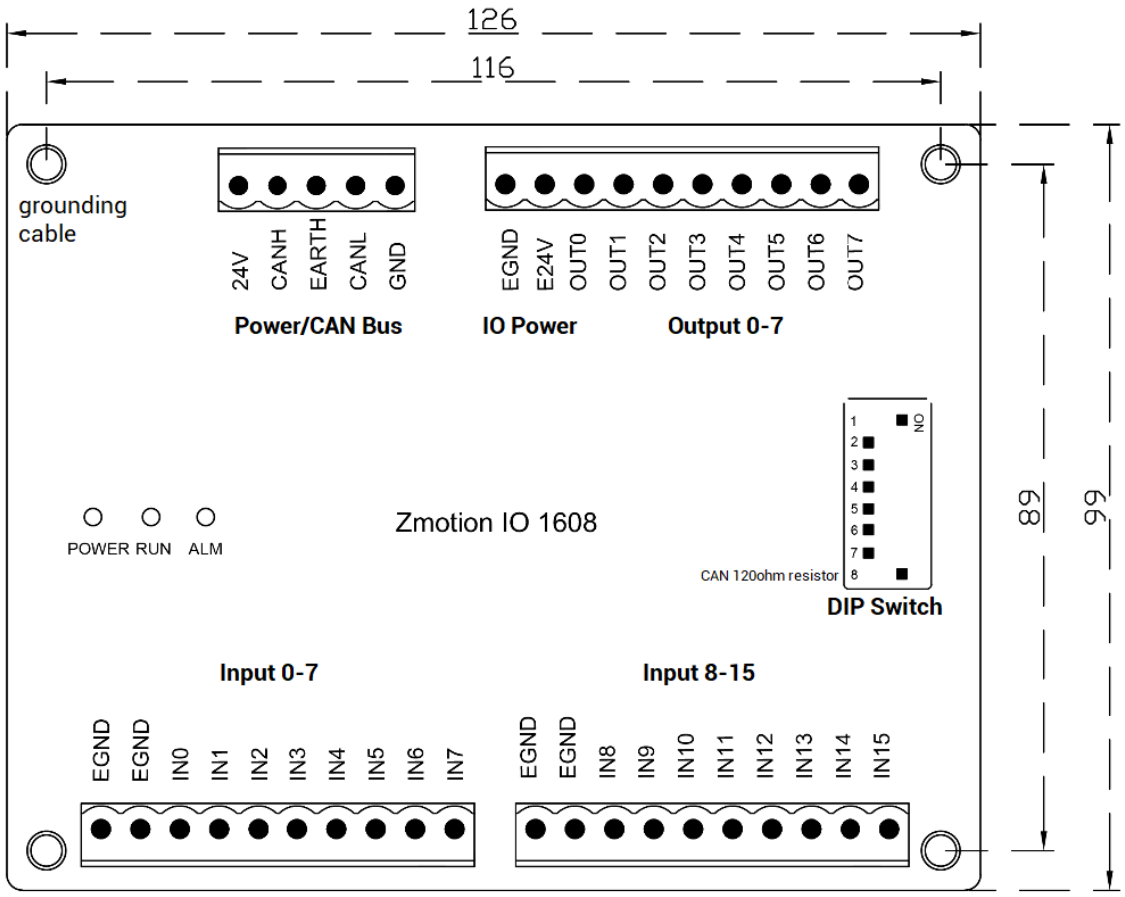
3.3.1. Interface Definition



Mark	Interface	Number	Description
IO POWER	Status Indication Led	1	IO power indicator: it lights when IO power conducted.
POWER		1	Power indicator: it lights when power is conducted.
RUN		1	Run indicator: it lights when runs normally
ALM		1	Error indicator: it lights when runs abnormally
Main power	Power communication terminal	1	24V DC power supplies power for expansion module to control communication circuit.
CAN bus		1	Connect to CAN expansion module or main controller
IO power	Digital output terminal	1	24V DC power supplies for IO.
Digital IO output		8	NPN leakage type
Digital input terminal		16	NPN type.
DIP Switch		1	8 dial codes, CAN communication parameters can be customized when it is used by expansion module.

3.3.2. Hardware Installment

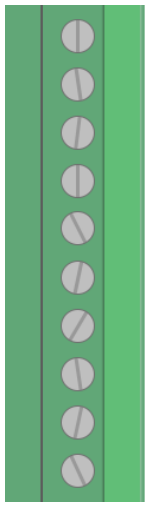
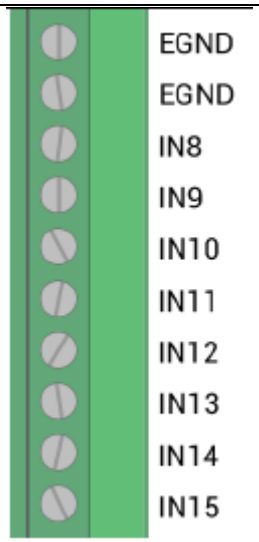
ZIO1608 expansion module adopts the horizontal installation method of screw fixing, and each expansion module should be installed with 4 screws for fastening.



→ Unit: mm →Installment Hole Diameter: 4.5mm →height: 35mm

3.3.3. IN Digital Input

→ Wiring Definition

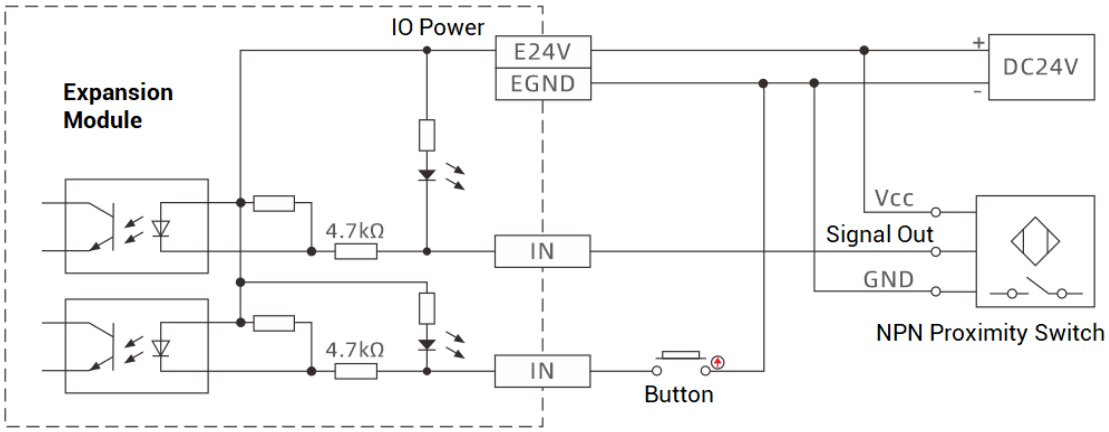
Terminal	Name	Type	Function 1
	EGND	/	IO power ground
	EGND	/	IO power ground
	IN0	NPN type, digital input	Input 0
	IN1		Input 1
	IN2		Input 2
	IN3		Input 3
	IN4		Input 4
	IN5		Input 5
	IN6		Input 6
	IN7		Input 7
	EGND	/	IO power ground
	EGND	/	IO power ground
	IN8	NPN type, digital input	Input 8
	IN9		Input 9
	IN10		Input 10
	IN11		Input 11
	IN12		Input 12
	IN13		Input 13
	IN14		Input 14
	IN15		Input 15

→ Specification

Item	Digital Input (IN0-15)
Input mode	NPN type, it is triggered when there is low-electric level input
Frequency	< 5kHz
Impedance	4.7KΩ
Voltage level	DC24V
The voltage to open	<14.5V

The voltage to close	>14.7V
Minimal current	-1.8mA (negative)
Max current	-6mA (negative)
Isolation mode	optoelectronic isolation
Note: the above parameters are standard values when the voltage of controller power supply (E+24V port) is 24V.	

→ Wiring Reference



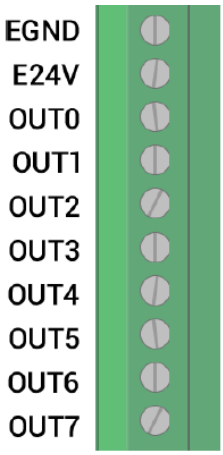
→ Wiring Note:

- The wiring principle of digital input IN (0-15) is shown in the figure above. The external signal source can be an optocoupler, a key switch or a sensor, etc., all can be connected as long as the requirements on output of electric level can be achieved.
- For the public end, please connect the "EGND" port on IO the power supply to the "COM" terminal of the external input device. If the signal area power supply of the external device and the power supply of the controller are in the same power supply system, this connection also can be omitted.

3.3.4. OUT Digital Output

→ Wiring Definition

Terminal	Name	Type	Function 1

	EGND	/	IO power ground / IO Public End
	E24V	/	IO power input DC24V
	OUT0	NPN leakage type, digital output	Output 0
	OUT1		Output 1
	OUT2		Output 2
	OUT3		Output 3
	OUT4		Output 4
	OUT5		Output 5
	OUT6		Output 6
	OUT7		Output 7

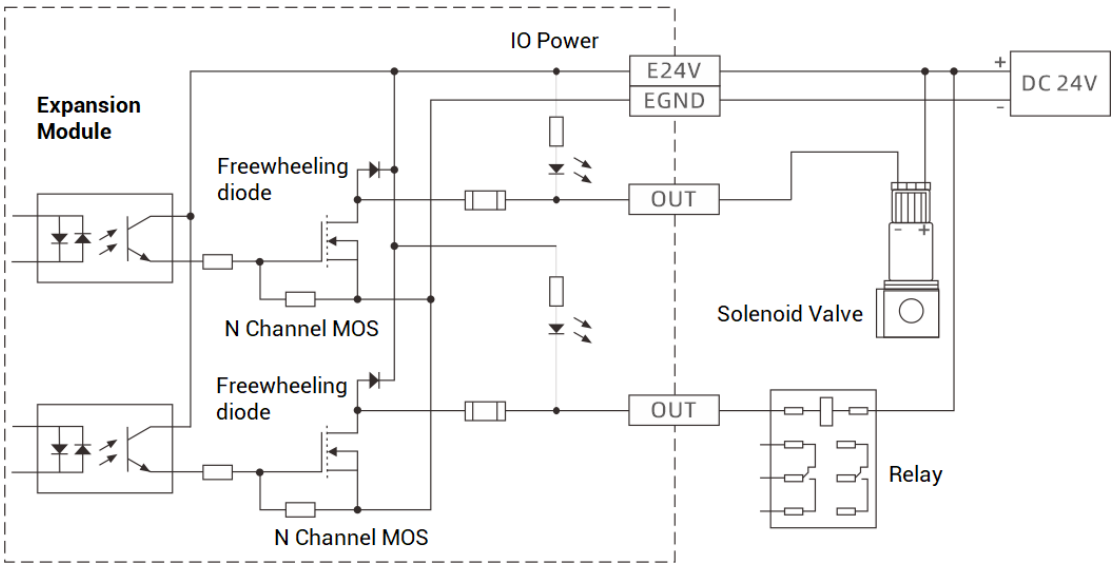
→ Specification

Item	Digital Output (OUT0-7)
Output mode	NPN leakage type, it is 0V when outputs
Frequency	< 8kHz
Voltage level	DC24V
Max output current	+300mA
Max leakage current when off	25μA
Respond time to conduct	12μs
Respond time to close	80μs
Overcurrent protection	Support
Isolation method	optoelectronic isolation

Note:

- ✧ The times in the form are typical based on the resistive load, and may change when the load circuit changes.
- ✧ Due to the leak-type output, the shutdown of the output will be obviously affected by the external load circuit, and the output frequency should not be set too high in the application. It is recommended to be lower than 8HKz. If there needs higher speed, please contact us to adjust parameter or custom hardware.

→ Wiring Reference



→ Wiring Note:

- The wiring principle of digital output OUT (0-7) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device. If the DC power supply of the external device and the controller power supply are in the same power supply system, this connection can also be omitted.

3.3.5. Expansion Module Usage

(1) Please follow the above wiring instructions to do power, CAN, and IO signal wiring correctly.

(2) Assign IO address and communication speed ratio through DIP switch.

(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

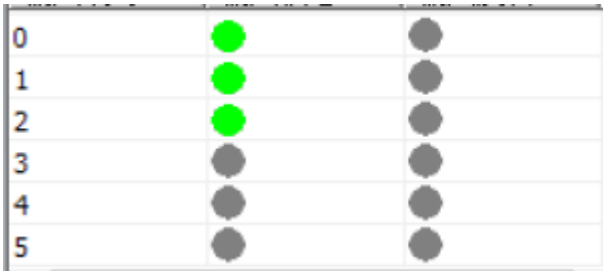
(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or

disable the internal CAN master function.

(5) After all the settings are completed, it is time to communicate, in “State the controller"--“CAN nodes", it will show information of expansion module.

Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

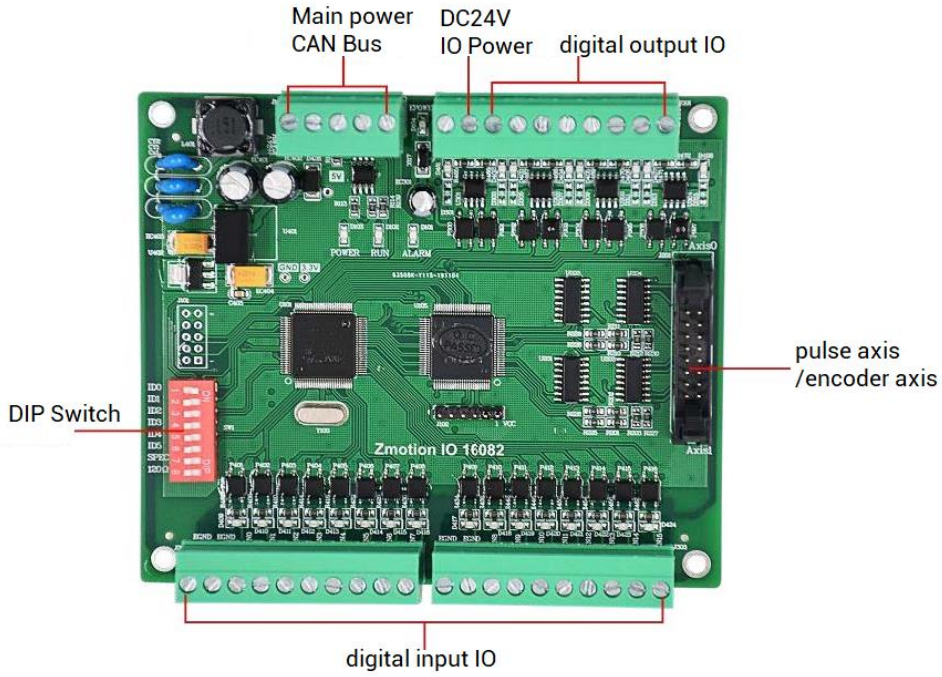
(6) State values of relative input ports can be read directly through “IN” command, also, it can be read through “ZDevelop/View/In". Please refer to “ZBasic" for details.



(7) Open or close output port directly through “OP" command, also, it can be opened or closed through “ZDevelop/View/Op". Please refer to “ZBasic" for details.

3.4. ZIO16082

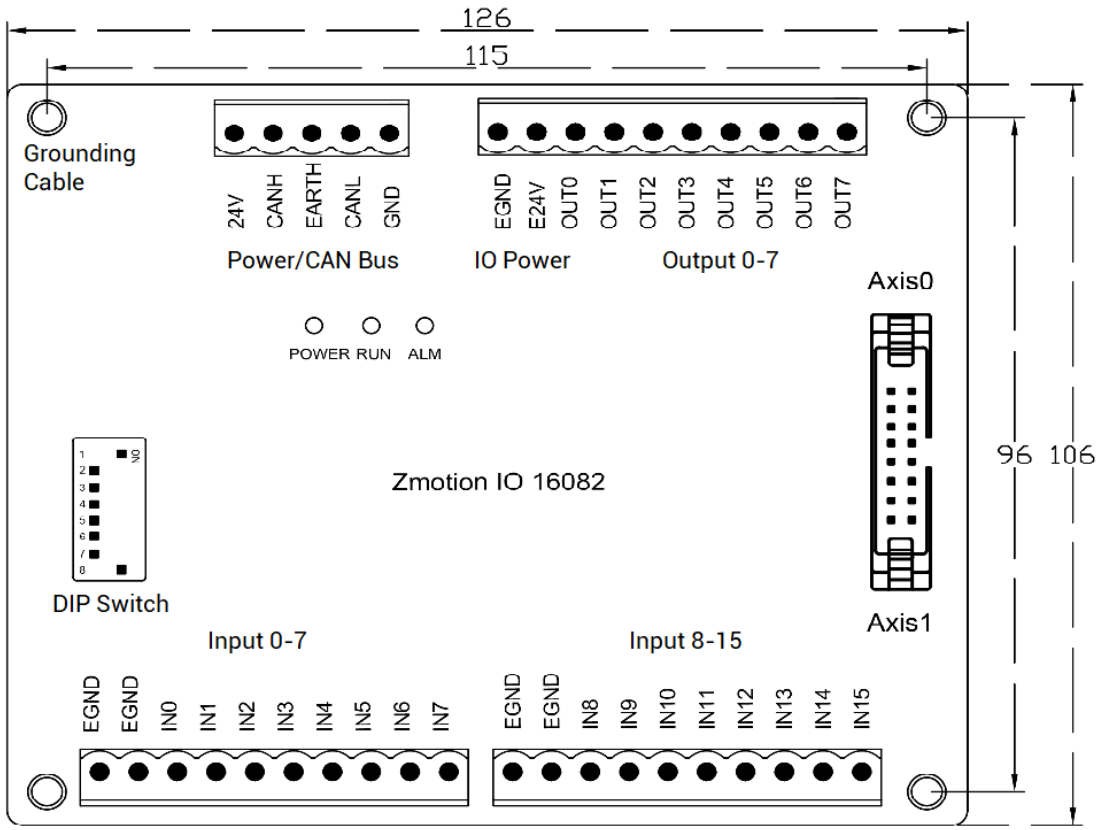
3.4.1. Interface Definition



Mark	Interface	Number	Description
IO POWER	Status Indication Led	1	IO power indicator: it lights when IO power conducted.
POWER		1	Power indicator: it lights when power is conducted.
RUN		1	Run indicator: it lights when runs normally
ALM		1	Error indicator: it lights when runs abnormally
Main power	Power communication terminal	1	24V DC power supplies power for expansion module to control communication circuit.
CAN bus		1	Connect to CAN expansion module or main controller
IO power	Digital output terminal	1	24V DC power supplies for IO.
Digital IO output		8	NPN leakage type.
Digital input terminal		16	NPN type
DIP Switch		1	8 dial codes, CAN communication parameters can be customized when it is used by expansion module.
Pulse axes		2	Each interface can be configured as differential pulse output or differential encoder input.

3.4.2. Hardware Installment

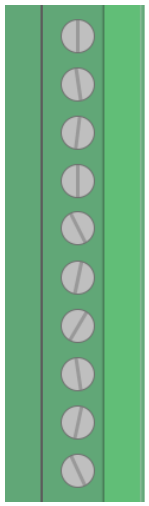
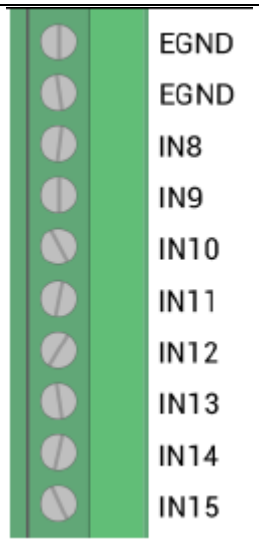
ZIO16082 expansion module adopts the horizontal installation method of screw fixing, and each expansion module should be installed with 4 screws for fastening.



→ Unit: mm →Installment Hole Diameter: 4.5mm →height: 35mm

3.4.3. IN Digital Input

→ Wiring Definition

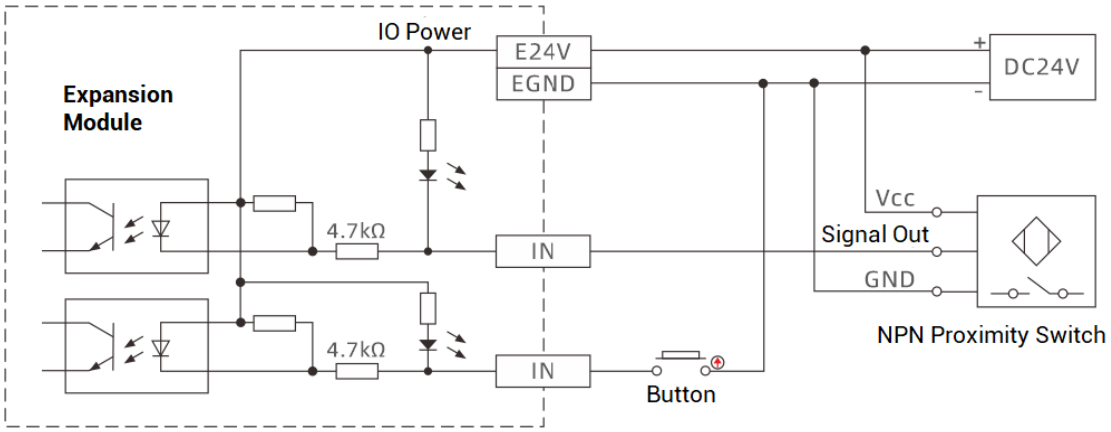
Terminal	Name	Type	Function 1
	EGND	/	IO power ground
	EGND	/	IO power ground
	IN0	NPN type, digital input	Input 0
	IN1		Input 1
	IN2		Input 2
	IN3		Input 3
	IN4		Input 4
	IN5		Input 5
	IN6		Input 6
	IN7		Input 7
	EGND	/	IO power ground
	EGND	/	IO power ground
	IN8	NPN type, digital input	Input 8
	IN9		Input 9
	IN10		Input 10
	IN11		Input 11
	IN12		Input 12
	IN13		Input 13
	IN14		Input 14
	IN15		Input 15

→ Specification

Item	Digital Input (IN0-15)
Input mode	NPN type, it is triggered when there is low-electric level input
Frequency	< 5kHz
Impedance	4.7KΩ
Voltage level	DC24V
The voltage to open	<14.5V

The voltage to close	>14.7V
Minimal current	-1.8mA (negative)
Max current	-6mA (negative)
Isolation mode	optoelectronic isolation
Note: the above parameters are standard values when the voltage of controller power supply (E24V port) is 24V.	

→ Wiring Reference



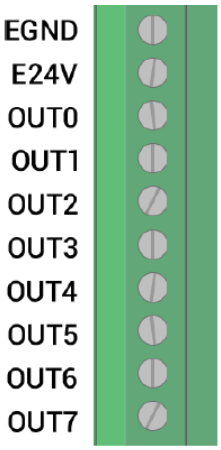
→ Wiring Note:

- The wiring principle of digital input IN (0-15) is shown in the figure above. The external signal source can be an optocoupler, a key switch or a sensor, etc., all can be connected as long as the requirements on output of electric level can be achieved.
- For the public end, please connect the "EGND" port on the IO power supply to the "COM" terminal of the external input device. If the signal area power supply of the external device and the power supply of the controller are in the same power supply system, this connection also can be omitted.

3.4.4. OUT Digital Output

→ Wiring Definition

Terminal	Name	Type	Function 1

	EGND	/	IO power ground / IO Public End
	E24V	/	IO power input DC24V
	OUT0	NPN leakage type, digital output	Output 0
	OUT1		Output 1
	OUT2		Output 2
	OUT3		Output 3
	OUT4		Output 4
	OUT5		Output 5
	OUT6		Output 6
	OUT7		Output 7

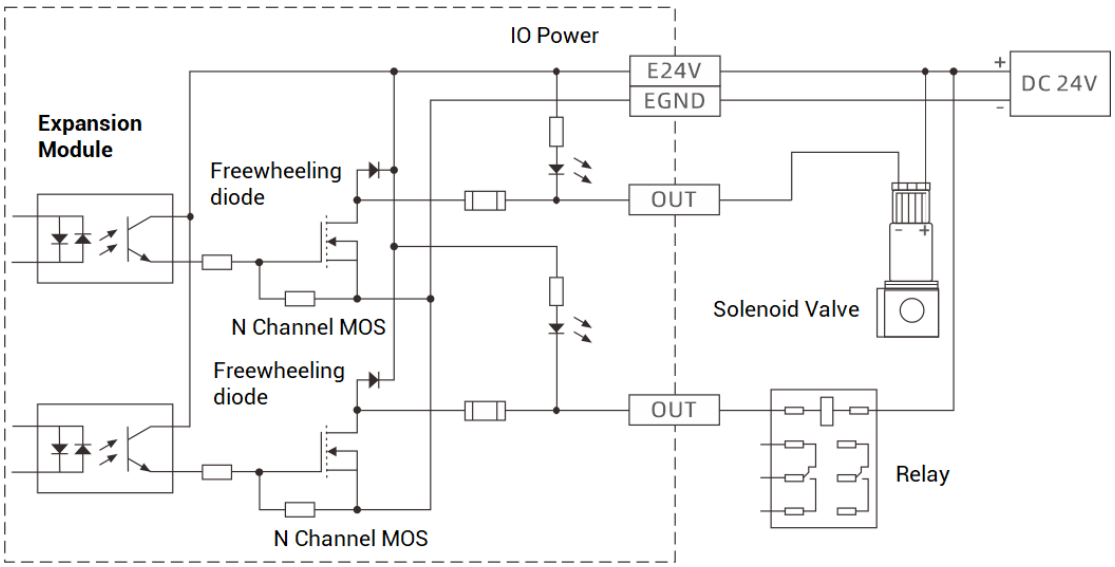
→ Specification

Item	Digital Output (OUT0-7)
Output mode	NPN leakage type, it is 0V when outputs
Frequency	< 8kHz
Voltage level	DC24V
Max output current	+300mA
Max leakage current when off	25μA
Respond time to conduct	12μs
Respond time to close	80μs
Overcurrent protection	Support
Isolation method	optoelectronic isolation

Note:

- ✧ The times in the form are typical based on the resistive load, and may change when the load circuit changes.
- ✧ Due to the leak-type output, the shutdown of the output will be obviously affected by the external load circuit, and the output frequency should not be set too high in the application. It is recommended to be lower than 8HKz. If there needs higher speed, please contact us to adjust parameter or custom hardware.

→ Wiring Reference



→ Wiring Note:

- The wiring principle of digital output OUT (0-7) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device. If the DC power supply of the external device and the controller power supply are in the same power supply system, this connection can also be omitted.

3.4.5. Expansion Module Usage

(1) Please follow the above wiring instructions to do power, CAN, and IO signal wiring correctly.

(2) Assign IO address and communication speed ratio through DIP switch.

(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

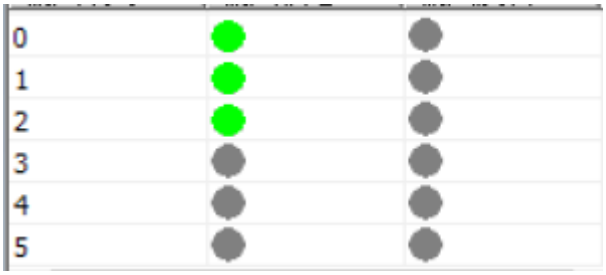
(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or

disable the internal CAN master function.

(5) After all the settings are completed, it is time to communicate, in “State the controller"--“CAN nodes", it will show information of expansion module.

Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

(6) State values of relative input ports can be read directly through “IN” command, also, it can be read through “ZDevelop/View/In". Please refer to “ZBasic" for details.



(7) Open or close output port directly through “OP" command, also, it can be opened or closed through “ZDevelop/View/Op". Please refer to “ZBasic" for details.

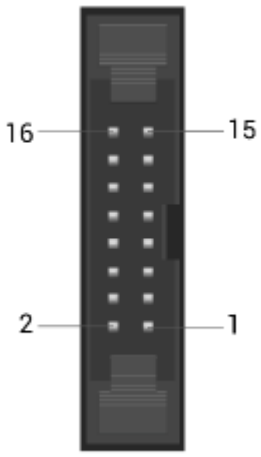
3.4.6. AXIS Interface Signal

This product provides 2 axis signal interfaces that integrate in one 16PIN horn

connector male socket. Each terminal provides 0V and +5V output, which can provide 5V power for the encoder.

Before the axis is used, firstly map, and bind axis No., then configure ATYPE parameter, axis can be configured as pulse axis or encoder axis.

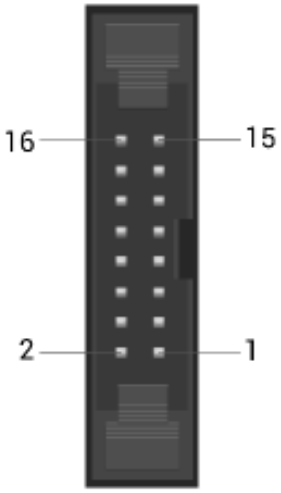
→ Interface Definition (Configure as Pulse-Axis)

Interface	Pin	Signal	Description
	1	PUL1+	Servo/stepper pulse output (differential signal)
	2	PUL1-	
	3	DIR1+	Servo/stepper directional output (differential signal)
	4	DIR-	
	5	GND	Negative pole of 5V power of pulse/encoder signal
	6	/	/
	7	/	/
	8	+5V	Positive pole of 5V power of pulse/encoder signal
	9	PUL0+	Servo/stepper pulse output (differential signal)
	10	PUL0-	
	11	DIR0+	Servo/stepper directional output (differential signal)
	12	DIR0-	
	13	GND	Negative pole of 5V power of pulse/encoder signal
	14	/	/
	15	/	/
	16	+5V	Positive pole of 5V power of pulse/encoder signal

Note:

- ✧ +5V is only used for communication between the controller and the servo driver, please do not use it as power supply for other places.
- ✧ PIN 1-8 are axis 1, PIN 9-16 are axis 0.

→ Interface Definition (Configure as Encoder-Axis)

Interface	PIN	Signal	Description
	1	EA1+	Encoder differential input signal A1+
	2	EA1-	Encoder differential input signal A1-
	3	EB1+	Encoder differential input signal B1+
	4	EB1-	Encoder differential input signal B1-
	5	GND	5V power (–) of pulse / encoder signal
	6	EZ1+	Encoder differential input signal Z1+
	7	EZ1-	Encoder differential input signal Z1-
	8	+5V	5V power (+) of pulse / encoder signal
	9	EA0+	Encoder differential input signal A0+
	10	EA0-	Encoder differential input signal A0-
	11	EB0+	Encoder differential input signal B0+
	12	EB0-	Encoder differential input signal B0-
	13	GND	5V power (–) of pulse / encoder signal
	14	EZ0+	Encoder differential input signal Z0+
	15	EZ0-	Encoder differential input signal Z0-
	16	+5V	5V power (+) of pulse / encoder signal

Note:

✧ +5V is only used for communication between the controller and the servo driver, please do not use it as power supply for other places.

✧ PIN 1-8 are axis 1, PIN 9-16 are axis 0.

3.4.6.1. Axis Interface Specification & Wiring

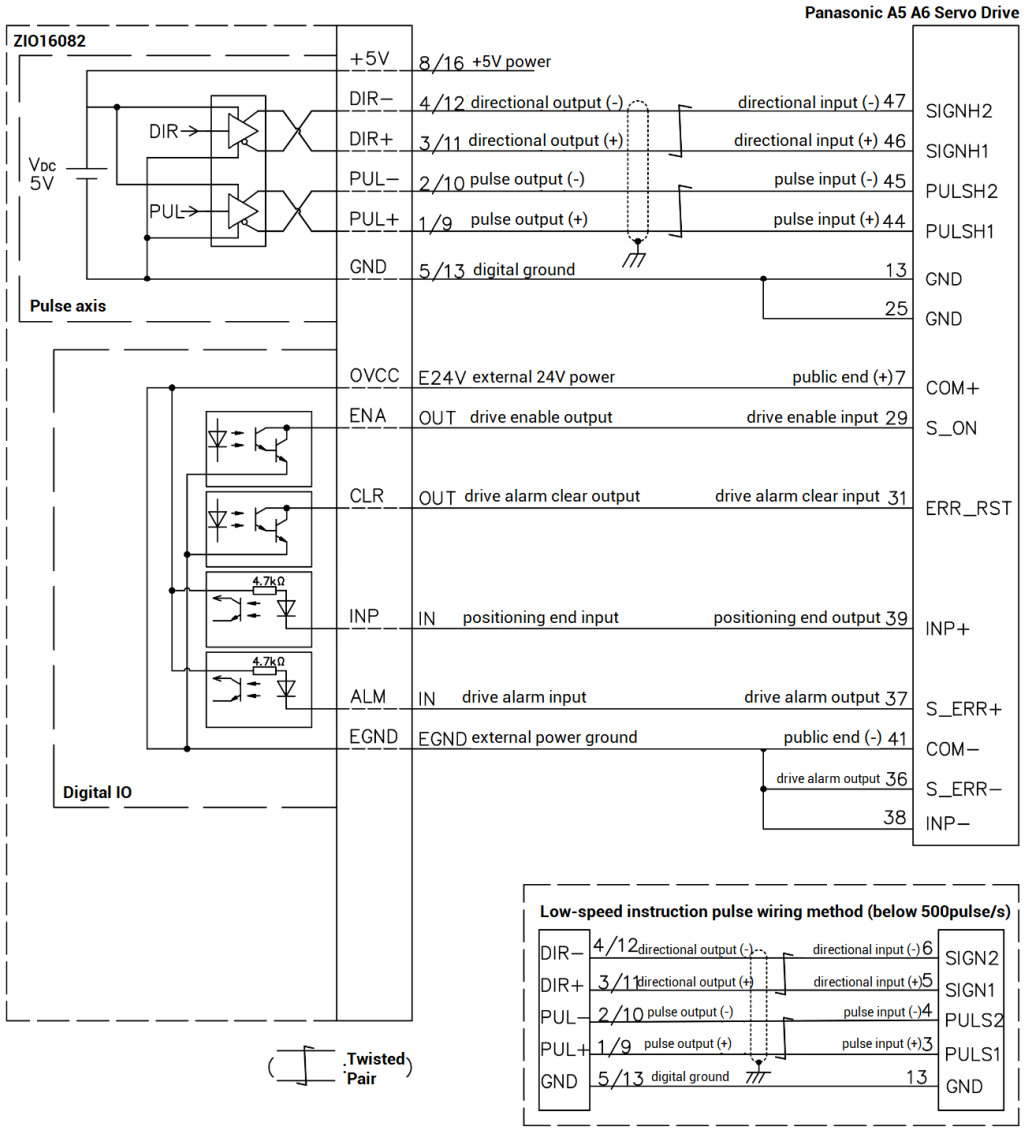
→ Specification

Signal	Item	Description
PUL/DIR	Signal type	Differential output signal
	Voltage range	0-5V
	Maximum frequency	5MHz
EA/EB/EZ	Signal type	Differential input signal

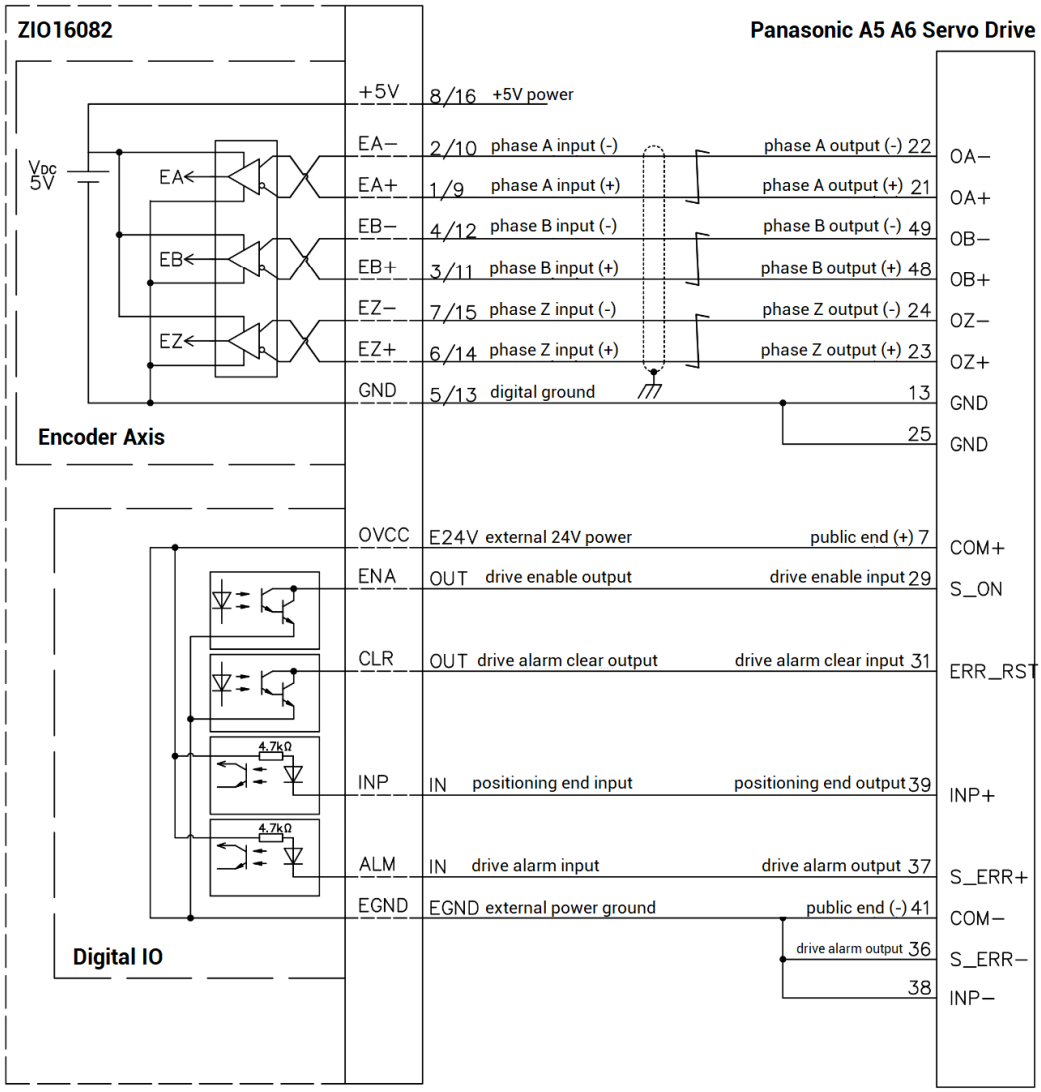
	Voltage range	0-5V
	Maximum frequency	5MHz
+5V, GND	Maximum output current for 5V	50mA

→ Wiring Reference

Reference example of wiring of pulse axis with Panasonic A5/A6 servo driver



Reference example of wiring of encoder axis with Panasonic A5/A6 servo driver:



→ Wiring Note:

✧ The wiring principle of the differential pulse axis interface is shown in the figure above, and the wiring methods of different types of drivers are different, please connect carefully.

✧ Please use STP (Shielded Twisted Pair), especially in bad environments, and make sure the shielding layer is fully grounded.

3.4.6.2. Basic Usage Method

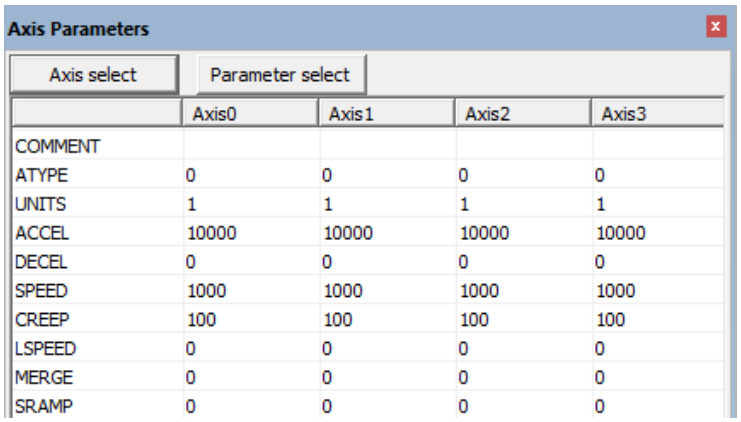
(1) Please follow the above wiring instructions to do CAN wiring correctly.

(2) After power on, please use ETHERNET or RS232 (default parameter, it can be connected directly) to connect to ZDevelop.

(3) It needs to map axis, using AXIS_ADDRESS instruction.

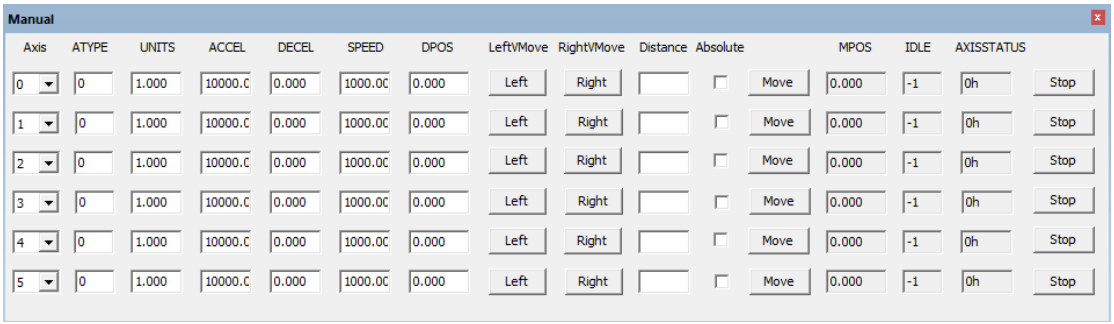
(4) Set axis parameters, such as, ATYPE, UNITS, SPEED, ACCEL, FWD_IN, REV_IN, etc.

(5) There are many parameters related to pulse axis, they can be set and checked through relative instructions, please see "axis parameter and axis status" of "ZBasic", or see "ZDevelop/View/Axis parameter".



	Axis0	Axis1	Axis2	Axis3
COMMENT				
ATYPE	0	0	0	0
UNITS	1	1	1	1
ACCEL	10000	10000	10000	10000
DECEL	0	0	0	0
SPEED	1000	1000	1000	1000
CREEP	100	100	100	100
LSPEED	0	0	0	0
MERGE	0	0	0	0
SRAMP	0	0	0	0

(6) Control corresponding motion through "View – Manual".



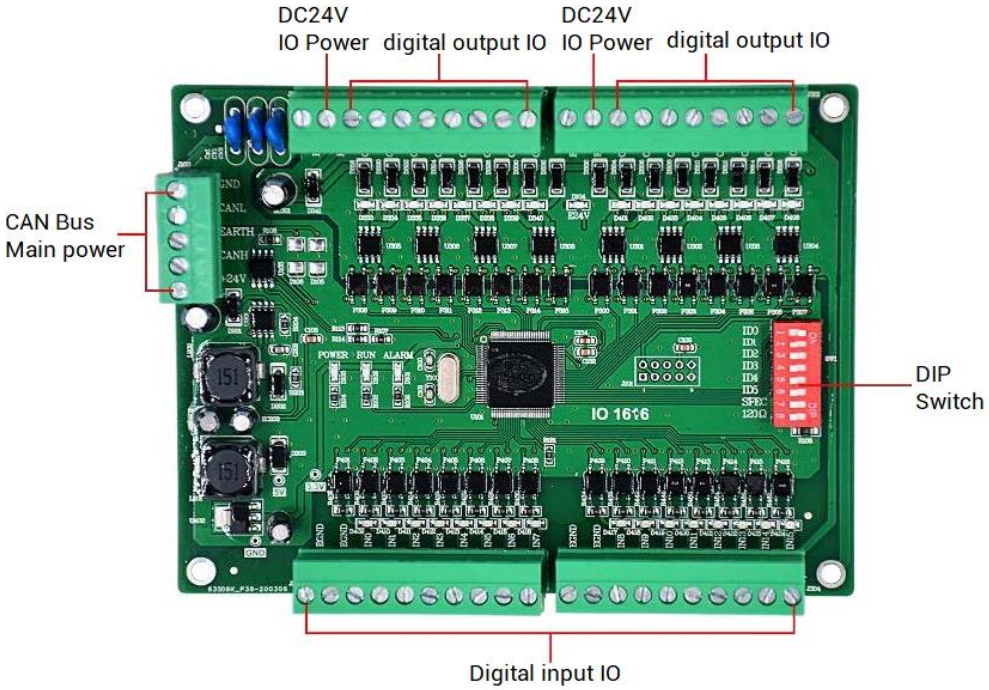
Refer to BASIC Routine:

```
BASE(6,7)                    'select axis 6 and axis 7
ATYPE = 0,0                  'set them as virtual axes
AXIS_ADDRESS(6)=1+(32*0)     'map axis 0 of ZCAN expansion module ID1 into axis 6
```

```
AXIS_ADDRESS(7)=1+(32*1)      ‘map axis 1 of ZCAN expansion module ID1 into axis 7
ATYPE = 8,8                   ‘set axis 6 and axis 7 as pulse axes expanded by ZCAN
UNITS = 1000,1000             'set pulse amount as 1000 pulses for axis 6, 7, the unit is Pulse
SPEED = 100,100               'set axis speed as 100*1000 pulse/s
ACCEL = 1000,1000             ‘set axis acceleration as 1000*1000 pulse/s/s
FWD_IN = -1,-1                'prohibit using axis positive hard position limit
REV_IN = -1,-1                'prohibit using axis negative hard position limit
MOVE(10) AXIS(6)              'axis 6 moves distance of 10*1000 pulses in positive
MOVE(-20) AXIS(6)             'axis 6 moves distance of 20*1000 pulses in negative
```

3.5. ZIO1616

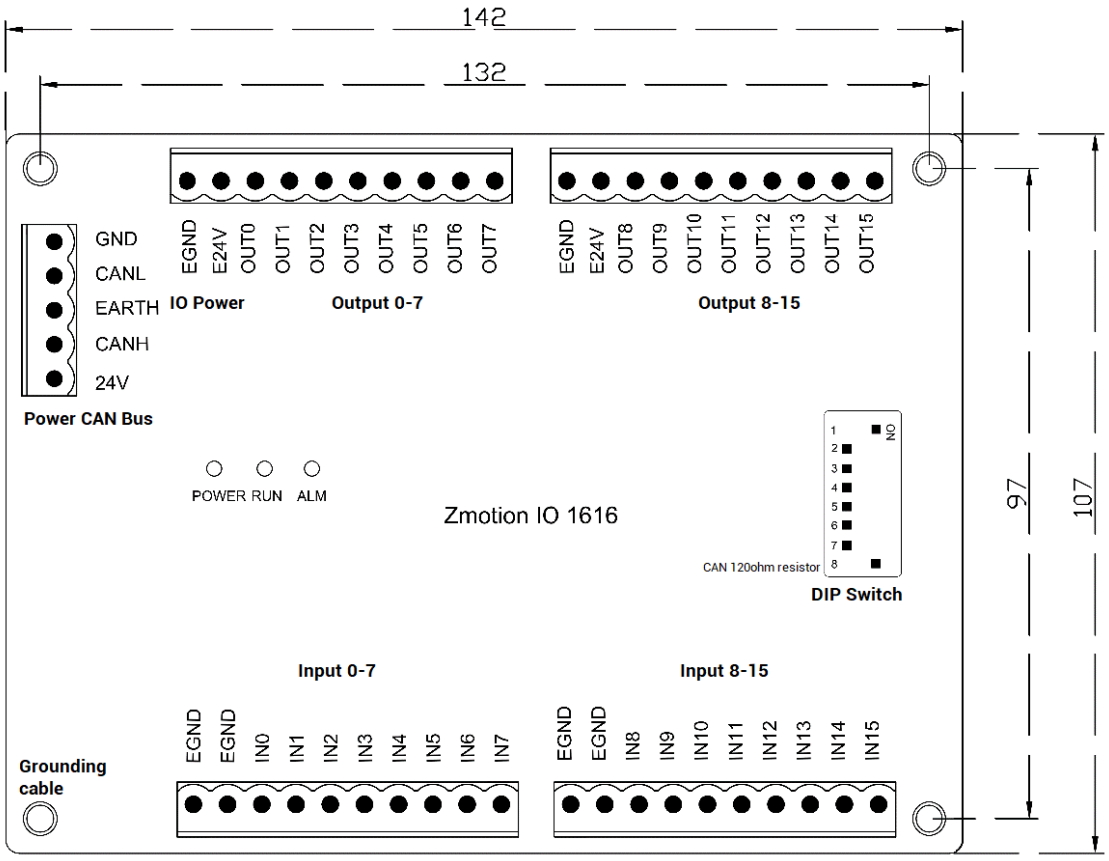
3.5.1. Interface Definition



Mark	Interface	Number	Description
IO POWER	Status Indication Led	1	IO power indicator: it lights when IO power conducted.
POWER		1	Power indicator: it lights when power is conducted.
RUN		1	Run indicator: it lights when runs normally
ALM		1	Error indicator: it lights when runs abnormally
Main power	Power communication terminal	1	24V DC power supplies power for expansion module to control communication circuit.
CAN bus		1	Connect to CAN expansion module or main controller
IO power	Digital output terminal	1	24V DC power supplies for IO.
Digital IO output		16	NPN leakage type.
Digital input terminal		16	NPN type.
DIP Switch		1	8 dial codes, CAN communication parameters can be customized when it is used by expansion module.

3.5.2. Hardware Installment

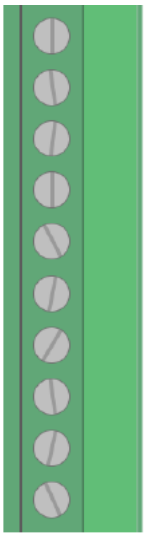
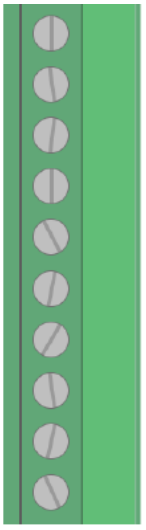
ZIO1616 expansion module adopts the horizontal installation method of screw fixing, and each expansion module should be installed with 4 screws for fastening.



→ Unit: mm →Installment Hole Diameter: 4.5mm →height: 35mm

3.5.3. IN Digital Input

→ Wiring Definition

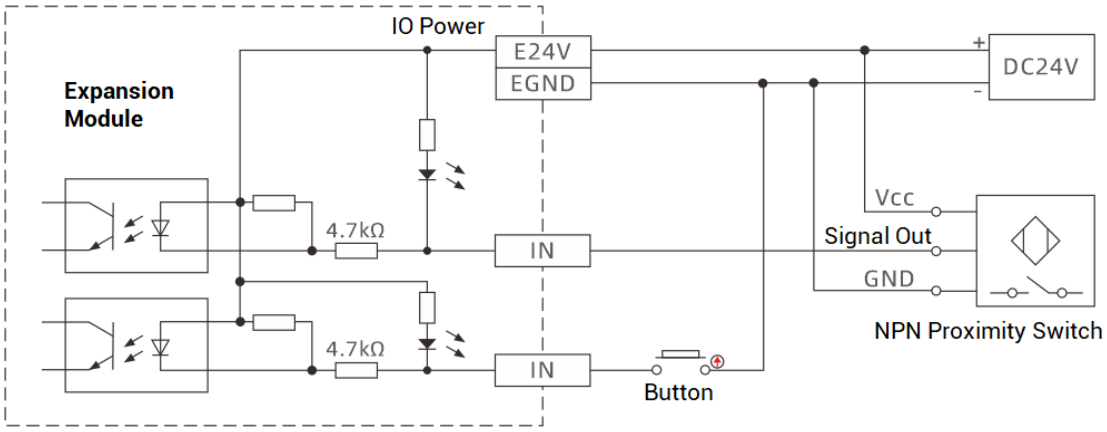
Terminal	Name	Type	Function 1
	EGND	/	IO power ground
	EGND	/	IO power ground
	IN0	NPN type, digital input	Input 0
	IN1		Input 1
	IN2		Input 2
	IN3		Input 3
	IN4		Input 4
	IN5		Input 5
	IN6		Input 6
	IN7		Input 7
	EGND	/	IO power ground
	EGND	/	IO power ground
	IN8	NPN type, digital input	Input 8
	IN9		Input 9
	IN10		Input 10
	IN11		Input 11
	IN12		Input 12
	IN13		Input 13
	IN14		Input 14
	IN15		Input 15

→ Specification

Item	Digital Input (IN0-15)
Input mode	NPN type, it is triggered when there is low-electric level input
Frequency	< 5kHz
Impedance	4.7KΩ
Voltage level	DC24V
The voltage to open	<14.5V

The voltage to close	>14.7V
Minimal current	-1.8mA (negative)
Max current	-6mA (negative)
Isolation mode	optoelectronic isolation
Note: the above parameters are standard values when the voltage of controller power supply (E24V port) is 24V.	

→ Wiring Reference



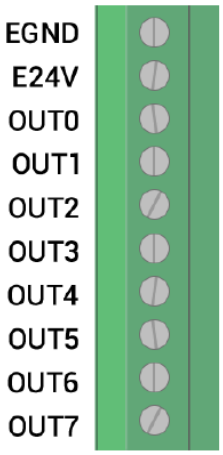
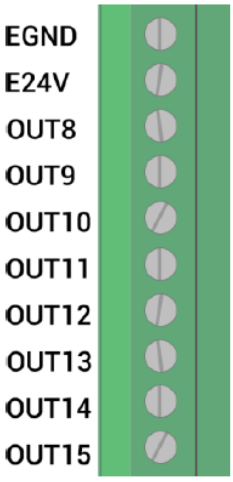
→ Wiring Note:

- The wiring principle of digital input IN (0-15) is shown in the figure above. The external signal source can be an optocoupler, a key switch or a sensor, etc., all can be connected as long as the requirements on output of electric level can be achieved.
- For the public end, please connect the "EGND" port on the IO power supply to the "COM" terminal of the external input device. If the signal area power supply of the external device and the power supply of the controller are in the same power supply system, this connection also can be omitted.

3.5.4. OUT Digital Output

→ Wiring Definition

Terminal	Name	Type	Function 1

	EGND	/	IO power ground / IO Public End
	E24V	/	IO power input DC24V
	OUT0	NPN leakage type, digital output	Output 0
	OUT1		Output 1
	OUT2		Output 2
	OUT3		Output 3
	OUT4		Output 4
	OUT5		Output 5
	OUT6		Output 6
	OUT7		Output 7
	EGND	/	IO power ground / IO Public End
	E24V	/	IO power input DC24V
	OUT8	NPN leakage type, digital output	Output 8
	OUT9		Output 9
	OUT10		Output 10
	OUT11		Output 11
	OUT12		Output 12
	OUT13		Output 13
	OUT14		Output 14
	OUT15		Output 15

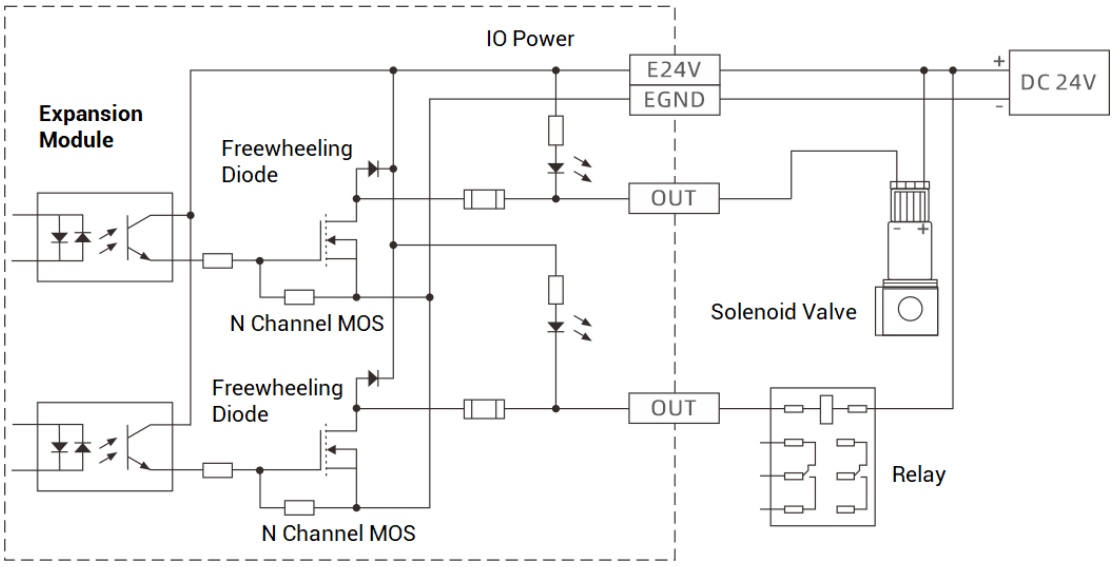
→ Specification

Item	Digital Output (OUT0-15)
Output mode	NPN leakage type, it is 0V when outputs
Frequency	< 8kHz
Voltage level	DC24V
Max output current	+300mA
Max leakage current when off	25μA
Respond time to conduct	12μs
Respond time to close	80μs
Overcurrent protection	Support
Isolation method	optoelectronic isolation

Note:

- ✧ The times in the form are typical based on the resistive load, and may change when the load circuit changes.
- ✧ Due to the leak-type output, the shutdown of the output will be obviously affected by the external load circuit, and the output frequency should not be set too high in the application. It is recommended to be lower than 8HKz. If there needs higher speed, please contact us to adjust parameter or custom hardware.

→ Wiring Reference



→ Wiring Note:

- The wiring principle of digital output OUT (0-15) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device. If the DC power supply of the external device and the controller power supply are in the same power supply system, this connection can also be omitted.

3.5.5. Expansion Module Usage

(1) Please follow the above wiring instructions to do power, CAN, and IO signal wiring correctly.

(2) Assign IO address and communication speed ratio through DIP switch.

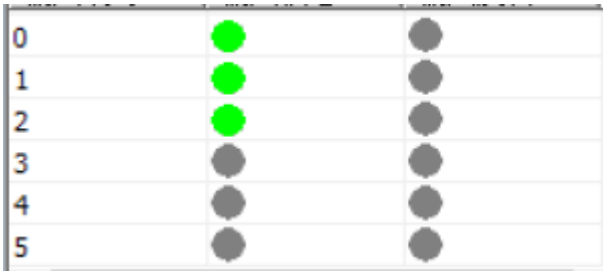
(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

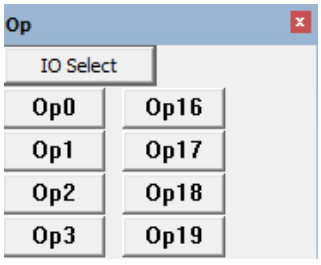
(5) After all the settings are completed, it is time to communicate, in “State the controller"--“CAN nodes", it will show information of expansion module.

Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

(6) State values of relative input ports can be read directly through “IN” command, also, it can be read through “ZDevelop/View/In". Please refer to “ZBasic” for details.

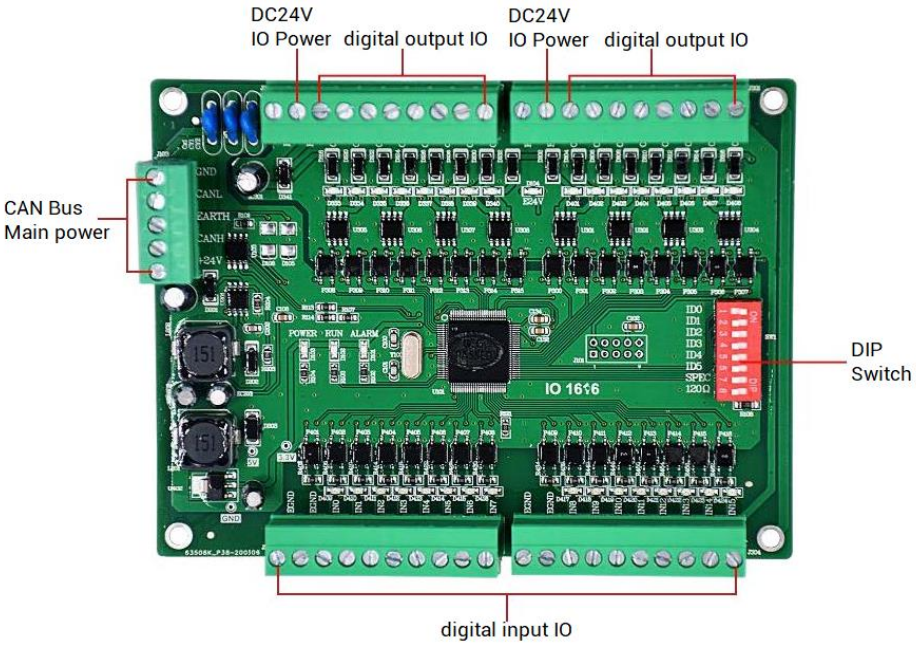


(7) Open or close output port directly through “OP” command, also, it can be opened or closed through “ZDevelop/View/Op". Please refer to “ZBasic" for details.



3.6. ZIO1616-PNP

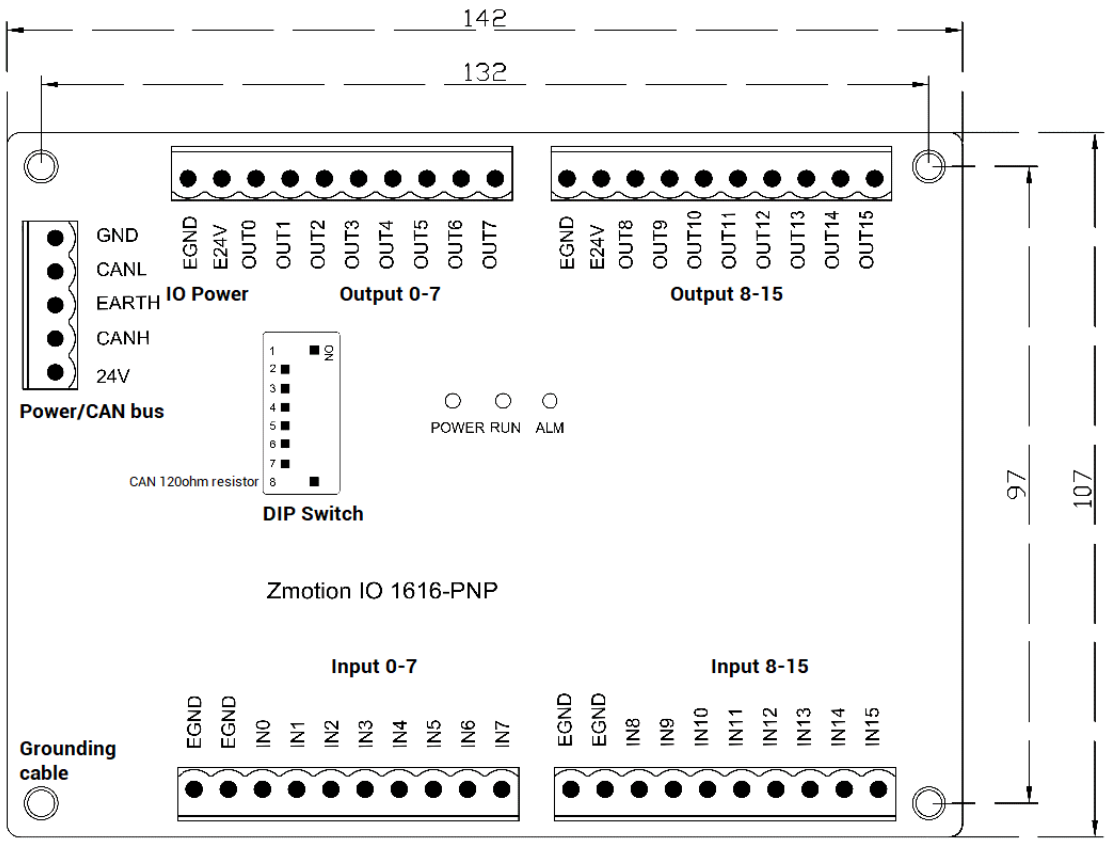
3.6.1. Interface Definition



Mark	Interface	Number	Description
IO POWER	Status Indication Led	1	IO power indicator: it lights when IO power conducted.
POWER		1	Power indicator: it lights when power is conducted.
RUN		1	Run indicator: it lights when runs normally
ALM		1	Error indicator: it lights when runs abnormally
Main power	Power communication terminal	1	24V DC power supplies power for expansion module to control communication circuit.
CAN bus		1	Connect to CAN expansion module or main controller
IO power	Digital output terminal	1	24V DC power supplies for IO.
Digital IO output		16	PNP source type.
Digital input terminal		16	PNP type.
DIP Switch		1	8 dial codes, CAN communication parameters can be customized when it is used by expansion module.

3.6.2. Hardware Installment

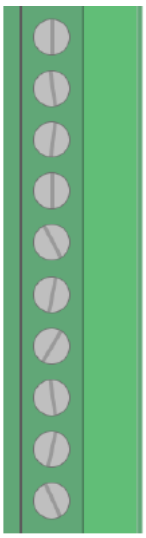
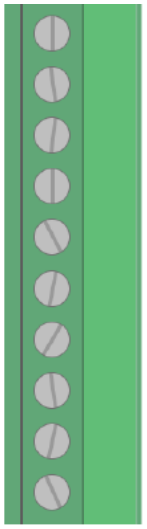
ZIO1616-PNP expansion module adopts the horizontal installation method of screw fixing, and each expansion module should be installed with 4 screws for fastening.



→ Unit: mm →Installment Hole Diameter: 4.5mm →height: 35mm

3.6.3. IN Digital Input

→ Wiring Definition

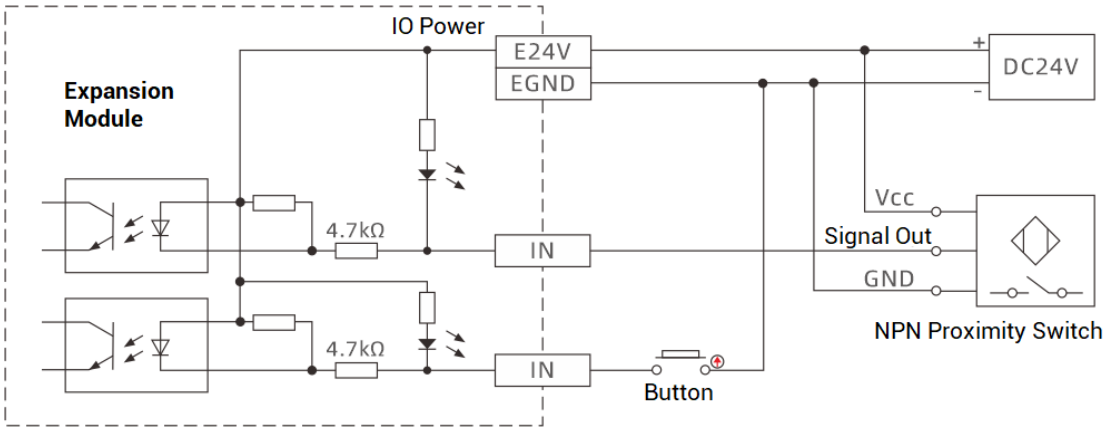
Terminal	Name	Type	Function 1
	EGND	/	24V Output - / IO Public End
	OVCC	/	24V Output + (max current 500mA)
	IN0	PNP type, digital input	Input 0
	IN1		Input 1
	IN2		Input 2
	IN3		Input 3
	IN4		Input 4
	IN5		Input 5
	IN6		Input 6
	IN7		Input 7
	EGND	/	24V Output - / IO Public End
	OVCC	/	24V Output + (max current 500mA)
	IN8	PNP type, digital input	Input 8
	IN9		Input 9
	IN10		Input 10
	IN11		Input 11
	IN12		Input 12
	IN13		Input 13
	IN14		Input 14
	IN15		Input 15

→ Specification

Item	Digital Input (IN0-15)
Input mode	PNP type, it is triggered when there is high-electric level input

Frequency	< 5kHz
Impedance	4.7KΩ
Voltage level	DC24V
The voltage to open	<7.2V
The voltage to close	>6.8V
Minimal current	+1.2mA (positive)
Max current	+5mA (positive)
Isolation mode	optoelectronic isolation
Note: the above parameters are standard values when the voltage of controller power supply (E24V port) is 24V.	

→ Wiring Reference

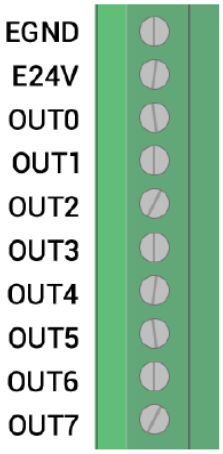
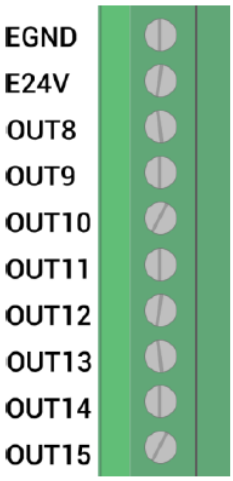


→ Wiring Note:

- The wiring principle of digital input IN (0-15) is shown in the figure above. The external signal source can be an optocoupler, a key switch or a sensor, etc., all can be connected as long as the requirements on output of electric level can be achieved.
- For the public end, please connect the "EGND" port on the IO power supply to the "COM" terminal of the external input device. If the signal area power supply of the external device and the power supply of the controller are in the same power supply system, this connection also can be omitted.

3.6.4. OUT Digital Output

→ Wiring Definition

Terminal	Name	Type	Function 1
	EGND	/	IO power ground / IO Public End
	E24V	/	IO power input DC24V
	OUT0	PNP source type, digital output	Output 0
	OUT1		Output 1
	OUT2		Output 2
	OUT3		Output 3
	OUT4		Output 4
	OUT5		Output 5
	OUT6		Output 6
	OUT7		Output 7
	EGND	/	IO power ground / IO Public End
	E24V	/	IO power input DC24V
	OUT8	PNP source type, digital output	Output 8
	OUT9		Output 9
	OUT10		Output 10
	OUT11		Output 11
	OUT12		Output 12
	OUT13		Output 13
	OUT14		Output 14
	OUT15		Output 15

→ Specification

Item	Digital Output (OUT0-15)
Output mode	PNP source type, it is 24V when outputs
Frequency	< 8kHz
Voltage level	DC24V
Max output current	-300mA

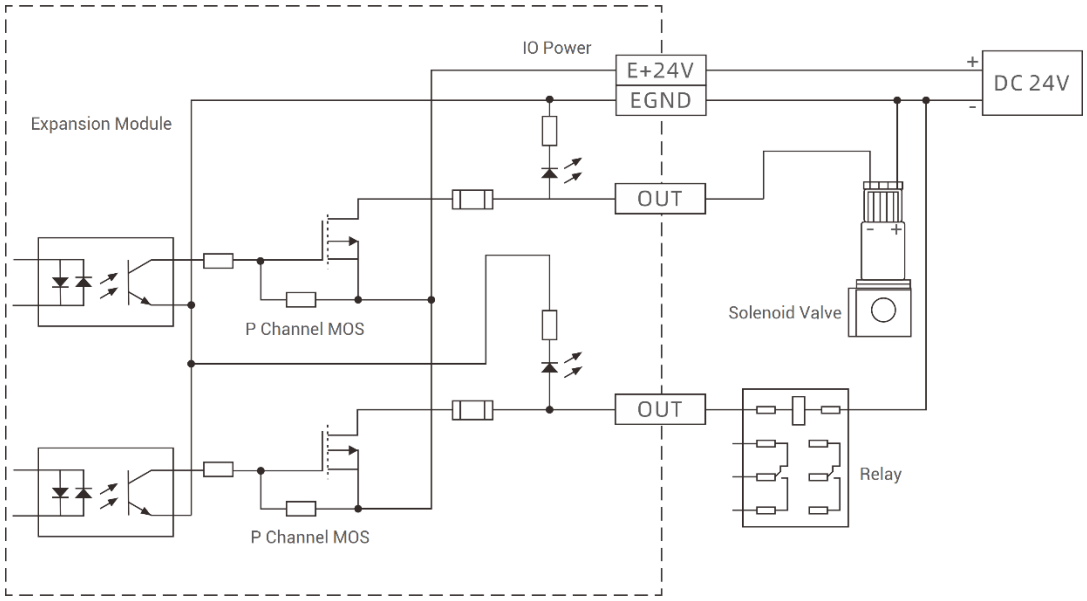
Max leakage current when off	25μA
Respond time to conduct	12μs
Respond time to close	55μs
Overcurrent protection	Support
Isolation method	optoelectronic isolation

Note:

✧ The times in the form are typical based on the resistive load, and may change when the load circuit changes.

✧ Due to PNP source type output, the shutdown of the output will be obviously affected by the external load circuit, and the output frequency should not be set too high in the application. It is recommended to be lower than 8HKz. If there needs higher speed, please contact us to adjust parameter or custom hardware.

→ Wiring Reference



→ Wiring Note:

- The wiring principle of digital output OUT (0-15) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device. If the

DC power supply of the external device and the controller power supply are in the same power supply system, this connection can also be omitted.

3.6.5. Expansion Module Usage

(1) Please follow the above wiring instructions to do power, CAN and IO signal wiring correctly.

(2) Assign IO address and communication speed ratio through DIP switch.

(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

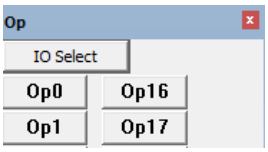
(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

(5) After all the settings are completed, it is time to communicate, in “State the controller"--“CAN nodes", it will show information of expansion module.

Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

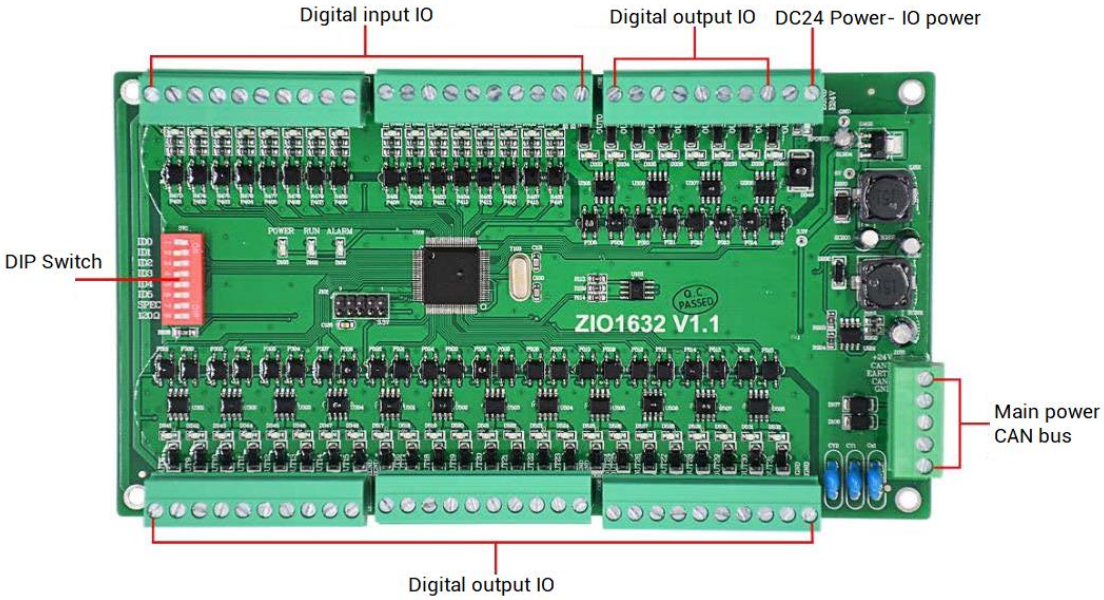
(6) State values of relative input ports can be read directly through “IN” command, also, it can be read through “ZDevelop/View/In". Please refer to “ZBasic" for details.

(7) Open or close output port directly through “OP" command, also, it can be opened or closed through “ZDevelop/View/Op". Please refer to “ZBasic" for details.



3.7. ZIO1632

3.7.1. Interface Definition

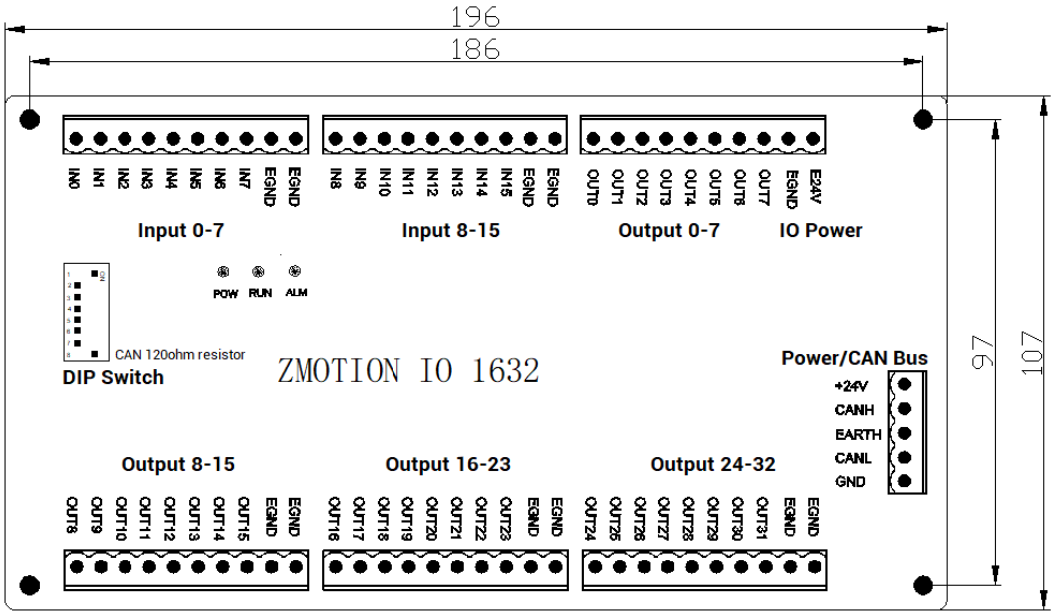


Mark	Interface	Number	Description
IO POWER	Status Indication Led	1	IO power indicator: it lights when IO power conducted.
POWER		1	Power indicator: it lights when power is conducted.
RUN		1	Run indicator: it lights when runs normally
ALM		1	Error indicator: it lights when runs abnormally
Main power	Power communication terminal	1	24V DC power supplies power for expansion module to control communication circuit.
CAN bus		1	Connect to CAN expansion module or main controller
IO power	Digital output terminal	1	24V DC power supplies for IO.
Digital IO output		32	NPN leakage type.
Digital input terminal		16	NPN type
DIP Switch		1	8 dial codes, CAN communication parameters can be

		customized when it is used by expansion module.

3.7.2. Hardware Installment

ZIO1632 expansion module adopts the horizontal installation method of screw fixing, and each expansion module should be installed with 4 screws for fastening.

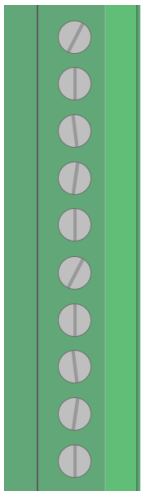
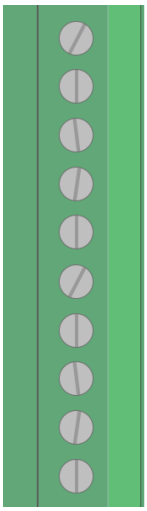


→ Unit: mm →Installment Hole Diameter: 4.5mm →height: 35mm

3.7.3. IN Digital Input

→ Wiring Definition

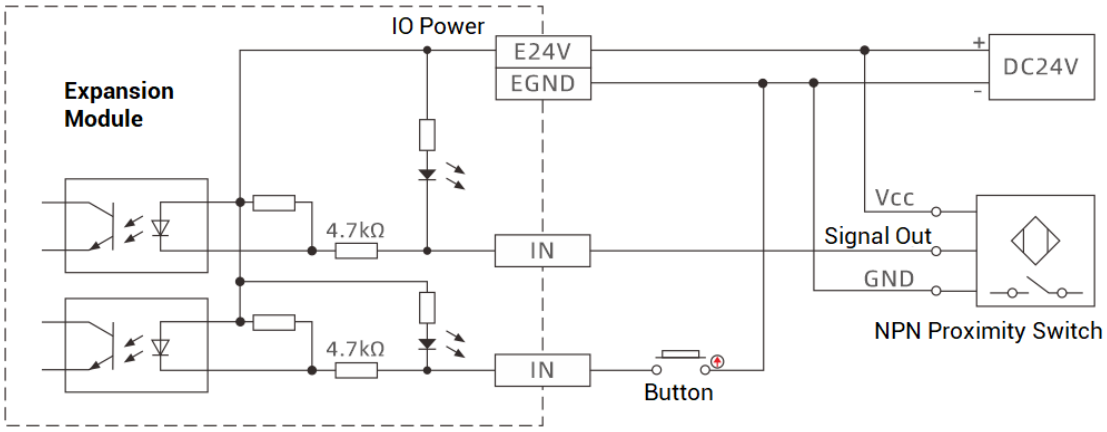
Terminal	Name	Type	Function 1
	EGND	/	IO power ground
	EGND	/	IO power ground
	IN7	NPN type, digital input	Input 0
	IN6		Input 1
	IN5		Input 2
	IN4		Input 3
	IN3		Input 4
	IN2		Input 5

	IN1		Input 6
	IN0		Input 7
	EGND	/	IO power ground
	EGND	/	IO power ground
	IN15	NPN type, digital input	Input 8
	IN14		Input 9
	IN13		Input 10
	IN12		Input 11
	IN11		Input 12
	IN10		Input 13
	IN9		Input 14
	IN8		Input 15

→ Specification

Item	Digital Input (IN0-15)
Input mode	NPN type, it is triggered when there is low-electric level input
Frequency	< 5kHz
Impedance	4.7KΩ
Voltage level	DC24V
The voltage to open	<14.5V
The voltage to close	>14.7V
Minimal current	-1.8mA (negative)
Max current	-6mA (negative)
Isolation mode	optoelectronic isolation
Note: the above parameters are standard values when the voltage of controller power supply (E24V port) is 24V.	

→ Wiring Reference

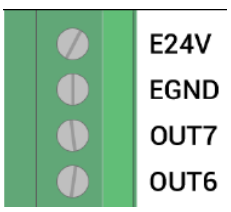


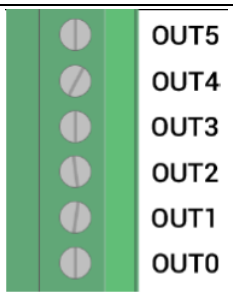
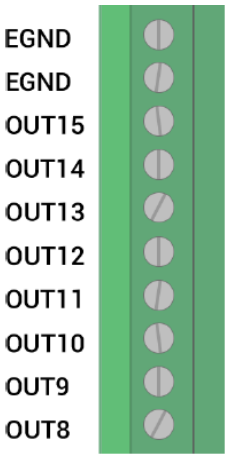
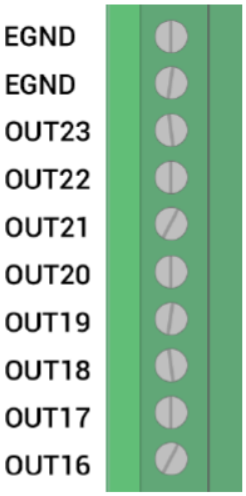
→ Wiring Note:

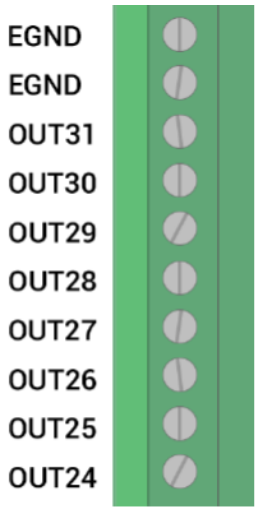
- The wiring principle of digital input IN (0-15) is shown in the figure above. The external signal source can be an optocoupler, a key switch or a sensor, etc., all can be connected as long as the requirements on output of electric level can be achieved.
- For the public end, please connect the "EGND" port on the IO power supply to the "COM" terminal of the external input device. If the signal area power supply of the external device and the power supply of the controller are in the same power supply system, this connection also can be omitted.

3.7.4. OUT Digital Output

→ Wiring Definition

Terminal	Name	Type	Function 1
	E24V	/	IO power input DC24V
	EGND	/	IO power ground / IO Public End
	OUT7	NPN leakage type, digital output	Output 7
	OUT6		Output 6
	OUT5		Output 5
	OUT4		Output 4
	OUT3		Output 3
	OUT2		Output 2

	OUT1		Output 1
	OUT0		Output 0
	EGND	/	IO Public End
	EGND	/	IO Public End
	OUT15	NPN leakage type, digital output	Output 15
	OUT14		Output 14
	OUT13		Output 13
	OUT12		Output 12
	OUT11		Output 11
	OUT10		Output 10
	OUT9		Output 9
	OUT8		Output 8
	EGND	/	IO Public End
	EGND	/	IO Public End
	OUT23	NPN leakage type, digital output	Output 23
	OUT22		Output 22
	OUT21		Output 21
	OUT20		Output 20
	OUT19		Output 19
	OUT18		Output 18
	OUT17		Output 17
	OUT16		Output 16
	EGND	/	IO Public End
	EGND	/	IO Public End
	OUT31	NPN leakage type, digital output	Output 31
	OUT30		Output 30
	OUT29		Output 29
	OUT28		Output 28
	OUT27		Output 27
	OUT26		Output 26
	OUT25		Output 25

	OUT24		Output 24

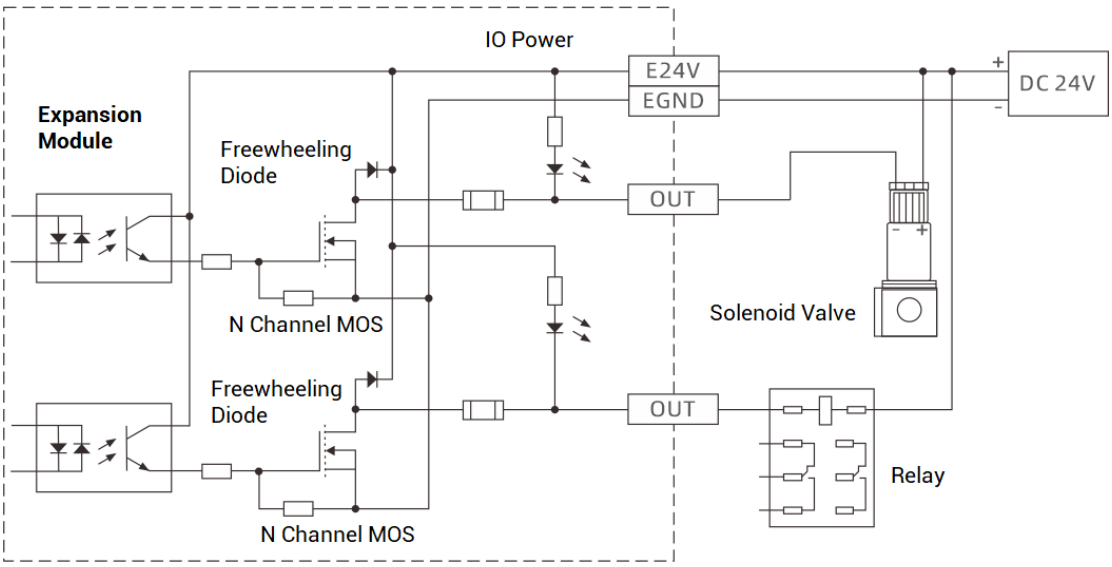
→ Specification

Item	Digital Output (OUT0-31)
Output mode	NPN leakage type, it is 0V when outputs
Frequency	< 8kHz
Voltage level	DC24V
Max output current	+300mA
Max leakage current when off	25μA
Respond time to conduct	12μs
Respond time to close	80μs
Overcurrent protection	Support
Isolation method	optoelectronic isolation

Note:

- ✧ The times in the form are typical based on the resistive load, and may change when the load circuit changes.
- ✧ Due to the leak-type output, the shutdown of the output will be obviously affected by the external load circuit, and the output frequency should not be set too high in the application. It is recommended to be lower than 8HKz. If there needs higher speed, please contact us to adjust parameter or custom hardware.

→ Wiring Reference



→ Wiring Note:

- The wiring principle of digital output OUT (0-31) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device. If the DC power supply of the external device and the controller power supply are in the same power supply system, this connection can also be omitted.

3.7.5. Expansion Module Usage

(1) Please follow the above wiring instructions to do power, CAN and IO signal wiring correctly.

(2) Assign IO address and communication speed ratio through DIP switch.

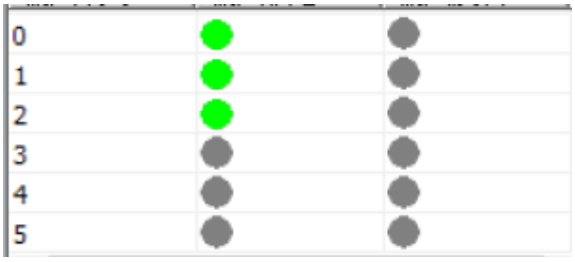
(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

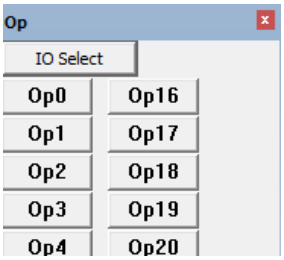
(5) After all the settings are completed, it is time to communicate, in “State the controller"--“CAN nodes", it will show information of expansion module.

Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

(6) State values of relative input ports can be read directly through “IN” command, also, it can be read through “ZDevelop/View/In". Please refer to “ZBasic" for details.

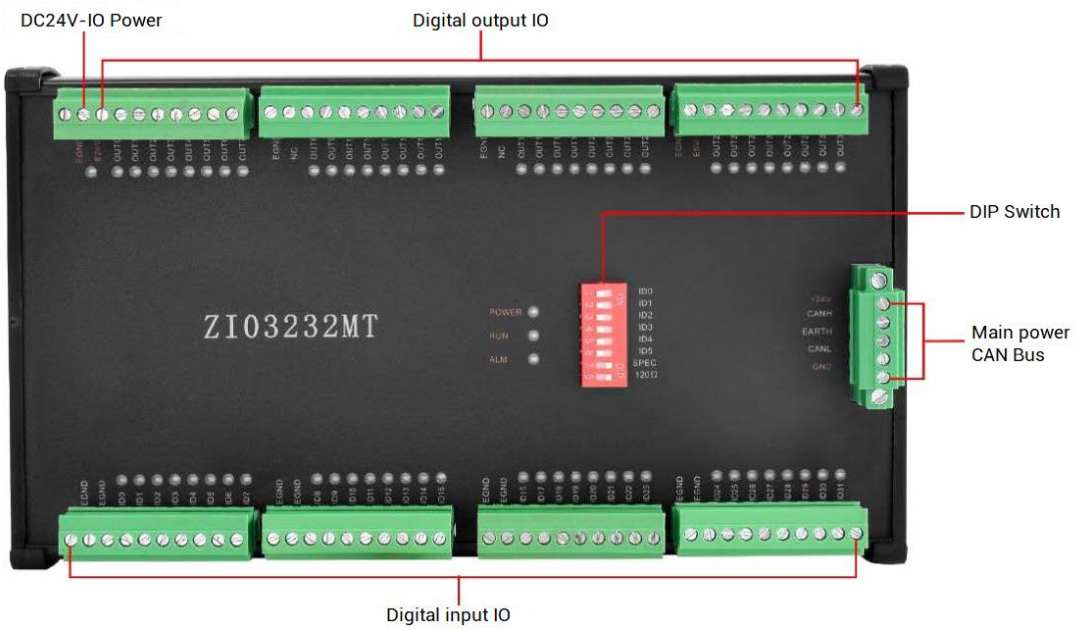


(7) Open or close output port directly through “OP” command, also, it can be opened or closed through “ZDevelop/View/Op". Please refer to “ZBasic" for details.



3.8. ZIO3232MT

3.8.1. Interface Definition

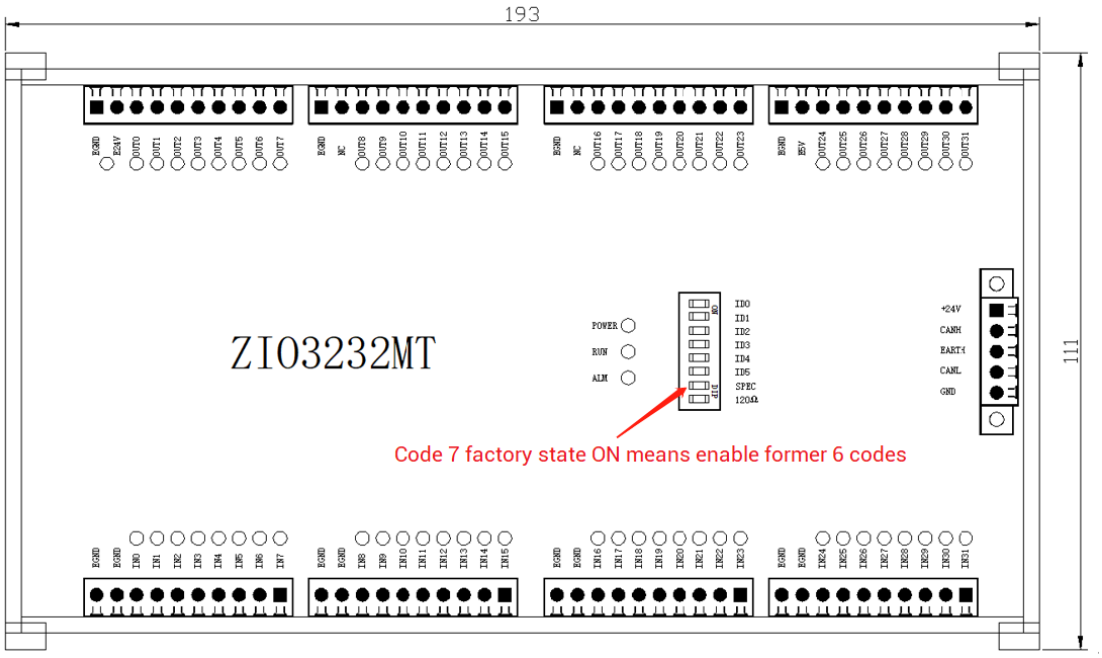


➢ The code 7 of ZIO3232MT is dialed as ON by default, which means front 6-bit are enabled.

Mark	Interface	Number	Description
POWER	Status Indication Led	1	Power indicator: it lights when power is conducted.
RUN		1	Run indicator: it lights when runs normally
ALM		1	Error indicator: it lights when runs abnormally
Main power	Power communication terminal	1	24V DC power supplies power for expansion module to control communication circuit.
CAN bus		1	Connect to CAN expansion module or main controller
IO power	Digital output terminal	1	24V DC power supplies for IO. The led is ON when connecting.
Digital IO output		32	NPN leakage type
Digital input terminal		32	NPN type.
DIP Switch		1	8 dial codes, CAN communication parameters can be customized when it is used by expansion module.

3.8.2. Hardware Installment

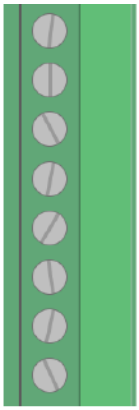
ZIO3232MT expansion module adopts guide rail installation method, the guide rail is national C45 rail.

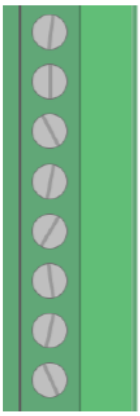


→ Unit: mm →Width: 35mm →height: 53mm

3.8.3. IN Digital Input

→ Wiring Definition

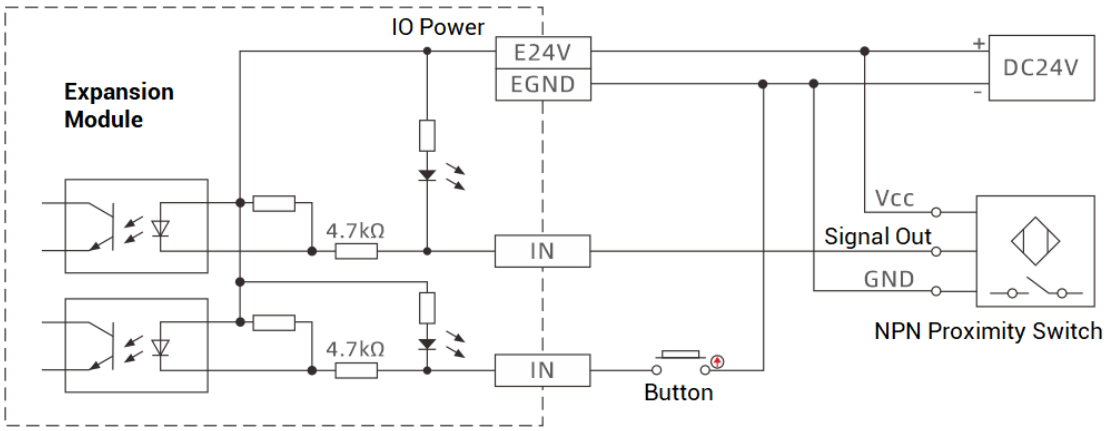
Terminal	Name	Type	Function 1
 IN0 IN1 IN2 IN3 IN4 IN5 IN6 IN7	IN0	NPN type, digital input	Input 0
	IN1		Input 1
	IN2		Input 2
	IN3		Input 3
	IN4		Input 4
	IN5		Input 5
	IN6		Input 6
	IN7		Input 7

	IN8	NPN type, digital input	Input 8
	IN9		Input 9
	IN10		Input 10
	IN11		Input 11
	IN12		Input 12
	IN13		Input 13
	IN14		Input 14
	IN15		Input 15
Note: IN 16-23/24-31 are same as input 0-7/8-15.			

→ Specification

Item	Digital Input (IN0-31)
Input mode	NPN type, it is triggered when there is low-electric level input
Frequency	< 5kHz
Impedance	4.7KΩ
Voltage level	DC24V
The voltage to open	<14.5V
The voltage to close	>14.7V
Minimal current	-1.8mA (negative)
Max current	-6mA (negative)
Isolation mode	optoelectronic isolation
Note: the above parameters are standard values when the voltage of controller power supply (E24V port) is 24V.	

→ Wiring Reference

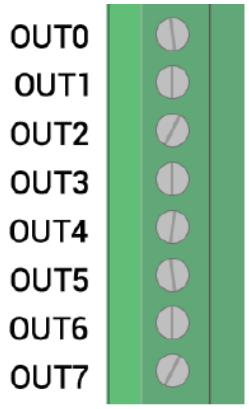
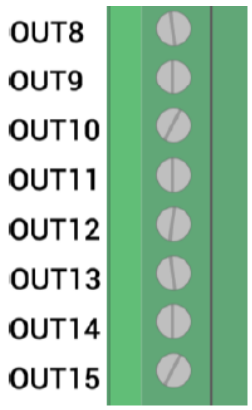


→ Wiring Note:

- The wiring principle of digital input IN (0-31) is shown in the figure above. The external signal source can be an optocoupler, a key switch or a sensor, etc., all can be connected as long as the requirements on output of electric level can be achieved.
- For the public end, please connect the "EGND" port on the IO power supply to the "COM" terminal of the external input device. If the signal area power supply of the external device and the power supply of the controller are in the same power supply system, this connection also can be omitted.

3.8.4. OUT Digital Output

→ Wiring Definition

Terminal	Name	Type	Function 1
	OUT0	NPN Leakage type, digital output	Output 0
	OUT1		Output 1
	OUT2		Output 2
	OUT3		Output 3
	OUT4		Output 4
	OUT5		Output 5
	OUT6		Output 6
	OUT7		Output 7
	OUT8		Output 8
	OUT9		Output 9
	OUT10		Output 10
	OUT11		Output 11
	OUT12		Output 12
	OUT13		Output 13
	OUT14		Output 14
	OUT15		Output 15
Note: output 16-23/24-31 are same as output 0-7/8-15.			

→ Specification

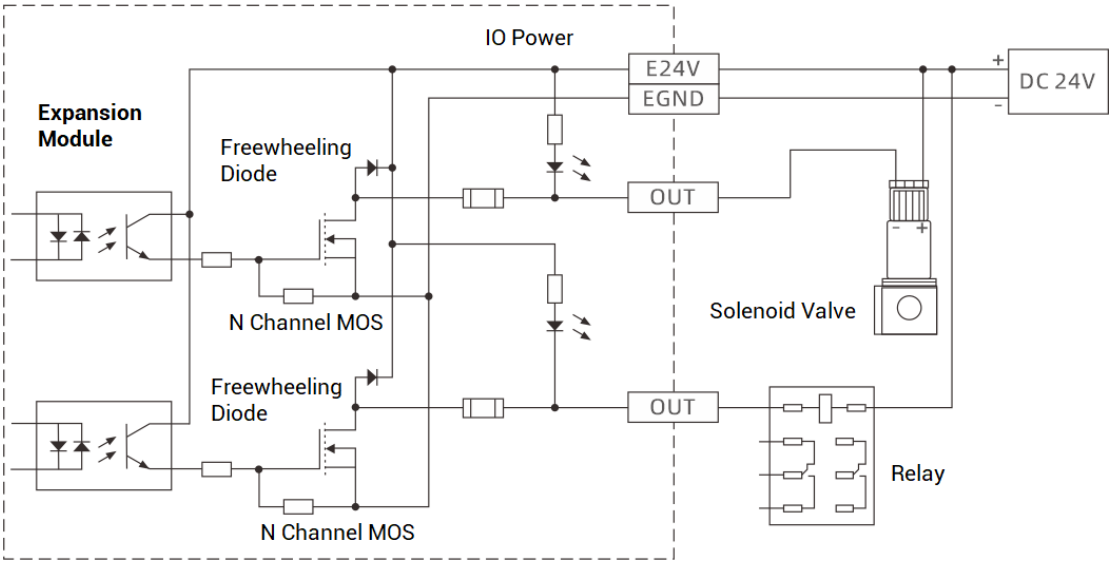
Item	Digital Output (OUT0-31)
Output mode	NPN leakage type, it is 0V when outputs
Frequency	< 8kHz
Voltage level	DC24V
Max output current	+300mA
Max leakage current when off	25μA
Respond time to conduct	12μs
Respond time to close	80μs
Overcurrent protection	Support
Isolation method	optoelectronic isolation

Note:

✧ The times in the form are typical based on the resistive load, and may change when the load circuit changes.

✧ Due to the leak-type output, the shutdown of the output will be obviously affected by the external load circuit, and the output frequency should not be set too high in the application. It is recommended to be lower than 8HKz. If there needs higher speed, please contact us to adjust parameter or custom hardware.

→ Wiring Reference



→ Wiring Note:

- The wiring principle of digital output OUT (0-31) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device. If the DC power supply of the external device and the controller power supply are in the same power supply system, this connection can also be omitted.

3.8.5. Expansion Module Usage

(1) Please follow the above wiring instructions to do power, CAN and IO signal wiring correctly.

(2) Assign IO address and communication speed ratio through DIP switch. The bit 7 is ON to enable front 6-bit.

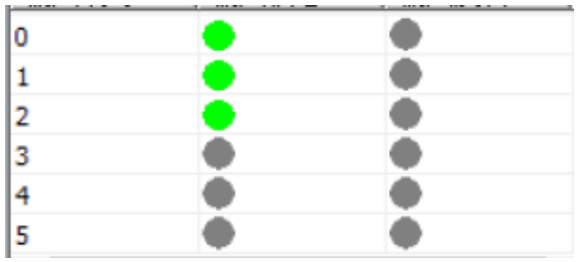
(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

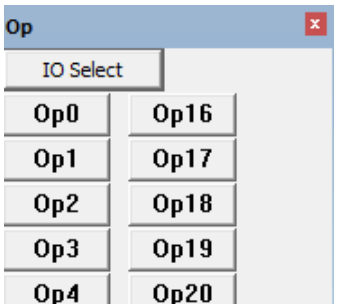
(5) After all the settings are completed, it is time to communicate, in "State the controller"--"CAN nodes", it will show information of expansion module.

Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

(6) State values of relative input ports can be read directly through "IN" command, also, it can be read through "ZDevelop/View/In". Please refer to "ZBasic" for details.

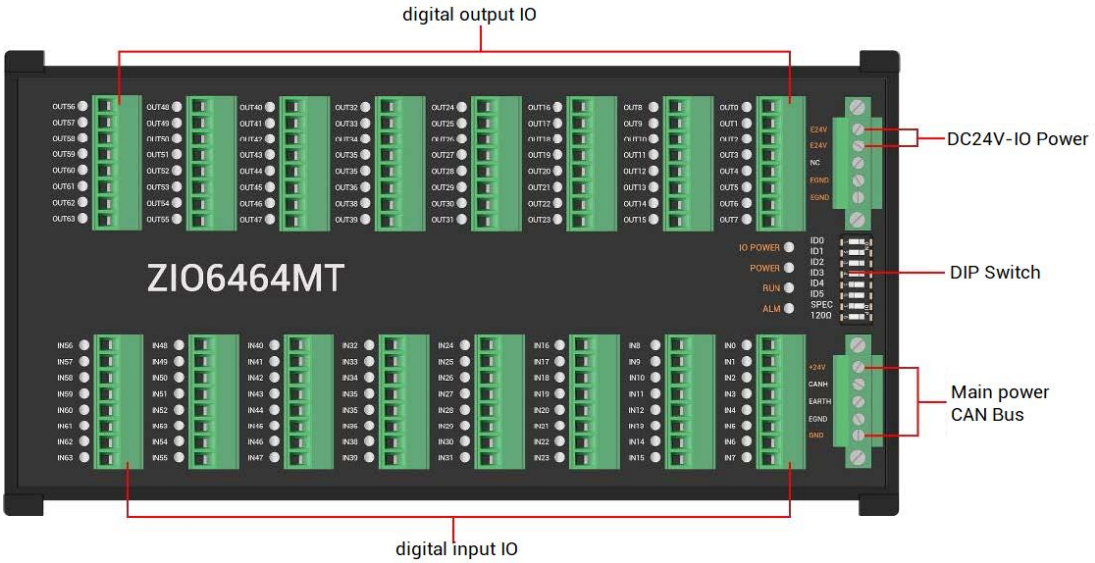


(7) Open or close output port directly through “OP" command, also, it can be opened or closed through “ZDevelop/View/Op". Please refer to “ZBasic" for details.



3.9. ZIO6464MT

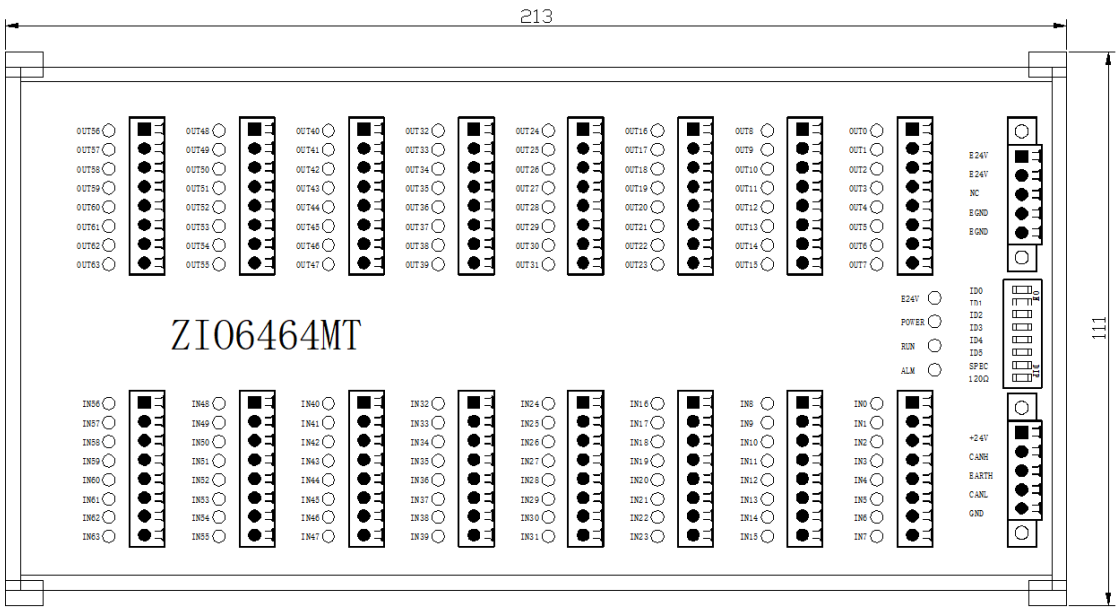
3.9.1. Interface Definition



Mark	Interface	Number	Description
E24V	Status Indication Led	1	IO power indicator: it lights when IO power conducted.
POWER		1	Power indicator: it lights when power is conducted.
RUN		1	Run indicator: it lights when runs normally
ALM		1	Error indicator: it lights when runs abnormally
Main power	Power communication terminal	1	24V DC power supplies power for expansion module to control communication circuit.
CAN bus		1	Connect to CAN expansion module or main controller
IO Power		2	24V DC power for IO.
Digital input terminal		64	NPN leakage type.
Digital output terminal		64	NPN type.
DIP Switch		1	8 dial codes, CAN communication parameters can be customized when it is used by expansion module.

3.9.2. Hardware Installment

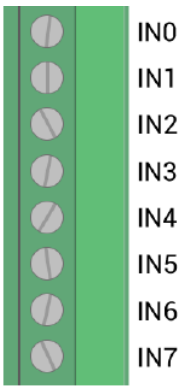
ZIO6464MT expansion module adopts guide rail installation method, the guide rail is national C45 rail.

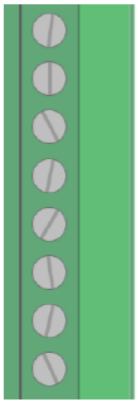


→ Unit: mm →Width: 35mm →height: 53mm

3.9.3. IN Digital Input

→ Wiring Definition

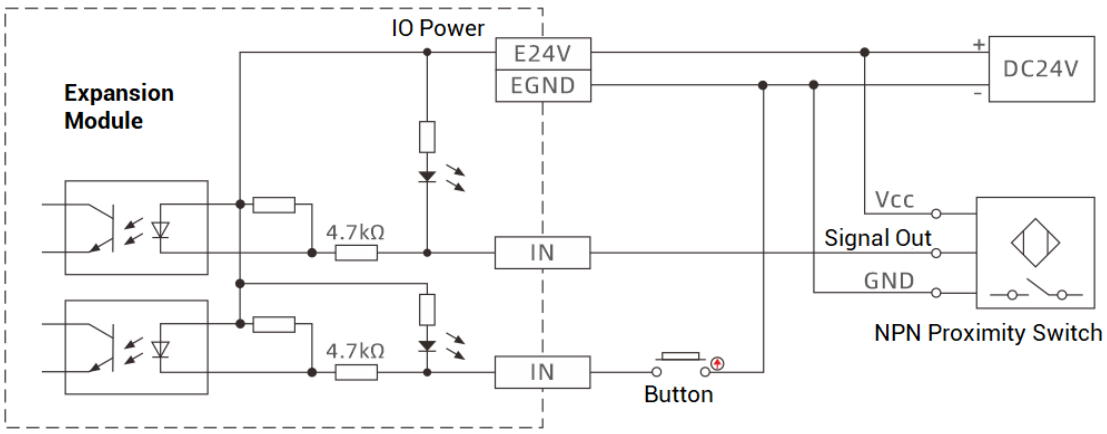
Terminal	Name	Type	Function 1
	IN0	NPN type, digital input	Input 0
	IN1		Input 1
	IN2		Input 2
	IN3		Input 3
	IN4		Input 4
	IN5		Input 5
	IN6		Input 6
	IN7		Input 7
	IN8		Input 8
	IN9		Input 9
	IN10		Input 10
	IN11		Input 11
	IN12		Input 12

	IN13		Input 13
	IN14		Input 14
	IN15		Input 15
Note: input 16-23/24-31/32-39/40-47/48-55/56-63 are same as input 0-7/8-15.			

→ Specification

Item	Digital Input (IN0-63)
Input mode	NPN type, it is triggered when there is low-electric level input
Frequency	< 5kHz
Impedance	4.7KΩ
Voltage level	DC24V
The voltage to open	<14.5V
The voltage to close	>14.7V
Minimal current	-1.8mA (negative)
Max current	-6mA (negative)
Isolation mode	optoelectronic isolation
Note: the above parameters are standard values when the voltage of controller power supply (E24V port) is 24V.	

→ Wiring Reference

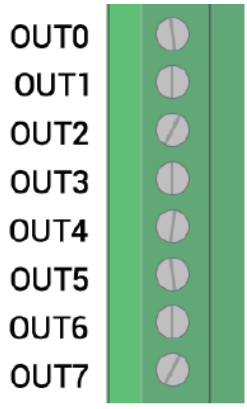
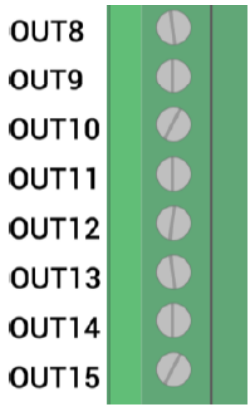


→ Wiring Note:

- The wiring principle of digital input IN (0-63) is shown in the figure above. The external signal source can be an optocoupler, a key switch or a sensor, etc., all can be connected as long as the requirements on output of electric level can be achieved.
- For the public end, please connect the "EGND" port on the IO power supply to the "COM" terminal of the external input device. If the signal area power supply of the external device and the power supply of the controller are in the same power supply system, this connection also can be omitted.

3.9.4. OUT Digital Output

→ Wiring Definition

Terminal	Name	Type	Function 1
	OUT0	NPN type, digital output	Output 0
	OUT1		Output 1
	OUT2		Output 2
	OUT3		Output 3
	OUT4		Output 4
	OUT5		Output 5
	OUT6		Output 6
	OUT7		Output 7
	OUT8		Output 8
	OUT9		Output 9
	OUT10		Output 10
	OUT11		Output 11
	OUT12		Output 12
	OUT13		Output 13
	OUT14		Output 14
	OUT15		Output 15
Note: output 16-23/24-31/32-39/40-47/48-55/56-63 are same as output 0-7/8-15.			

→ Specification

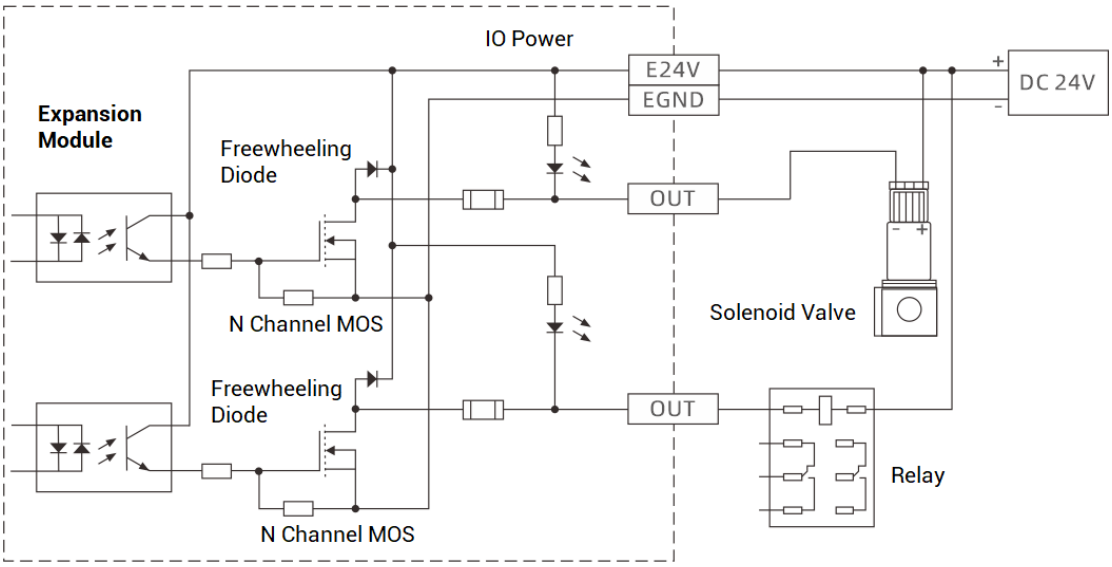
Item	Digital Output (OUT0-63)
Output mode	NPN leakage type, it is 0V when outputs
Frequency	< 8kHz
Voltage level	DC24V
Max output current	+300mA
Max leakage current when off	25μA
Respond time to conduct	12μs
Respond time to close	80μs
Overcurrent protection	Support
Isolation method	optoelectronic isolation

Note:

✧ The times in the form are typical based on the resistive load, and may change when the load circuit changes.

✧ Due to the leak-type output, the shutdown of the output will be obviously affected by the external load circuit, and the output frequency should not be set too high in the application. It is recommended to be lower than 8HKz. If there needs higher speed, please contact us to adjust parameter or custom hardware.

→ Wiring Reference



→ Wiring Note:

- The wiring principle of digital output OUT (0-63) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device. If the DC power supply of the external device and the controller power supply are in the same power supply system, this connection can also be omitted.

3.9.5. Expansion Module Usage

(1) Please follow the above wiring instructions to do power, CAN and IO signal wiring correctly.

(2) Assign IO address and communication speed ratio through DIP switch.

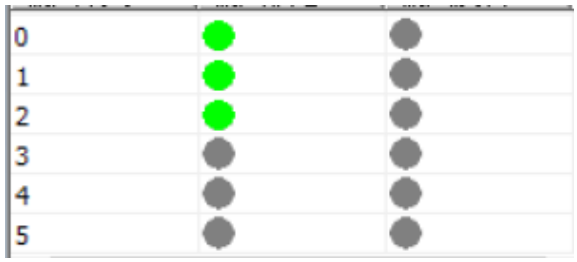
(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

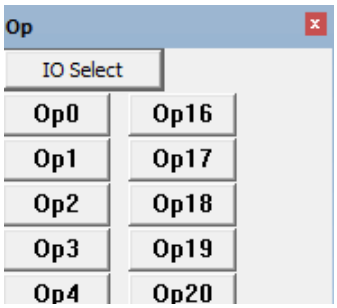
(5) After all the settings are completed, it is time to communicate, in “State the controller"--“CAN nodes", it will show information of expansion module.

Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

(6) State values of relative input ports can be read directly through “IN" command, also, it can be read through “ZDevelop/View/In". Please refer to “ZBasic" for details.

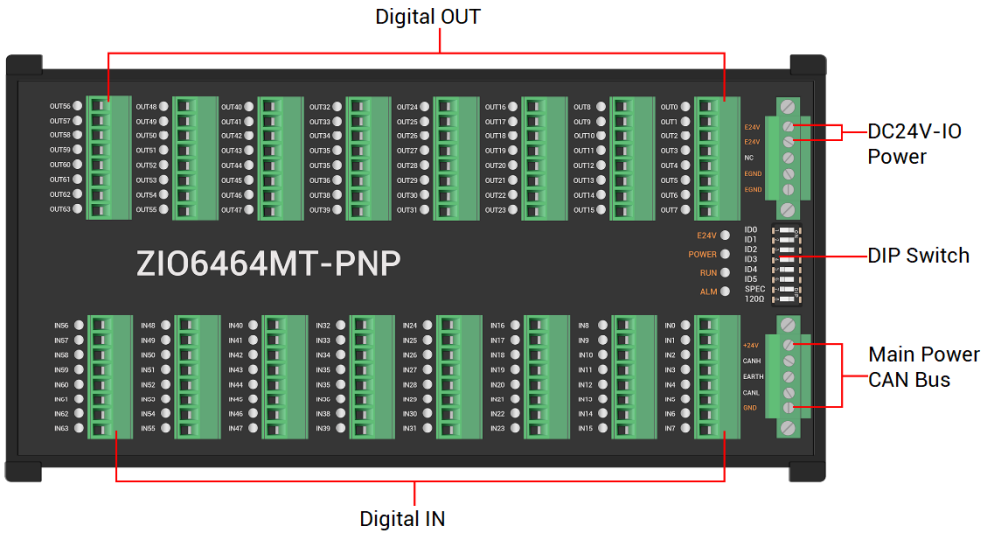


(7) Open or close output port directly through “OP" command, also, it can be opened or closed through “ZDevelop/View/Op". Please refer to “ZBasic" for details.



3.10. ZIO6464MT-PNP

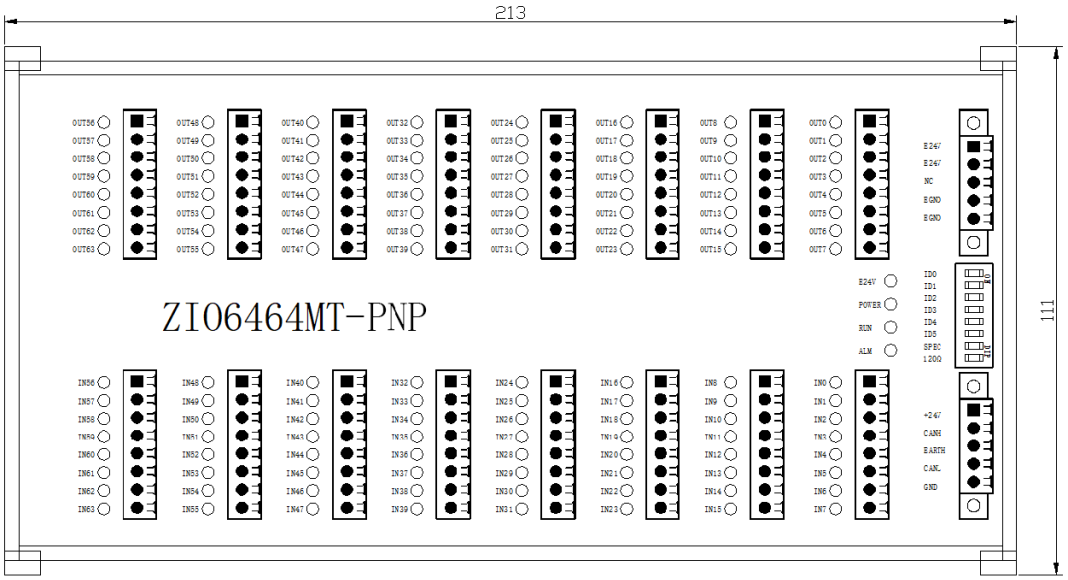
3.10.1. Interface Definition



Mark	Interface	Number	Description
E24V	Status Indication Led	1	IO power indicator: it lights when IO power conducted.
POWER		1	Power indicator: it lights when power is conducted.
RUN		1	Run indicator: it lights when runs normally
ALM		1	Error indicator: it lights when runs abnormally
Main power	Power communication terminal	1	24V DC power supplies power for expansion module to control communication circuit.
CAN bus		1	Connect to CAN expansion module or main controller
IO Power		2	24V DC power for IO.
Digital input terminal		64	NPN source type.
Digital output terminal		64	NPN type.
DIP Switch		1	8 dial codes, CAN communication parameters can be customized when it is used by expansion module.

3.10.2. Hardware Installment

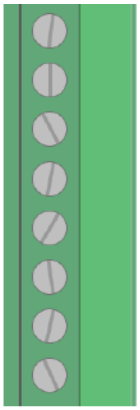
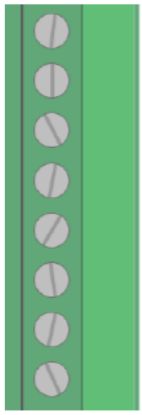
ZIO6464MT-PNP expansion module adopts guide rail installation method, the guide rail is national C45 rail.



→ Unit: mm →Width: 35mm →height: 53mm

3.10.3. IN Digital Input

→ Wiring Definition

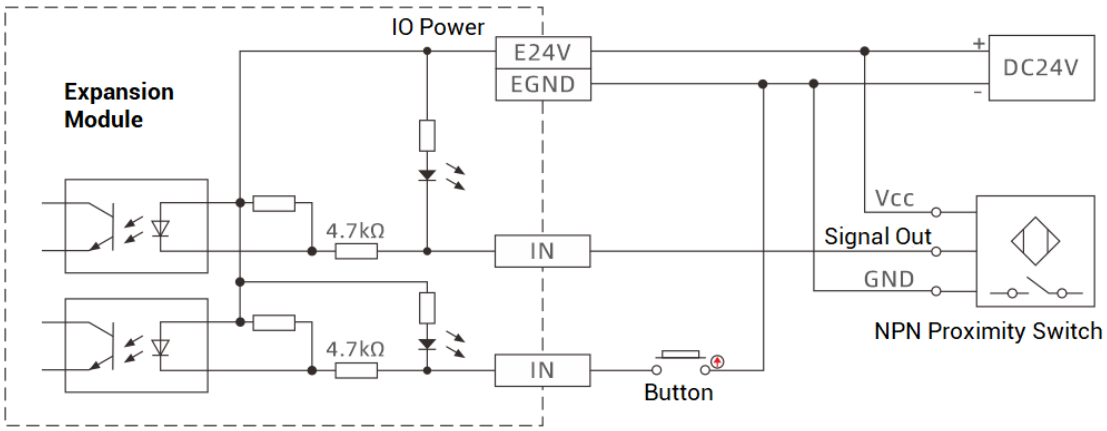
Terminal	Name	Type	Function 1
 IN0 IN1 IN2 IN3 IN4 IN5 IN6 IN7	IN0	PNP type, digital input	Input 0
	IN1		Input 1
	IN2		Input 2
	IN3		Input 3
	IN4		Input 4
	IN5		Input 5
	IN6		Input 6
	IN7		Input 7
 IN8 IN9 IN10 IN11 IN12 IN13 IN14 IN15	IN8		Input 8
	IN9		Input 9
	IN10		Input 10
	IN11		Input 11
	IN12		Input 12
	IN13		Input 13
	IN14		Input 14
	IN15		Input 15

Note: input 16-23/24-31/32-39/40-47/48-55/56-63 are same as input 0-7/8-15.

→ Specification

Item	Digital Input (IN0-63)
Input mode	PNP type, it is triggered when there is high-electric level input
Frequency	< 5kHz
Impedance	4.7KΩ
Voltage level	DC24V
The voltage to open	<7.2V
The voltage to close	>6.8V
Minimal current	+1.2mA (positive)
Max current	+5mA (positive)
Isolation mode	optoelectronic isolation
Note: the above parameters are standard values when the voltage of controller power supply (E24V port) is 24V.	

→ Wiring Reference



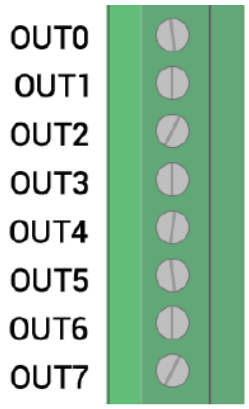
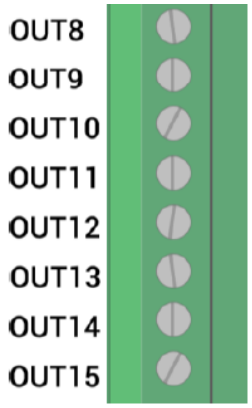
→ Wiring Note:

- The wiring principle of digital input IN (0-63) is shown in the figure above. The external signal source can be an optocoupler, a key switch or a sensor, etc., all can be connected as long as the requirements on output of electric level can be achieved.
- For the public end, please connect the "EGND" port on the IO power supply to the "COM" terminal of the external input device. If the signal area power supply of the external device and the power supply of the controller are in the same power supply

system, this connection also can be omitted.

3.10.4. OUT Digital Output

→ Wiring Definition

Terminal	Name	Type	Function 1
	OUT0	PNP source type, digital output	Output 0
	OUT1		Output 1
	OUT2		Output 2
	OUT3		Output 3
	OUT4		Output 4
	OUT5		Output 5
	OUT6		Output 6
	OUT7		Output 7
	OUT8		Output 8
	OUT9		Output 9
	OUT10		Output 10
	OUT11		Output 11
	OUT12		Output 12
	OUT13		Output 13
	OUT14		Output 14
	OUT15		Output 15
Note: output 16-23/24-31/32-39/40-47/48-55/56-63 are same as output 0-7/8-15.			

→ Specification

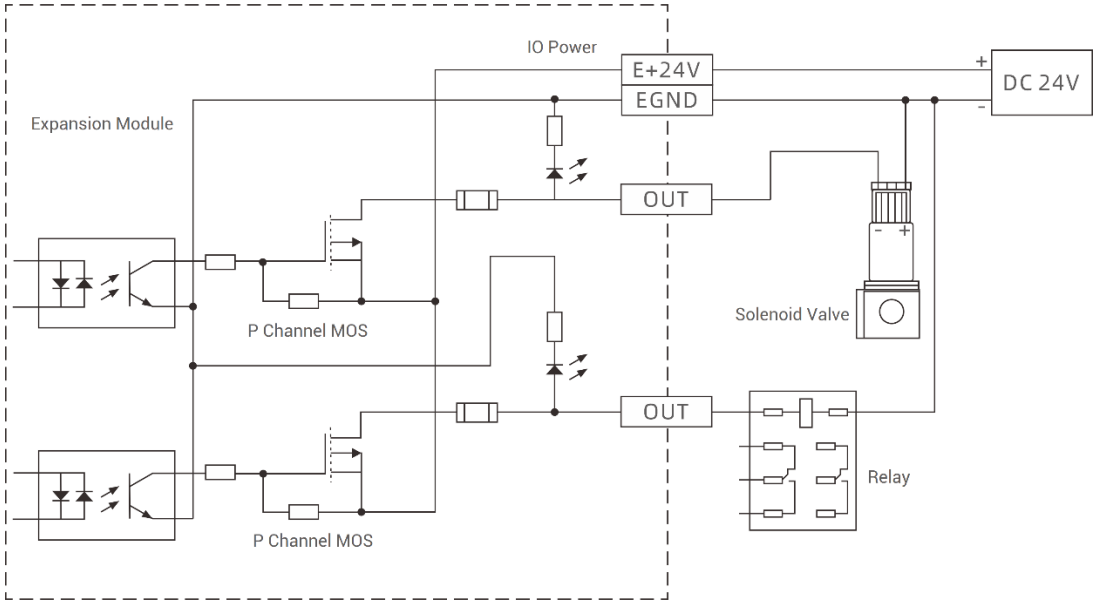
Item	Digital Output (OUT0-63)
Output mode	PNP source type, it is 24V when outputs
Frequency	< 8kHz
Voltage level	DC24V
Max output current	-300mA
Max leakage current when off	25μA
Respond time to conduct	12μs
Respond time to close	55μs

Overcurrent protection	Support
Isolation method	optoelectronic isolation

Note:

- ✧ The times in the form are typical based on the resistive load, and may change when the load circuit changes.
- ✧ Due to the PNP source output, the shutdown of the output will be obviously affected by the external load circuit, and the output frequency should not be set too high in the application. It is recommended to be lower than 8HKz. If there needs higher speed, please contact us to adjust parameter or custom hardware.

→ Wiring Reference



→ Wiring Note:

- The wiring principle of digital output OUT (0-63) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device. If the DC power supply of the external device and the controller power supply are in the same power supply system, this connection can also be omitted.

3.10.5. Expansion Module Usage

(1) Please follow the above wiring instructions to do power, CAN and IO signal wiring correctly.

(2) Assign IO address and communication speed ratio through DIP switch.

(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

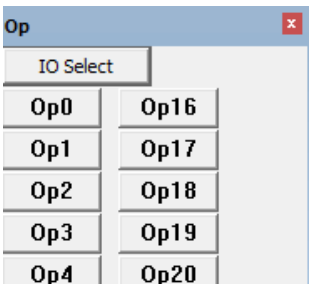
(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

(5) After all the settings are completed, it is time to communicate, in “State the controller"--“CAN nodes", it will show information of expansion module.

Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

(6) State values of relative input ports can be read directly through “IN" command, also, it can be read through “ZDevelop/View/In". Please refer to “ZBasic" for details.

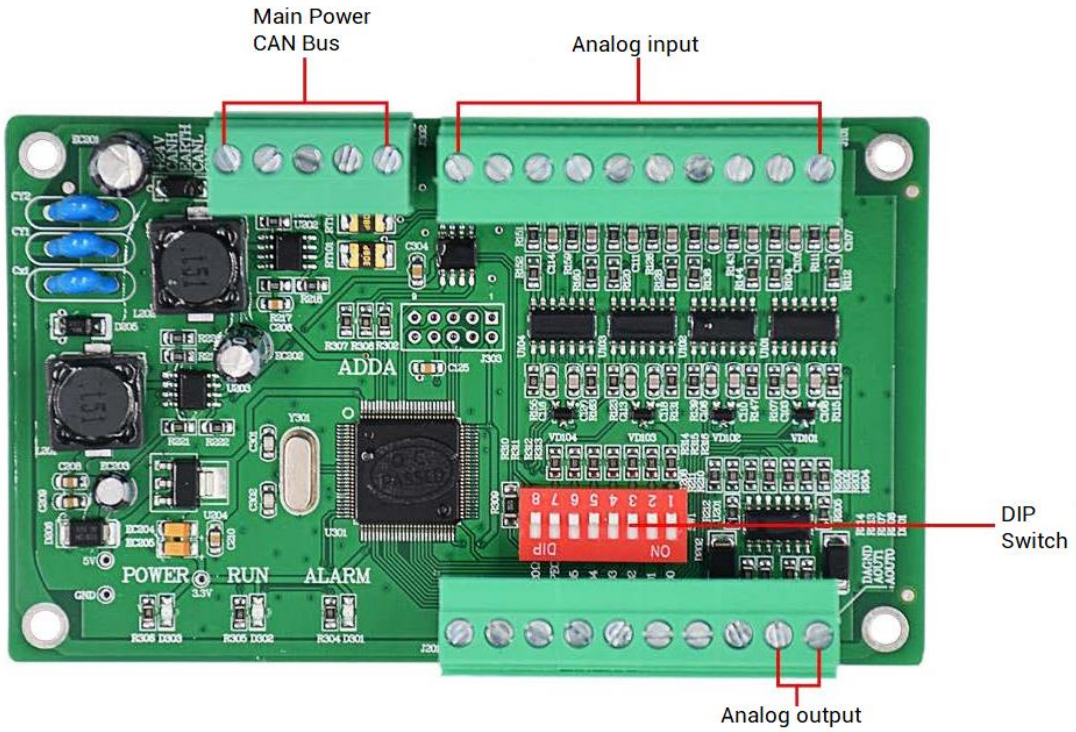
(7) Open or close output port directly through “OP" command, also, it can be opened or closed through “ZDevelop/View/Op". Please refer to “ZBasic" for details.



Chapter IV Analog IO Expansion Module

4.1. ZAIO0802

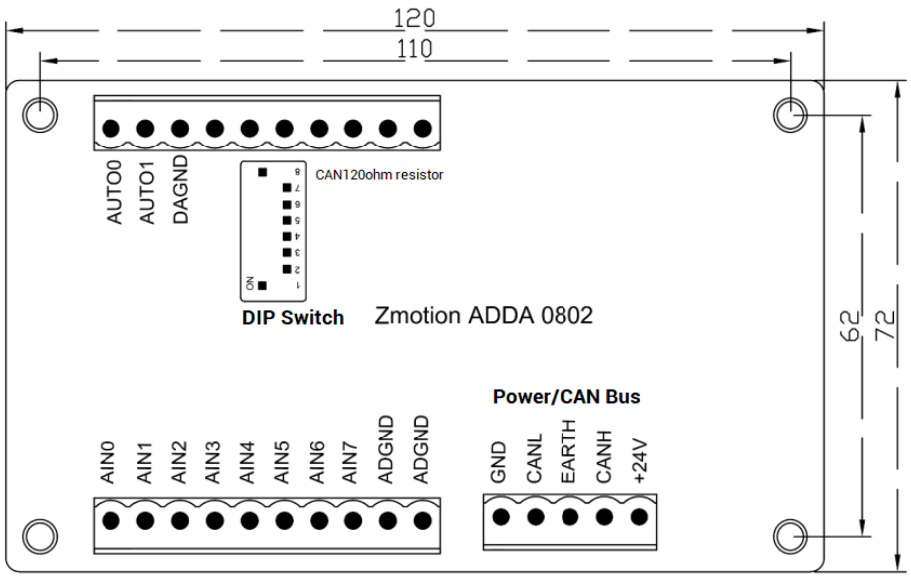
4.1.1. Interface Definition



Mark	Interface	Number	Description
POWER	Status Indication Led	1	Power indicator: it lights when power is conducted.
RUN		1	Run indicator: it lights when runs normally
ALM		1	Error indicator: it lights when runs abnormally
Main power	Power communication terminal	1	24V DC power supplies power for expansion module to control communication circuit.
CAN bus		1	Connect to CAN expansion module or main controller
Analog input		8	Resolution is 12-bit, range: 0-10V
Analog output		2	Resolution is 12-bit, range: 0-10V
DIP Switch		1	8 dial codes, CAN communication parameters can be customized when it is used by expansion module.

4.1.2. Hardware Installment

ZAIO0802 expansion module adopts the horizontal installation method of screw fixing, and each expansion module should be installed with 4 screws for fastening.

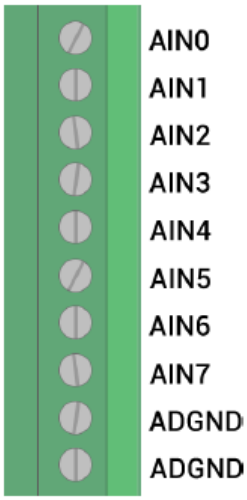


→ Unit: mm →Installment Hole Diameter: 4.5mm →height: 35mm

4.1.3. AD/DA Analog Input/Output

The analog port adopts 2 sets of 10Pin screw-type pluggable terminal.

→ Wiring Definition

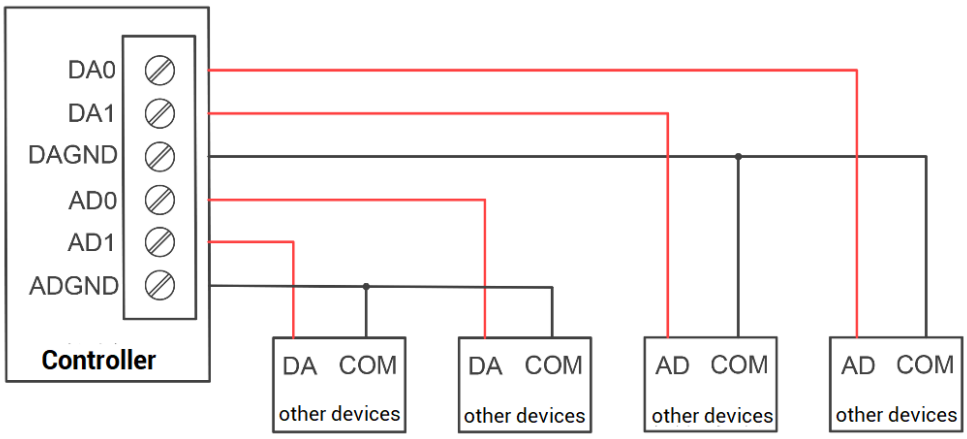
Terminal	Name	Type	Function
	AIN0	Input	Analog input terminal AIN(0)
	AIN1	Input	Analog input terminal AIN(1)
	AIN2	Input	Analog input terminal AIN(2)
	AIN3	Input	Analog input terminal AIN(3)
	AIN4	Input	Analog input terminal AIN(4)
	AIN5	Input	Analog input terminal AIN(5)
	AIN6	Input	Analog input terminal AIN(6)
	AIN7	Input	Analog input terminal AIN(7)
	ADGND	Public end	Public end of input analog
	ADGND	Public end	Public end of input analog

	AOUT0	Output	Analog output terminal AOUT(0)
	AOUT1	Output	Analog output terminal AOUT(1)
	DAGND	Public end	Public end of output analog
Note: analog input/output are single-ended input, the reference ground of sensor needs to be connected to ADGND/DAGND terminals.			

→ Specification

Item	AD (0-7)	DA (0-1)
Resolution	12-bit	12-bit
Data range	0-4095	0-4095
Signal range	0-10V input	0-10V output
Data refresh ratio	1KHz	1KHz
Voltage input impedance / output load	300Ω (voltage input impedance)	>10KΩ (voltage output load)

→ Wiring Reference



→ Wiring Note:

- The analog input/output wiring method is as shown in the figure above, and the external load signal range must match it.
- Please use twisted-pair shielded cables, especially in harsh environments, and make sure the shielding layer is fully grounded.

4.1.4. Expansion Module Usage

(1) Please follow the above wiring instructions to do power, CAN and IO signal wiring correctly.

(2) Assign IO address and communication speed ratio through DIP switch.

(3) After powered on, please use ETHERNET or RS232 to connect to ZDevelop.

(4) Please use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs, and use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

(5) After all the settings are completed, it is time to communicate, in “State the controller"--“CAN nodes", it will show information of expansion module.

Local	432-0(ZMC432)	32	30(0-29)	18(0-17)	0	2(0-1)
1	48(ZIO1632)	0	16(32-47)	32(32-63)	0	0
3	26(ZIO16082)	2	16(64-79)	8(64-71)	0	0
4	10(ZAIO0802)	0	0	0	8(40-47)	2(20-21)

(6) Analog input voltage can be read through “AIN" command and corresponding analog voltage can be output through “AOUT" command, also, data of each channel can be checked through “ZDevelop/View/AD/DA”. Please refer to “ZBasic” for details.

Chapter V Run and Maintain

The correct operation and maintenance of the motion controller can not only guarantee and extend the life cycle of the equipment itself, but also take technical management measures according to the pre-specified plan or the corresponding technical conditions to prevent equipment performance degradation or reduce the probability of equipment failure.

5.1. Regular Inspection and Maintenance

The working environment has an impact on the controller. Therefore, it is usually inspected regularly based on the inspection cycle of 6 months to 1 year. The inspection cycle of the motion controller can be appropriately adjusted according to the surrounding environment to make it work within the specified standard environment.

Check item	Check content	Inspection standards
power supply	Check whether the voltage is rated	DC 24 V (-10%~10%)
surroundings	Whether the ambient temperature is within the specified range (when installed in the cabinet, the temperature inside the cabinet is the ambient temperature)	-10°C - 55°C
	Whether the ambient humidity is within the specified range (when installed in the cabinet, the humidity in the cabinet is the ambient humidity)	10%-95% non-condensing
	Is there direct sunlight	No
	With or without droplets of water, oil, chemicals, etc.	No
	Whether there is dust, salt, iron filings, dirt	No
	Whether there is corrosive gas	No
	Whether there are flammable and explosive gases or articles	No

	Whether the controller is subjected to vibration or shock	Should be within the range of vibration resistance and impact resistance
	Is the heat dissipation good	Keep good ventilation and heat dissipation
Installation and Wiring Status	Whether the basic unit and the expansion unit are installed firmly	The mounting screws should be tightened without loosening
	Whether the connecting cables of the basic unit and the expansion unit are fully inserted	The connection cable cannot be loosened
	Are the screws of the external wiring loose	Screws should be tightened without loosening
	Whether the cable is damaged, aged, cracked	The cable must not have any abnormal appearance

5.2. Common Problems

Problems	Suggestions
Motor does not rotate.	1. Check whether CAN bus communicates successfully 2. Check whether axis address is configured correctly when expanding axes. 3. Check whether the ATYPE of the controller is correct. 4. Check whether hardware position limit, software position limit, alarm signal work, and whether axis states are normal. 5. Check whether motor is enabled successfully. 6. Confirm whether pulse amount UNITS and speed values are suitable. If there is the encoder feedback, check whether MPOS changes. 7. Check whether pulse mode and pulse mode of drive are matched. 8. Check whether alarm is produced on motion controller station or drive station.

	9. Check whether the wiring is correct. 10. Confirm whether controller sends pulses normally.
No signal comes to the input.	1. Check whether the limit sensor is working normally, and whether the "input" view can watch the signal change of the limit sensor. 2. Check whether the mapping of the limit switch is correct. 3. Check whether the limit sensor is connected to the common terminal of the controller.
The output does not work. No voltage and current signals in input channel.	1. Check whether IO power is needed. 2. Check whether the output number matches the ID of the IO board.
POWER led is ON, RUN led is OFF.	1. Check whether the power of the power supply is sufficient. At this time, it is best to supply power to the controller alone, and restart the controller after adjustment. 2. Check whether the ALM light flickers regularly (hardware problem).
RUN led is ON, ALM led is ON.	1. Program running error, please check ZDevelop error code, and check application program. 2. Check the wiring, resistor, and the DIP setting. 3. Check controller CANIO ADDRESS configuration, master station should be 32, see whether CAN communication speed are consistent.
CAN expansion module cannot be connected.	1. Check the CAN wiring and power supply circuit, whether the 120 ohm resistor is installed at both ends. 2. Check the master-slave configuration, communication speed configuration, etc. 3. Check the DIP switch to see if there are multiple expansion modules with the same ID. 4. Use twisted-pair cables, ground the shielding layer, and use dual power supplies for severe interference (the main power supply of the expansion module and the IO power supply are separately powered)

Analog voltage signal is unstable.	1. Check the wiring. 2. Check whether analog max scale values and voltage range selection are correct. 3. When the analog interface is reserved, it is normal for voltage waveform. Connect spare analog terminal into analog AGND terminal, the voltage unstable situation can be promoted.