

SYNTEC FC SERIES



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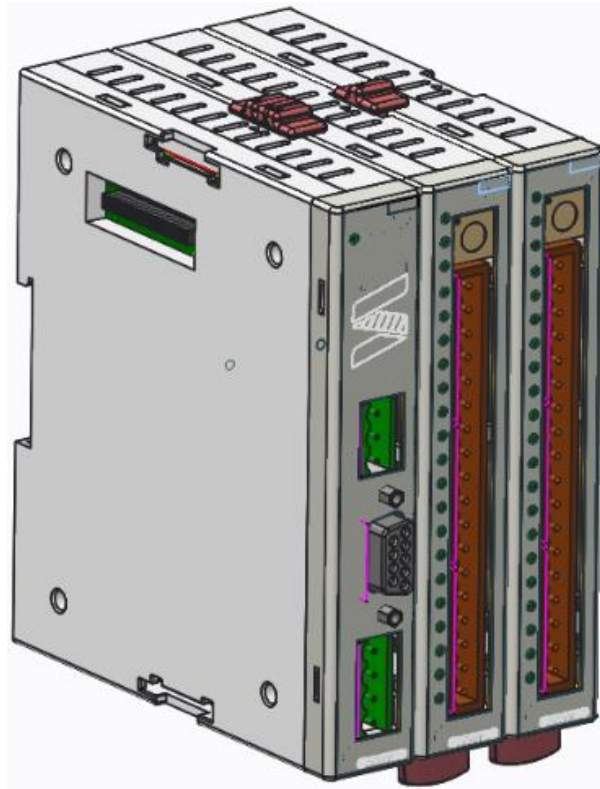
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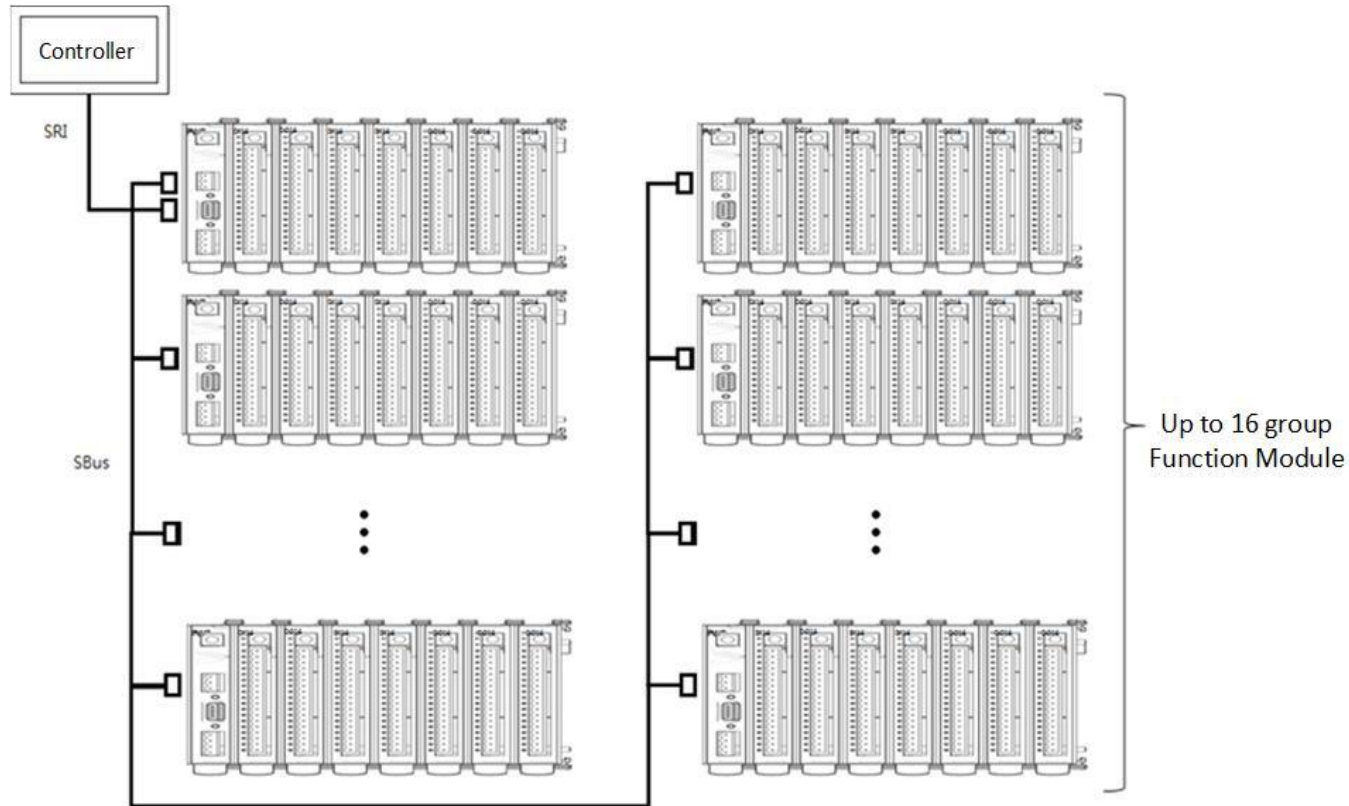
FC series of modules for the Syntec of science and technology introduced a highly flexible, friendly, high-speed communications and integration of digital I / O module. Providing a series of high-performance and low-cost modular input / output modules, with a Syntec of full range of controllers, providing the most cost-effective automation market integration program. Each module can be independently disassembled, according to the needs of users, flexible configuration module type and quantity, in the module arrangement order, but also according to the user wiring needs arbitrary placement, but the functional module maintenance only Replace the damaged module.

Easy to use, each time you start the FC module can automatically scan all connected devices , users do not need to do other settings, can be used directly, if the actual module configuration and controller-side settings are different, will take the initiative to remind user. A variety of FC function modules as long as the power module on the right can be used as the main module, so unlike the general commercial products, in addition to functional modules need additional CPU module.

FC module through the SRI (Syntec Remote Interface) high-speed serial communication interface, directly with the controller to communicate, so that FC module and the controller to achieve high efficiency between the transmission and high integration . So to provide users with a more flexible system expansion architecture, not because the system points too large and complex settings and other issues, resulting in the user in the construction system and operation of the inconvenience , so that can also keep the system Flexibility and integrity, but also allow users to build the project in the process, can be more efficient.



1.1. FC series module diagram:



FC series modules have the following characteristics:

1. **Powerful system configuration flexibility**

- The number of FC function modules, according to a variety of user needs flexible configuration.
- FC function modules can be connected in series with each request. Up to 16 FC function modules can be connected in series.
- You can easily connect the user to the corresponding I / O points through the dial knob on the function module.

- Users do not need to make any settings, through the controller man-machine interface can be easily used.
- DI and DO function module in series, no special classification, can be arbitrarily connected.

2. Support for larger I / O points

- DI digital input function module can provide 16 ~ 32 channel input signal.
- DO digital output function module can provide 16 ~ 32 channel output signal.
- Up to 16 function modules can be connected in series with each function module. A module can provide up to 512 channels of input and output signals.
- The controller can connect up to 16 groups of function modules in series, providing up to 8192 channels of input and output signals.

The following lists the FC series module models:

classification	model	The name is displayed on the controller	Model description
Power module	FC-PWR	no	24VDC power supply module
Digital I / O modules	FC-DI16	FC-DI-16	24VDC, 5mA, 16 channel input
	FC-DO16	FC-DO-16	12 ~ 24VDC, 2A, 16 channel output
	FC-DI32	FC-DI-32	<ul style="list-style-type: none"> • 2 sets of horns of the 16 points, wire and I / O line sharing • 24VDC (source input)

			<ul style="list-style-type: none"> • A secondary side of the isolation
	FC-DO32	FC-DO-32	<ul style="list-style-type: none"> • 2 sets of horns of the 16 points, wire and I / O line sharing • 24VDC / 625mA (source output) • A secondary side of the isolation
AD / DA module	FC-SLSR	FC-SMLSR	<ul style="list-style-type: none"> • PWM output 1 group • DA output 4 groups • AD input 8 groups

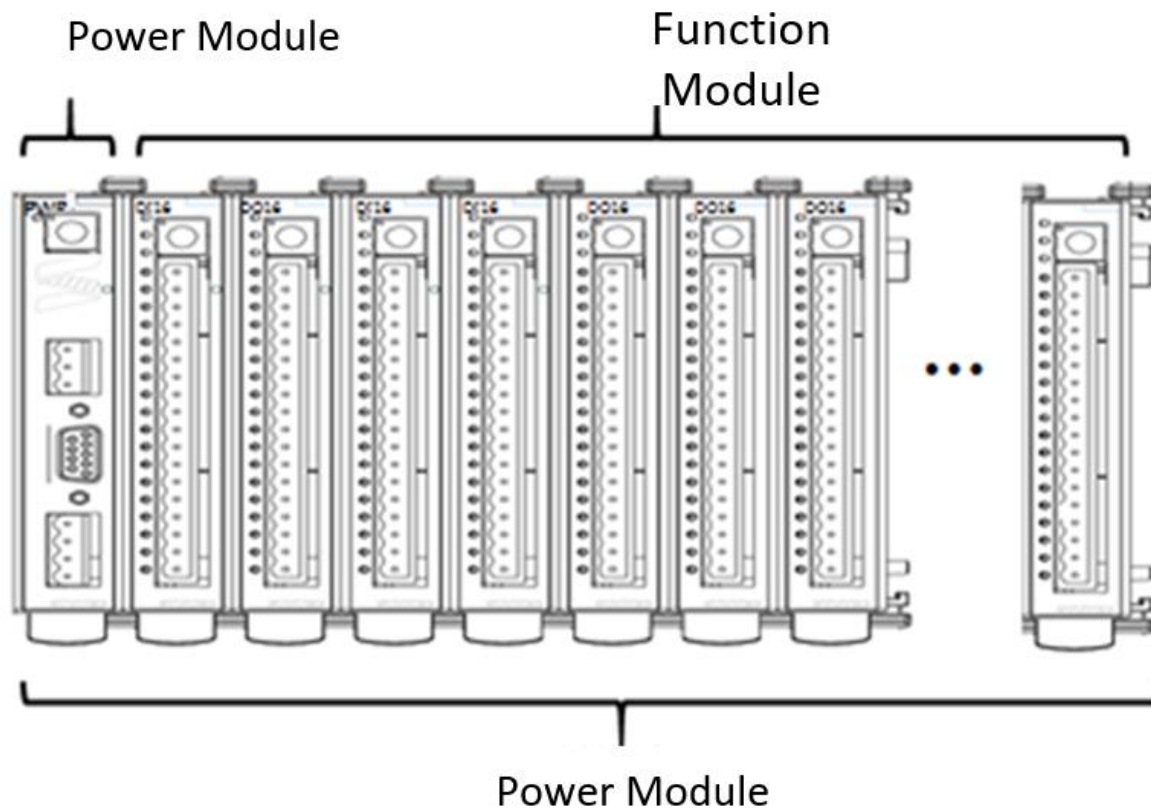
1.2. Introduction FC Architecture

This section describes the overall architecture of the FC series module, including the controller on the FC series module and FC series of the relationship between the modules, the following column to introduce the focus of this architecture:

1.2.1. FC series chart:

- FC series modules can be divided into power modules and functional modules, functional modules that have a specific function of the module, such as digital input and output, analog input and output modules.

- The FC module consists of a power module and other functional modules (up to 16 units), as shown below.

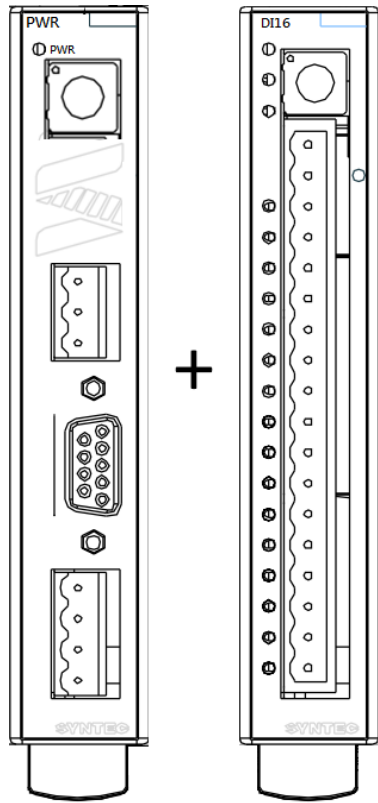


- Communication architecture is divided into two: the controller of the FC module power module and FC module module with the same module sub-module. The former is called SRI (Syntec Remote Interface), which is called SBus communication, to facilitate the distinction.

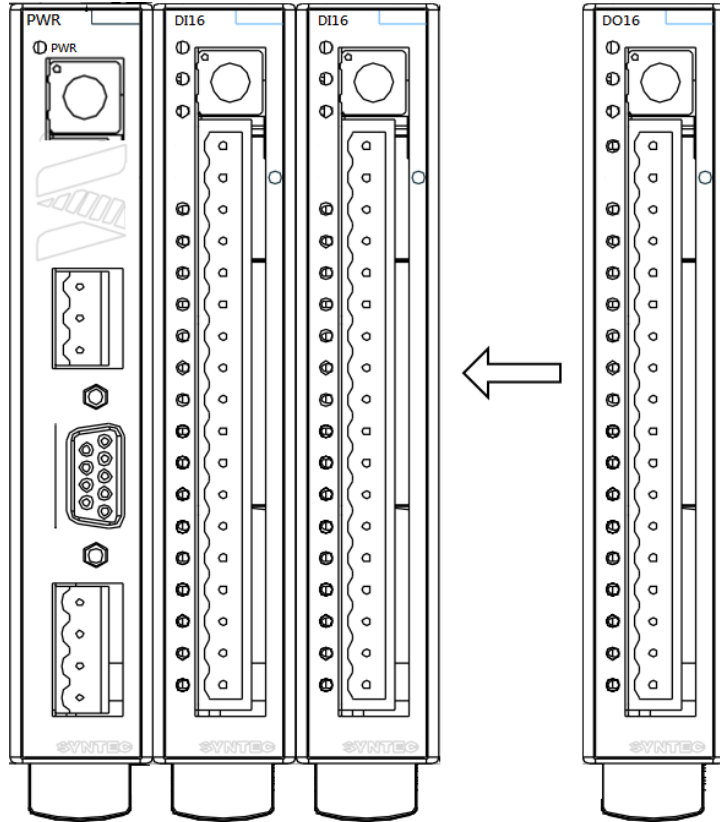
- The modules are connected to each other through the side of the joints, the SBus communication. The controller is through the power module on the internal communication connector and other functional modules connected to the SRI communication.
- A variety of FC function modules can be used in series with each other, so unlike the general commercial products, in addition to functional modules need additional CPU module.

1.2.2. FC module minimum architecture requirements:

To construct an FC module system, it is necessary to include at least one power module or high-order FC module, and a functional module. If the system requires only a set of digital input signals, only one power module and a set of digital inputs Module, as shown below.



If there is more FC function module requirements, only need to add the function module on the right side of the module , as shown below



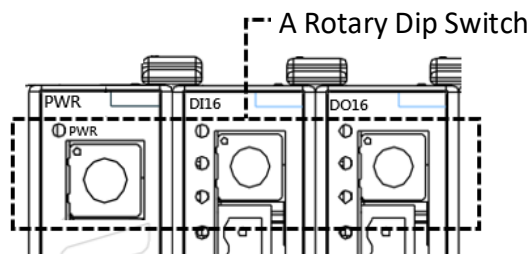
1. The unified specifications of each module are as follows:

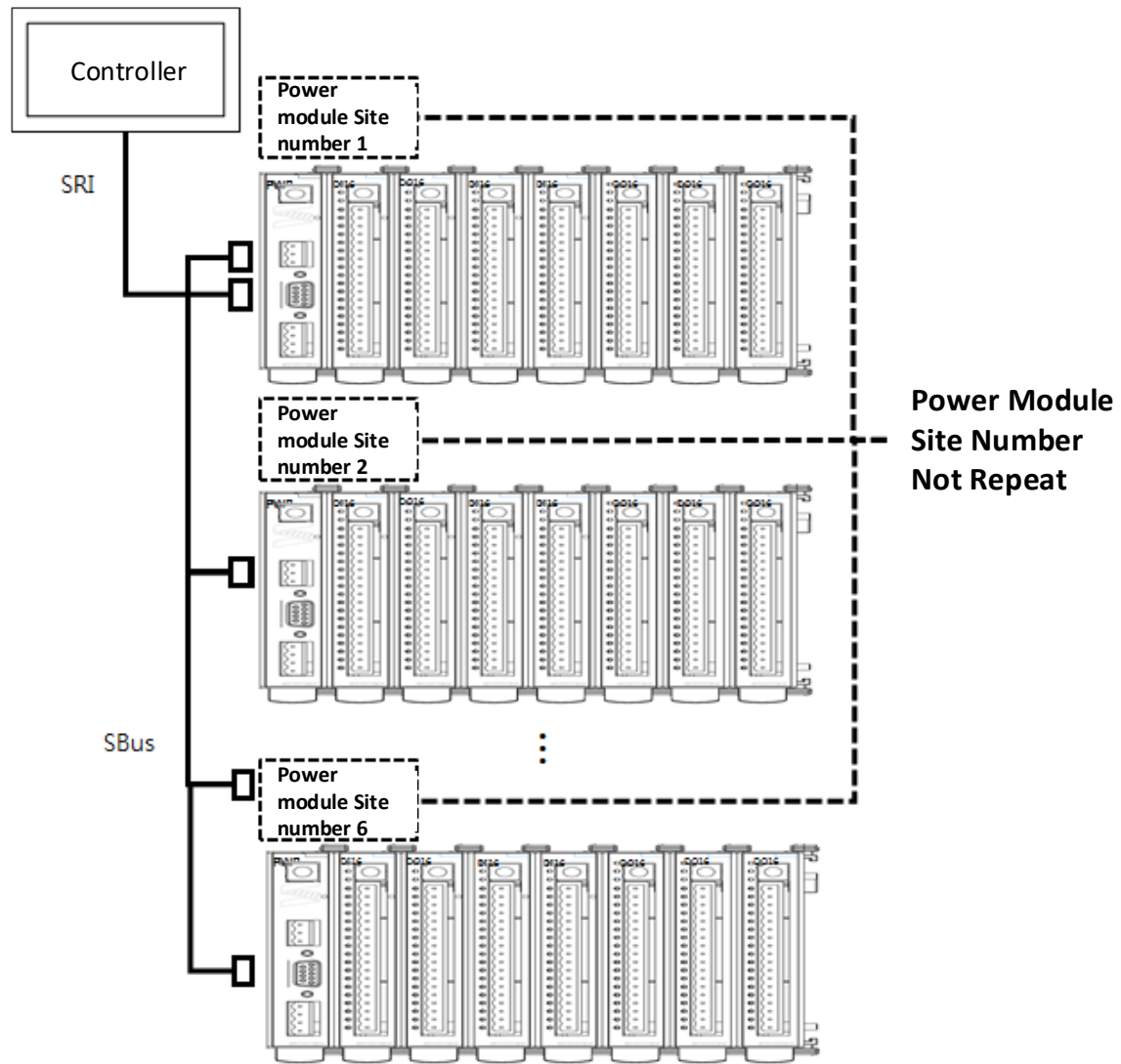
project	specification
Module connection mode	Side hanging
Number of module links	16 modules
Module connection	44 pin 1.27 mm Pitch double pin
size	23x120x100 (WxHxD mm)

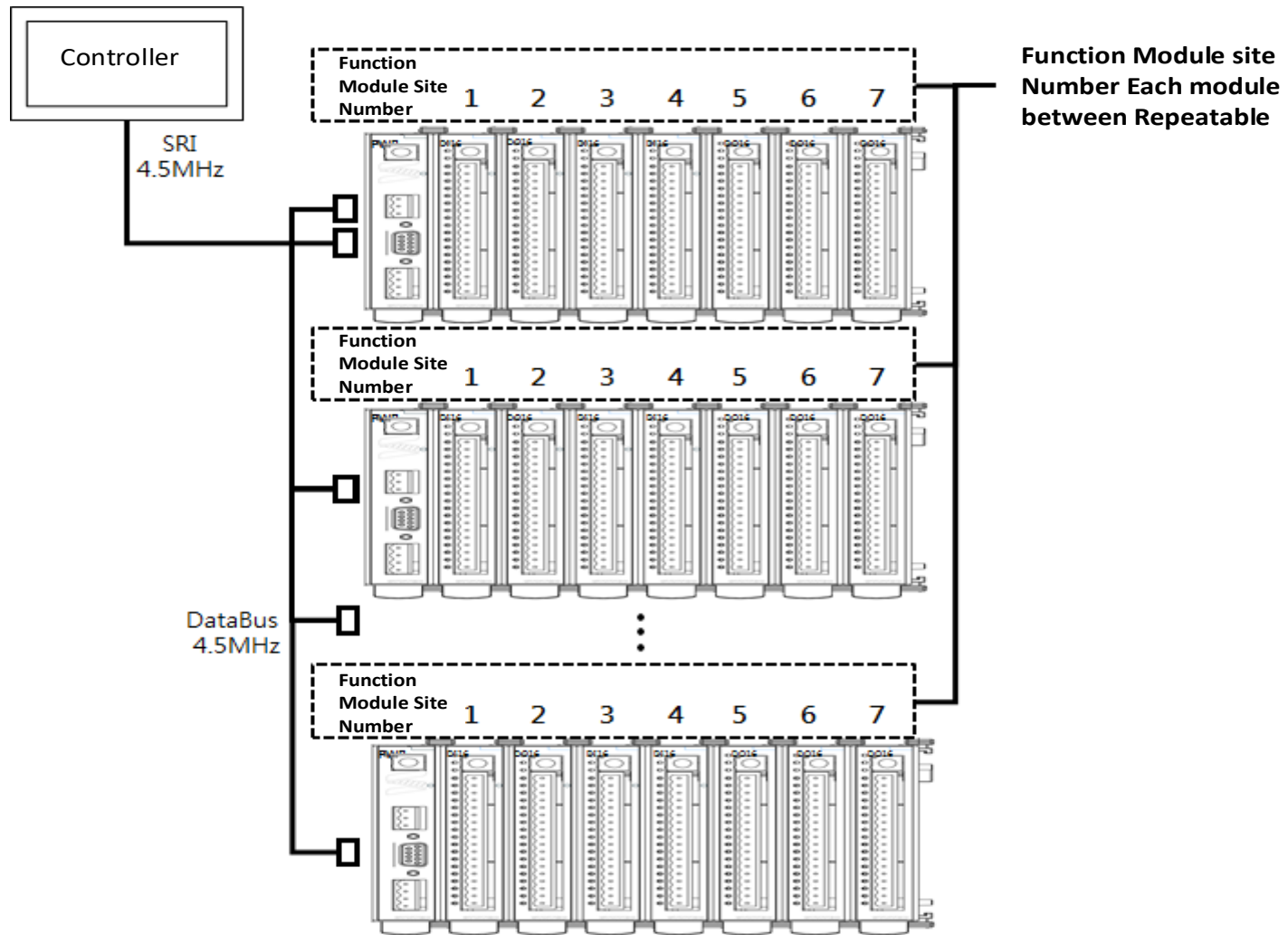
Set the site finger switch

FC module of **each module** to be configured according to the user's I / O requirements. It needs to distinguish the station number of each function module through the site finger switch. (The value of the station of the rotary finger switch is 0x00 ~ 0x0F)

Note! If there are multiple FC modules connected to the controller, the module's power module site number configuration, **can not be repeated** ! As shown below. And the function module part, the function module between the string module site number **can be repeated**! As shown below.

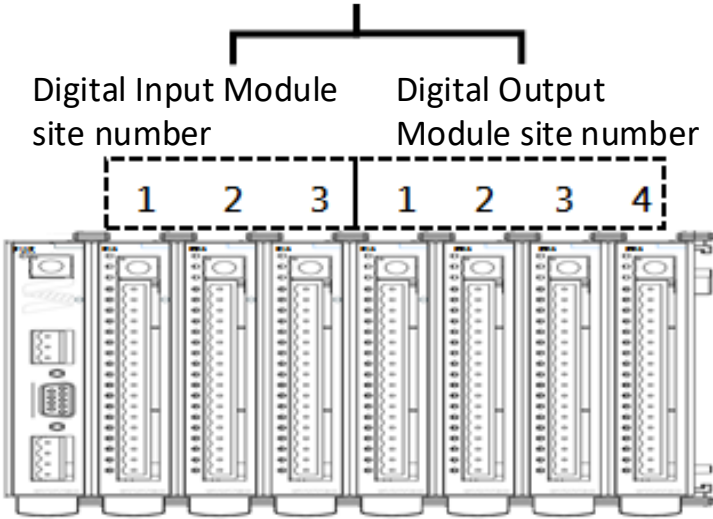




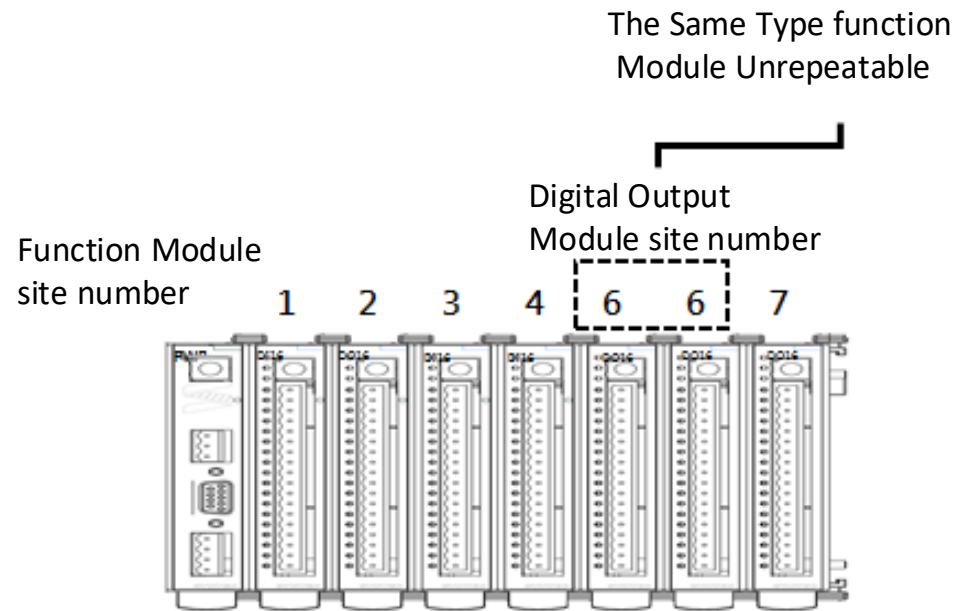


The same module in the different type of functional modules, site number **can be repeated** , as shown below.

Different Type Function Module
. Module Site Number Can be Repeat



Note! The same type of function module in the same module site number **can not be repeated** ! As shown below.

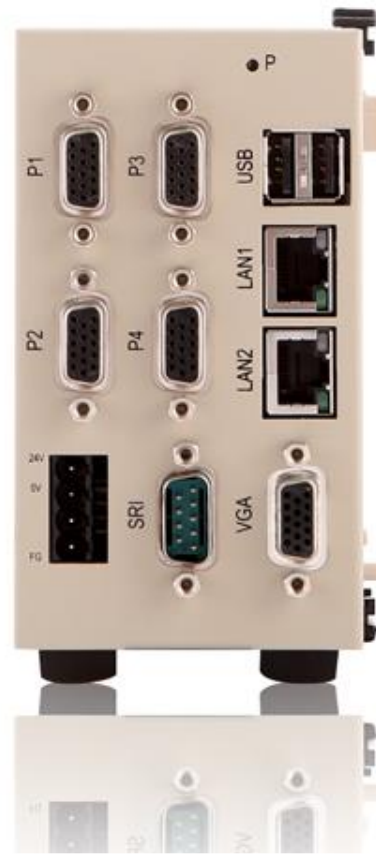


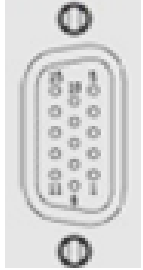
1.3. Hardware Interface Definition

1.3.1. FC Controller Hardware Interface Definition

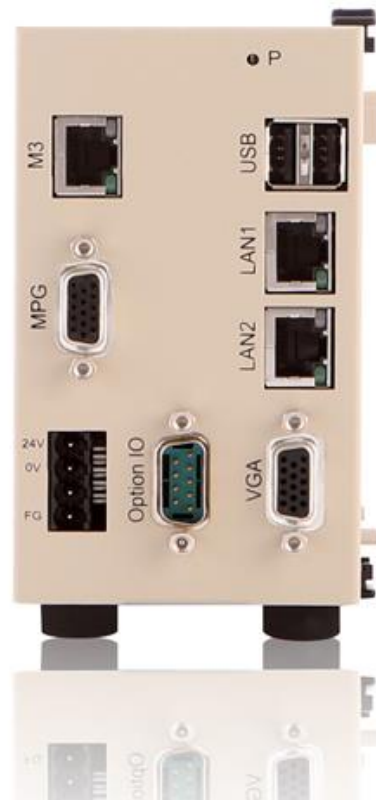
Introduce the definition of the hardware interface on the FC controller. The hardware interface mainly introduces the servo interface, SRI interface, power interface and MPG port.

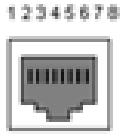
1.3.2. The FC-The A Type With Pulse Interface Definitions



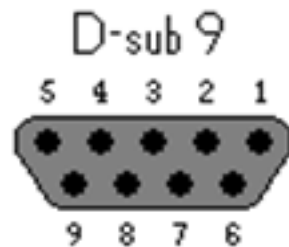
P1 ~ P4	Pin feet	Signal definition	Pin feet	Signal definition	Pin feet	Signal definition
	1	A +	6	C-	11	CW +
	2	A-	7	ALM +	12	CW-
	3	B +	8	ALM-	13	CCW +
	4	B-	9	SERVO-ON	14	CCW-
	5	C +	10	SERVO-CLR	15	OUT_COM

1.3.3. FC-B Serial Bus Type Servo Interface Definition



M3 interface	Pin feet	Signal definition	Pin feet	Signal definition
	1	TX +	5	air
	2	TX-	6	RX-
	3	RX +	7	air
	4	air	8	air

1.3.4. The SRI Interface Definition



SRI interface	Pin feet	Signal definition	Pin feet	Signal definition
	1	485_D1 +	6	485_D3- (standard 485 Interface)
	2	485_D1-	7	485_D3- (standard 485 Interface)
	3	485_D2 +	8	air

	4	485_D2-	9	VCC
	5	GND		

* Note: Pin5 Pin6 pin7 is the standard RS485 hardware interface .

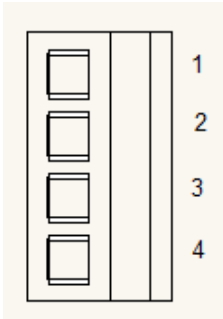
Pin5 is GND , pin6 is data- , pin7 is data + .

1.3.5. Handwheel MPG port

FC-B bus controller, with hand wheel MPG interface, access hand wheel, 15pin interface is defined as follows:

Pin	Signal	Pin	Signal	Pin	Signal	MPG Interface
1	MPG A+	6	--	11	IN 60	
2	MPG A-	7	IN 56	12	IN 61	
3	MPG B+	8	IN 57	13	IN 62	
4	MPG B-	9	IN 58	14	GND	
5	--	10	IN 59	15	VCC(+5V)	

1.3.6. Power Interface Definition



Power supply terminal	Pin feet	definition
	1	24VDC
	2	0V
	3	air
	4	FG ground

1.4. Power module specifications

1. The general specifications of each module are as follows:

project	specification
Operating ambient temperature	-20 ~ 60 ° C
Storage ambient temperature	-40 to 70 ° C
Operating ambient humidity	5 ~ 95%, no condensation
Storage ambient humidity	5 ~ 95%, no condensation

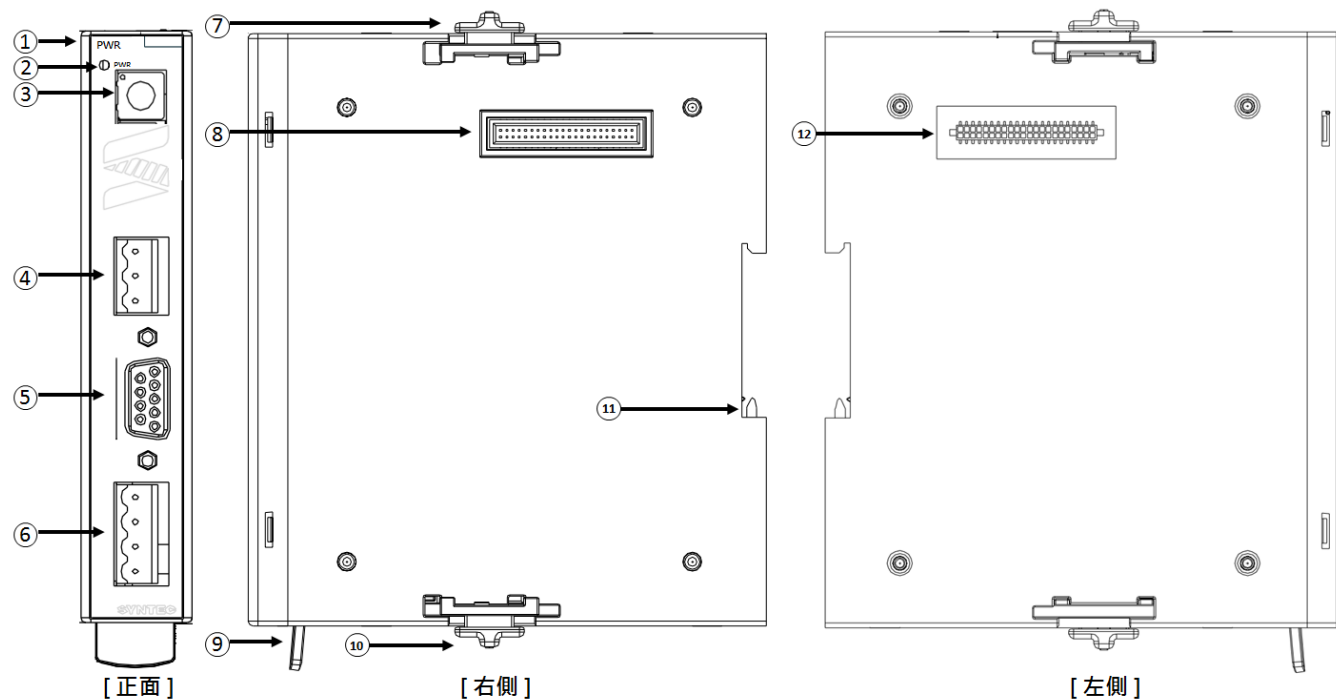
project	specification
Resistance to vibration / shock	International Standard Specification IEC61131-2, IEC 68-2-6 (TEST Fc) / IEC61131-2 & IEC 68-2-27 (TEST Ea)
working environment	No corrosive gas is present
Installation location	Machine control box
Pollution level	2

2. General specifications:

project	specification
Input power	24V 1.3A (18V ~ 32V)
Output power	5.2V +/- 50mV, 5A
Power supply wire capacity	2A / 24VDC
Inrush current	<45A @ 115VAC
Power protection	24VDC input with short circuit protection, with overcurrent protection
Insulation voltage	5MΩ or more (all outputs / entry point to ground between 500VDC)

project	specification
Ground	The wire diameter of the grounding wiring shall not be less than the diameter of the power supply terminals L, N
Power connector	4 pin 5.0mm pitch European terminal
External communication connector	D-sub 9 Pin female 3 pin 5.0mm pitch Euro terminal

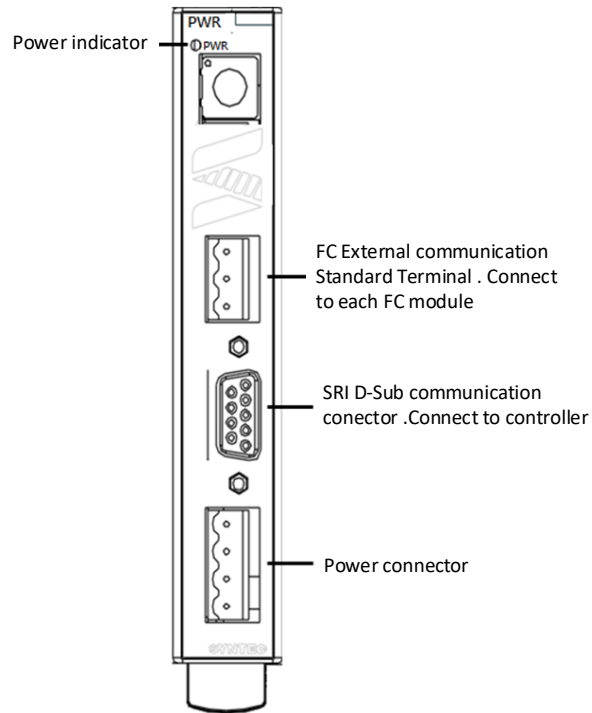
1.4.1. Introduction to the power module



Power module appearance:

The main module of the power module contains the following three connectors.

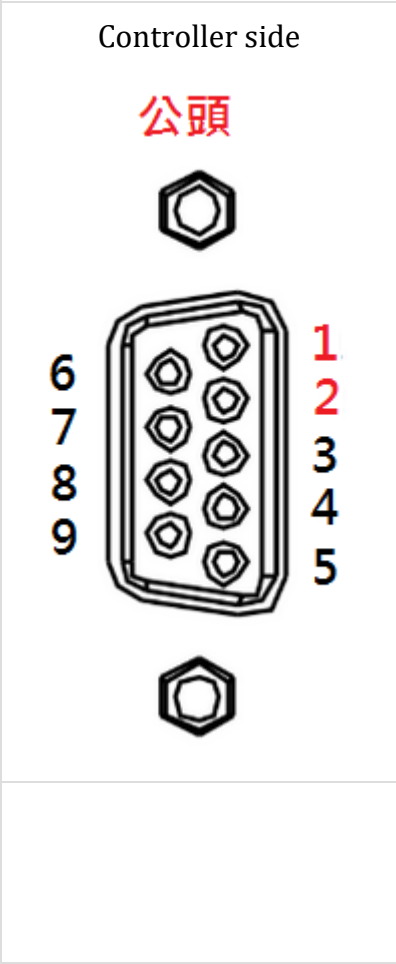
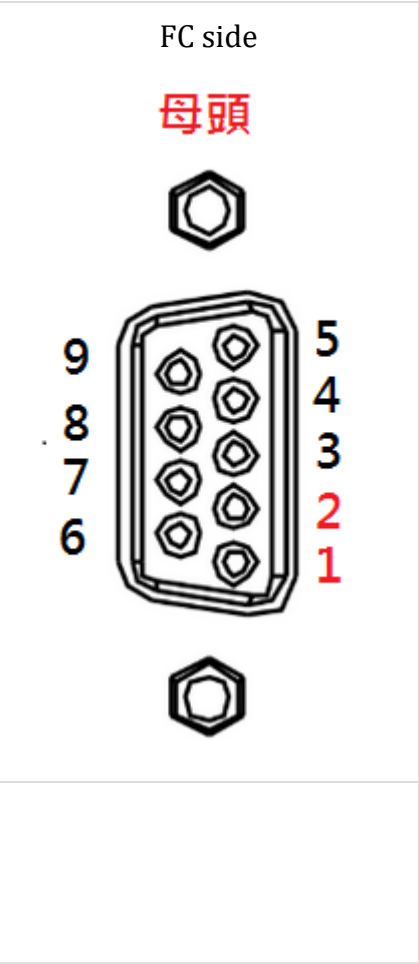
- External communication European standard terminal connector (for connection to each FC module)
- SRI D-Sub communication connector (for connection to controller)
- Power connector



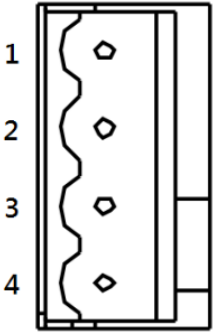
Power Module Pin Definitions:

External communication connector pin definition (for connection to each FC module)		
Numbering	Pin name	
1	External RS485 D +	

2	External RS485 D-		
3	FG		
External communication connector Pin definition (for connection to controller)			
Numbering	Pin name		
1	External RS485 D +		
2	External RS485 D-		
3	-		
4	-		
5	-		
6	-		
7	-		
8	-		
9	-		



Power connector pin definition	
Numbering	Pin name
1	24V Power
2	GND
3	N / A
4	FG



LED definition:

Module name	LED indicator name	description
Power module	PWR indicator (yellow)	Indicates the operating status of the power module Constant: power module has power output Off: The power module has no power output

Serial number	name	Description
1	Model name	Module Model Name Abbreviation (PWR: Power Module)
2	Power indicator (green)	Indicates the status of the power supply
3	Rotary finger switch	Set the site number of the module
4	External communication European regulations	Connect to other FC power modules for use,
5	SRI D-Sub communication terminal	For connection to the controller, refer
6	Power connector	For details on pin instructions
7	Upper end fastener	Connect to the upper end of the other FC function modules
8	Internal communication connector (left side)	Connect to other FC function modules for use
9	Slide rails	Control the slides of the slide rails
10	Lower end fastener	Connect to the lower end of the other FC function modules
11	Slide rails	Fix the groove on the slide
12	Internal communication connector (right side)	No effect

1.5. Digital IO Specification

1.5.1. FC-DI16

Electrical specifications

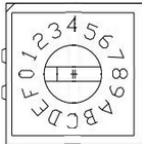
project		specification
Input the number of signal channels		16 channel
Input point type		Digital input
Input signal specification		24V (Sink / Source)
Input Current		24VDC, 5mA
action	OFF → ON	> 15VDC
The prospective	ON → OFF	<5VDC
reaction	OFF → ON	10ms ± 10%
time	ON → OFF	15ms ± 10%
Maximum input frequency		2.5KHz
input resistance		2.2KΩ

Input circuit isolation	Optocoupler isolation
Input the action display	When the optocoupler is driven, the input point indicator lights
Input signal connector size	18 pin 5.0mm pitch European terminal

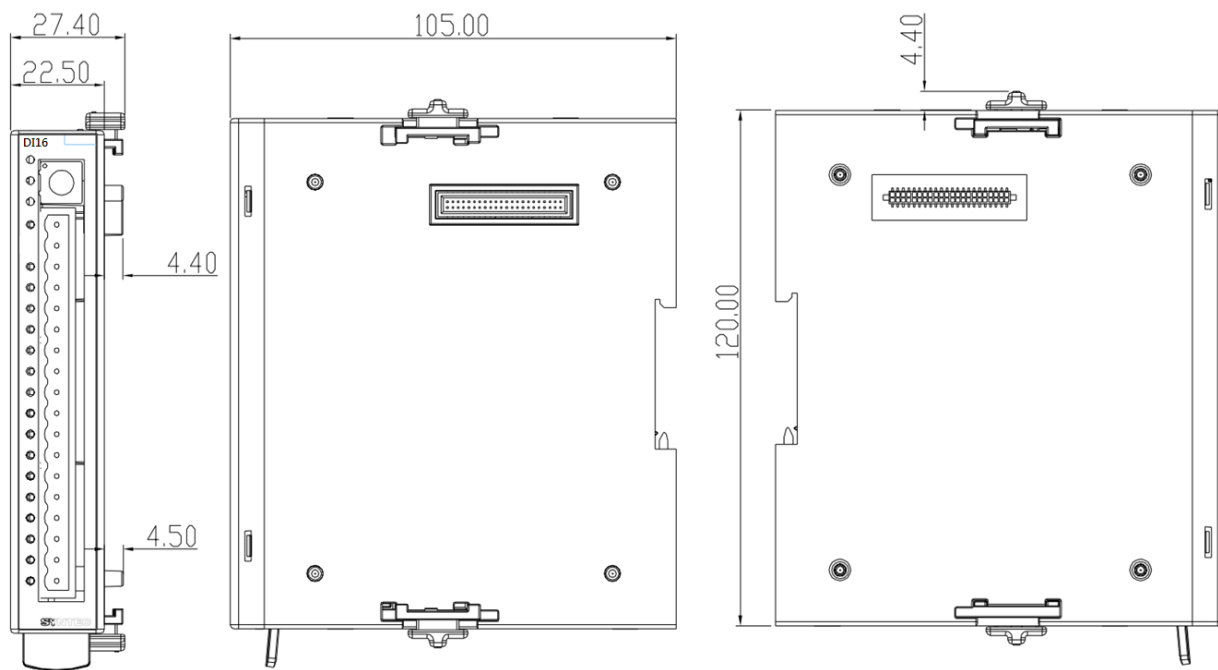
Introduction of rotary finger switches

The function module site number is used for the site configuration within the FC module. The station number consists of a rotatable finger switch, which can be rotated from 0x00 to 0x0F.

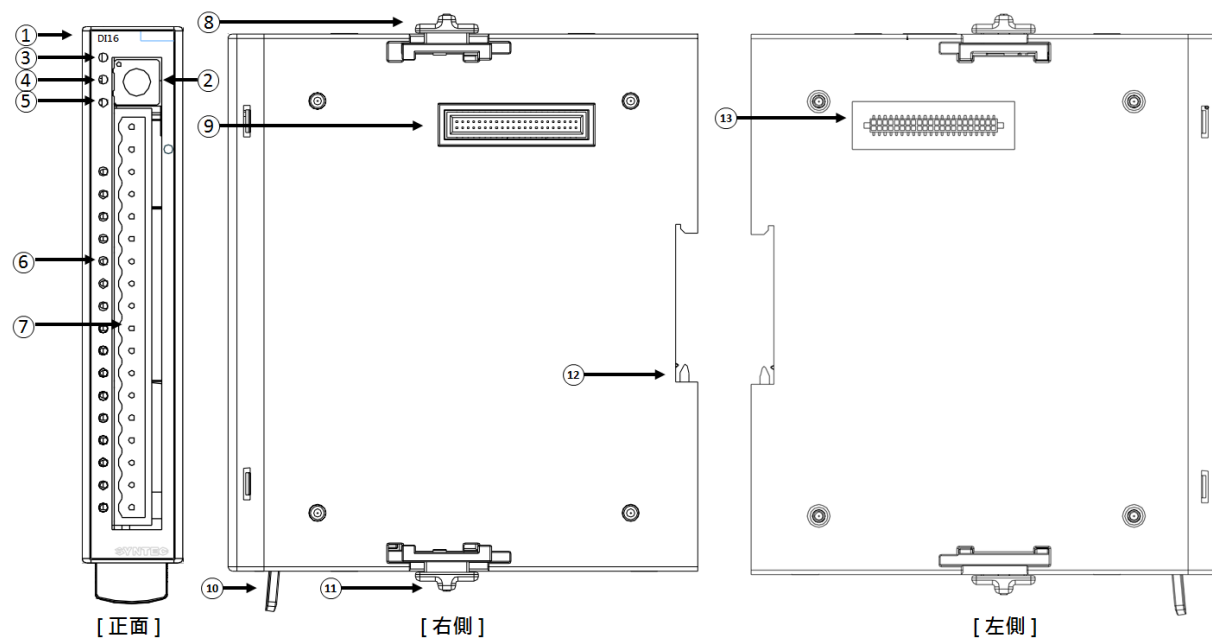
(Note! The function number of each function module is configured, and the same type of function module is **not repeatable** in the same module)

Site number	definition	Exterior
0x00 ~ 0x0F	FC module within the site number	

Physical dimension



Function module part introduction



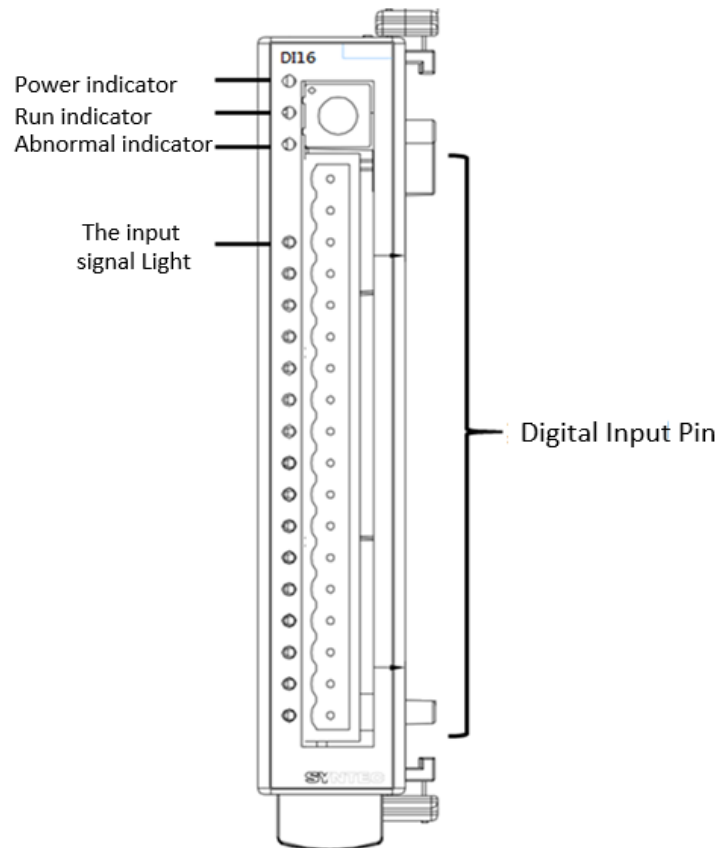
Serial number	name	Description
1	Model name	Module model name abbreviation (DI16: digital input function module)
2	Rotary finger switch	Set the site number of the function module
3	Power Indicator	Indicates the status of the power supply (yellow)

Serial number	name	Description
4	Operation indicator light	Indicates the status of the operation (green)
5	Exception light	Indicates the status of the exception (red)
6	Input signal indicator	When the input point is on, the input lamp lights up.
7	Input pin terminal	For detailed digital input pin descriptions
8	Upper end fastener	Connect to the upper end of the other FC function modules
9	Internal communication connector (right side)	Connect to other FC function modules for communication use
10	Slide rails	Control the slides of the slide rails
11	Lower end fastener	Connect to the lower end of the other FC function modules
12	Slide rails	Fix the groove on the slide
13	Internal communication connector (left side)	Connect to other FC function modules for communication use

Digital Input Module Pin Definitions:

The digital input function module is mainly divided into the left and right side of the line connection (power and communication pin) and digital input pin. In the installation phase, through the connection of the FC function module has been the left side of the 44 pin connection, and power and communication pins have been connected to the right side of the 44 pin is reserved for FC function module for serial use The While the main pin of the digital input signal is defined as follows:

Digital Input Function Module Appearance:



DI Digital Input Function Module Pin Definitions:

DI module input signal pin definition

Numbering	Pin name	
1	Com	1 ○
2	Com	2 ○
3	Input signal 1	3 ○
4	Input signal 2	4 ○
5	Input signal 3	5 ○
6	Input signal 4	6 ○
7	Input signal 5	7 ○
8	Input signal 6	8 ○
9	Input signal 7	9 ○
10	Input signal 8	10 ○
11	Input signal 9	11 ○
12	Input signal 10	12 ○
13	Input signal 11	13 ○
14	Input signal 12	14 ○
15	Input signal 13	15 ○
16	Input signal 14	16 ○
17	Input signal 15	17 ○
		18 ○

18	Input signal 16	
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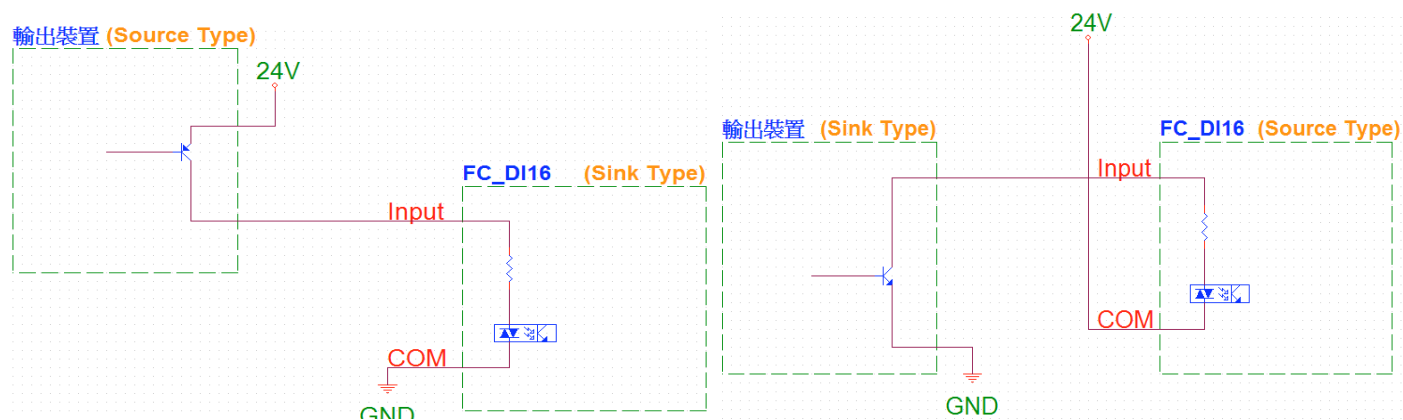
Note: If the digital function module has any exception, it will interrupt all digital output!

LED definition:

Module name	LED indicator name	description
Digital input Function module	P indicator (yellow)	Indicates the power status of the function module Constant: Function module power input is normal Off: Function module power input interrupt
	R indicator (green)	Indicates the operational status of the function module Constant: function module running Off: Function module stops
	E indicator (red)	Indicates the abnormal status of the function module Constant: function module exception occurs Off: The function module is normal
	Digital input communication indicator (green)	Indicates the input status of each digit input point Constant: digital input signal in action Off: countless bit input signal is activated

Wiring method

Wiring method is free to select Source / Sink. When using the Source, COM point 24V, I point Sink Type output; when selected Sink, COM point 0V, I then connected Source Type output. The following is a diagram of the internal structure of FC DI16.



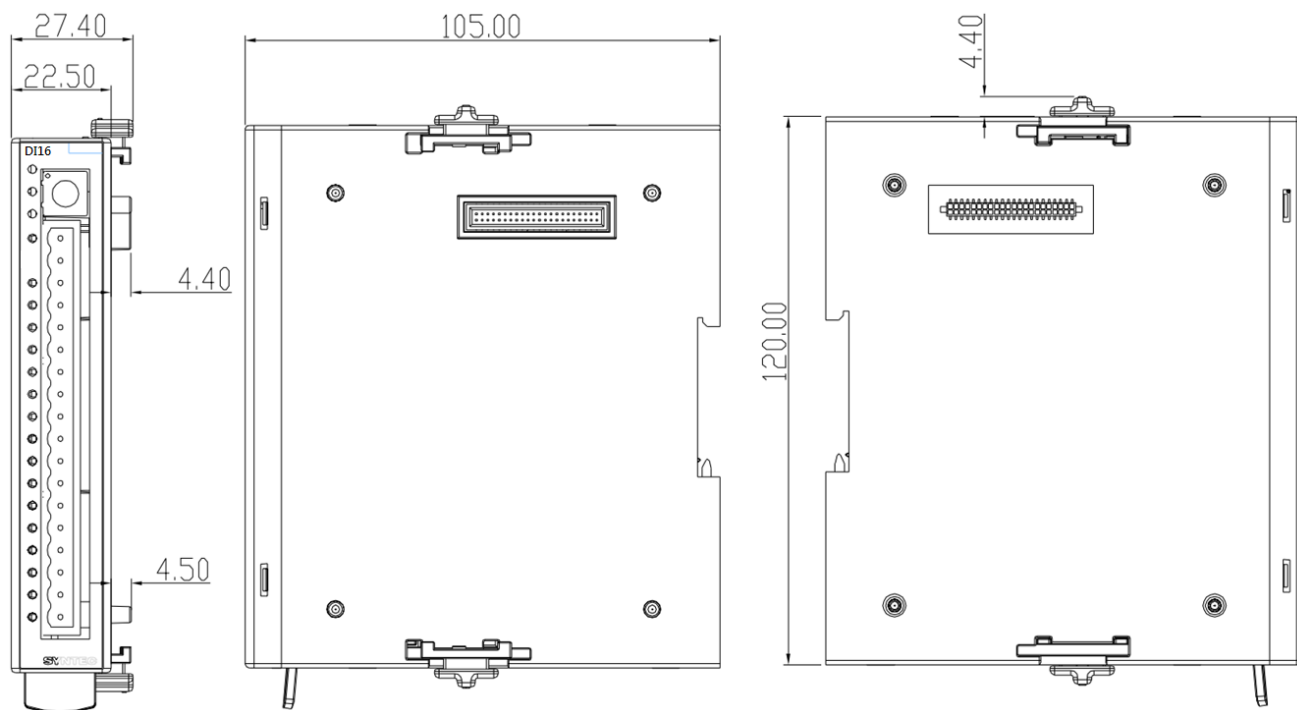
1.5.2. FC-DI32

Electrical specifications

project	specification
Input the number of signal channels	16 channel
Input point type	Digital input

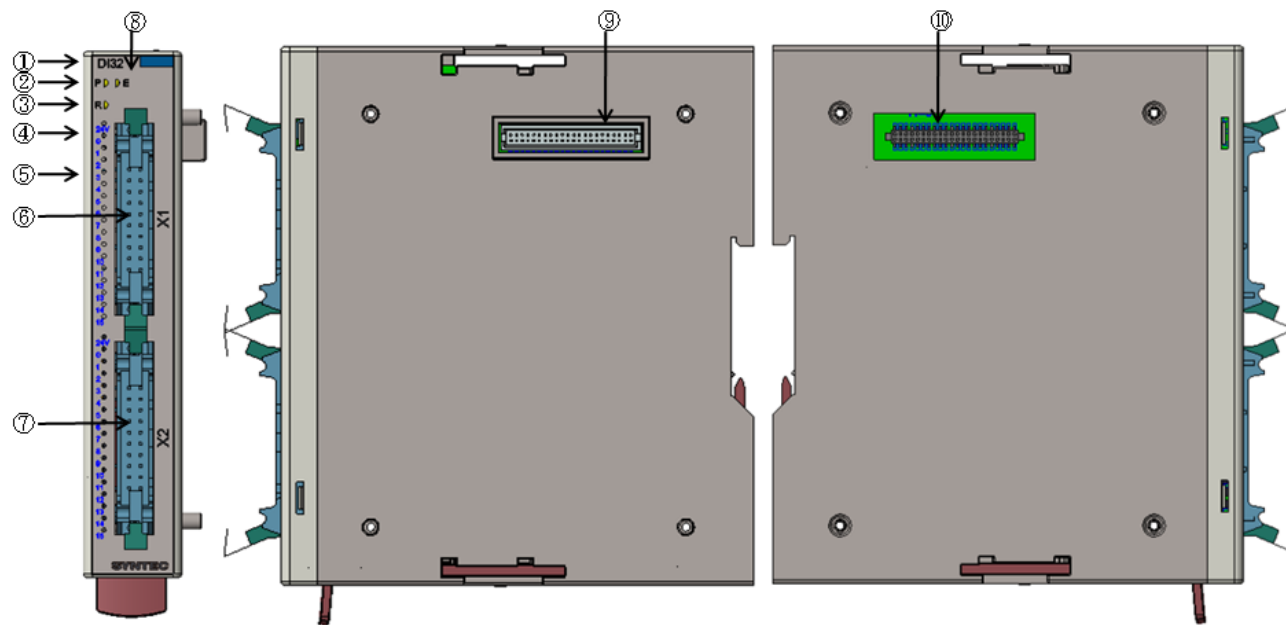
Input signal specification		24V (Sink / Source)
Input Current		24VDC, 5mA
action The prospective	OFF → ON	> 15VDC
	ON → OFF	<5VDC
reaction time	OFF → ON	10ms ± 10%
	ON → OFF	15ms ± 10%
Maximum input frequency		2.5KHz
input resistance		2.2KΩ
Input circuit isolation		Optocoupler isolation
Input the action display		When the optocoupler is driven, the input point indicator lights
Input signal connector size		20 pin 2.54mm pitch horn connector × 2

Physical dimension



Note: Refer to FC-DI16 for the same size.

Function module part introduction



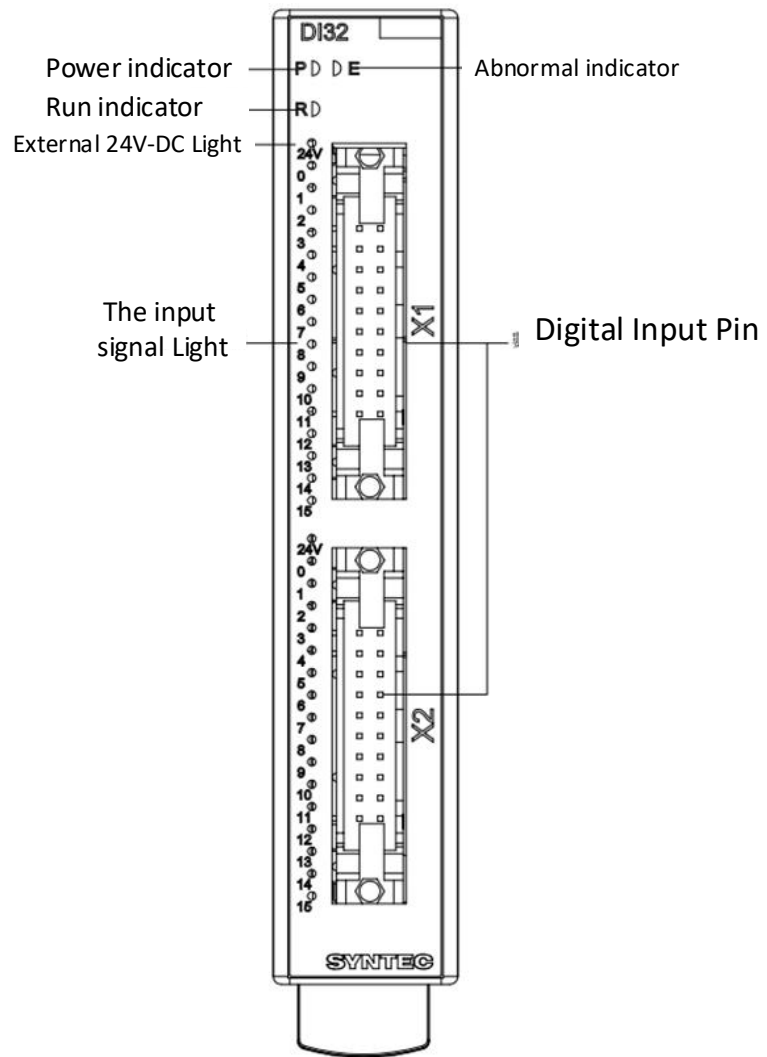
Serial number	name	Description
1	Model name	Module model name abbreviation
2	Power Indicator	Indicates the status of the power supply (green)
3	Operation indicator light	Indicates the state of operation (yellow)
4	External 24V power indicator	Indicates the status of the power supply (green)
5	Exception light	Indicates the status of the exception (red)

Serial number	name	Description
6	Input the horn connector X1	For detailed digital input pin descriptions
7	Input the horn connector X2	For detailed digital input pin descriptions
8	Exception light	Indicates the status of the exception (red)
9	Internal communication connector (right side)	Connect to other FC function modules for communication use
10	Internal communication connector (left side)	Connect to other FC function modules for communication use

Digital Input Module Pin Definitions:

The digital input function module is mainly divided into the left and right side of the line connection (power and communication pin) and digital input pin. In the installation phase, through the connection of the FC function module has been the left side of the 44 pin connection, and power and communication pins have been connected to the right side of the 44 pin is reserved for FC function module for serial use The While the main digital input signal of the 2 sets of horn connectors is defined as follows:

Digital Input Function Module Appearance:



Pin definition:

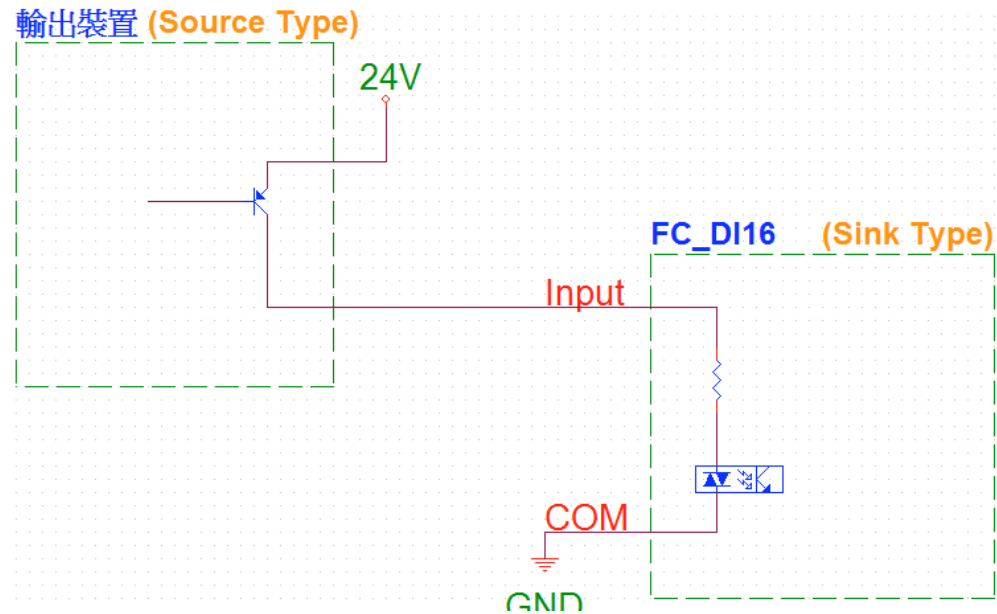
Note: If the digital function module has any exception, it will interrupt all digital output!

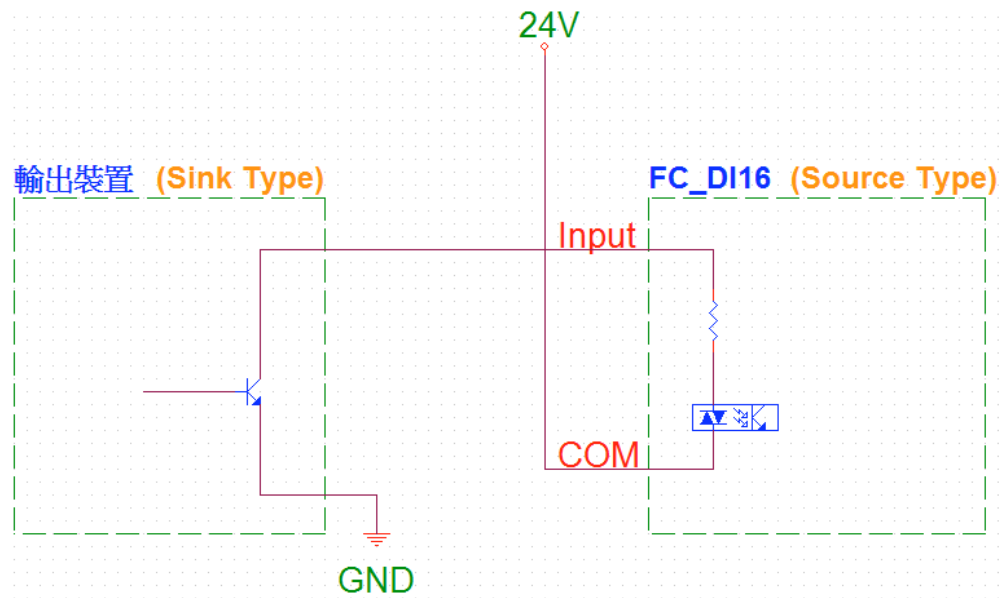
LED definition:

Module name	LED indicator name	description
Digital input Function module	P indicator (yellow)	Indicates the power status of the function module Constant: Function module power input is normal Off: Function module power input interrupt
	R indicator (green)	Indicates the operational status of the function module Constant: function module running Off: Function module stops
	E indicator (red)	Indicates the abnormal status of the function module Constant: function module exception occurs Off: The function module is normal
	Digital input communication indicator (green)	Indicates the input status of each digit input point Constant: digital input signal in action Off: countless bit input signal is activated

Wiring method

1. Point direct input
wiring can be freely selected Source / Sink. When using the Source, COM point 24V, I point Sink Type output; when selected Sink, COM point 0V, I then connected Source Type output. The following is a diagram of the internal structure of FC DI32.
Note: Because each connector COM point at the same time together, such as the use of SINK INPUT, the same connector must be all 16 points into SINK INPUT.





2.

1.5.3. FC-D016

Electrical specifications

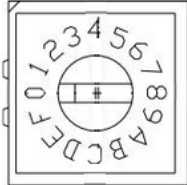
project	specification
Number of output signal channels	16 chanel
Output point type	Transistor-T
Voltage specification	24VDC below

maximum load	Resistivity	2A / 1 point (8A / COM)
	Inductance	12W (24VDC)
Output signal specification		24V, 1.9A (8A total)
Output signal connector size		18 pin 5.0mm pitch European terminal

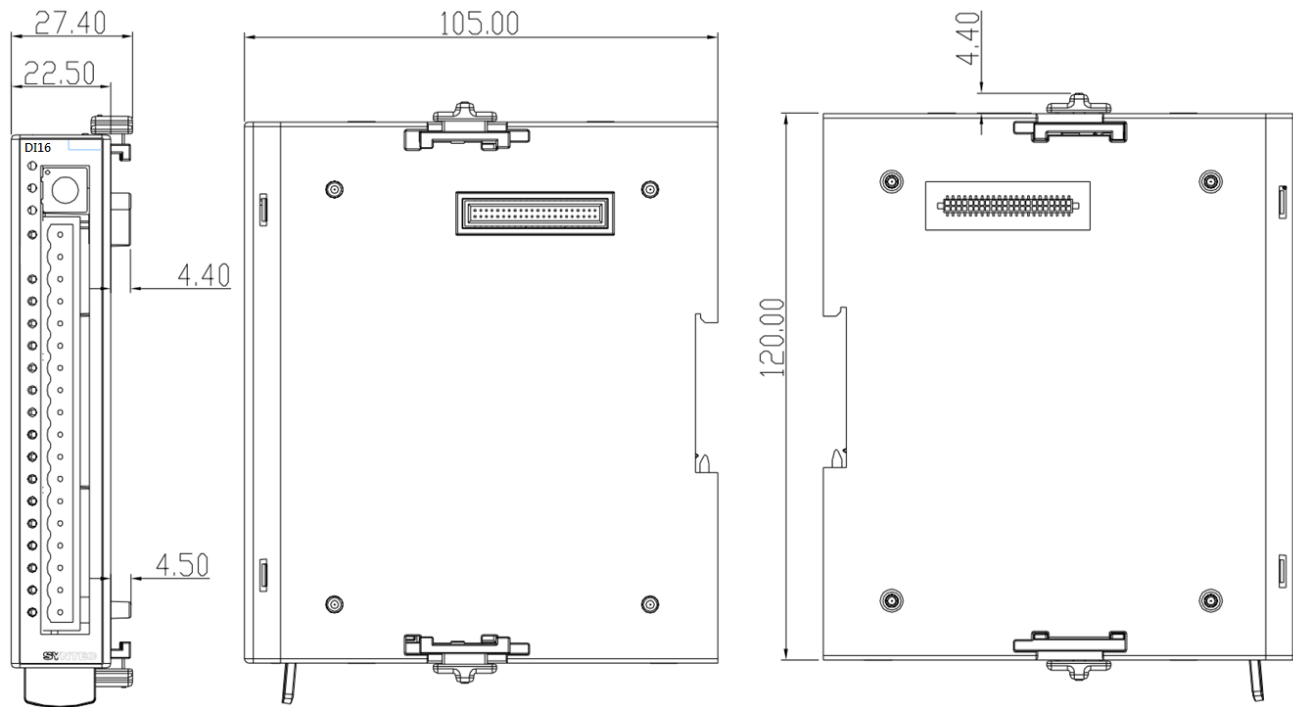
Introduction of rotary finger switches

The function module site number is used for the site configuration within the FC module. The station number consists of a rotatable finger switch, which can be rotated from 0x00 to 0x0F.

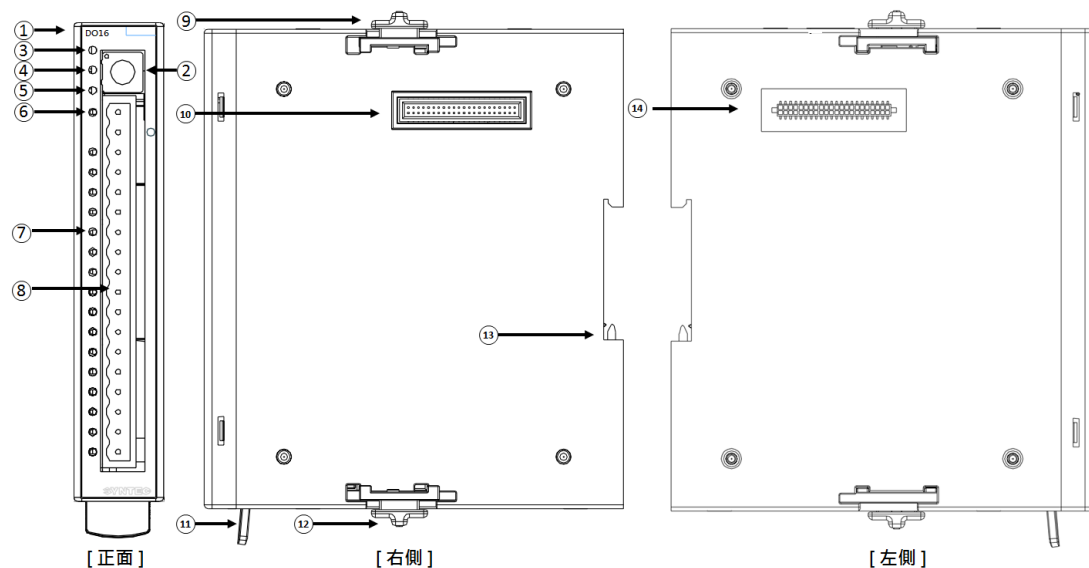
(Note! The function number of each function module is configured, and the same type of function module is **not repeatable** in the same module)

Site number	definition	Exterior
0x00 ~ 0x0F	FC module within the site number	

Physical dimension



Function module part introduction



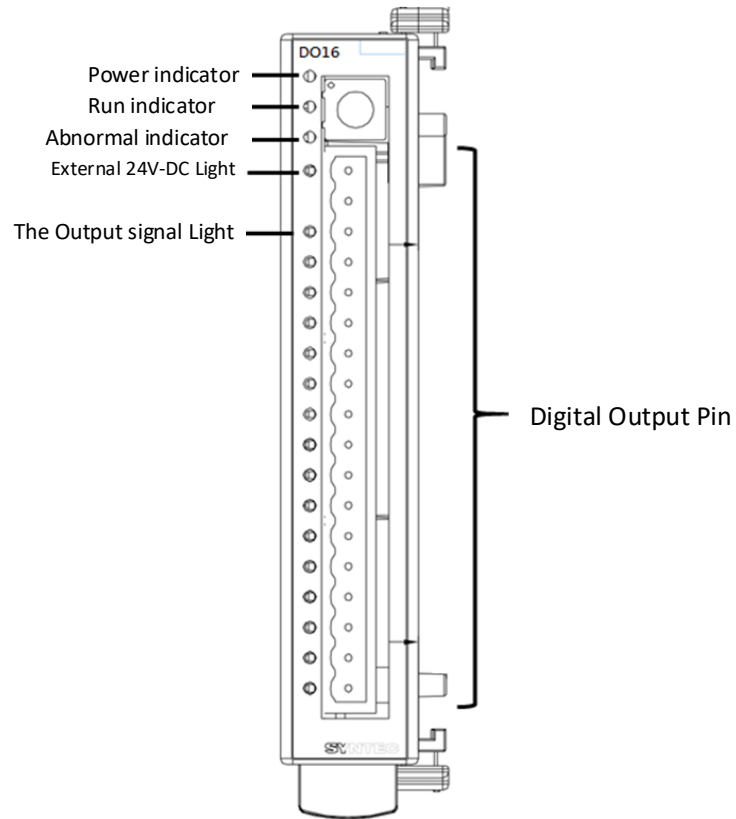
Serial number	name	Description
1	Model name	Module model name abbreviation (DO16: digital output function module)
2	Rotary finger switch	Set the site number of the function module
3	Power Indicator	Indicates the status of the power supply (yellow)
4	Operation indicator light	Indicates the status of the operation (green)
5	Exception light	Indicates the status of the exception (red)

Serial number	name	Description
6	24V indicator light	When the power is on, it lights up 24V indicator (green)
7	Output signal indicator	When the output point guide is on, the output indicator lights up.
8	Output pin terminal	For detailed digital output pin descriptions, refer below
9	Upper end fastener	Connect to the upper end of the other FC function modules
10	Internal communication connector (right side)	Connect to other FC function modules for communication use
11	Slide rails	Control the slides of the slide rails
12	Lower end fastener	Connect to the lower end of the other FC function modules
13	Slide rails	Fix the groove on the slide
14	Internal communication connector (left side)	Connect to other FC function modules for communication use

Digital Output Function Module Pin Definitions:

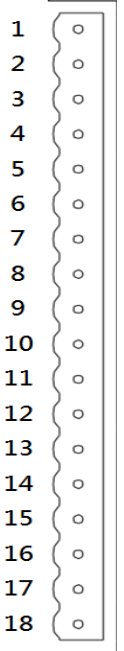
Digital output function module is mainly divided into the left and right sides of the line connection (power and communication pin) and digital output pin. In the installation phase, through the connection of the FC function module has been the left side of the 44 pin connection, and power and communication pins have been connected to the right side of the 44 pin is reserved for FC function module for serial use The While the main pinout of the 18 output pins is defined as follows:

Digital Output Function Module Appearance:



DO digital output function Module pin definition:

DO module output signal pin definition

Numbering	Pin name	
1	24V	
2	GND	
3	Output signal 1	
4	Output signal 2	
5	Output signal 3	
6	Output signal 4	
7	Output signal 5	
8	Output signal 6	
9	Output signal 7	
10	Output signal 8	
11	Output signal 9	
12	Output signal 10	
13	Output signal 11	
14	Output signal 12	
15	Output signal 13	
16	Output signal 14	
17	Output signal 15	
18	Output signal 16	

Note: If the digital function module has any exception, it will interrupt all digital output!

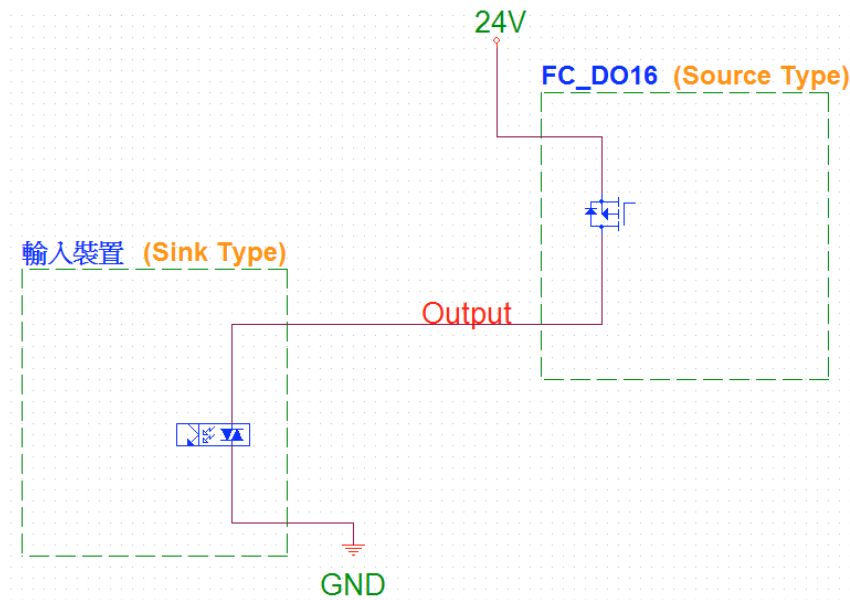
LED definition:

Module name	LED indicator name	description
Module name	LED indicator name	description
Digital output Function module	P indicator (yellow)	Indicates the power status of the function module Constant: Function module power input is normal Off: Function module power input interrupt
	R indicator (green)	Indicates the operational status of the function module Constant: function module running Off: Function module stops
	E indicator (red)	Indicates the abnormal status of the function module Constant: function module exception occurs Off: The function module is normal
	Digital output communication indicator (green)	Indicates the output status of each digit output point Constant: digital output signal Off: countless bit output signal is activated
	24V indicator (yellow)	Indicates the external power supply status of the digital output function module

Module name	LED indicator name	description
		Constant light: the input power supply is normal (constant after the power is turned on) Off: No power supply

Wiring method

Wiring mode is Source Type, 0 point output connected Sink Type input device. The following is the FC DO16 internal architecture diagram.



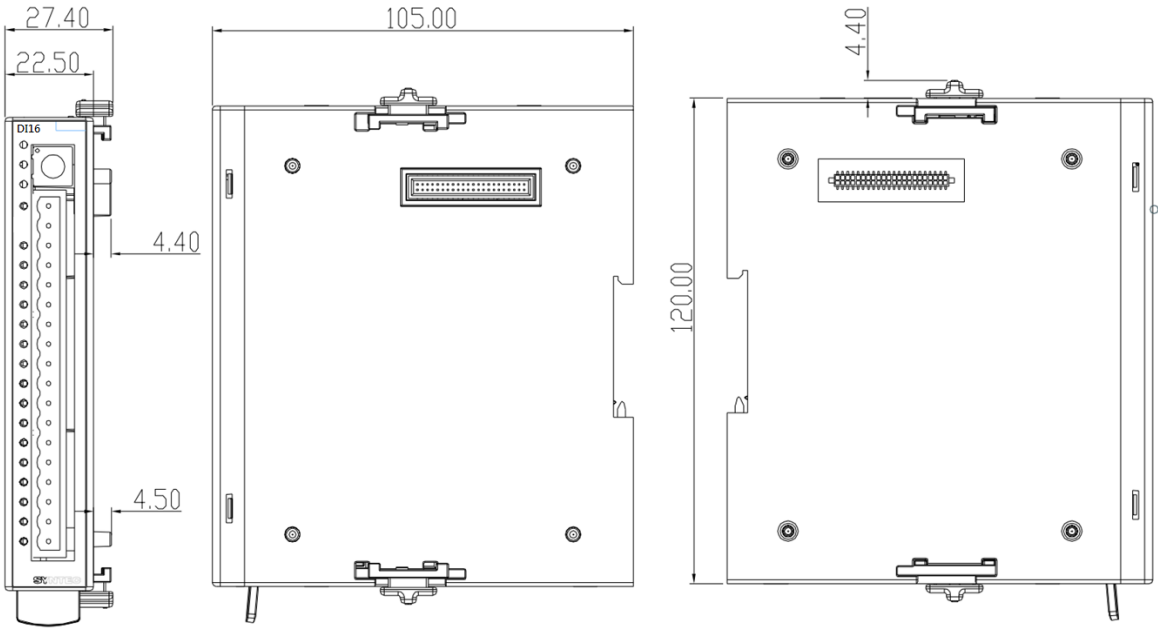
1.5.4. FC-D032

Electrical specifications

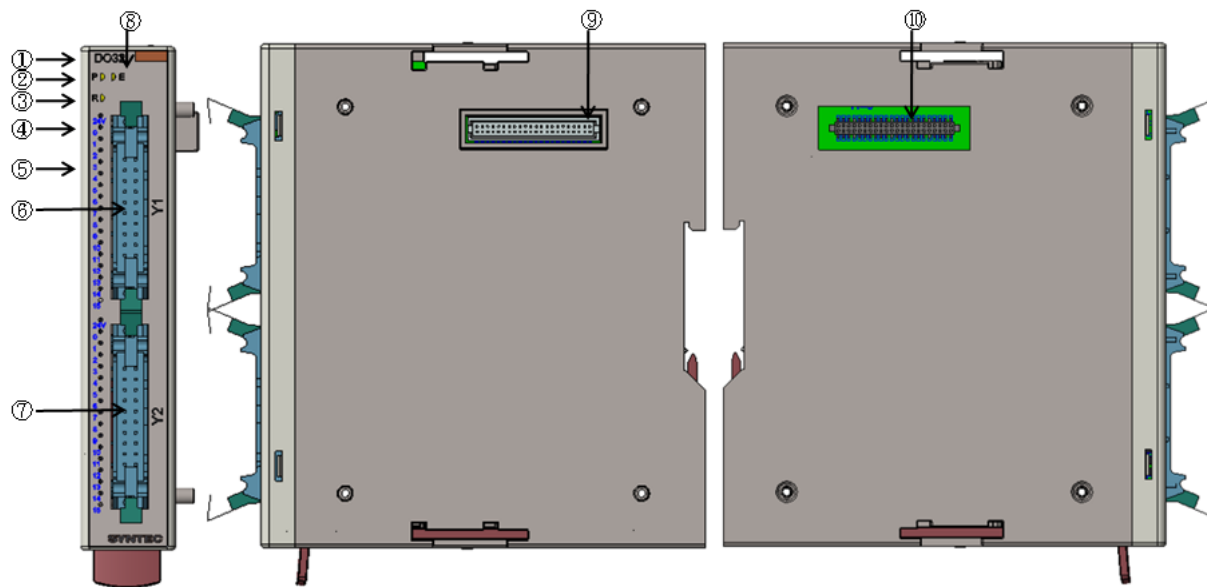
project	specification
Number of output signal channels	32 chanel
Output point type	Transistor-T, isolated
Voltage specification	24VDC below

To promote the ability	625mA / 1 point
Output signal connector size	20 pin 2.54mm pitch horn connector × 2

physical dimension



Function module part introduction



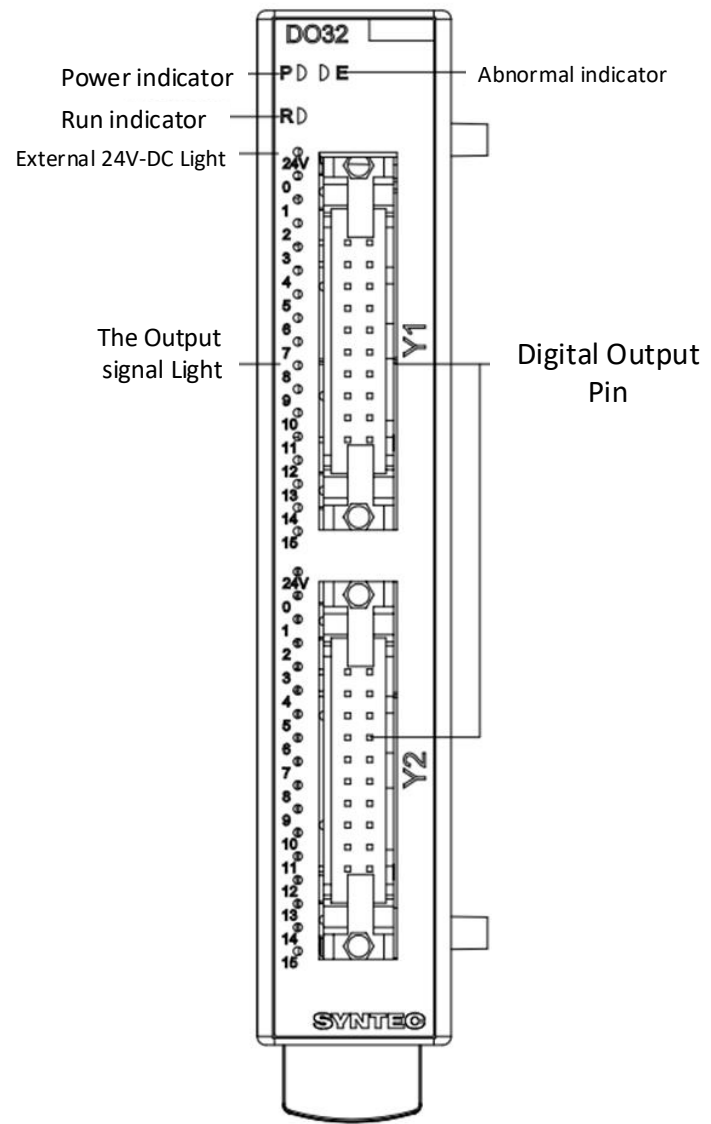
Serial number	name	Description
1	Model name	Module model name abbreviation
2	Power Indicator	Indicates the status of the power supply (green)
3	Operation indicator light	Indicates the state of operation (yellow)
4	External 24V power indicator	Indicates the status of the power supply (green)
5	Exception light	Indicates the status of the exception (red)
6	Output horn connector Y1	For detailed digital input pin descriptions

Serial number	name	Description
7	Output horn connector Y2	For detailed digital input pin descriptions
8	Exception light	Indicates the status of the exception (red)
9	Internal communication connector (right side)	Connect to other FC function modules for communication use
10	Internal communication connector (left side)	Connect to other FC function modules for communication use

Digital Output Function Module Pin Definitions:

Digital output function module is mainly divided into the left and right sides of the line connection (power and communication pin) and digital output pin. In the installation phase, through the connection of the FC function module has been the left side of the 44 pin connection, and power and communication pins have been connected to the right side of the 44 pin is reserved for FC function module for serial use The While the main digital output signal of the 2 sets of horn connectors is defined as follows:

Digital Output Function Module Appearance:



Pin definition:

Note: If the digital function module has any exception, it will interrupt all digital output!

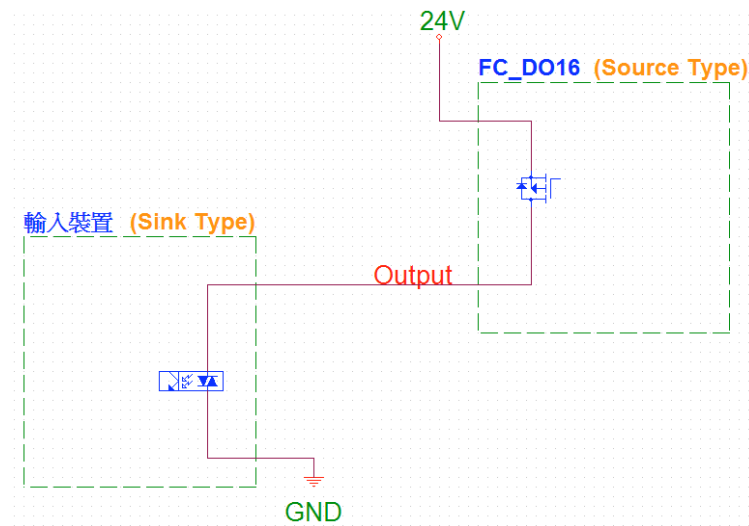
LED definition:

Module name	LED indicator name	description
Digital output Function module	P indicator (yellow)	Indicates the power status of the function module Constant: Function module power input is normal Off: Function module power input interrupt
	R indicator (green)	Indicates the operational status of the function module Constant: function module running Off: Function module stops
	E indicator (red)	Indicates the abnormal status of the function module Constant: function module exception occurs Off: The function module is normal
	Digital output communication indicator (green)	Indicates the output status of each digit output point Constant: digital output signal Off: countless bit output signal is activated
	24V indicator (yellow)	Indicates the external power supply status of the digital output function module

Module name	LED indicator name	description
		Constant light: the input power supply is normal (constant after the power is turned on) Off: No power supply

Wiring method

- Point direct output wiring for the Source Type, 0 point output connected Sink Type input device. The following is an overview of the FC WiMAX internal architecture.
Note that the maximum capacity for each point is 625mA. If there is a higher current load, please use FC-DO16.



1.6. Parameter Setting

1.6.1. Summary

FC module device parameter settings can be roughly divided into the following two:

- (1) Parameter setting of communication port of FC device and host controller
- (2) Device parameter setting of FC module and host controller

The following sections will show you how to set the relevant parameters through the HMI provided by the host controller.

1.6.2. Communication port parameter setting

After the upper controller is powered on, you can enter the parameter setting page of the communication port via the following function keys as shown below:

8 key: 「Parameter setting」 → 「Next」 → 「Next」 → 「SRI parameter setting」

5 key: 「Parameter setting」 → 「Next」 → 「Next」 → 「Next」 → "SRI parameter setting"

CNC Monitor v10.116.38C

2017/11/21 17:02:13 N0 L1 ●Ready Auto Page Up Alarm

(1~10) Keyboard Off Keyboard Off Page Dr

COM No.	COM1	COM2	COM3
Serial Scan Time (μ)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Enable-Disable	Enable ▼	<input type="text"/>	<input type="text"/>
Protocol Type	RS485 ▼	<input type="text"/>	<input type="text"/>
Buad Rate	4.5 Mbps ▼	<input type="text"/>	<input type="text"/>
Control Mode	Hardware ▼	<input type="text"/>	<input type="text"/>
Scan Time (ms)	100	<input type="text"/>	<input type="text"/>
Timeout (ms)	10	<input type="text"/>	<input type="text"/>
Device Info.	Setting	Setting	Setting

<< Save Com Port >>

Relevant parameters of each port are described in detail in the following table:

Parameter content	Setting value	default value
Whether to enable	Close enabled	shut down
Protocol	RS485	RS485
Baud rate	2400 bps 4800 bps 9600 bps 14400 bps 19200 bps 28800 bps 38400 bps 57600 bps 115200 bps 1 Mbps 2 Mbps 3 Mbps	4 Mbps

Parameter content	Setting value	default value
	4 Mbps 4.5 Mbps 5 Mbps 10 Mbps	
Control mode	Software hardware mixing	Hardware
Scan time	0 ~ 10000 ms	10 ms
Communication timeout	0 ~ 10000 ms	10 ms

After editing, press "Save Setting", the following message will appear to remind the parameter setting has been written to the system parameters, the new settings will take effect after the power is off again.

CNC Monitor v10.116.38C

2017/11/21 17:03:05 N0 L1 ●Ready Auto Page Up Alarm

Keyboard On Keyboard Off Page Dr

COM No.	COM1	COM2	COM3
Serial Scan Time (μs)			
Enable-Disable			
Protocol Type			
Buad Rate			
Control Mode	Hardware		
Scan Time (ms)	100		
Timeout (ms)	10		
Device Info.	Setting	Setting	Setting

MessageBox

Ok

<< Ok >>

1.6.3. Running IO scanning operation instructions

1.6.3.1. I / O hardware scan function

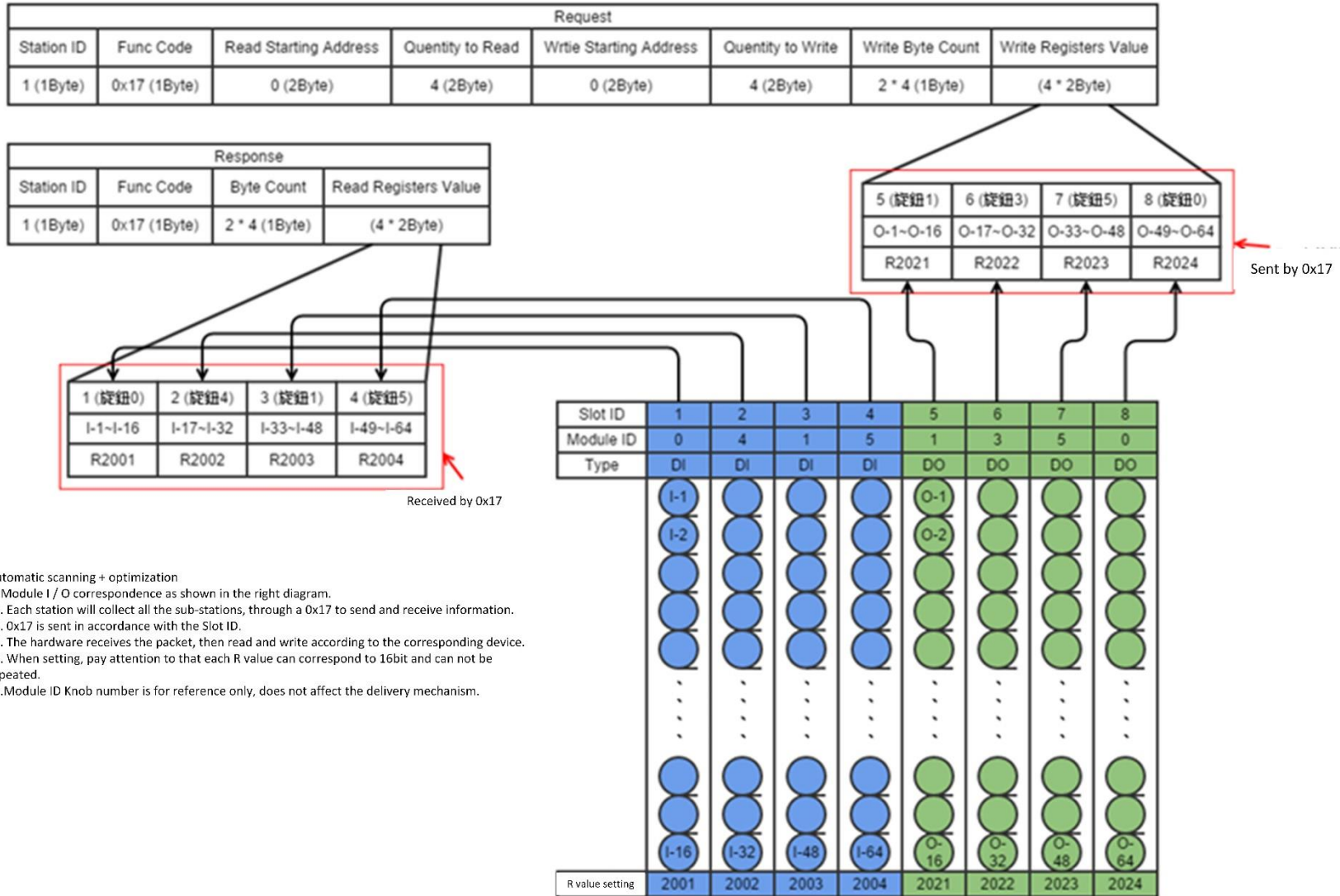
Device type

1. DI: 16 Ge Digital Input (accounting for 16 bit input)

2. DO: 16 Ge Digital Output (accounting for 16 bit output)

Each will now corresponds to a 16bit R value (set by the man-machine)

- **Mechanism to send and receive packets (in DI / DO as an example)**



Automatic scanning + optimization

1. Module I / O correspondence as shown in the right diagram.
2. Each station will collect all the sub-stations, through a 0x17 to send and receive information.
3. 0x17 is sent in accordance with the Slot ID.
4. The hardware receives the packet, then read and write according to the corresponding device.
5. When setting, pay attention to that each R value can correspond to 16bit and can not be repeated.
6. Module ID Knob number is for reference only, does not affect the delivery mechanism.

1.6.3.2. Scanning step (FIG above example)

1. Hardware set mode and initialization is successful, that is, into the hardware scan mode.
2. When the signal input via the external device DI, DI core will automatically change to the updated value R (eg: I-1 ~ I-16 corresponds to the R2001)
3. After changing the value of the output R of the core output will automatically change to the R value DO apparatus (e.g.: R2024 corresponds to the O-49 ~ O-64)
4. step (2 and 3) is updated once per scan time.

1.6.3.3. Device parameter information setting

From the parameter setting page of communication port , select "Device Parameter Information Setting" to set the module parameters of each device under each communication port. The following page is displayed, the left column shows the device station number and the right column shows The actual installation of the device module configuration and system parameter settings.



The left column device station number is illustrated as follows:

	normal	unknown	Different
Compare instructions	External device installation configuration content and the corresponding	Have detected an external device is mounted but without a	External device installation configuration content and the corresponding

	normal	unknown	Different
	parameters exactly the same	corresponding parameter setting	parameters are different
Illustration			

Note After using "Edit Device" or "Delete Device", you must execute "Save All Settings" to write the settings to the system parameters. The new settings will not take effect until the power is turned off again.

1.6.4. Editing device

Press "Edit Unit" to skip to the right column for editing. For newly detected external devices, refer to the following operations using "Auto Sync " and "Write to Staging Area " to read the information synchronized to the system parameter settings, and can be set freely read or write the initial R value, pay attention to this when writing system is only temporary staging area, then you must execute "Save all settings" will be set to write to system parameters .

G54 NO L1 參數設定 2014/10/24 09:34:55 未登入

裝置

站號1
站號2
站號3

安裝組態與參數設定

站號 2

實際安裝組態

編號	1
模組 ID	3
模組類型	C-AI-0

系統參數設定

編號	1
讀取起始 R	0
寫入起始 R	0
模組類型	C-AI-0

•就緒 自動執行 警報

<< 自動同步 寫入暫存區 韌體更新 >>

G54 NO L1 參數設定 2014/10/24 09:32:45 未登入

裝置

站號1
站號2
站號3

安裝組態與參數設定

站號 2

實際安裝組態

編號	1
模組 ID	3
模組類型	C-AI-0

系統參數設定

編號	
讀取起始 R	
寫入起始 R	
模組類型	

•就緒 自動執行 警報

<< 自動同步 寫入暫存區 韌體更新 >>

G54 NO L1 參數設定 2014/10/24 09:45:04 未登入

裝置

站號1
站號2
站號3

安裝組態與參數設定

站號 2

實際安裝組態

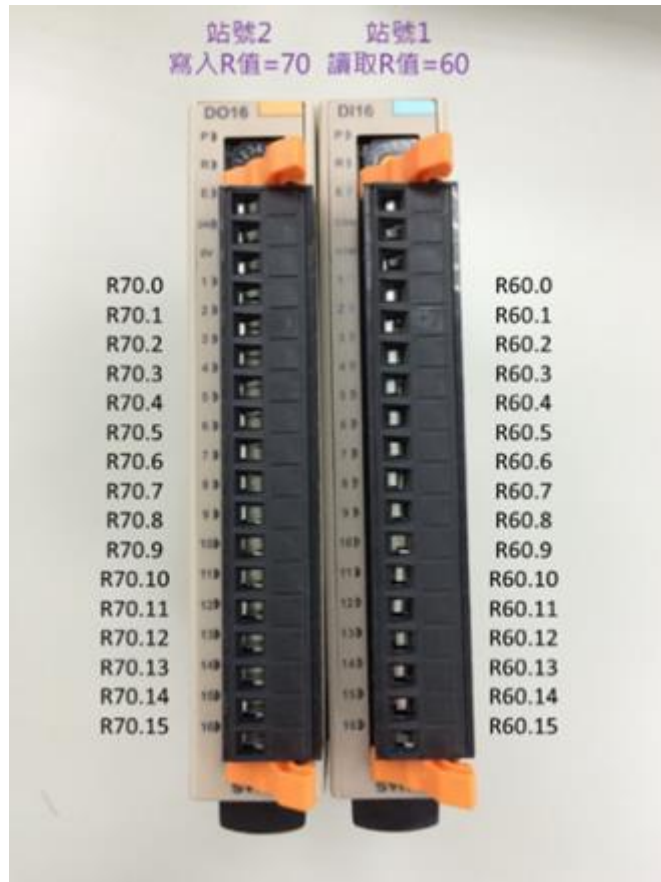
編號	1
讀取起始 R	0
寫入起始 R	0
模組類型	C-AI-0

寫入成功，請執行'儲存全部設定'以完成參數更新！

●就緒 自動執行 警報

<< 確定 >>

1.6.5. Example



1.6.6. R Occupied instructions

Device	Read the number of R values	Write the number of R values	Description			
DI-16	1	0	The filled R value 0 ~ 15bit corresponds to I0 ~ I15			
DO-16	0	1	The filled R value 0 ~ 15bit corresponds to O0 ~ O15			
Smart Laser	8	7	Read:			
			Modbus address	AD function	Valid output value	Actual volt range
			R value filled	AD1	-32767 ~ 32767	-10V ~ 10V
			R value filled in +1	AD2	-32767 ~ 32767	-10V ~ 10V
			R value filled +2	AD3	-32767 ~ 32767	-10V ~ 10V
			R value filled +3	AD4	-32767 ~ 32767	-10V ~ 10V
			R value filled +4	AD5	-32767 ~ 32767	-10V ~ 10V
			R value filled +5	AD6	-32767 ~ 32767	-10V ~ 10V

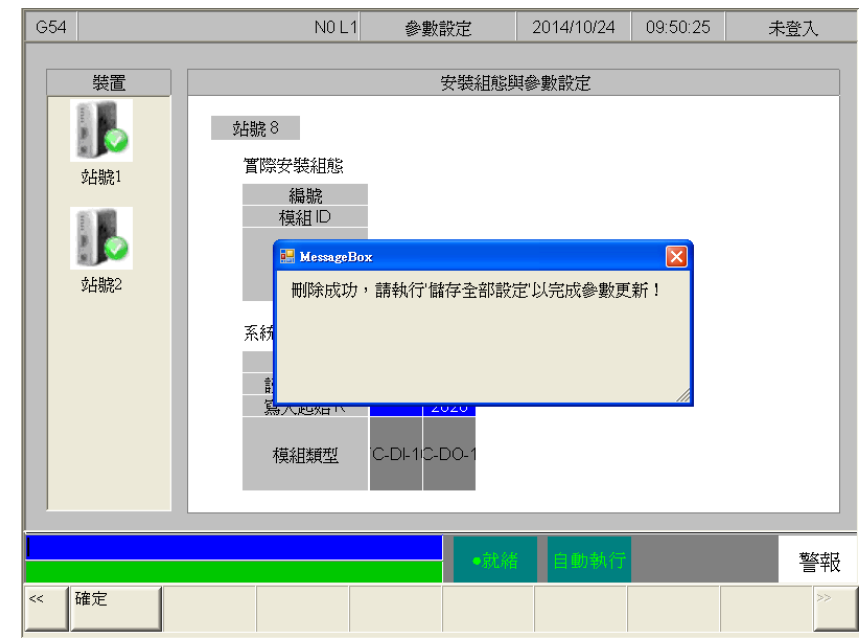
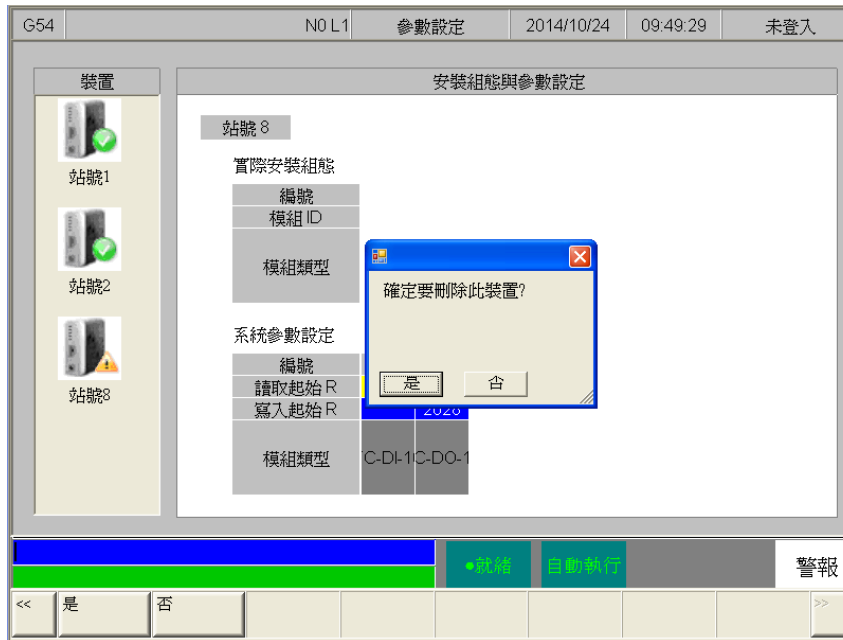
Device	Read the number of R values	Write the number of R values	Description				
			R value filled +6	AD7	-32767 ~ 32767	-10V ~ 10V	
			R value filled +7	AD8	-32767 ~ 32767	-10V ~ 10V	
			Write:				
			Modbus address	PWM function description	Valid inputrange	Default	Remarks
			R value filled	Base time (B): Unit ns	1 ~ 65535	1000	Frequency range 1 second / T * B: 1Hz ~ 333.33kHz Duty Cycle (t / T%): Valid Range 0 ~ 100% If t > T, it will show as 100%
			R value filled in +1	Pulse output period (T): The unit is base time	1 ~ 65535	1000	

Device	Read the number of R values	Write the number of R values	Description				
			R value filled +2	Pulse output width (t): The unit is base time	0 ~ 65535	0	
			Modbus address	DA function description	Valid input value	Actual volt range	
			R value filled +3	DA1	-2047 ~ 2047	-10V ~ 10V	
			R value filled +4	DA2	-2047 ~ 2047	-10V ~ 10V	
			R value filled +5	DA3	-2047 ~ 2047	-10V ~ 10V	
			R value filled +6	DA4	-2047 ~ 2047	-10V ~ 10V	
Laser Marking	4	0	Modbus address	AD function	Valid output value	Actual volt range	
			R value filled	AD1	-32767 ~ 32767	-10V ~ 10V	

Device	Read the number of R values	Write the number of R values	Description			
			R value filled in +1	AD2	-32767 ~ 32767	-10V ~ 10V
			R value filled +2	AD3	-32767 ~ 32767	-10V ~ 10V
			R value filled +3	AD4	-32767 ~ 32767	-10V ~ 10V
DI-32	2	0	The filled R value 0 ~ 15bit corresponds to I0 ~ I15 (filled R value +1) 0 ~ 15bit corresponds to I16 ~ I31			
DO-32	0	2	The filled R value 0 ~ 15bit corresponds to O0 ~ O15 (filled R value +1) 0 ~ 15bit corresponds to O16 ~ O31			

1.6.7. Remove the device

For installation configuration content corresponding parameter does not match the external device, if the number of external devices because the knob has changed, then you can refer to the following operations using the "Delete device " set this parameter to delete, attention must then execute "Save All Settings "will be set to write the system parameters.



1.6.8. Diagnostic function

The host controller to the FC module may monitor diagnostic information as shown in the following table

Display level	Diagnostic variables	Description	Possible problems / causes	May rule out the method
Port	The actual scan time	If this value is larger than the parameter setting value, increase the parameter setting value	Scanning time longer than expected An SRI-001 alert will be issued	Reduce the total number of modules Increase set scan time
FC module (station do not)	Protocol error flag	0: no error; 1: error	The controller sends out Function ID which each station module does not know, the module may stop working	Check the controller software version Check submodule software version
	Communication timeout flag	0: no error; 1: error	When the module communication times out, an SRI-002 alarm will be issued	Check the controller and module wiring is correct Check the module is normal
	CRC check error flag	0: no error; 1: error	Packets can not be correctly delivered to the module, SRI-003 alert will be issued if	Check if the wire is damaged

Display level	Diagnostic variables	Description	Possible problems / causes	May rule out the method
			the number of CRC errors is too high	Confirm street damage
	The number of characters received error flag	0: no error; 1: error	The length of the packet in the hardware mode does not match the expected one	Check the controller software version Check submodule software version
	Protocol error error code	0: no error; others: error code is displayed	This field shows the error code of the communication error	Check the controller software version Check submodule software version
	Miscommunication agreement number	The cumulative number of errors	When the communication has been wrong, the value will always be accumulated	
	Number of overtime communications	The cumulative number of errors	Communication has been over time , the	

Display level	Diagnostic variables	Description	Possible problems / causes	May rule out the method
			cumulative present value would have been	
	CRC check the number of errors	The cumulative number of errors	When the wire / connector is not stable, the value will always be accumulated	
	The number of characters to receive the wrong number of times	The cumulative number of errors	This value accumulates when the packet length does not match the expected value in hardware mode	
FC module (substation)	Status code (not implemented)	Bit 0 ~ 1: Error Type Bit 1 ~ 2: Error Level Bit 3 ~ 7: Error Count		

The operator can enter the diagnostic page view from the following function keys

8 keys: "Diagnostic Functions" → "SRI Status"

5 keys: "Next Page" → "Diagnostic Functions" → "Next Page" → "SRI Status"

2018/1/22	15:53:53	N0 L1	●Ready	Auto	Page Up	Alarm				
			Keyboard ON	Keyboard OFF	Page Dn					
COM 1 Real Scan Time (μs)										
Station No.	1	2	3	4	5	6	7	8	9	10
Error Flag	0	0	0	0	0	0	0	0	0	0
Timeout Flag	0	0	0	0	0	0	0	0	0	0
CRC Error Flag	0	0	0	0	0	0	0	0	0	0
Byte Error Flag	0	0	0	0	0	0	0	0	0	0
Error Code	0	0	0	0	0	0	0	0	0	0
Error Count	0	0	0	0	0	0	0	0	0	0
Timeout Count	0	0	0	0	0	0	0	0	0	0
CRC Error Count	0	0	0	0	0	0	0	0	0	0
Byte Error Count	0	0	0	0	0	0	0	0	0	0
<<	COM 1	COM 2	COM 3	Prev. Page	Next Page					>>

1.6.9. Power on automatic scanning

- **Steps**

1. The first boot (not yet set), first through the human-machine interface port parameters (please refer to the previous section of the parameter settings) set, and re-boot.
2. After rebooting, all FC hardware devices will be automatically scanned. Since there is no information in the profile for the first scan, the corresponding I / O register (R value) needs to be set and set by the HMI and restarted Boot.
3. After rebooting again, if there is no abnormality, the device can work normally.

- **Actual situation may be encountered when the instructions**

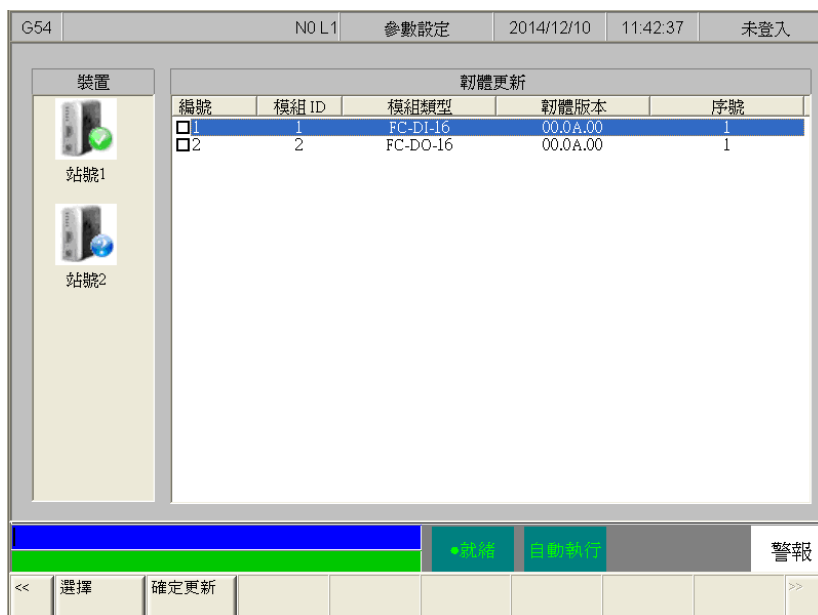
1. If the device does not conform to the parameter settings, the CNC may encounter errors when the actual device is more than the parameter settings because the core updates the IO according to the device content set by the parameters The newly added device will not be scanned correctly. In this case, go to the SRI setting screen and restart the device after the device is properly set up.
 - a. When the actual device is less than the parameter setting, some devices do not exist, so no message sent by the CNC core will be responded to, causing the core to send an SRI alarm to notify the user that the scanning time is too short or the SRI- 001, SRI-002 alarm). In this case, go to the SRI setting screen and turn on the device again after setting the device correctly.
 - b. The actual device and parameter settings do not match, may also cause a and b of the mixture occurred.
2. If a CRC confirmation failure alarm (SRI-003) is issued, check that the wires and connectors are tight and that the SRI-003 does not have any relation to the mechanism of turning on the auto-scan unit

1.7. Firmware update

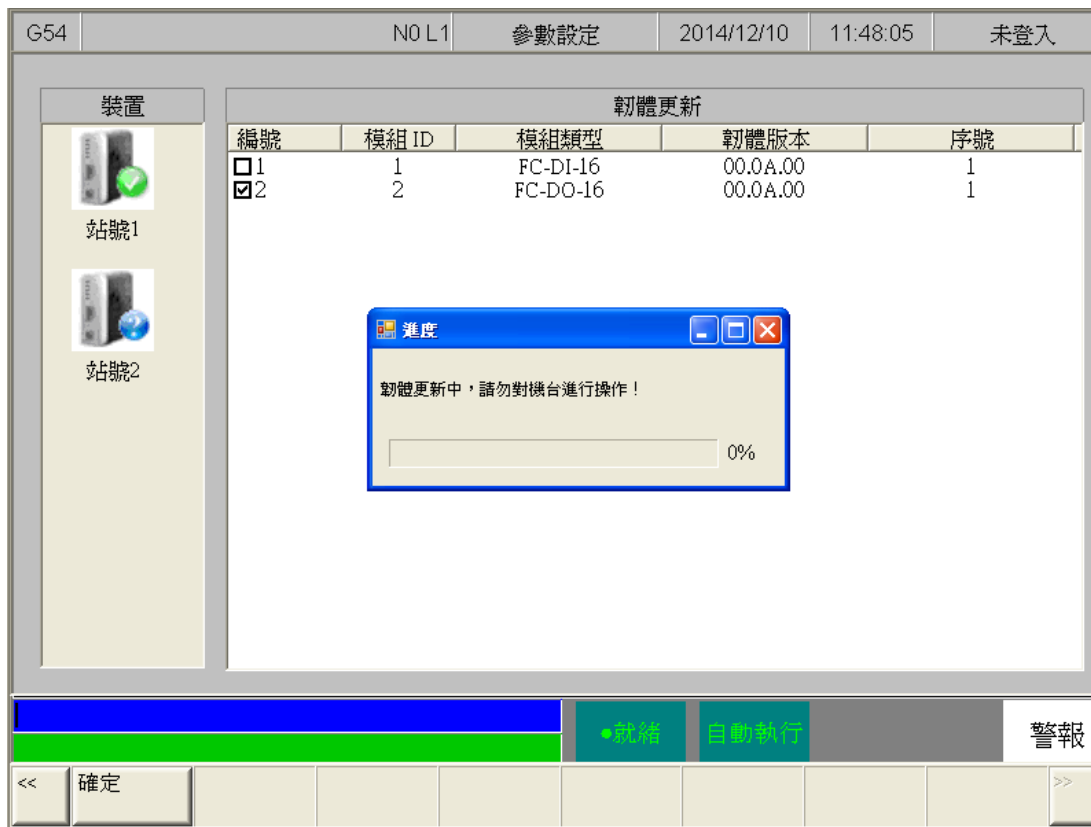
The operator can enter the firmware update page from the following function keys

8 key: 「Parameter setting」 → 「Next」 → 「Next」 → 「SRI parameter setting」 → 「Device parameter information setting」 → 「Editing device」 → 「Firmware update」

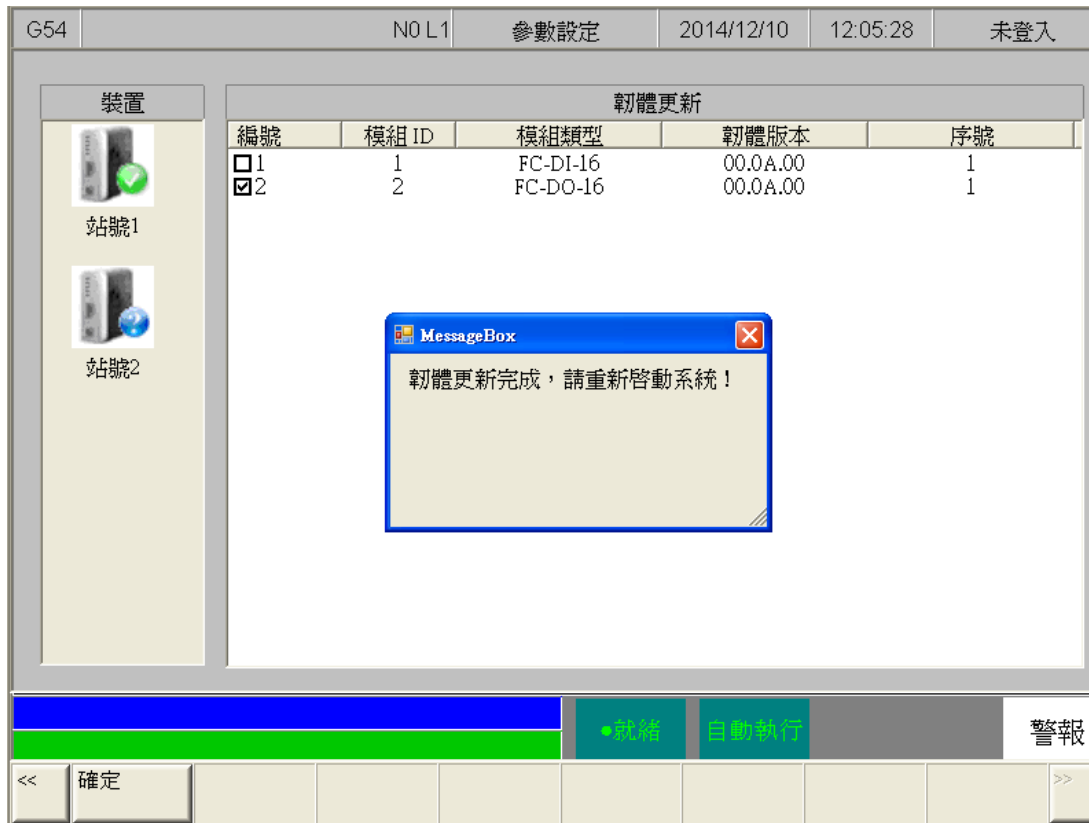
5 key: 「Parameter setting」 → 「Next」 → 「Next」 → 「Next」 → 「SRI Parameter Setting」 → 「Device Parameter Information Setting」 → 「Editing Device」 → 「Firmware Update」



First use up and down to move the cursor to the module you want to update, press "Select" can be checked or canceled, after the selection is completed press "OK" to start the update.



After the firmware is updated, the user should restart the FC device and the upper controller system according to the message.









Precautions:

1.
 - a. When updating the firmware of multiple modules at once, select the same type of module to avoid system operation error!
 - b. The system is completed before the firmware update, or the upper end Do not operate the device controller FC to avoid erroneous operation of the system !
 - c. After the firmware update is completed, follow the prompt message to restart the FC unit and the upper controller system to avoid system operation errors !

- d. For the same module, the firmware update is complete before restarting, do not repeat the update again to avoid system operation error !

1.8. Troubleshooting

When performing inspections, be aware of the following and may cause injury to personnel and equipment by mistake or inadvertent operation.

-  • Make sure that the surrounding environment is not exposed to corrosive substances (such as chlorides and sulfide gases) and flammable substances (such as oil mist and cutting dust) or dust deposits, to avoid FC module failure or fire.
-  • Do not touch the terminals to avoid terminal oxidation or electric shock.
-  • Please turn off the external power before removing or replacing the terminal or screw to avoid electric shock.
-  • It is forbidden to exert gravity on the cable, pull or clamp it with force, avoid damaging the cable or releasing the terminal and touching the terminal.
-  • Make sure the input voltage is within the rated range.
-  • Do not disassemble or modify the FC module or repair it yourself. Failure to do so may result in product failure, fire or personal injury.
 - Before touching the module, touch the grounding metal or wear an antistatic wrist strap to release the static electricity from the human body to avoid damaging the module.
 - When using a mobile phone or communication device, keep proper distance so as to avoid interference with the system and malfunction.
 - Avoid installing the FC module in direct sunlight or humid environment.
 - Make sure that the FC module is at a proper distance from the heat sources such as the coil, heater, resistor and so on to avoid overheating of the components.
 - Set the emergency power-off system and over-current protection device according to the actual needs to protect the FC module.
 - Repeatedly inserting and removing a module may result in poor contact with the internal communication slot between the module and the module.

- During operation and maintenance, confirm the stability of the installation and avoid any damage to the FC module caused by unexpected vibration.

1.8.1. Basic Inspect

This chapter describes the various types of faults that can occur while the system is operating, as well as the causes and remedies for these faults. Troubleshooting must first identify the cause of the malfunction. Before judging the cause of the malfunction, please confirm the following items.

Check the following items:

- FC module system must be operated under normal conditions (including environmental, electrical, mechanical vibration ... and other conditions).
- The power of the device is properly connected, and the power input to the FC module system is normally on (the power indicator on the module is yellow) .
- All modules, terminals, slide rails and cables are properly installed .
- Each module's display light is normal. (P power indicator, R operation indicator, DO module 24V indicator, DI / DO module signal indicator)

In order to maintain the normal operation of the FC module, follow the basic checklist below after confirming that the surrounding environment and the FC module meet the above precautions. If any abnormality occurs, follow the instructions in Chapter 5, "Troubleshooting," and proceed immediately .

No.	Check item	an examination	Judgment criteria	Processing method
1	Visual inspection	Visual inspection	Whether there is dirty, water stains and so on.	Remove dust and dirt

No.	Check item		an examination	Judgment criteria	Processing method
2	The installation of each module		<ol style="list-style-type: none"> 1. Check the module and the slide is loose 2. Check the module is loose 3. Check each module below the seizure of seizure 	Module must be installed securely	<ol style="list-style-type: none"> 1. Reinstall the module to the rail. 2. Install the module properly. 3. The upper and lower fasteners have been buckled to the correct position 4. Plectrum inward seizure
3	Terminal connection		<ol style="list-style-type: none"> 1. Check the power terminals for looseness 2. Check SRI D-Sub communication cable for looseness 3. Check the external communication European rules terminals are loose 4. Check if the internal communication slot is loose 5. Check if the input / output terminals are loose 	All kinds of terminals can not be loose	Connect all kinds of terminals properly
	Power module	PWR light	Check whether PWR light is on green light	PWR light must be bright green	

No.	Check item		an examination	Judgment criteria	Processing method
4	Digital input / digital output Function module	(P) Power light	Check whether P light is bright yellow light	(P) light must be yellow light	Troubleshooting See Chapter 5 - Troubleshooting Procedures
		(R) operation indicator	Check if the R light is lit green	(R) light must be green light	
		(E) Abnormal indicator	Check if the E lamp is lit red	(E) light can not be red light	
		Communication indicator	Check each digital I / O channel for a green light	When there are digital I / O signals, it needs to light green	
	Digital output function module	24V indicator	Check if the 24V indicator is lit green	When the power is on, it lights 24V (green)	

1.8.2. FC power module communication troubleshooting:

error code	Description	Processing method
E20001	The controller side can not fetch FC module information	<ol style="list-style-type: none">1. Check the power indicator is normal. For details, refer to Chapter 3 - Power Module Wiring2. Check the power connector is correct. For more affection See Chapter 3 - Power module wiring3. Check if the SRI D-Sub communication cable is normal.4. Check the external communication European rules terminal wiring is correct . For more affection See Chapter 3 - Power module wiring5. Check whether the module is assembled correctly. For details, see Chapter 3 - Assembly6. Check if the right internal communication connector is properly connected. For details, see Chapter 3 - Assembly7. Check the rotary dial switch is set correctly. For details, see Chapter 3 - Assembly8. Reboot test

1.8.3. FC digital input module communication troubleshooting:

error code	Description	Processing method
E30001	The controller can not capture digital input module information	<ol style="list-style-type: none"> 1. Check the power indicator is normal. For details, see Chapter 3 - Assembly 2. Check whether the module and the left and right modules are correctly assembled. For details, see Chapter 3 - Assembly 3. Check if the rotary dial switch is set correctly. For details, see Chapter 3 - Assembly 4. Reboot test
E30002	(P) Power light is off	<ol style="list-style-type: none"> 1. Check that the left internal communication slot is correctly installed with the left FC module. For details, seeChapter 3 - Assembly 2. Reboot test
E30003	(R) operation indicator does not light	<ol style="list-style-type: none"> 1. Check that the left internal communication slot is correctly installed with the left FC module. For details, see Chapter 3 - Assembly 2. Reboot test
E30004	(E) Abnormal indicator light is steady	<ol style="list-style-type: none"> 1. Check that the left internal communication slot is correctly installed with the left FC module. For details, see Chapter 3 - Assembly 2. Check the operation indicator light is on .

error code	Description	Processing method
		3. Reboot the test
E30005	Can not capture digital input signal	<ol style="list-style-type: none"> 1. Check that the left internal communication slot is correctly installed with the left FC module. For details, see Chapter 3 - Assembly 2. Check if the SRI D-Sub communication cable is normal. 3. Check the signal light is correct. 4. Check whether the signal connection terminal is installed correctly. 5. Check the signal is sent normally output. 6. Reboot test

1.8.4. FC digital output module communication troubleshooting:

error code	Description	Processing method
E40001	The controller can not capture the digital output module information	<ol style="list-style-type: none"> 1. Check the power indicator is normal. For details, see Chapter 3 - Assembly 2. Check that the left internal communication slot is correctly installed with the left FC module. For details, see Chapter 3 - Assembly

error code	Description	Processing method
		3. Check if the rotary dial switch is set correctly. For details, see Chapter 3 - Assembly 4. Reboot test
E40002	(P) Power light is off	1. Check that the left internal communication slot is correctly installed with the left FC module. For details, see Chapter 3 - Assembly 2. Reboot test
E40003	(R) operation indicator does not light	1. Check that the left internal communication slot is correctly installed with the left FC module. For details, see Chapter 3 - Assembly 2. Reboot test
E40004	(E) Abnormal indicator light is steady	1. Check that the left internal communication slot is correctly installed with the left FC module. For details, see Chapter 3 - Assembly 2. Check the operation indicator light is on . 3. Reboot the test
E40005	Can not output digital input signal	1. Check that the left internal communication slot is correctly installed with the left FC module. For details, see Chapter 3 - Assembly 2. Check if the SRI D-Sub communication cable is normal. 2. Check the signal light is correct. 3. Check whether the signal connection terminal is installed correctly.

error code	Description	Processing method
		4. Check the signal is sent normally output. 5. Reboot the test

1.8.5. FC-IO Module Communication Error Check - SRI

Alarm ID	SRI-001	Alarm title	[Scan time set too short]
Description	This alarm is issued when the actual scan time of the controller exceeds the set scan time.		
Possible Causes	System performance is not enough, too many scanning points and the set scan time is too short.		
Method of exclusion	Increase the scan time.		
Alarm ID	SRI-002	Alarm title	【Time out of communication】
Description	This alarm is issued when the unit does not respond.		
Possible Causes	Hardware wiring error or device problem.		
Method of exclusion	Check the hardware is set and connected properly.		

Alarm ID	SRI-003	Alarm title	[CRC error count too much]
Description	This alarm is issued when a CRC error exceeds a certain number of times.		
Possible Causes	The hardware is not properly connected or the cable is defective		
Method of exclusion	Check if the hardware is properly set and connected, especially for wire.		
Alarm ID	SRI-004	Alarm title	【Module has been changed, please check device settings】
Description	This alarm is issued when there is any difference between the parameter setting and the actual installation configuration .		
Possible Causes	External device station number or module order has changed.		
Method of exclusion	Please reset the system parameters .		
Alarm ID	SRI-005	Alarm title	Failed firmware update
Description	An error occurred while updating the firmware.		
Possible Causes	<ol style="list-style-type: none"> 1. There was an error in the communication during the update. 2. The module power supply is abnormal during the update process. 3. The FC-IO module is faulty. 		
Method of exclusion	<ol style="list-style-type: none"> 1. Check if the hardware is properly set up and connected, especially the wire, and restart the firmware update. 2. Check the module power supply is normal , and re-firmware update. 3. If the firmware update continues to fail, please contact the original factory to find a solution. 		

Alarm ID	SRI-005	Alarm title	Failed firmware update
Alarm ID	SRI-006	Alarm title	【Module in the boot loader (Boot loader), need to re-burn the firmware before normal use】
Description	When the module is detected in boot mode during power-on, this alarm will be issued.		
Possible Causes	Firmware has failed to update, causing the module to stay in burn mode.		
Method of exclusion	Please reinstall the firmware.		
Alarm ID	SRI-007	Alarm title	【Module Communication Abnormal】
Description	When the module communication error code, will issue this alarm.		
Possible Causes	The module can not communicate normally.		
Method of exclusion	<ol style="list-style-type: none"> 1. Turn off after power off. 2. Update the firmware version. 3. Operation period of time to jump this alarm, it may be noise interference, please check the surrounding interference sources, equipment , wire anti-interference treatment is indeed. 		
Alarm ID	SRI-008	Alarm title	Module Initialization Failure
Description	This alarm is issued when the module fails to initialize.		
Possible Causes	The module HW-ID interpretation is wrong.		
Method of exclusion	Return to the original maintenance.		

Alarm ID	SRI-009	Alarm title	【Firmware updated successfully, reboot effective】
Description	After the firmware update is successful, the alarm prompts, you need to reboot.		
Possible Causes			
Method of exclusion	Controller reboots.		