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Vertical Bus Expansion Module

ZMI0310





Vision Motion Controller



Motion Controller



Motion Control Card



IO Expansion Module



HMI

Statement

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> Notes

In order to prevent possible harm and damage caused by incorrect use of this product, the following instructions are given on matters that must be observed.

Danger

Do not use it in places with water, corrosive or flammable gases, or near	N
flammable substances.	May cause
When installing or disassembling, make sure the product is powered off.	electric
Cables should be connected securely, and exposed parts that are	shock, fire,
energized must be insulated by insulators.	damage,
Wiring work must be performed by professionals.	etc.

Notes

It should be installed within the specified environmental range.	
Make sure there are no foreign objects on the product hardware circuit	
board.	May Cause
After installation, the product and the mounting bracket should be tight	uamage,
and firm.	mis-
After installation, at least 2-3cm should be left between the product and	operation,
surrounding components for ventilation and replacement.	elc.
Never disassemble, modify, or repair it by yourself.	

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Chapter I Introduction

1.1. Product Introduction

ZMIO310 Series expansion module is a kind of vertical fieldbus expansion module, which supports EtherCAT and CAN to expand IO, AD and DA. When IO, AD and DA are not enough, it needs a coupler module (ZMIO310-ECAT or ZMIO-CAN communication module) to match with submodules (input/output/AD/DA module) to expand.

Sub modules include: ZMI0310-1616N, ZMI0310-1616P, ZMI0310-32DI, ZMI0310-32DO, ZMI0310-DOP, ZMI0310-4AD, ZMI0310-4DA.



Expand by EtherCAT





- Digital inputs and outputs are with signal indication lights, which are used to check
 IO states.
- The resolution of analog is 16-bit, there are voltage type or current type, and there

are multiple ranges.

- One single coupler can extend 512 inputs or 512 outputs at most. If you need more, please select several couplers.
- One single coupler can extend 32 ADs or 32 DAs at most. If you need more, please select several couplers.
- It is convenient to do expansion wiring.

This manual mainly describes ZMIO310 specification, property, usage, etc. Please read this manual carefully to know more about the product, and then you could use more safely.



1.2. Module Models

No.	Interface	Description
1	ZMIO310-ECAT	Coupler module, EtherCAT module
2	ZMIO310-CAN	Coupler module, CAN module
3	ZMI0310-1616N	Expansion sub-module, 16 IN (NPN/PNP), 16 OUT (NPN)
4	ZMI0310-1616P	Expansion sub-module, 16 IN (NPN/PNP), 16 OUT (PNP)
5	ZMI0310-32DI	Expansion sub-module, 32 IN (NPN/PNP)
6	ZMI0310-32D0	Expansion sub-module, 32 OUT (NPN)
Ø	ZMI0310-32DOP	Expansion sub-module, 32 OUT (PNP)
8	ZMIO310-4AD	Expansion sub-module, 4 AD, 16bit
9	ZMI0310-4DA	Expansion sub-module, 4 DA, 16bit

1.3. Product Specification

Madal	ZMI0310-	ZMI0310-	ZMI0310-	ZMI0310-	
Model	4AD	4DA	ECAT	CAN	
AD Analog Input	4	0	-	-	
DA Analog Output	0	4	-	-	
Analog Resolution	16bit	16bit	-	-	
Communication			Cthor OAT	CAN	
Protocol	-	-	EtherCAT	CAN	
Dimensions (mm)	32*95*93				

Madal	ZMI0310-	ZMI0310-	ZMIO310-	ZMI0310-	ZMI0310-
Model	1616N	1616P	32DI	32DO	32DOP
Digital Input	16	16	32	0	0
Digital Input Type	NPN/PNP	NPN/PNP	NPN/PNP	-	-
Digital Output	16	16	0	32	32
Digital Output Type	NPN	PNP	-	NPN	PNP
Dimensions (mm)	24*95*93				

1.4. Nameplate & Models

> Coupler:



> Coupler + Sub-Modules

[ZMIO310	- 1	61	6	N
Mark	Product Series		Ma	ırk	
ZMI0310	Vertical Bus Module		1616N		D
			161	6P	D
			320	00	D
			32D	OP	D
			4 A	D	A

Mark	Sub-Module
1616N	Digital Sub-Module
1616P	Digital Sub-Module
32DO	Digital Sub-Module
32DOP	Digital Sub-Module
4AD	Analog Sub-Module
4DA	Analog Sub-Module
32DI	Digital Sub-Module

Coupler	Inner IN	Inner OUT	Communication Interface	Functions
ZMIO310-ECAT	-	-	EtherCAT	EtherCAT Communication Module
ZMIO310-CAN	-	-	CAN	CAN Communication Module

Sub-Module	Inner IN	Inner OUT	AD/DA	Ю Туре	Functions
7/10210 16161	16	16		IN: NPN/PNP	IN / OUT
	10		-	OUT: NPN	Module
7140210 16160	16	16		IN: NPN/PNP	IN / OUT
21010310-1010P	10	16	-	OUT: PNP	Module
ZMI0310-32DI	32	-	-	IN: NPN/PNP	IN Module
ZMI0310-32D0	-	32	-	OUT: NPN	OUT Module
ZMI0310-32DOP	-	32	-	OUT: PNP	OUT Module
7140210 440			4		AD Module
ZIMIU3TU-4AD	-	-	4	-	(16Bit)
			4	-	DA Module
ZIVIIO3TU-4DA	-	-	4		(16Bit)

1.5. Power Requirements

This expansion module uses dual-power supply, that is, one coupler module ZMIO310-ECAT or ZMIO310-CAN uses one power supply, then one submodule uses another power supply (when there is enough power for power supply, submodules can use one power supply, but submodule and coupler module can't use the same one power).

Model/Item	Power Voltage	Current to open	Current to work
ZMIO310-ECAT	Coupler main	1A	0.5A
ZMIO310-CAN	power, DC24V is recommended. 18V-36V is max.	0.2A	0.1A
ZMI0310-1616N	Submodule power supply, DC24V is recommended. 18V-36V is max.	0.2A	0.1A
ZMI0310-161P		0.6A	0.3A
ZMIO310-16DI		0.2A	0.1A
ZMI0310-16D0		0.2A	0.1A
ZMI0310-16D0P		1A	0.5A
ZMIO310-4AD		0.2A	0.1A
ZMIO310-4DA		0.2A	0.1A

1.6. Work Environment

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

1.7. Hardware Installment

- > Installment Steps:
- Please use a 35mm standard DIN rail.
- Open the rail buckle of the ECAT communication module and embed the ECAT communication module on the DIN rail.
- Press the rail buckle of the ECAT communication module to fix the ECAT communication module on the DIN rail.



> Module Size (mm):

Chapter II Coupler Modules

2.1. ZMIO310-ECAT Communication Module

Interface Definition:



No.	Interface	Description			
1	User terminal	Power terminal, connect to DC24V power.			
	Local expansion	Connect to expansion submodules, plug in and pull			
	behind level interface	out when in hot are unsupported.			
		EtherCAT input, used to connect EtherCAT master			
9	EtherCAT IN	station or former level EtherCAT slave station.			
4	EtherCAT OUT	EtherCAT output, connect EtherCAT slave station.			
		• Power state: green, it lights when power is			
		conducted.			
9	State indication Led	• Run state: green, it lights when runs normally			
		• Error state: red, it lights when runs incorrectly			
Note: Eth	erCAT IN and EtherCAT (DUT can't be mixed.			

Performance & Specification

ltem	Specification	
Power Voltage	24V DC	
Communication Protocol	EtherCAT Industrial Real-time Bus Protocol	
Service	CoE (PDO, SDO), firmware upgrade	
Communication Cycle	250μs, 500μs, 1ms, 2ms, 4ms, etc.	
Max Communication	Eth syn at 100M/h as	
Speed	Ethernet TOOMbds	
Network Port	Standard Ethernet RJ45 interface	
Transfer Medium	5E Category STP	
Transfer Distance	Distance between two nodes is less than 100m	
	• ZMI0310-32DI/32D0/322D0P. max 16 submodules (can be mixed)	
Continuation	• ZMI0310-1616P/1616N: max 8 submodules (can be mixed)	
Sub-Module	• ZMI0310-4AD/DA: max 8 submodules (can be mixed)	
Expansion	> Note: all submodules can't > 16, for one ZMI0310-1616P/N, it	
	belongs to 2 submodules. Real numbers refer to each module power.	
Max IOs of	512 inputs or 512 outputs	
Continuation Sub Module		
Max AIOs of		
Continuation Sub Module	32 ADS OF 32 DAS	
Self-Power	1.6W	
Internal power for		
behind level	8.4₩	

Main Power Terminal	Mark	Туре	Function
GND	GND	IN	Main Power Ground
NC	NC	-	Reserved
EARTH 🖬 🧻	EARTH	Ground	Shield
NC	NC	-	Reserved
+24V	+24V	IN	Main Power 24V IN

EtherCAT

> Specification

Mark		ltem	Description		
	PIN	Signal	Description	Communication Protocol	EtherCAT
	1	TX+	Send signal (+) Send signal (-)	Communication Velocity	100Mbps
	4	RX+	Receive signal (+) Reserved	Refresh Cycle Communication Cable	Max 500us
	6	RX-	Reserved Receive signal (-)		Super5E STP
	8 NC Reserved Cable Le		Cable Length	<100m	

> Wiring

- (1) When connect to EtherCAT drives / other devices, using one super 5e shielded cable to connect to slave device's EtherCAT IN. Then, this slave device (EtherCAT OUT) also can be connected to next one device (EtherCAT IN).
- (2) Ethernet States:

LED & State	Common-ON	Shrink
Green Led	Build 10M communication	Data is receiving and sending
Yellow Led	Build 100M communication	Data is receiving and sending

> Notes

- 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 30cm.
- 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.

Usage:

- (1) Please do correct power & EtherCAT module wiring.
- (2) Connect controller to <u>RTSys</u> by Ethernet / Serial port.
- (3) Connect to EtherCAT drivers:
 - a) SLOT_SCAN command to scan the slot No. on the EtherCAT
 - b) AXIS_ADDRESS command to map axis No.
 - c) SLOT_START command to open bus, SLOT_STOP closes bus
 - d) After that, configure and operate local pulse axes.
- (4) Connect to EtherCAT expansion modules:
 - a) SLOT_SCAN command to scan the slot No. on the EtherCAT
 - b) AXIS_ADDRESS command to map axis No., NODE_IO/NODE_AIO to map IO No.
 - c) SLOT_START command to open bus, SLOT_STOP closes bus
 - d) After that, usage of extended IO and axis is same as local one.
- (5) View slot No. and node information through RTSys>Controller>Controller State>Slot0Node.
- (6) Above commands and others, please refer to RTBasic Programming Manual.

Malfunction Indication & Solution

Status Indication Light		n Light	Reason		Solution		
POW	RUN	ERR	Reason		Solution		
ON	twinkle alternately and slowly		The communication between EtherCAT master station and coupler module breaks	*	Check if crystal head is loosened or not Check the net cable is damaged or not Restart the power.		
ON	twir alterr and r	nkle nately apidly	The pre-scanned sub module and actual continuation sub module are not totally matched.	++	Check if the continuation submodule is lost, or be in malfunction Check if appears hot plug or discharger Restart the power.		

2.2. ZMIO310-CAN Communication Module

Interface Definition:



No.	Interface	Description		
	User terminal	Power terminal, connect to DC24V power.		
Ū	CAN	Connect to controller / submodules.		
	Local expansion	Connect to expansion submodules, plug in and pull		
	behind level interface	out when in hot are unsupported.		
3	DID owitch	8 codes, CAN address, CAN speed can be set, and		
	DIP SWIICH	conduct CAN 120-ohm terminal resistor.		
		• POW state: green, it lights when power is		
4		conducted.		
	State mulcation Leu	• Run state: green, it lights when runs normally		
		• Error state: red, it lights when runs incorrectly		

Performance & Specification

ltem	Specification
Power Voltage	24V DC
Communication Protocol	CAN

Max Connected	Up to 16 CAN slave modules
Transfer Distance	Distance between two nodes is less than 30m
Address Configuration	By DIP switch
	• ZMI0310-32DI/32D0/322D0P. max 16 submodules (can be mixed)
Continuation	• ZMIO310-1616P/1616N: max 8 submodules (can be mixed)
Sub-Module	• ZMIO310-4AD/DA: max 8 submodules (can be mixed)
Expansion	> Note: all submodules can't > 16, for one ZMI0310-1616P/N, it
	belongs to 2 submodules. Real numbers refer to each module power.
Self-Power	0.6W
Internal power for	7.0W
behind level	1.300
Supported Service	Upgrade firmware
Note: mew version update	d the module program, if added submodule numbers exceed the coupler
limit, there will be alarm.	

User Terminal

Main Power Terminal	Mark	Туре	Function
GND	GND	IN	Main Power Ground
	CANL	IN/OUT	CAN Differential Data -
EARTH 🗨 📕 🦳	EARTH	Ground	Shield
NC 🔍 📕 🔘	CANH	IN/OUT	CAN Differential Data +
+24V	+24V	IN	Main Power 24V IN

CAN

> Specification

CAN	Description
Communication Velocity	≤1Mbps
Terminal Resistor	120-ohm
Wiring Structure	Daisy Chain Structure
Max Nodes	≤16

Cable Length	Recommend: <30m (500kbps)
Communication Isolation	YES

> 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 no many 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 30cm.
- 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.

Usage:

(1) Please do correct power & CAN module wiring.

- (2) Connect controller to <u>RTSys</u> by Ethernet / Serial port.
- (3) Configure controller CAN master station:
 - a) CANIO_ADDRESS command to set master station "address" & "velocity".
 - b) CANIO_ENABLE command to enable / disable CAN master station function.
 - c) View parameters by RTSys>controller>controller state>communication config.
- (4) View bus node parameters by RTSys>controller>controller state>ZCanNode.
- (5) Correctly set the "address" and "speed" of the CAN slave station expansion module according to the manual of the slave station, complete resource mapping.
- (6) After all the settings are completed, restart the power supply of all stations to establish communication. 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.
- (7) Above commands and others, please refer to <u>RTBasic Programming Manual</u>.

> DIP Switch:



The ZMIO310-CAN expansion module generally has an 8-bit DIP switch, dial ON to take effect, and the meaning of the DIP is as follows:

- 1-4: CAN module address ID, the corresponding values are 0-15 (4-bit, convert to decimal system from binary system).
- 5-6: CAN communication speed, corresponding values are 0-3 (2-bit, convert to decimal system from binary system), 4 kinds of speeds can be selected.
- 7: reserved.
- 8: 120-ohm resistor, dial ON means a 120-ohm resistor is connected between CANL and CANH.

More details of expansion IO address mapping and communication speed, please refer to

Chapter IV CAN Bus Expansion Description.

Status Indication Light		n Light	Deesen		O . It stime		
POW	RUN	ERR	Reason		Solution		
ON	twin altern and sl	kle ately lowly	The communication between EtherCAT master station and coupler module breaks	* * *	Check if crystal head is loosened or not Check the net cable is damaged or not Restart the power.		
ON	twin altern and ra	kle ately pidly	The pre-scanned sub module and actual continuation sub module are not totally matched.	+ + +	Check if the continuation submodule is lost, or be in malfunction Check if appears hot plug or discharger Restart the power.		

Malfunction Indication & Solution

2.3. Coupler Sub-Modules Extension (16 / 32)

Coupler	Sub-Module Models	Max Sub-Modules
	All modules combination: 1616N/1616P, one	16
ZMIO310-	belongs to 2 submodules	10
ECAT	16DI / 16DO / 16DOP / 32DI / 32DO / 32DOP	16
	1616N / 1616P / 4AD / 4DA	8
	All modules combination: IN & OUT numbers	16
ZMIO310-	can't exceed 16.	10
CAN	16DI / 16DO / 16DOP / 1616N / 1616P	6
	32DI / 32DO / 32DOP / 4AD / 4DA	3

Chapter III Coupler Modules

3.1. ZMIO310-1616N

Interface Definition:



No.	Interface	Description		
1	IO power	Power terminal, connect to DC24V power.		
2	Digital output	OUT0-OUT15		
3	Digital input	IN0-IN15		
A	Local expansion	Connect to expansion submodules, plug in and		
Ð	behind level interface	pull out when in hot are unsupported.		
5	Local expansion front	Connect to coupler / expansion submodules, plug		
	level interface	in and pull out when in hot are unsupported.		
6	IO signal indication led	Indicate each channel input / output signal		
Ø		• POW led: green, it lights when power is		
	State Indication Led	conducted.		
		• Run led: green, it lights when runs normally		
		• Error led: red, it lights when runs incorrectly		

	Terminal	Name	Туре	Function
--	----------	------	------	----------

	10		Digital input 0
	11		Digital input 1
	12		Digital input 2
	13		Digital input 3
	14		Digital input 4
	15		Digital input 5
	16		Digital input 6
12	17	NPN / PNP type,	Digital input 7
	18	iow-speed	Digital input 8
15	19	inputs	Digital input 9
	110		Digital input 10
co 11 0 0 11 co	111		Digital input 11
	112		Digital input 12
	113		Digital input 13
	114	1	Digital input 14
	115		Digital input 15
	CO	 COM0: IN (0-1 COM0 with 24 	5) = public ends, determine IN type. V = NPN, COM0 with 0V = PNP.
	00		Digital output 0
	01		Digital output 1
	02		Digital output 2
00 00 08	03		Digital output 3
	04		Digital output 4
	05		Digital output 5
01	06		Digital output 6
	07	NPN type, low-	Digital output 7
03 04 05 06 04 07 24V 011 012 013 014 014 015 015	08	speed outputs	Digital output 8
	09		Digital output 9
	010		Digital output 10
	011		Digital output 11
	012		Digital output 12
	013		Digital output 13
	014		Digital output 14
	015		Digital output 15
	24V	24V power input +	

		0V	24V power input -, digital output public end
--	--	----	--

Malfunction Indication & Solution

Status Indication Led		on Led	Passan		Solution		
POW	RUN	ERR	Keason		Solution		
				ŧ	Check whether CAN terminal wiring		
					is correct.		
			4	Check whether bus two sides are			
			CAN communication Abnormal		connected one 120-ohm resistor		
UN	UN	UN	CAN communication Abnormal	4	Check whether multiple CAN		
				modules use the same hardware ID			
			4	Check whether the submodule			
					numbers exceed max limit		
				4	Check whether connected		
			Preset submodule is not		submodules are lost / are error		
		F OFF	perfectly consistent with real	4	Check whether the power "plug-in &		
ON OFF	OFF		connected submodule.		out under hot"		
				4	Restart the power supply		
			Master / slave state firmware	4	Update the firmware for master		
		abnormal		station and slave station both.			

3.2. ZMIO310-1616P

Interface Definition:



No.	Interface	Description	
1	IO power	Power terminal, connect to DC24V power.	
2	Digital output	OUT0-OUT15	
3	Digital input	IN0-IN15	
	Local expansion	Connect to expansion submodules, plug in and	
Ŧ	behind level interface	pull out when in hot are unsupported.	
5	Local expansion front	Connect to coupler / expansion submodules, plug	
	level interface	in and pull out when in hot are unsupported.	
6	IO signal indication led	Indicate each channel input / output signal	
Ø		• POW led: green, it lights when power is	
	State Indication Led	conducted.	
		• Run led: green, it lights when runs normally	
		• Error led: red, it lights when runs incorrectly	

Terminal	Name	Туре	Function
	10	NPN / PNP type,	Digital input 0
	11	low-speed	Digital input 1

	12	inputs	Digital input 2
	13		Digital input 3
	14		Digital input 4
	15		Digital input 5
	16		Digital input 6
	17		Digital input 7
12	18		Digital input 8
	19		Digital input 9
15	110		Digital input 10
16	111		Digital input 11
o 🚺 🔵 🚺 o	112		Digital input 12
	113		Digital input 13
	114		Digital input 14
	115		Digital input 15
	C0	 COM0: IN (0-1 COM0 with 24 	15) = public ends, determine IN type. IV = NPN, COM0 with 0V = PNP.
	00		Digital output 0
	01		Digital output 1
	02		Digital output 2
	03		Digital output 3
	04		Digital output 4
	05		Digital output 5
00 08	06		Digital output 6
01 09 02 01 010	07	PNP type, low-	Digital output 7
03 011	08	speed outputs	Digital output 8
04 012 05 013	09		Digital output 9
06 014 07 015 24V 00 0V	010		Digital output 10
	011		Digital output 11
	012		Digital output 12
	013		Digital output 13
	014		Digital output 14
	015		Digital output 15
	24V	24V power input +	
	0V	24V power input -,	digital output public end

Malfunction Indication & Solution

Status Indication Led			Passon		Solution		
POW	RUN	ERR	neason		Solution		
				ŧ	Check whether CAN terminal wiring		
					is correct.		
				4	Check whether bus two sides are		
ON	ON	ON	CAN communication Abnormal		connected one 120-ohm resistor		
UN			CAN COmmunication Abnormal	4	Check whether multiple CAN		
					modules use the same hardware ID		
				4	Check whether the submodule		
					numbers exceed max limit		
				ŧ	Check whether connected		
ON OFF		Preset submodule is not		submodules are lost / are error			
	OFF	OFF	perfectly consistent with real	4	Check whether the power "plug-in &		
			connected submodule.		out under hot"		
				4	Restart the power supply		
			Master / slave state firmware	4	Update the firmware for master		
			abnormal		station and slave station both.		

3.3. ZMIO310-32DI

Interface Definition:



No.	Interface	Description		
1	Digital input	INO-IN31		
0	Local expansion	Connect to expansion submodules, plug in and		
	behind level interface	pull out when in hot are unsupported.		
@	Local expansion front	Connect to coupler / expansion submodules, plug		
3	level interface	in and pull out when in hot are unsupported.		
4	IO signal indication led	Indicate each channel input / output signal		
		• POW led: green, it lights when power is		
6	State Indication Lod	conducted.		
9	State mulcation Leu	• Run led: green, it lights when runs normally		
		• Error led: red, it lights when runs incorrectly		

Terminal	Name	Туре	Function
	10		Digital input 0
	11		Digital input 1
	12		Digital input 2
	13		Digital input 3
	14		Digital input 4
10	15		Digital input 5
11 19	16	NPN / PNP type, low-speed inputs	Digital input 6
12	17		Digital input 7
	18		Digital input 8
15 📕 🔵 🚺 113	19		Digital input 9
16	110		Digital input 10
	111		Digital input 11
	112		Digital input 12
	113		Digital input 13
	114		Digital input 14
	115		Digital input 15
	CO	 IN (0-15) = pu COM0 with 24 	blic ends, determine the IN type. V = NPN, COM0 with 0V = PNP.
	116	NPN / PNP type,	Digital input 16

	117	low-speed	Digital input 17			
	118	inputs	Digital input 18			
	119		Digital input 19			
	120		Digital input 20			
	121		Digital input 21			
116	122		Digital input 22			
117 125	123		Digital input 23			
119	124		Digital input 24			
	125		Digital input 25			
	126		Digital input 26			
123	127		Digital input 27			
C1 C1	128		Digital input 28			
	129		Digital input 29			
	130		Digital input 30			
	131		Digital input 31			
	C1	➢ IN (16-31) = p	ublic ends, determine the IN type.			
		COM1 with 24	V = NPN, COM1 with 0V = PNP.			
Note: this module itself doesn't have 24V / 0V power input terminal, no need to be						
powered separately. And its input type can be switched by C0/C1 connected coupler						
(+24v / GND) / other sub-module's (24V / 0V) interface.						

Malfunction Indication & Solution

Status Indication Led		on Led	Passan		Solution	
POW	RUN	ERR	Reason		Solution	
				4	Check whether CAN terminal wiring	
					is correct.	
		ON	CAN communication Abnormal	4	Check whether bus two sides are	
					connected one 120-ohm resistor	
UN	UN			4	Check whether multiple CAN	
				modules use the same hardware ID		
				4	Check whether the submodule	
					numbers exceed max limit	
ON	OFF	OFF	Preset submodule is not	4	Check whether connected	

	perfectly consistent with real		submodules are lost / are error
	connected submodule.	4	Check whether the power "plug-in &
			out under hot"
		4	Restart the power supply
	Master / slave state firmware	4	Update the firmware for master
	abnormal		station and slave station both.

3.4. ZMI0310-32D0

Interface Definition:



No.	Interface	Description		
1	IO power	Power terminal, connect to DC24V power.		
2	Digital output	OUT0-OUT31		
0	Local expansion	Connect to expansion submodules, plug in and		
0	behind level interface	pull out when in hot are unsupported.		
4	Local expansion front	Connect to coupler / expansion submodules, plug		
Ð	level interface	in and pull out when in hot are unsupported.		
5	IO signal indication led	Indicate each channel input / output signal		
		• POW led: green, it lights when power is		
6	State Indication Lod	conducted.		
		• Run led: green, it lights when runs normally		
		• Error led: red, it lights when runs incorrectly		

Terminal	Name	Туре	Function
	00		Digital output 0
	01		Digital output 1
	02		Digital output 2
	03		Digital output 3
	04		Digital output 4
00	05		Digital output 5
01 09	06		Digital output 6
03 011	07	NPN type, low-	Digital output 7
04	08	speed outputs	Digital output 8
05 013	09		Digital output 9
07	010		Digital output 10
NC	011		Digital output 11
	012		Digital output 12
	013		Digital output 13
	014		Digital output 14
	015		Digital output 15
	NC	Reserved	
	016		Digital output 16
	017		Digital output 17
	018		Digital output 18
	019		Digital output 19
016 024	020		Digital output 20
018	021		Digital output 21
019 027	022	NPN type, low-	Digital output 22
021	023	speed outputs	Digital output 23
022	024		Digital output 24
24V	025		Digital output 25
	026		Digital output 26
	027		Digital output 27
	028		Digital output 28
	029		Digital output 29

030	Digital output 30
031	Digital output 31
24V	24 power input +
0V	24 power input -, digital output public end

Malfunction Indication & Solution

Status Indication Led			Descen		Colution		
POW	RUN	ERR	Reason		Solution		
				ŧ	Check whether CAN terminal wiring		
					is correct.		
				4	Check whether bus two sides are		
			CAN communication Abnormal		connected one 120-ohm resistor		
UN	UN UN	UN	CAN communication Abnormal	4	Check whether multiple CAN		
					modules use the same hardware ID		
				4	Check whether the submodule		
					numbers exceed max limit		
				4	Check whether connected		
ON OF			Preset submodule is not		submodules are lost / are error		
	OFF	OFF OFF	perfectly consistent with real	4	Check whether the power "plug-in &		
			connected submodule.		out under hot"		
				4	Restart the power supply		
			Master / slave state firmware	4	Update the firmware for master		
			abnormal		station and slave station both.		

3.5. ZMI0310-32DOP

Interface Definition:



No.	Interface	Description			
1	IO power	Power terminal, connect to DC24V power.			
2	Digital output	OUT0-OUT31			
0	Local expansion	Connect to expansion submodules, plug in and			
0	behind level interface	pull out when in hot are unsupported.			
	Local expansion front	Connect to coupler / expansion submodules, plug			
4	level interface	in and pull out when in hot are unsupported.			
5	IO signal indication led	Indicate each channel input / output signal			
		• POW led: green, it lights when power is			
6	Otata Indiantian Lad	conducted.			
	State mulcation Leu	• Run led: green, it lights when runs normally			
		• Error led: red, it lights when runs incorrectly			

Terminal	Name	Туре	Function
	00	PNP type, low-	Digital output 0
	01		Digital output 1
	02	speed outputs	Digital output 2

	03		Digital output 3		
	04		Digital output 4		
	05		Digital output 5		
	06		Digital output 6		
	07		Digital output 7		
02 010 010	08		Digital output 8		
03 011	09		Digital output 9		
04 012 05 013 06 014	010		Digital output 10		
	011		Digital output 11		
07 015	012		Digital output 12		
	013		Digital output 13		
	014		Digital output 14		
	015		Digital output 15		
	NC	Reserved			
	016		Digital output 16		
	017		Digital output 17		
	018		Digital output 18		
	019		Digital output 19		
	020		Digital output 20		
	021		Digital output 21		
016 024	022		Digital output 22		
018	023	PNP type, low-	Digital output 23		
019 027	024	speed outputs	Digital output 24		
021	025		Digital output 25		
022	026		Digital output 26		
24V 001 0V	027		Digital output 27		
	028		Digital output 28		
	029		Digital output 29		
	030		Digital output 30		
	031		Digital output 31		
	24V	24 power input +			
	0V	24 power input -, digital output public end			

Malfunction Indication & Solution

Status Indication Led		on Led	Deecen		Calution		
POW	RUN	ERR	Reason		Solution		
			CAN communication Abnormal	+	Check whether CAN terminal wiring		
					is correct.		
ON OI				4	Check whether bus two sides are		
	ON				connected one 120-ohm resistor		
	UN	UN		4	Check whether multiple CAN		
					modules use the same hardware ID		
				4	Check whether the submodule		
					numbers exceed max limit		
ON OFF			ŧ	Check whether connected			
		OFF	Preset submodule is not		submodules are lost / are error		
	OFF		perfectly consistent with real	4	Check whether the power "plug-in &		
			connected submodule.		out under hot"		
				4	Restart the power supply		
			Master / slave state firmware	4	Update the firmware for master		
			abnormal		station and slave station both.		

3.6. ZMI0310-4AD

Interface Definition:



No.	Interface	Description			
1	IO power	Power terminal, connect to DC24V power supply.			
2	Analog input	4-channel analog input			
0	Local expansion	Connect to expansion submodules, plug in and			
0	behind level interface	pull out when in hot are unsupported.			
4	Local expansion front	Connect to coupler / expansion submodules, plug			
	level interface	in and pull out when in hot are unsupported.			
9		• POW led: green, it lights when power is			
	State Indication Lad	conducted.			
	State indication Led	• Run led: green, it lights when runs normally			
		• Error led: red, it lights when runs incorrectly			

Terminal	Name	Туре	Function	
I+	+	I+ V+ V- SG I+ V+ V- SG AGND NC	Channel 0 current input +	
	V+		Channel 0 voltage input +	
	V-		Channel 0 voltage input -	
V-	SG		Shielded	
I+	+		Channel 1 current input +	
V+	V+		Channel 1 voltage input +	
sg 🖬 🦷	V-		Channel 1 voltage input -	
AGND	SG		Shielded	
	AGND		Analog public current input -	
	NC		Reserved	
I+ C V+ C SG C I+ C V- C	+	Analog Input	Channel 2 current input +	
	V+		Channel 2 voltage input +	
	V-		Channel 2 voltage input -	
	SG		Shielded	
	+		Channel 3 current input +	
	V+		Channel 3 voltage input +	
E+24V	V-		Channel 3 voltage input -	
EGND 🗖 🧻 🦲	SG		Shielded	
	E+24V	/	24V power input +	

EGND	/	24V power input -

Malfunction Indication & Solution

Status Indication Led		n Led	Passan		Solution		
POW	RUN	ERR	Reason		Solution		
				ŧ	Check whether CAN terminal wiring		
					is correct.		
				4	Check whether bus two sides are		
ON ON					connected one 120-ohm resistor		
	UN	UN	CAN COmmunication Abnormal	4	Check whether multiple CAN		
					modules use the same hardware ID		
				4	Check whether the submodule		
				numbers exceed max limit			
ON OFF		OFF		4	Check whether connected		
	OFF		Preset submodule is not		submodules are lost / are error		
			perfectly consistent with real	4	Check whether the power "plug-in &		
			connected submodule.		out under hot"		
				4	Restart the power supply		
			Master / slave state firmware	4	Update the firmware for master		
			abnormal		station and slave station both.		
3.7. ZMIO310-4DA

Interface Definition:



No.	Interface	Description		
1	IO power	Power terminal, connect to DC24V power supply.		
2	Analog input	4-channel analog output		
0	Local expansion	Connect to expansion submodules, plug in and		
0	behind level interface	pull out when in hot are unsupported.		
4	Local expansion front	Connect to coupler / expansion submodules, plug		
	level interface	in and pull out when in hot are unsupported.		
9		• POW led: green, it lights when power is		
	State Indication Led	conducted.		
		• Run led: green, it lights when runs normally		
		• Error led: red, it lights when runs incorrectly		

User Terminal

Terminal	Name	Туре	Function
	+		Channel 0 current output +
	V+	Analog Output	Channel 0 voltage output +
	VI-		Channel 0 voltage / current output -
	SG		Shielded

I+	+		Channel 1 current output +
V+ C VI- C	V+		Channel 1 voltage output +
SG	VI-		Channel 1 voltage / current output -
V+	SG		Shielded
sg a log	NC		Reserved
	NC		Reserved
	+		Channel 2 current output +
	V+		Channel 2 voltage output +
I+	VI-		Channel 2 voltage / current output -
VI- C	SG	Analog Output	Shielded
SG I I+	+		Channel 4 current output +
V+ C	V+		Channel 4 voltage output +
SG	VI-	-	Channel 4 voltage / current output -
EGND	SG		Shielded
	E+24V	/	24V power input +
	EGND	/	24V power input -

Malfunction Indication & Solution

Status Indication Led		on Led	Dessen	Colution	
POW	RUN	ERR	Reason		Solution
				+	Check whether CAN terminal wiring
					is correct.
				4	Check whether bus two sides are
ON					connected one 120-ohm resistor
UN UN	UN	CAN communication Abnormal	4	Check whether multiple CAN	
				modules use the same hardware ID	
				4	Check whether the submodule
					numbers exceed max limit
				4	Check whether connected
			Preset submodule is not		submodules are lost / are error
ON	OFF	OFF	perfectly consistent with real	4	Check whether the power "plug-in &
			connected submodule.		out under hot"
				4	Restart the power supply

	Master / slave state firmware	+	Update the firmware for master
	abnormal		station and slave station both.

3.8. Sub-Module Performance & Specification

Digital Inputs

Item	Specification
Power Voltage	24VDC
Input Type	Digital input
10 Dower Supply Veltage	NPN / PNP
	NPN (IO public end connects to +24V)
input Method	PNP (IO public end connects to EGND)
Input Current (Typical)	NPN (-4.8mA), PNP (+4.8mA)
Input Impendence	4.7ΚΩ
Voltage when ON	For PNP type, >7.2V. For NPN type, <14.5V
Voltage when OFF	For PNP type, <6.8V. For NPN type, >14.7V
Internal power	0.3W
Self-Power	1.9W
Isolation	Coupler isolation
Input Frequency	<5kHz
Action showing (output)	When the output is ON, output indication led will be ON.

Digital Outputs (NPN)

Item	Specification	
Power Voltage	24VDC	
Output Type	Digital output	
Output Method	NPN type, it is low electric level when there is output	
Output Overcurrent	May is 200mA and the may tripping autrent is 600mA	
Protection	Max is southa, and the max tripping current is bound.	
The max leakage current	25μΑ	
when OFF		

Respond time when ON	12µA
Respond time when OFF	80μΑ
Internal power	0.3W
Self-Power	1.3W
Isolation	Coupler isolation
Input Frequency	<8kHz
Action showing (output)	When the output is ON, output indication led will be ON.
Supported Service	Update the firmware

Digital Outputs (PNP)

Item	Specification	
Power Voltage	24VDC	
Output Type	Digital output	
Output Method	PNP type, it is high electric level when there is output	
Output Overcurrent	Max is 300mA, and the max tripping current is 600mA.	
Protection		
The max leakage current	254	
when OFF	ΖθμΑ	
Respond time when ON	12µA	
Respond time when OFF	60µA	
Internal power	0.3W	
Self-Power	1.3W	
Isolation	Coupler isolation	
Input Frequency	<8kHz	
Action showing (output)	When the output is ON, output indication led will be ON.	
Supported Service	Update the firmware	

Analog Inputs

ltem	Specification
Power Voltage	24VDC
Input Channel	4

Voltage Input Impedance	>1MΩ		
Valtaga Input Danga	Dual-polarity: -5~5V, -10~10V		
voltage input Range	Single-polarity: 0~5V, 0~10V		
Current Input Range	0~20mA, 4~20mA		
Resolution	16-bit		
Sampling Time	1ms/channel		
Precision (common	Voltage ±0.1%, current ±0.1% (full-range)		
temperature 25°C)			
Precision (environment	Voltage +0.3% current +0.8%		
temperature 0~55°C)	Voltage ±0.5%, current ±0.6%		
Internal power	0.4W		
Self-Power	0.7W		
Isolation	Coupler isolation		
Supported Service	Update the firmware		

Analog Outputs

ltem	Specification	
Power Voltage	24VDC	
Output Channel	4	
Voltage Output Load	>10ΚΩ	
Valtara Outrut Danga	Dual-polarity: -5~5V, -10~10V	
voltage Output Range	Single-polarity: 0~5V, 0~10V	
Current Output Range	0~20mA, 4~20mA	
Resolution	16-bit	
Converting Time	1ms/channel	
Precision (common	Voltage ±0.1%, current ±0.1% (full-range)	
temperature 25°C)		
Precision (environment	Voltage ±0.3%, current ±0.8%	
temperature 0~55°C)		
Internal power	0.3W	
Self-Power	0.9W	
Isolation	Coupler isolation	
Supported Service	Update the firmware	

3.9. Sub-Module Wiring

ZMI0310-32DI module itself doesn't have 24V / 0V power input terminal.

Its input type can be switched by C0/C1 connected coupler (+24v / GND) / other sub-module's (24V / 0V) interface.

Digital Input (NPN)



Digital Input (PNP)



Digital Output (NPN)



Digital Output (PNP)



Analog Input (Voltage Type)



Analog Input (Current Type)



Analog Output (Voltage Type)



Analog Output (Current Type)



Chapter IV Usage Description

4.1. Power Consumption Calculation Example

For coupler module, here, take ZMI0310-ECAT communication module as the example.

ECAT communication module is supplied externally by DC24V, internal coupler supplies 5V power for each module, the max output current is 2A.

Except itself internal power consumption 1.6W, it supplies 8.4W power for each expansion submodule. Please see below form for reference.

Models	Description	Power Consumption
ZMI0310-ECAT	ECAT communication module	1.6W
ZMIO310-1616N	16 inputs & 16 outputs module	0.3W
ZMI0310-1616P	16 inputs & 16 outputs module	0.3W
ZMI0310-32DI	16 inputs module	0.3W
ZMIO310-4AD	4 analog inputs module	0.4W
ZMIO310-4DA	4 analog outputs module	0.3W

4.2. IO Starting No. Settings

Expand by EtherCAT

If the coupler uses ECAT communication module, IO starting No. of input module and output modules are configured through "NODE_IO" command, AIO starting No. of AD module and DA module are configured through "NODE_AIO" command.

Digital Inputs:

NODE_IO					
Grammar	NODE_I	NODE_IO (slot, node) = iobase			
	slot	Controller bus slot No.	Default is 0		
Parameters	node	Device No.	Start from 0		
	iobase	IO start No.	Expanded input and output		

				start No. are the same
Example	NODE_I	0 (0,0) = 32	'expanded IO	start No. of Node 0 is 32
Notes	 IO : If the second second	start No. only on the IO start No. Stly, check the ximum value of the simultaneou	can be set as m is 30, which me e controller st of controller ex f expanded IO N usly, so it is not	nultiples of 8, like, 0, 8, 16, etc. eans it should be set as 24. tatus to know the local IO kactly, then use NODE_IO for o. and local IO repeat, they are recommended.
	u Alexandre Ale	update, the IN rting address i real IO, then, IN	I value will be s s 16, offset to 3 I state of this a	saved. For example, when the 32, former area of 16~31 have rea will not be updated.

NODE_AIO					
Grammar	NODE_IO (slot, node) = aiobase				
	slot	Controller bus slot No.	Default is 0		
Doromotoro	node	Device No.	Start from		
Falameters	aiobasa	AIO start No	Expanded AD and DA start No.		
	alobase	Alo Start No.	are the same		
Example	NODE_AI	NODE_AIO (0,0) = 32 'expanded AIO start No. of Node 0 is 32			
	Firstly, check the controller status to know the local All				
Notes	maximum value of controller exactly, then use NODE_AIO for				
NOLES	avoid repetition. If expanded AIO number and local AIO repeat,				
they are valid simultaneously, so it is not recommende			so it is not recommended.		

Expand by CAN

If the coupler uses CAN communication module, IO starting No. of input module and output module and AIO starting No. of AD module and DA module are configured through DIP (dial code switch). Dial 1-4 to set IO address, dial 5-6 to set CAN communication speed.

> Set Digital IO Starting No.

DIP codes 1-4 are used to set address combination value. Then, refer to current IO No., controller sets corresponding IO and AIO starting No. according to the address

combination values. <u>(OFF=0, ON=1, address combination value = dial code 4 × 8 + dial</u> <u>code 3 × 4 + dial code 2 × 2 + dial code 1).</u>

• For Example:

If the controller itself contains 28 INs and 16 OPs, then the starting address of the first expansion module should exceed the maximum value of 28.

According to below rule, the dial code should be set to the combination value 1 (binary combination value 0001, from right to left, dial code 1-4, at this time, dial 1 is set to ON, and the others are set to OFF), then IO No. on the expansion board = the expansion board No. value + the starting IO No. value, among them, the IOs that are vacant from 29-31 are not used. And subsequent extended boards continue to dial according to the IO points in turn.

• Digital IO Mapping No. Form:

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

The starting digital IO mapping No. starts from 16 and increases in multiples of 16

> Set Analog IO Starting No.

The starting IO mapping No. of analog AD starts from 8 and increases in multiples of 8. The starting IO mapping No. of analog DA starts from 4 and increases in multiples of 4. The allocation of analog IO numbers corresponding to different dial code IDs is as follows:

Address ID	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

Set Communication Speed

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

Code 6	Code 5	DIP 5-6 combination value	CAN communication speed
0	0	0	500Kbps (default value)
0	1	1	250Kbps
1	0	2	125Kbps
1	1	3	1Mbps

The corresponding speeds are as follows:

Note

Please select CAN communication speed ratio according to actual application. There are some elements should be considered, such as, transfer distance, delay time, electronic interference, etc. It is recommended to use 500Kbps for Baud rate.

4.3. Read & Write IO & AIO

Туре	Specific Models	Related Command	Permission	Related View
	ZMI0310-1616N			
IN	ZMI0310-1616P	IN	Read-Only	IN View
	ZMIIO310-32DI			
OUT	ZMI0310-1616N			
	ZMI0310-1616P	OD		
	ZMI0310-32D0	UP		UP view
	ZMI0310-32DOP		write	
AD	ZMIO310-4AD	AIN	Read-Only	AD /DA View
DA	ZMI0310-4DA	AOUT	R & W	AD /DA View

Expanded IO, AD and DA can be operated by related instructions, like, IN, OP, AIN, AOUT.

• Note:

AD, DA module ranges can be set and viewed by CANIO_INFO (can id, 17, submodule address). For more details, please refer to <u>RTBasic Programming Manual</u>.

4.4. Sub-Module Functions Configuration

"Function Configuration" is only valid when the ECAT communication coupler is used.

Use SDO_WRITE to write SDO, use SDO_READ to read SDO message.

Write Data Dictionary

SDO_WRITE		
Grammar	SDO_WRITE (slot, node, index, subindex, type, value)	

Parameter List	Slot	Bus slot No.	Default is 0
	Node	Device No.	Start from 0, 0
	Index	Data dictionary No.	-
	Subindex	Sub module No.	-
	Туре	Data type	Refer to "Type" form
	Value	Data value	-

Read Data Dictionary

SDO_READ				
Grammar	SDO_READ (slot, node, index, subindex, type, tablenum)			
	Slot	Bus slot No.	Default is 0	
Parameter List	Node	Device No.	Start from 0, 0	
	Index	Data dictionary No.	-	
	Subindex	Sub No.	-	
	Туре	Data type	Refer to "Type" form	
	tablenum	TABLE where saves		
		read data	-	

> Type: fill in "type" value according to data type described by data dictionary.

"type" value	Corresponding Data Type	
1	boolean	
2	integer 8	
3	integer 16	
4	integer 32	
5	unsigned 8	
6	unsigned 16	
7	unsigned 32	

Chapter V Data Dictionary Description

The data dictionary description only can be built by ECAT communication module, CAN module doesn't have data dictionary.

5.1. Data Dictionary Overview

Below form shows all dictionary overviews of ZMIO310-ECAT communication module.

• Note:

The address of the expansion sub-module is numbered from 0 according to the order of access to the coupler. **For example**, the first expansion sub-module connected to the coupler has an address of 0, the second expansion sub-module has an address of 1, and so on.

Index	Subindex	Description				
	-	Set equipment work mode.				
	00h	The category of work modes.				
5000h	016	Recover to initial state when power off, or hold the state when				
	0111	power off.				
	02h	Reserved				
	-	Control dictionary.				
(5001+expansion	00h	The number of configured types.				
submodule address) h	01h	Configure or get the type of AD/DA analog range.				
For example:	02h	Configure AD analog channel switch.				
(5001+a) h=500bh	03h	Reserved				
	04h	Reserved				
(6000+10*expansion	-	State dictionary.				
submodule address) h	006	The number of state dictionary subindex of ZMI0310-1616N,				
For example:	0011	ZMIO310-1616P.				
(6000+a∗10) h=60a0h	01h	Get the input state value of ZMIO310-1616N, ZMIO310-1616P.				
(7000+10*expansion	-	Control dictionary.				
submodule address) h	00b	The number of control dictionary subindex of ZMI0310-				
For example:	0011	1616N, ZMIO310-1616P.				

(7000+a*10) h=70a0h	01h	Set the output state of ZMI0310-1616N, ZMI0310-1616P.				
	-	State dictionary.				
(6001+10∗expansion	00h	The number of state dictionary subindex of AD module.				
submodule address) h	01h	Get the input status value of AD module channel 0.				
For example:	02h	Get the input status value of AD module channel 1.				
(6001+a*10) h=60a1h	03h	Get the input status value of AD module channel 2.				
	04h	Get the input status value of AD module channel 3.				
	-	Control dictionary.				
(7001+10*expansion	00h	The number of control dictionary subindex of DA module.				
submodule address) h	01h	Configure the output value of DA module channel 0.				
For example:	02h	Configure the output value of DA module channel 1.				
(7001+a*10) h=70a1h	03h	Configure the output value of DA module channel 2.				
	04h	Configure the output value of DA module channel 3.				
(6002+10*expansion	-	State dictionary				
submodule address) h	00h	The number of state dictionary subindex of ZMI0310-32DI				
For example:	01h	Get the input state value of ZMI0310-32DI channel CH0-15				
(6002+a ∗10) h=60a2 h	02h	Get the input state value of ZMI0310-32DI channel CH016-31				
	-	Control dictionary.				
(7002) 10 oversion	006	The number of control dictionary subindex of ZMI0310-32D0,				
(7002+10*expansion	0011	ZMIO310-32DOP				
submodule address) n	011	Configure the output state value of ZMIO310-32DO /				
For example:	UTh	ZMIO310-32DOP channel CH0-15.				
(1002+a*10) h=10a2h	0.01	Configure the output state value of ZMIO310-32DO /				
	UZN	ZMIO310-32DOP channel CH16-31.				

5.2. Local Behind-level Expansion Address Description

After coupler module is power-on, it will scan local back-level expansion interface, and it will assign one expansion address for each scanned expansion submodule.

• For Example:

The local back-level interface of ECAT communication module (ZMIO310-ECAT) connects to 7 input submodules (2 ZMIO310-1616N + 2 ZMIO310-32DI + 1 ZMIO310-32DO + 1 ZMIO310-4AD + 1 ZMIO310-4DA). And the slot No. and node No. are 0 by default.

Sub-Module Address Assignment

Note: following command examples in data dictionary chapter are according to below submodules' addresses.

ECAT communication module starts to scan and assigns address when it is power-on. The submodule address is assigned starting from 0, then according to the connection sequence, that is, the expansion address of the first input module is 0, the expand address of DA module is 6.

Module sequence	Model name	Assigned address
ECAT Coupler	ZMIO310-ECAT	/
The first submodule	ZMIO310-1616N	0
The second submodule	ZMIO310-1616N	1
The third submodule	ZMI0310-32DI	2
The fourth submodule	ZMI0310-32DI	3
The fifth submodule	ZMI0310-32D0	4
The sixth submodule	ZMIO310-4AD	5
The seventh submodule	ZMIO310-4DA	6

- This expand address is used to build data dictionary, and the address assignment is not influenced by expansion submodule type.
- For CAN communication module, the address assigned is only for internal control.

Module Corresponding Data Dictionary

Address Information		Dictionary Description				
Audress	mormation	Rule	Dictionary			
-	-	-	5000h			
0	1st 7MI0210 1616N	IN state dictionary: (6000 + 10 *	6000h			
U		expansion sub module address) h	7000h			
1		OUT state dictionary: (7000 + 10 *	6010h			
	2 ^{.4} 21010310-10101	expansion sub module address) h	7010h			
2	1 st ZMIO310-32DI	State dictionary: (6002 + 10 *	6022h			
3	2 rd ZMIO310-32DI	expansion sub module address) h	6032h			

4	1 st ZMI0310-32D0	Control dictionary: (7002 + 10 * expansion sub module address) h	7042h
E	1st 70410210 40D	State dictionary: (6001 + 10 * expansion sub module address) h	6051h
5 1 ⁵⁵ ZIMIO310-4AI	1 21010310-4AD	Control dictionary: (5001 + expansion sub module address) h	5006h
6	1st 70410210 4DA	Control dictionary: (7001 + 10 * expansion sub module address) h	7061h
0	1 21010310-4DA	Control dictionary: (5001 + expansion sub module address) h	5007h

- Next, introduce each submodule's data dictionary content, function, and specific configuration methods.
- This address 0~6 corresponding data dictionary is built when the related expansion module connected only, for other modules, it will not create.

5.3. Data Dictionary Details

Here 5.3 mainly shows all dictionary details of ZMIO310-ECAT communication module.

Format Description

Index	Subindex	Object	bject Default		Data	Dermission
(hex)	(hex)	name	value	lue range		Permission

- ♦ Index (hex): the index No. of object, a 4-bit hexadecimal system number.
- ♦ Subindex (hex): the subindex No. of object, a 2-bit hexadecimal system number.
- ♦ Object name: the name of object. For subindex, it is the name of subindex.
- ♦ Default value: the value is configured by default.
- ♦ Data range: for the object that only can be read, it is the read range. For the object that can be read and written, it is the configuration range.
- ♦ Data type: data type of object
- ♦ Permission: it is used to determine the object that only can read or be read and

written (RO=read only, RW=write only, RW=read & write).

Index: 5000h

Index	Subindex	Object	Default	Range	Туре	Permission
		CANFIG_DATA	2	2	UNSIGND8	RO
	<u>00h</u>	 The category of w The final university 	ult subindex.			
		I he fixed value is	2.			1
		CANFIG_1_INDENT	2	1/2	UNSIGND16	RW
		• The state after po	wer off r	esume initia	l state or keep	state.
5000b		• The usage of data				
	016	1. After opening	TART commar	nd, when the		
	UIN	communicati	on breaks,	output state	s of DO/DOP m	odule and DA
		modules reco	ver as initi	al values.		
		2. After commu	/DOP module			
		and DA modu	les keep cu	urrent states		
	<u>02h</u>	Reserved				

Configure Output State after Communication Broken

Command Used	SDO_	SDO_WRITE					
	SDO_WRITE (slot, node, index, subindex, type, value)						
	• :	• Slot: bus slot No., default is 0					
	• 1	Node: device No., s	starting from 0				
	• 1	ndex: data diction	ary No.				
	• Subindex: sub No.						
Command Usage	• -	• Type: data type, refer to Type form					
		Type Value	Data Type				
		1	Boolean				
		2	Integer 8				
		3	Integer 16				
		Integer 32					
		5	Unsigned 8				

		6	Uns	signed 16				
		7	Uns	signed 32				
	• \	Value: data value						
	This	function is used	to keep / up	date the output sta	te of			
	DA/D	0/D0P after the r	naster-slave s	station communicati	on is			
	interr	upted. <mark>There are t</mark>	wo modes, an	d the default is mod	e 2.			
Emotion Description	Mode	• 1: after the com	munication br	reaks, the output sta	ate is			
Function Description		the initial valu	ie (the output	is 0, DA is the mini	mum			
		value of the cu	urrent range).					
	Mode 2: after the communication breaks, the output state is							
	the state when it was disconnected.							
	Digital output module							
	ZMI0310-1616N, ZMI0310-1616P, ZMI0310-32DO, ZMI0310-							
	32DC	IP.						
Object to Use	<u>Ana</u>	alog output modul	<u>e</u>					
	ZMIO310-4DA.							
	This function is only valid for output and DA expanded by the							
	current coupler.							
Data Dictionary	5000	h						
Francis	SDO_	WRITE (0, 0, \$500	0, 1, 6, 1)	'configure as mode	1			
Examples	SDO_	WRITE (0, 0, \$500	0, 1, 6, 2)	'configure as mode	2			

Index: 5001h

Index	Subindex	Obj	ect	Default	ault Range		Туре	Permission						
	006	CONFIG	G_DATA	2		4	UNSIGND	B RO						
	0011	• The number of default subindex, the fixed value is 2.												
(5001)				n	2~	7 or		6 DW						
		CONFIG_1		2	10	~15	UNSIGNDT	0 11						
		• Confi	• Configure the range type of analog module, or read range type value											
	<u>01h</u>	• The m	neaning of da	ata values:										
auuress/ II								Module	Data Value	Rang	je	Modu	le Value	Range
		AD	2	0~10	DV DV		10	0~10V						
			3	-10V~	10V	DA	11	-10V~10V						

			4	4~20	mA		12	4~2	0mA		
			5	0~20	mA		13	0~2	0mA		
			6	0~5	δV		14	0~	√5V		
			7	-5~!	5V		15	-5	~5V		
		CONFIG_	2_INDENT	15	0~1	5 U	NSIGND1	6	RW		
		• Conf	igure AD modu	ile chanr	nel data.						
		• Data	value model, r	namely, c	orrespo	nd to 4 c	hannels c	of AD m	odule.		
			AD Module	9	CH3	CH2	CH1	СНО			
		Va	lue (16 hexade	ecimal)	8	4	2	1			
		• The r	meaning of eac	ch data v	alue:		·				
			Data Value		I	Range Ty	pe				
		-	0		All ch	annels a	re OFF.				
					-	1		Ch	annel 0 is	ON.	
			2		Ch	annel 1 is	SON.				
		-	3	Cha	annel 0 a	and chan	nel 1 are	ON.			
	<u>02h</u>	-	4		Ch	annel 2 is	ON.				
		-	5	Cha	annel 0 a	and chan	nel 2 are	ON.			
		-	6	Cha	annel 1 a	and chan	nel 2 are	ON.			
		-	7		Chanr	nel 0, 1, 2	are ON.				
		-	8		Ch	annel 3 is	SON.				
		-	9	Cha	annel 0 a	and chan	nel 3 are	ON.			
		-	10	Cha	annel 1 a	and chan	nel 3 are	ON.			
		-	11		Chanr	nel 0, 1, 3	are ON.				
		-	12	Cha	annel 2 a	and chan	nel 3 are	ON.			
			13		Chanr	nel 0, 2, 3	are ON.				
			14	_	Chanr	nel 1, 2, 3	are ON.				
			15		All cl	nannels a	ire ON.				
	03h	Reserved									
	04h	Reserved									

Configure Channel Enabling

Command Used	SDO_WRITE

	SDO_WRITE (slot, node, index, subindex, type, value)						
	 Slot: bus slot No., default is 0 						
	 Node: device No., starting from 0 						
	 Index: data dictionary No. 						
	•	Subindex: sub No.					
Command Usage	 Type: data type refer to Type form 						
		Type Value		Data Type			
J		1		Boolean			
		2		Integer 8			
		3		Integer 16			
		4		Integer 32			
		5	(Jnsigned 8			
		6	U	nsigned 16			
		(U	nsigned 32			
	Value: data value						
	This function is used to control whether the input channel of						
	the AD module is enabled or not.						
	There are 16 channel enabling modes and the default is to						
Function Description	enable all channels						
	• A four-bit binary number represents the anable status of						
	• A Tour-bit binary number represents the enable status of						
	four channels, each bit is a channel, the lowest bit is						
	channel 0, and the highest bit is channel 3.						
	Analog input module						
Object to Use	ZMIO310-4AD.						
Object to Ose	This function is only valid for output and DA expanded by the						
	current coupler.						
Data Dictionary	5006	ih: (5001 + AD sub	-module add	dress No.) h			
	'5006h is AD module control dictionary						
	SDO	_WRITE (0, 0, \$500	6, 2, 6, 0)	full channels are OF	F.		
Fxamples	SDO		6263)	'channel 0 1 are ΟΝ			
LAMIPICO	000 <u>-</u>		6 7 6 1 7)	(channel 2, 2 are ON			
	300		0, 2, 0, 12)	channel 2, 5 are UN.			
	SDO	_WRITE (0, 0, \$500	6, 2, 6, 15)	'tull channels are ON	I.		

Configure Range Switching

Command Used	SDO_WRITE					
	SDO_WRITE (slot, node,	index, subindex, type, value)				
	• Slot: bus slot No., default is 0					
	 Node: device No., starting from 0 					
	 Index: data dictionary No. 					
	 Subindex: sub No 					
	 Type: data type, ref 	er to Type form				
Command Usage	Type Value	Data Type				
	1	Boolean				
	2					
	3	Integer 16				
	4 F					
	5					
	7					
		Unsigned 32				
	Value: data value					
	This function is used to switch the range of the input channel					
	of the AD module (or the output channel of the DA module), and					
Function Description	the default value of both modules is the range of 0~10V					
	The measuring range corresponds to the type number of the					
	expansion sub-module, please refer to the table below.					
	Analog input module-	-				
	ZMI0310-4AD.					
Object to Use	Analog output module					
	ZMIO310-4DA.					
Data Distignant	5006h: (5001 + AD sub-	module address No.) h				
Data Dictionary	5007h: (5001 + DA sub-	module address No.) h				
	'5006h is AD module control dictionary, 5007h is DA module					
	control dictionary					
F ormulas	SDO_WRITE (0, 0, \$5006	i, 1, 6, 3)				
Examples	'AD module is switched	to -10V~10V range				
	SDO_WRITE (0, 0, \$5006	5, 1, 6, 5)				
	'AD module is switched to 0~20mA range					

SDO_WRITE (0, 0, \$5007, 1, 6, 11)
'DA module is switched to -10~10V range
SDO_WRITE (0, 0, \$5007, 1, 6, 13)
'DA module is switched to 0~20mA range

Note: when the same dictionary, but the subindex is not consistent, there needs the delay between 2 commands, refer to below program example:

SDO_WRITE (0, 0, \$5007, 1, 6, 4)	'switch AD module range into 4~20mA
DELAT (10)	
SDO_WRITE (0, 0, \$5007, 2, 6, 15)	ʻopen all channels

'when set \$5007 and \$5008, they are not the same one data dictionary, no need delay.
'set analog output ranger (analog output don't be with channel enable)
SDO_WRITE (0, 0, \$5008, 1, 6, 12) 'switch AD module range into 4~20mA

Type No.	Type Name	Module Type	Corresponding Range
1	ZM1111	Input module	
2	ZM1112	AD module	0~10V
3	ZM1113	AD module	-10~10V
4	ZM1114	AD module	4~20mA
5	ZM1115	AD module	0~20mA
6	ZM1116	AD module	0~5V
7	ZM1117	AD module	-5~5V
9	ZM2111	Output module	
10	ZM2112	DA module	0~10V
11	ZM2113	DA module	-10~10V
12	ZM2114	DA module	4~20mA
13	ZM2115	DA module	0~20mA
14	ZM2116	DA module	0~5V
15	ZM2117	DA module	-5~5V

> Type No. Description:

- This function is valid for current AD module (or DA module).
- One AD module (or DA module) cannot use multiple ranges, and all channels use the same one range, different modules can match with multi-range.

- Type No.1 and No.9 are fixedly used by input module and output module. Type No.2~No.7 are used only by AD module, Type No.10~No.15 are used only by DA module.
- When using AD module, if input voltage (or current) exceeds the range, then it will keep with the maximum value.

Index: 6000h

Index	Subindex	Object		Defaul	t F	lange	1	Гуре	Per	Permission		
	006	IN_GENERIC		1		1	UNS	SIGND8		RO		
	<u>0011</u>	• The number of default subindex, th					d value	e is 1.				
		IN_GENE_INT	1	0	0: ~(0x0000 ~0xFFFF		IGND16	5	RO		
		• Get the inpu	 Get the input state value of ZMIO310-1616N, ZMIO310-1616P. The usage of data value: 4-digit hexadecimal number is converted into 16-bit binary number, each 1-bit represents the input status of each channel. For Example 									
		• The usage of										
		16-bit binar										
<mark>(6000 +</mark>		channel.										
<mark>10</mark> *		For Example										
expansion		The obtained inp	ut valu	e is OxC)FF0, a	nd the c	onten	t of the	chann	el statu	IS	
<mark>submodule</mark>	<u>01h</u>	is as follows:										
<mark>address) h</mark>		Channel	СН	СН	СН	СН	СН	СН	СН	СН		
		Channel	15	14	13	12	11	10	9	8		
		Bit (Binary)	0	0	0	0	1	1	1	1		
		Hexadecimal		()			F	-]	
		Channel	СН	СН	СН	СН	СН	СН	СН	СН		
		Channel	7	6	5	4	3	2	1	0		
		Bit (Binary)	1	1	1	1	0	0	0	0	1	
		Hexadecimal	Hexadecimal F 0									

Get ZMI0310-1616N/1616P Input State Values

Command Used	SDO_READ
--------------	----------

	SDO BEAD (slot node index subindex type tablenum)					
	 Slot: bus slot No. default is 0 					
	Siot. bus siot No., default is 0					
	 Node: device No., starting from 0 					
	 Index: data 	diction	ary No.			
	 Subindex: s 	sub No.				
Command Usage	• Type: data type, refer to Type form					
	Type Va	alue	Data Type			
	1		Boolean			
	2		Integer 8			
	3		Integer 16			
	4		Integer 32			
	5		Unsigned 8			
	6		Unsigned 16			
	7		Unsigned 32			
	• Tablenum:	TABLE	position that saves read data			
	This function is used to read ZMIO310-1616N/1616P					
	module's channel input state values.					
	Note one 7MI0310-1616N/1616P has one 16 input					
Function Description	channels that is channel 0 15					
	channels, that is, channel U-15.					
	• 4-bit hexadecimal converts to 16-bit binary, each bit					
	represents each channel's input state.					
Object to Use	ZMI0310-1616	N, ZMIO	310-1616P.			
Data Dictionary	6000h, 6010h:	(6000 +	ZMI0310-1616N/1616P sub-mc	odule		
Data Dictionary	address No. * 10) h					
	'6000h, 6010h is	s ZMIO3	310-1616N/1616P state dictionary	1		
	'read data are saved into TABLE, please use TABLE to get data					
	SDO_READ (0, 0	, \$6000	, 1, 6, 100)			
	ʻget 16-channel	input s	tate of the first ZMIO310-1616N			
	? TABLE (100)					
Examples	'read the first or	ne ZMIO	310-1616N channel state			
	SDO READ (0.0	. \$6010	. 1. 6. 100)			
	faet 16-channel	innut s	tate of the second 7MI0310-1616	N		
	2 TABLE (100)	mpuro				
	: TADLE (100)					
	'read the second ZMIO310-1616N channel state					

Index: 7000h

Index	Subindex	Object	[Default	Ra	nge	Туре		Permission			
	ooh	OUT_GENERIC	OUT_GENERIC 1 1 UNSIGND8 RO									
	<u>00n</u>	• The number o	The number of default subindex, the fixed value is 1.									
		OUT_GEN_INT1		0	0x0 ~0x	000 FFFF	UNSIGND16		RW			
		• Get the outp	• Get the output state value of ZMIO310-1616N, ZMIO310-1616P.									
		• The usage of data value: 4-digit hexadecimal number is a								is converted		
		into 16-bit b	into 16-bit binary number, each 1-bit represents the input status of									
<mark>(7000 +</mark>		each channe	each channel.									
<mark>10</mark> *		For Example	For Example									
expansion		The obtained outp	out valu	ue is OxC)FF0, a	nd the o	content	of the o	channe	l status		
<mark>submodule</mark>	<u>01h</u>	is as follows:										
<mark>address) h</mark>		Chennel	СН	СН	СН	СН	СН	СН	СН	СН		
		Channel	15	14	13	12	11	10	9	8		
		Bit (Binary)	0	0	0	0	1	1	1	1		
		Hexadecimal		C)			F				
				Channel	СН	СН	СН	СН	СН	СН	СН	СН
		Channel	7	6	5	4	3	2	1	0		
		Bit (Binary)	0	0	0	0						
		Hexadecimal		F				C				

Set ZMI0310-1616N/1616P Input State Values

Command Used	SDO_V	SDO_WRITE					
Command Usage	SDO_V	WRITE (slot, node lot: bus slot No., lode: device No., s ndex: data diction ubindex: sub No. ype: data type, re	, index, subindex, type, value) default is 0 starting from 0 ary No. fer to Type form				
		Type Value	Data Type Boolean				

		2	Integer 8				
		3	Integer 16				
		4	Integer 32				
		5	Unsigned 8				
		6	Unsigned 16				
		7	Unsigned 32				
	•	Value: data value					
	This	This function is used to set ZMI0310-1616N/1616P module's					
	chan	nel output state va	alues.				
	\triangleright	Note: one ZMIO3	10-1616N/1616P has one 16 o	utput			
Function Description	channels, that is, channel 0-15						
	• 4-bit bevadecimal converts to 16-bit binary each bit						
	 A bit field control to bit bindry, each bit 						
		represents each ci	nannel's output state.				
Object to Use	ZMIC	0310-1616N, ZMIC	0310-1616P.				
Data Distignam	7000h, 7010h: (7000 + ZMIO310-1616N/1616P sub-module						
Data Dictionary	address No. * 10) h						
	'7000)h, 7010h is ZMIO	310-1616N/1616P control dictiona	ary			
	'set the first ZMIO310-1616N high 8-bit output channel state						
	as ON, make low 8-bit channel state as OFF.						
Examples	SDO_	_WRITE (0, 0, \$700	0, 1, 6, 0xFF00)				
	'set the second ZMIO310-1616N high 8-bit output channel						
	state as OFF, make low 8-bit channel state as ON.						
	SDO_WRITE (0, 0, \$7010, 1, 6, 0xFF00)						

> Notes:

- if SDO command is used to configure DO output, it is only valid before EtherCAT START, because the controller will automatically open PDO command to configure DO channel output after EtherCAT START.
- 2) PDO real-time is high, then it covers DO channel data of SDO configuration.
- 3) PDO command corresponds to OP in RTBasic, please refer to RTBasic manual for specific usage of OP.

Index: 6001h

Index	Subindex	Object	Default	Range	Туре	Permission				
	00h	IN_GENERIC	4	4	UNSIGND8	RO				
	<u>0011</u>	• The number of de	fault subin	dex, the fixed	d value is 4.					
		IN_GEN_INT1	0	0x0000 ~0xFFFF	UNSIGND16	RO				
		Get input state value of AD module channel 0.								
		• The meaning of date value: 0x0000~0xFFFF means the scale value of								
		analog, which is c	onverted fi	rom gained a	nalog AD.					
		For Example								
		If the current range of A	D module	is 0~5V :						
		Dig	ital Output							
(6001 -	<u>01h</u>		0xFFFF -		→					
(6001 +										
		Digital converted from AD is represented by Y*								
submodule		*Analog gained from AD is represented by X*								
address) h										
uuurcoo) n		Then:								
		✓ AD input value can be calculated from the above graphic: (Y-0)/								
		(0xFFFF-0) = (X-0) / (5V-0), namely, <mark>Y = 0xFFFF*X / 5V</mark> .								
		Value X is the gained known condition of current AD module, value Y is								
		converted from AD through PC side. Same, value Y is gained from PC, then								
		X value can be calculate	ed reversel	<u>y.</u>						
		IN_GEN_INT2	0	0x0000 ~0xFFFF	UNSIGND16	RO				
		• Get the input state	e value of A	D channel 1						
	<u>02h</u>	• The meaning of da	ate value: ()x0000~0xFF	FFF means the	scale value of				
		analog, which is c	onverted fi	rom gained a	inalog from AD.					
		For Example								
		If the current range of A	D module	is -5~5V:						





Get AD Module Input State Values

Command Used	SDO_READ			
Command Usage	SDO_READ (slot, node, index, subindex, type, tablenum)			
	 Slot: bus slot No., default is 0 			
	• Node: device No., starting from 0			
	Index: data dictionary No.			

	Subindex: sub No.			
	• Type: data type, refer to Type form			
	Type Value	Data Type		
	1	Boolean		
	2	Integer 8		
	3	Integer 16		
	4	Integer 32		
	5	Unsigned 8		
	6	Unsigned 16		
	7	Unsigned 32		
	• Tablenum: TABLE	position that saves read data		
	 This function is used to read AD module's channel input value One AD module has 4 channels: channel 0, channel 			
Function Description				
	channel 2, and cha	annel 3.		
Object to Use	ZMIO310-4AD			
Data Dictionary	6051h: (6001 + ZMIO310-4AD sub-module address No. * 10) h			
	'6051h is ZMIO310-4A	D state dictionary		
	'read data are saved into TABLE, please use TABLE to get data			
	SDO_READ (0, 0, \$6051	, 1, 6, 100) 'get channel 0 input state		
Examples	? TABLE (100)	'read channel 0 data		
	SDO_READ (0, 0, \$6051	, 2, 6, 100) 'get channel 1 input state		
	? TABLE (100)	'read channel 1 data		
	SDO_READ (0, 0, \$6051	, 3, 6, 100) 'get channel 2 input state		
	? TABLE (100)	'read channel 2 data		
	SDO_READ (0, 0, \$6051	, 4, 6, 100) 'get channel 3 input state		
	? TABLE (100)	'read channel 3 data		

Index: 7001h

Index	Subindex	bindex Object Default Range		Range	Туре	Permission		
<mark>(7001 +</mark>	<u>00h</u>	IN_GENERIC	4	4	UNSIGND8	RO		
<mark>10*</mark>		• The number of default subindex, the fixed value is 4.						
expansion			0	0x0000		DW/		
<mark>submodule</mark>	<u>01h</u>	IN_GEN_INTT	U	~0xFFFF	UNSIGNDIO	٩٧م		
<mark>address) h</mark>		Get input state va	lue of DA n	nodule <mark>chan</mark> r	nel O.			



		Then:				
		✓ DA output value can be calculated from the above graphic: [Y-(-10V)]				
		/ [10V-(-10V)] = (X-0) / (0xFFFF-0), namely, Y = [10V-(-10V)] *				
		0xFFFF – 10V				
		Value X is the gained known condition of current PC side, then get Y from DA. Same, you can preset DA output value at first, then X value can be				
		calculated reversely.				
		IN_GEN_INT3	0	0x0000 ~0xFFFF	UNSIGND16	RW
		Get input state value of DA module channel 2.				
		• The meaning of date value: 0x0000~0xFFFF means the scale valu				
		analog, PC side input scale value outputs analog transferred by DA.				
		For Example				
		If the current range of [A module	is 0mA~20m	A :	
		analog OUT				
			20m4			
			201114			
	<u>03n</u>			0 0xFFFF		
		digital IN				
		Digital converted from DA is represented by Y				
		*PC side input digital, tl	nat is, the s	cale value, re	epresented by >	{ *
		Then:				
		✓ DA output value can be calculated from the above graphic: (Y-0) /				
		(20mA-0) = (X-0) / (0xFFFF-0), namely, Y = 20mA * X / 0xFFFF				
		Value X is the gained known condition of current PC side, then get Y from				
		DA. Same, you can preset DA output value at first, then X value can be				
		calculated reversely.				
			_	0x0000		
		IN_GEN_IN4	0	~0xFFFF	UNSIGND16	RW
		Get input state value of DA module channel 3.				
	<u>04h</u>	• The meaning of date value: 0x0000~0xFFFF means the scale value of				
		analog, PC side input scale value outputs analog transferred by DA.				
		For Example				
		If the current range of DA module is 4mA~20mA :				
		IT THE CURRENT RANGE OF DA MODULE IS 4MA~2UMA:				



Set ZMI0310-4DA Output Values

Command Used	SDO_WRITE				
	SDO_WRITE (slot, node, index, subindex, type, value)				
	•	 Slot: bus slot No., default is 0 			
	• Node: device No., starting from 0				
	 Index: data dictionary No. 				
	 Subindex: sub No. 				
	 Type: data type, refer to Type form 				
Command Usage					
		Type Value Data Type			
		1	Boolean		
		2	Integer 8		
		3	Integer 16		
		4	Integer 32		
		5	Unsigned 8		
		6	Unsigned 16		
	7 Unsigned 32				
	• Value: data value				
-----------------------------	--	--	--	--	
	This function is used to set DA module's channel output values				
Function Description	• One DA module has 4 channels: channel 0, channel 1,				
	channel 2, and channel 3.				
Object to Use	ZMIO310-4DA				
Data Dictionary	7061h: (7001 + ZMIO310-4DA sub-module address No. * 10) h				
	'7061h is ZMIO310-4DA control dictionary				
	SDO_WRITE (0, 0, \$7061, 1, 6, 65535)				
	'set channel 0 output value as 0xFFFF				
	SDO_WRITE (0, 0, \$7061, 2, 6, 65535)				
Examples	'set channel 0 output value as 0xFFFF				
	SDO_WRITE (0, 0, \$7061, 3, 6, 65535)				
	'set channel 0 output value as 0xFFFF				
	SDO_WRITE (0, 0, \$7061, 4, 6, 65535)				
	'set channel 0 output value as 0xFFFF				

> Notes:

- if SDO command is used to configure DA output, it is only valid before EtherCAT START, because the controller will automatically open PDO command to configure DA channel output after EtherCAT START.
- 2) PDO real-time is high, then it covers DA channel data of SDO configuration.
- 3) PDO command corresponds to AOUT in RTBasic, please refer to RTBasic manual for specific usage of AOUT.

Index: 6002h

Index	Subindex	Object	Default	Range	Туре	Permission		
<mark>(6002 +</mark>	006	IN_GENERIC	1	1	UNSIGND8	RO		
<mark>10*</mark>	<u>0011</u>	• The number of default subindex, the fixed value is 1.						
expansion	016		0	0x0000		PO		
<mark>submodule</mark>	<u>0111</u>		U	~0xFFFF	UNSIGNDIO	КU		

<mark>address) h</mark>		• Get the input state value of ZMIO310-32DI module's channel 0-15.											
		•	• The usage of data value: 4-digit hexadecimal number is converted into										
			16-bit binary number, each 1-bit represents the input status of each										
			channel.										
		-	For Example										
		Т	The obtained input value is 0x0FF0, and the content of the channel status										
		is	is as follows:										
				СН СН СН СН СН СН СН СН СН									
			Channel	15	14	13	12	11	10	9	8		
			Bit (Binary)	0	0	0	0	1	1	1	1		
			Hexadecimal		(LF	:			
				СН	СН	СН	СН	СН	СН	СН	СН		
			Channel	7	6	5	4	3	2	1	0		
			Bit (Binary)	1	1	1	1	0	0	0	0		
			Hexadecimal		F	=			C)			
			IN_GEN_INT2 0 0x0000 ~0xFFFF UNSIGND16 R0										
		•	Get the input state value of ZMIO310-32DI module's channel 16-31.										
		•	The usage o	f data	value: 4-	-digit h	exadeci	mal nu	mber is	convei	ted int	о	
			16-bit binar	y num	ber, eac	h 1-bit	represe	ents the	e input	status	of eac	h	
			channel.										
		-	-For Example										
		т	he obtained inpu	ut valu	ıe is 0x0	FF0, ar	nd the c	ontent	of the	channe	l statu	s	
	<u>02h</u>	is	s as follows:										
				СН	СН	СН	СН	СН	СН	СН	СН		
			Channel	31	30	29	28	27	26	25	24		
		Bit (Binary) 0 0 0 0 1							1	1	1		
			Hexadecimal))	1		ı F	:	L		
				СН	СН	СН	СН	СН	СН	СН	СН		
			Channel	23	22	21	20	19	18	17	16		
			Bit (Binary)	1	1	1	1	0	0	0	0		
			Hexadecimal		F	I =	<u> </u>)			
		1							, c	•		l I	

Get ZMIO310-32DI Module Input State Values

Command Used	SDO_READ						
	SDO_READ (slot, node, ir	ndex, subindex, type, tablenum)					
	Slot: bus slot No., default is 0						
	• Node: device No., st	arting from 0					
	 Index: data dictional 	ry No.					
	• Subindex: sub No.						
	 Type: data type, refe 	er to Type form					
Command Usage	Type Value	Data Type					
		Boolean					
	2	Integer 8					
	3						
	5						
	5						
	7						
	Tablenum: TABLE position that saves read data						
	This function is used to read ZMIO310-32DI module's channel						
	input values						
	• One 7MIO310-32DI module has 32 input channels						
Function Description	channel 0-31						
	4 bit boxedenimel converte to 16 bit binery cosh bit						
	• 4-bit nexadecimal converts to 16-bit binary, each bit						
Object to Use							
Ubject to Use							
Data Dictionary	6022h, 6032h: (6002 + ZMIO310-32DI sub-module address						
-	No. * 10) h						
	'6022h, 6032h are ZMIO	310-32DI state dictionary					
	'read data are saved into	TABLE, please use TABLE to get data					
	SDO_READ (0, 0, \$6022,	1, 6, 100)					
	aet the first ZMI0310-3	2DI channel 0-15 input state					
Examples	? TABLE (100)	·					
	$\frac{1}{1000}$ (read the first $\frac{7M0310}{1000}$	32DI channel state					
	SUU_KEAD (U, U, \$6022,	Ζ, Ό, ΙΟΟ)					
	'get the first ZMIO310-32DI channel 16-31 input state						

? TABLE (100)
'read the first ZMIO310-32DI channel state
SDO_READ (0, 0, \$6032, 1, 6, 100)
'get the second ZMIO310-32DI channel 0-15 input state
? TABLE (100)
'read the second ZMIO310-32DI channel state
SDO_READ (0, 0, \$6032, 2, 6, 100)
'get the second ZMIO310-32DI channel 16-31 input state
? TABLE (100)
'read the second ZMIO310-32DI channel state

Index: 7002h

Index	Subindex	Object		Object Default Range					Peri	mission				
	006	IN_GENERIC	IN_GENERIC 1 1 UNSIGND8 RO											
	<u>0011</u>	• The number of default subindex, the fixed value is 1.												
		IN_GEN_INT1		0	0x ~0;	0000 xFFFF	UNSI	GND16		RW				
(7002 + 10∗ expansion	(7002 + 10∗ expansion	 Get the out module's channel. The usage of 16-bit binary channel. For Example The obtained input 	 Get the output state value of ZMIO310-32DO / ZMIO310-32DOP module's channel 0-15. The usage of data value: 4-digit hexadecimal number is converted into 16-bit binary number, each 1-bit represents the input status of each channel. <i>For Example</i> The obtained input value is 0x0EE0, and the content of the channel status 											
submodule	<u>01h</u>	is as follows:												
address) h			СН	СН	СН	СН	СН	СН	СН	СН				
		Channel	15	14	13	12	11	10	9	8				
			Bit (Binary)	0	0	0	0	1	1	1	1			
		Hexadecimal		0				F						
		Channel	СН	СН	СН	СН	СН	СН	СН	СН				
						Glainer	7	6	5	4	3	2	1	0
		Bit (Binary)	1	1	1	1	0	0	0	0				
		Hexadecimal		F			0							

		Hexadecimal		F				0				
		Bit (Binary)	1	1	1	1	0	0	0	0		
		Channel	23	22	21	20	19	18	17	16		
		Channal	СН	СН	СН	СН	СН	СН	СН	СН		
		Hexadecimal		()			F				
		Bit (Binary)	0	0	0	0	1	1	1	1		
		Channel	31	30	29	28	27	26	25	24		
			СН	СН	СН	СН	СН	СН	СН	СН		
<u>02h</u>	is as follows:											
	The obtained input value is 0x0FF0, and the content of the channel status											
	For Example											
		channel.										
		16-bit binary number, each 1-bit represents the input status of each										
	• The usage of data value: 4-digit hexadecimal number is converted into											
		module's channel 16-31.										
	•	Get the out	put st	ate valu	ue of 2	ZMIO31	0-32D	0 / ZN	110310	-32DOP		
		IN_GEN_IN12		U	0 ~0xFFFF		UNSIGND16			RU		
					0x	0000						

Set ZMI0310-32D0 Output Values

Command Used	SDO_	SDO_WRITE					
	SDO_ • : • : • :	 SDO_WRITE (slot, node, index, subindex, type, value) Slot: bus slot No., default is 0 Node: device No., starting from 0 Index: data dictionary No. Subindex: sub No. 					
Command Usage	•	Type: data type, re Type Value 1	fer to Type form Data Type Boolean				
		2	Integer 8				
		3	Integer 16				
		4	Integer 32				
		5	Unsigned 8				
		6	Unsigned 16				

		7	Unsigned 32				
	•	Value: data value					
	This	function is used	to read ZMI0310-32D0 / ZMI0)310-			
	32DC)P module's chanr	nel input values				
Function Description	•	One ZMI0310-32I	00 / ZMI0310-32DOP module ha	as 32			
Function Description		output channels: c	hannel 0-31.				
	•	4-bit hexadecima	l converts to 16-bit binary, eac	h bit			
	1	represents each cl	nannel's output state.				
Object to Use	ZMIC	0310-32DO, ZMIO3	10-32DOP				
Data Distignamy	7042	h: (7002 + ZMI	0310-32D0 / ZMI0310-32DOP	sub-			
Data Dictionary	modu	ule address No. * 1	0) h				
	'7042	2h: (7002 + ZMI	0310-32D0 / ZMI0310-32DOP	sub-			
	modu	ule address No. * 1	0) h				
	'set t	he first ZMIO310-	32D0 / 32DOP module's channel	0-15			
	(CH0	-15) high 8-bit ou	tput channel state as ON, make lo	-8 wc			
Evenales	bit cł	nannel state as OF	F.				
Examples	SDO_	WRITE (0, 0, \$704-	2, 1, 6, 0xFF00)				
	'set t	he first ZMIO310-	32DO / 32DOP module's channel 1	16-31			
	(CH16-31) high 8-bit output channel state as ON, make low 8-						
	bit cł	nannel state as OF	F.				
	SDO_WRITE (0, 0, \$7042, 2, 6, 0xFF00)						

> Notes:

- if SDO command is used to configure DO output, it is only valid before EtherCAT START, because the controller will automatically open PDO command to configure DO channel output after EtherCAT START.
- 2) PDO real-time is high, then it covers DO channel data of SDO configuration.
- 3) PDO command corresponds to OP in RTBasic, please refer to RTBasic manual for specific usage of OP.

Chapter VI Programming

6.1. Program in RTSys Software

RTSys is a PC-side program development, debugging and diagnostic software for the Zmotion motion controllers. Through it, users can easily edit and configure the controller program, quickly develop applications, diagnose system operating parameters in real time, and debug the running program in real time. What's more, it supports Chinese and English bilingual environments.

In RTSys, there are 4 programming languages for motion control development, Basic, PLC, HMI and C language, they can run multi-tasks among them, especially for Basic, multitask running can be achieved separately, hybrid programming is also OK with PLC, HMI and C language.

RTSys Downloading Address: https://www.zmotionglobal.com/pro_info_282.html

Features	Parameters	System Archite	cture	Download	
Name		Version No	Format	Size	Download
RTSys Development Softw	ware	V1.2.02	RAR	148MB	Download
RTSys User Manual V1.2.0)	V1.2.0	PDF	5.33MB	Download
RTBasic Programming Ma	anual	V1.1.0	PDF	18.3MB	Download
RTHMI Programming Mar	nual	V1.2.0	PDF	7.23MB	Download
Quick Start		VQuick Start	ZIP	16.1MB	Download
ZVision Basic Programmi	ng Manual V1.3.0	V1.3.0	PDF	10.6MB	Download
ZPLC		V1.0	PDF	1.7M	Download

And related manuals can be found in "Download":

Step	Operations	Display Interface
1	Switch the Language: "Language" – "English", then there will pop	Language Language Simplified Chinese Langlish





	Save File: edit	
	the program in	
	program	File(F)
	editing	Recent Projects
	window, click	
	"save", new	Open <u>2</u> 1
	built file will be	Close
5	saved under	
	"zpj." project	Close All
	automatically.	Save
	"Save all"	Save the active document (Ctrl+S)
	means all files	
	under this	Save All
	project will be	
	saved.	
	Connection:	
	Click	File(F) Home(O) Controller(C) Edit(E) View(V) Tool(T) Debug(D)
	"controller –	Connect Disconnect Download Download State the Firmware System Modify IP Controller controller controller controller international during Unlock Controller
	connect", if no	Controller Controller
	controller,	Connect to the controller (Ctrl+Alt+C) 1 × Connect to the controller (Ctrl+Alt+C) 1 × RTSyz Test 1 ERRSWITCH = 3
	select connect	Image: Basici.bas [0] 2 base(0) 'select axis 0 Image: Config files 3 atype=1 'pulse stepper or servo
	to simulator.	
	Then, "connect	
	to controller"	
6	window will	
Ū	pop up, you	Connect to Controller ×
	can select	
	serial port or	CUM • 38400 • No Parity • 0 • Connect Autoconnect
	net port to	IP 127.0.0.1 * 500 * Connect IP Scan
	connect,	PCI/Local + Connect Disconnect
	select	Native IP: 172 OK Cancel
	matched serial	
	port	
	parameters or	
	net port IP	

	address, then						
	click						
	"connect".						
	Download	RAM: it will not save when power off.					
	Program into	• ROM: It will save data when power off, and when the					
	Controller:	program is connected to controller again, running					
	"Ram/Rom" –	according to task No.					
	"download	File(F) Home(O) Controller(C)					
	RAM /						
	download	Connect Disconnect Download RAM ROM					
	ROM", if it is						
7	successful,	Output × Connected to Controller:VPLC5xx-Simu Version:5.20-20240426. Down to Controller Ram Success, 2024-08-15 11:16:29, Elapsed time: 94ms.					
	there is print						
	indication, at						
	the same time,	Command: Send Capture Clear					
	program is	Output Find Results					
	downloaded	Down to Controller Rom Success, 2024-08-15 11:17:02, Elapsed time: 93ms.					
	into controller						
	and runs						
	automatically.	Command: Send Capture Clear					
	Debug:						
	"Debug" –	File(F) Home(O) Controller(C) Edit(E) View(V) Tool(T) Debug(D)					
	"Start/Stop						
	Debug" to call	Download Download Start/Stop					
	"Task" and	Debug					
8	"Watch"	Enter Debug X					
	window,	Select enter mode					
	because it was	C Down rom again					
	downloaded	C No download, Reset					
	before, here	Attach to current					
	select "Attach	OK Cancel					
	the current".						

	Scope	Scope ×
	function: Click	Chunnel Config Accessibility Help
	"View" –	X Seale: 1s - Display: YT mode - Channels: 2 - 3D view: Oblique view -
	"Scope" to	Continuous Follov Magnifier Channel Cursor Statistics
9	open	Show Index Source Offset Scale Image: Open state 0 DPOS 200 sate(200) Image: Open state 0 DPOS 0 sate(200)
	oscilloscope.	
	It can capture	
	needed data,	
	for debugging.	

Notes:

- When opening an project, choose to open the zpj file of the project. If only the Bas file is opened, the program cannot be downloaded to the controller.
- When the project is not created, only the Bas file cannot be downloaded to the controller.
- The number 0 in automatic operation represents the task number, and the program runs with task 0, and the task number has no priority.
- If no task number is set for the files in the entire project, when downloading to the controller, the system prompts the following message WARN: no program set autorun

6.2. Program in Host-Computer by PC Languages

The controller supports development under various operating systems such as windows, linux, Mac, Android, and wince, and provides dll libraries in various environments such as vc, c#, vb.net, and labview, as shown in the figure below. PC software programming refers to <u>"Zmotion PC Function Library Programming Manual"</u>.



The program developed using the PC software cannot be downloaded to the controller, and it is connected to the controller through the dll dynamic library. The dll library needs to be added to the header file and declared during development.

• Get PC library file, example: <u>https://www.zmotionglobal.com/download_list_17.html</u>

Hardware Manuals	Software Manuals	Tool Software	Products Catalogs	Development Examples	PC Library Files	Product 3D Model
Product EPLAN	Video Description			1	1	
Quick Start						Download
Bus INIT BASIC					,	Download
C Sharp						Download
C PLUS PLUS						Download
LABVIEW						Download
Python						Download
Linux C Sharp 64 B	it					Download

The c++ project development process in VS is as follows:

Step	Operations	Display Interface			
1	Open VS, click "File" – "New" – "Project".	秋始页 - Microsoft Visual Studio 文件(方) 编辑(E) 视图(V) 调试(D) 团队(M) 工具(T) 体系结构(C) 测试(S) 分析(N) 窗口(W) 新建(N) か ひてしています。 ひてしています。 新建(N) かのは(W) かのは(W) のは(W) のは(W) ガ开(O) かのは(W) かのは(W) Shift+Alt+N かのは(W) かのは(W) Shift+Alt+N かのは(W) ひか(F) Ctrl+N がの解決方案(T) Ctrl+S ひか(F) Ctrl+N			
2	Select development language as "Visual C++" and the select program type as "MFC application type".	#23日 ・ 記 ・ 記 ・ 記 ・ 記 ・ 記 ・ 記 ・ 記 ・ 記			

3	Select "Based on basic box",	MFC 应用程序向导 - single	e_move ? × 呈序类型
click "next" or "finish"		概述 应用程序类型 复合文档支持 文档模板属性 制组度支持 用户界面功能 高级功能 生成的类	应期程席类型: ●単个文指① ●単个文指① ●「「「」」」」」 ●「「」」」」」」 ●「「」」」」」 ●「」」」」」 ●「」」」」 ●「」」」」」 ●「」」」」 ●「」」」」」 ●「」」」」 ●「」」」」 ●「」」」 ●「」」」」 ●「」」 ●「」」」 ●「」」」 ●「」」」 ●「」」」 ●「」」」 ●「」」」 ●「」」」 ●「」」」 ●「」」」 ●「」」 ●「」」」 ●「」」 ●「」」」 ●「」」 ●「」」」 ●「」」 ●「」」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」」 ●「」 ●「」 ●「」 ●「」 ●「」 ●「」 ●「」 ●「」 ●「」 ●「」 ●
4	Find C++		数 > 微盘整理函数库备份文件 > 函数库2.1 > windows平台 > 64位库 > C++.zip > dl库文件
	function	名称	^ 修改日期 类型 大小
	library	zauxdil.dil	2020/8/11 15:06 MT程序が展 2,200 KB 2020/8/11 15:06 Object File Library 69 KB 2020/8/11 14:56 C/C++ Header 141 KB
	provided by	✓ is zmotion.dll ✓ is zmotion.h	2019/3/16 12:21 应用程序扩展 2,549 KB 2019/6/3 14:41 C/C++ Header 39 KB
	manufacturer.	🏙 zmotion.lib	2019/3/16 12:21 Object File Library 51 KB
	Routine is		
	below (64-bit		
	library)		
5	Copy all DLL re	elated library file	es under the above path to the newly created
	project.		1 Mademinude and in AMB
6	Add a static	1) Right-	
	library and	click the	▶ ③ StalAALA 991(2) ・ ・ ・ ・ ・
	related header	header file	▶ ** 6 月月 台湾 創業法は、かた生活学習性発展(約(%) 新聞 2000/4515b 名 ですでき効果します) 新聞に見知(のたけ) * 生活な発展します。 ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・
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		in the pop-	■ 2019(6) 2019(2) 5441 H 2(24 39 KB ■ 2019(2) 16 1221 Object File Ubrary 51 KB 文件名(N): 2motion.h · · · · · · · · · · · · · · · · · · ·
		up window.	18504) 1004

7	Declare the	single_move_Dig.cpp 9 × (全局范围)
	relevant	□// single_move_Dlg.cpp : implementation file
	header files	⊟#include "stdafx.h" #include "single_moveh"
	and define the	#include `single_move_Dlg.h" #include "zauxdl12.h"
	controller	⊟#ifdef _DEBUG #define new DEBUG_NEW
	connection	<pre>#undef THIS_FILE [static char THIS_FILE[] =FILE; #cadif </pre>
	handle, so far	+end11 B///////////////////////////////////
	the project is	// CSingle_move_Dlg dialog
	newly created.	2MC_HANDLE g_handle = NULL; //控制器链接句柄

Chapter VII Operation and Maintain

The correct operation and maintenance of the device 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.

7.1. Regular Inspection and Maintenance

The working environment has an impact on the device. Therefore, it is usually inspected regularly based on the inspection cycle of 6 months to 1 year. The inspection cycle of the device 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 24V (-5%~5%)	
	Whether the ambient temperature is		
	within the specified range (when		
	installed in the cabinet, the	-10°C - 55°C	
	temperature inside the cabinet is the		
	ambient temperature)		
	Whether the ambient humidity is		
	within the specified range (when		
	installed in the cabinet, the humidity	10%-95% non-condensing	
surroundings	in the cabinet is the ambient		
	humidity)		
	Is there direct sunlight	No	
	With or without droplets of water, oil,	No	
	chemicals, etc.		
	Whether there is dust, salt, iron	No	
	filings, dirt		
	Whether there is corrosive gas	No	
	Whether there are flammable and	No	

	explosive gases or articles	
	Whether the device is subjected to	Should be within the range of
	whether the device is subjected to	vibration resistance and
		impact resistance
	Is the best dissipation good	Keep good ventilation and
	is the heat dissipation good	heat dissipation
	Whether the basic unit and the expansion unit are installed firmly	The mounting screws should be tightened without loosening
Installation and Wiring Status	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	Screws should be tightened
	loose	without loosening
	Whether the cable is damaged, aged,	The cable must not have any
	cracked	abnormal appearance

7.2. Common Problems & Solutions

Problems	Suggestions		
	1. Check whether the limit sensor is working normally,		
	and whether the "input" view can watch the signal		
No signal somes to the	change of the limit sensor.		
insut	2. Check whether the mapping of the limit switch is		
input.	correct.		
	3. Check whether the limit sensor is connected to the		
	common terminal of the controller.		
	1. Check whether IO power is needed.		
The output does not work.	2. Check whether the output number matches the ID of		
	the IO board.		
No Voltogo & Current	1. Check whether IO power is needed.		
No voltage & Current	2. Check whether the output number matches the ID of		
Signal for in Channel	the IO board.		
POWER led is ON, RUN led	1. Check whether the power of the power supply is		

is OFF.		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	1.	Program running error, please check RTSys error
ON.		code, and check application program.
	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,
CAN expension module		communication speed configuration, etc.
	3.	Check the DIP switch to see if there are multiple
cannot be connected.		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)