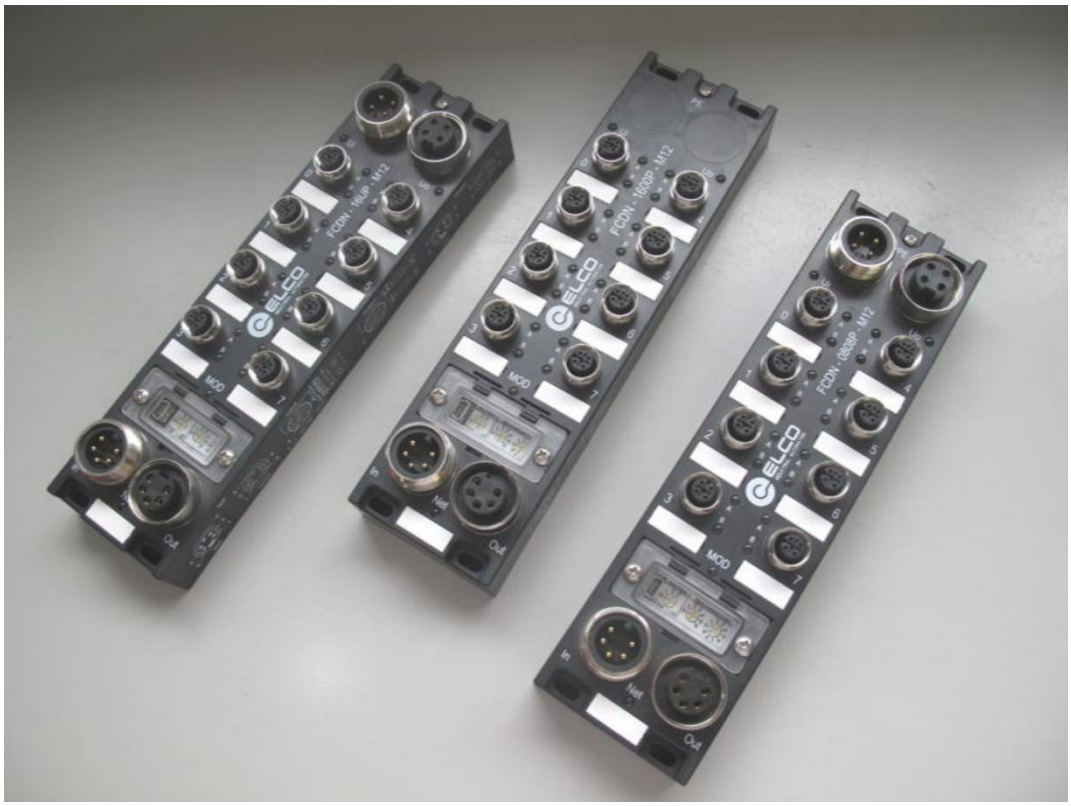
Compact67 I/O Module

----Devicenet Manual



DeviceNet™

1. Scope of application of this manual:

It's for ELCO Compact67 distributed I/O device with Devicenet protocol.

From the information in the manual, you can operate the Compact67 module on the Devicenet bus as a distributed I/O device connection controller (PLC, DCS, etc.).

2. Basic knowledge required:

This manual assumes that you have a basic knowledge of electrical and automation engineering. This manual describes each component based on valid data at the time of release. New components and parameter adjustments are updated in the new manual.

3. Guide:

This manual describes the hardware and use of the Compact67 distributed I/O device under the Devicenet protocol. Coverage includes:

- Installation and wiring
- Debugging and diagnosis
- Components
- Ordering data
- Technical parameters

4. Technical support:

This manual describes the product features and usage of the Compact67 distributed I/O device as fully as possible. If you have any questions or other questions about this product, please contact your local ELCO office or call the service hotline at 400-608-4005. You can also find more automation products on the ELCO website:

https://www.elcoautomation.com/en-us/

5. Liability exemption:

We have checked the consistency of the content and hardware and software described in the manual. However, the possibility of deviation is not excluded, and the content cannot be guaranteed to be completely consistent with the hardware and software. The data parameters have been tested as required, and the necessary modifications will be improved in the new version.

1. Product Overview

1.1 Definition

The Compact67 distributed I/O device is a compact Devicenet device with IP67 protection.

1.2 Product Introduction

The standard Compact67 bus I/O provides a reliable, trusted solution for connecting field controllers and fieldbus I/O systems in harsh field environments.
The Compact67 module based on a 60mm wide IP67 enclosure allows for standardized installation and safe and reliable operation in harsh working environments where water,

dust and vibration can occur. These features make them suitable for a wide range of

applications, such as material handling systems, automated assembly systems, and more. Other features include support for multiple signal inputs and outputs, and embedded
high-brightness LED diagnostics to help maintainers easily determine I/O, module and network status.

1.3 Features

- Compact design saves space for installation of mechanical equipment
- Fast and reliable connector connection, MiniChange (7/8”), MicroChange (M12)
- Support multiple input and output of signals
- Configurable I/O combination
- LED status indication
- Online diagnosis of modules and channels

1.4 Product Model List

No.	Model	Description
1	FCDN-1600P-M12	16-point PNP input or passive contact Short circuit protection, diagnosis
2	FCDN-0808P-M12	8-point PNP input or passive contact 8-point active output Short circuit protection, diagnosis
3	FCDN-16UP-M12	16-point PNP input and output, configurable Short circuit protection, diagnosis

2. Technical Parameters

2.1 Hardware parameter

FCDN-1600P-M12

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67 DeviceNet	**OPERATING MODES**	Polling, change of state, cyclic
DESCRIPTION	16 input PNP, 8 x M12	**TRANSFER RATE**	125, 250, 500 kbps
PROTOCOL	DeviceNet	**ADDRESS SETTINGS**	0 … 63, rotary switch

ELECTRICAL DATA

SUPPLY VOLTAGE	24 V DC (18 … 30 V DC)	**INPUT CHANNELS**	16
MODULE CONSUMPTION CURRENT	Max. 200 mA	**INPUT SUPPLY CURRENT**	Max. 200 mA per channel
OUTPUT SUPPLY CU RRENT	Total max. 8 A	**INPUT SIGNAL TYPE**	PNP sensor, stroke switch, dry contact, etc.
ELECTRICAL ISOLATION	Module / Ui and Uo voltage isolation	**INPUT DELAY**	2.5 ms
POWER SUPPLY	2 x 7/8'' 5pin, Male + Female	**OUTPUT CHANNELS**	8-
BUS COMMUNICATION	2 x 7/8'' 5pin, Male + Female	**OUTPUT RATED CURRENT**	Max. 2 A per channel, total max. 8 A
SIGNAL CONNECTION	8 x M12 A-code 4pin, Female	**OUTPUT SIG NAL TYPE**	Indicator, miniature sole-noid valve, etc.
COMMUNICATION INDICA-TION	LED indication, communication message	**OUTPUT FREQUENCY**	Resistive load 100 Hz, Inductive load 5 Hz
VOLTAGE DETECTION	Support, low voltage alarm	**PROCESS DATA IN**	2 bytes
SHORT-CIRCUIT & OVERLOAD	Support, LED indication	**PROCESS DATA OUT**	0 bytes
COMMUNICATION INDICA-TOR	Green LED		
POWER INDICATOR	Green LED		
IO STATUS INDICATOR	Green LED		

FUNCTIONAL SAFETY

MTTF (40 °C)	59a

GENERAL DATA

MOUNTING METHOD	4-hole screw mounting	**OPERATING TEMPERATURE**	-25 ... +70 °C
PROTECTION CLASS	IP67	**STORAGE TEMPERATURE**	-40 ... +85 °C
WEIGHT	483 g	**DIMENSIONS**	60 x 220 x 39 mm

APPROVALS

CE

FCDN-16UP-M12

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67 DeviceNet	**OPERATING MODES**	Polling, change of state, cyclic
DESCRIPTION	16 configurable input / output, PNP, 8 x M12	**TRANSFER RATE**	125, 250, 500 kbps
PROTOCOL	DeviceNet	**ADDRESS SETTINGS**	0 … 63, rotary switch

ELECTRICAL DATA

SUPPLY VOLTAGE	24 V DC (18 … 30 V DC)	**INPUT CHANNELS**	Max.16
MODULE CONSUMPTION CURRENT	Max. 200 mA	**INPUT SUPPLY CURRENT**	Max. 200 mA per channel
OUTPUT SUPPLY CU RRENT	Total max. 8 A	**INPUT SIGNAL TYPE**	PNP sensor, stroke switch, dry contact, etc.
ELECTRICAL ISOLATION	Module / Ui and Uo voltage isolation	**INPUT DELAY**	2.5 ms
POWER SUPPLY	2 x 7/8'' 5pin, Male + Female	**OUTPUT CHANNELS**	Max.16
BUS COMMUNICATION	2 x 7/8‘‘ 5pin, Male + Female	**OUTPUT RATED CURRENT**	Max. 2 A per channel, total max. 8 A
SIGNAL CONNECTION	8 x M12 A-code 4pin, Female	**OUTPUT SIG NAL TYPE**	Indicator, miniature sole-noid valve, etc.
COMMUNICATION INDICA-TION	LED indication, communication message	**OUTPUT FREQUENCY**	Resistive load 100 Hz, Inductive load 5 Hz
VOLTAGE DETECTION	Support, low voltage alarm	**PROCESS DATA IN**	2 bytes
SHORT-CIRCUIT & OVERLOAD	Support, LED indication	**PROCESS DATA OUT**	2 bytes
COMMUNICATION INDICA-TOR	Green LED		
POWER INDICATOR	Green LED		
IO STATUS INDICATOR	Green LED		

FUNCTIONAL SAFETY

MTTF (40 °C)	55a

GENERAL DATA

MOUNTING METHOD	4-hole screw mounting	**OPERATING TEMPERATURE**	-25 ... +70 °C
PROTECTION CLASS	IP67	**STORAGE TEMPERATURE**	-40 ... +85 °C
WEIGHT	483 g	**DIMENSIONS**	60 x 220 x 39 mm

APPROVALS

CE

FCDN-0808P-M12

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67 DeviceNet	**OPERATING MODES**	Polling, change of state, cyclic
DESCRIPTION	8 input + 8 output PNP, 8 x M12	**TRANSFER RATE**	125, 250, 500 kbps
PROTOCOL	DeviceNet	**ADDRESS SETTINGS**	0 … 63, rotary switch

ELECTRICAL DATA

SUPPLY VOLTAGE	24 V DC (18 … 30 V DC)	**INPUT CHANNELS**	8
MODULE CONSUMPTION CURRENT	Max. 200 mA	**INPUT SUPPLY CURRENT**	Max. 200 mA per channel
OUTPUT SUPPLY CU RRENT	Total max. 8 A	**INPUT SIGNAL TYPE**	PNP sensor, stroke switch, dry contact, etc.
ELECTRICAL ISOLATION	Module / Ui and Uo voltage isolation	**INPUT DELAY**	2.5 ms
POWER SUPPLY	2 x 7/8'' 5pin, Male + Female	**OUTPUT CHANNELS**	8
BUS COMMUNICATION	2 x 7/8‘‘ 5pin, Male + Female	**OUTPUT RATED CURRENT**	Max. 2 A per channel, total max. 8 A
SIGNAL CONNECTION	8 x M12 A-code 4pin, Female	**OUTPUT SIG NAL TYPE**	Indicator, miniature sole-noid valve, etc.
COMMUNICATION INDICA-TION	LED indication, communication message	**OUTPUT FREQUENCY**	Resistive load 100 Hz, Inductive load 5 Hz
VOLTAGE DETECTION	Support, low voltage alarm	**PROCESS DATA IN**	1 bytes
SHORT-CIRCUIT & OVERLOAD	Support, LED indication	**PROCESS DATA OUT**	1 bytes
COMMUNICATION INDICA-TOR	Green LED		
POWER INDICATOR	Green LED		
IO STATUS INDICATOR	Green LED		

FUNCTIONAL SAFETY

MTTF (40 °C)	57a

GENERAL DATA

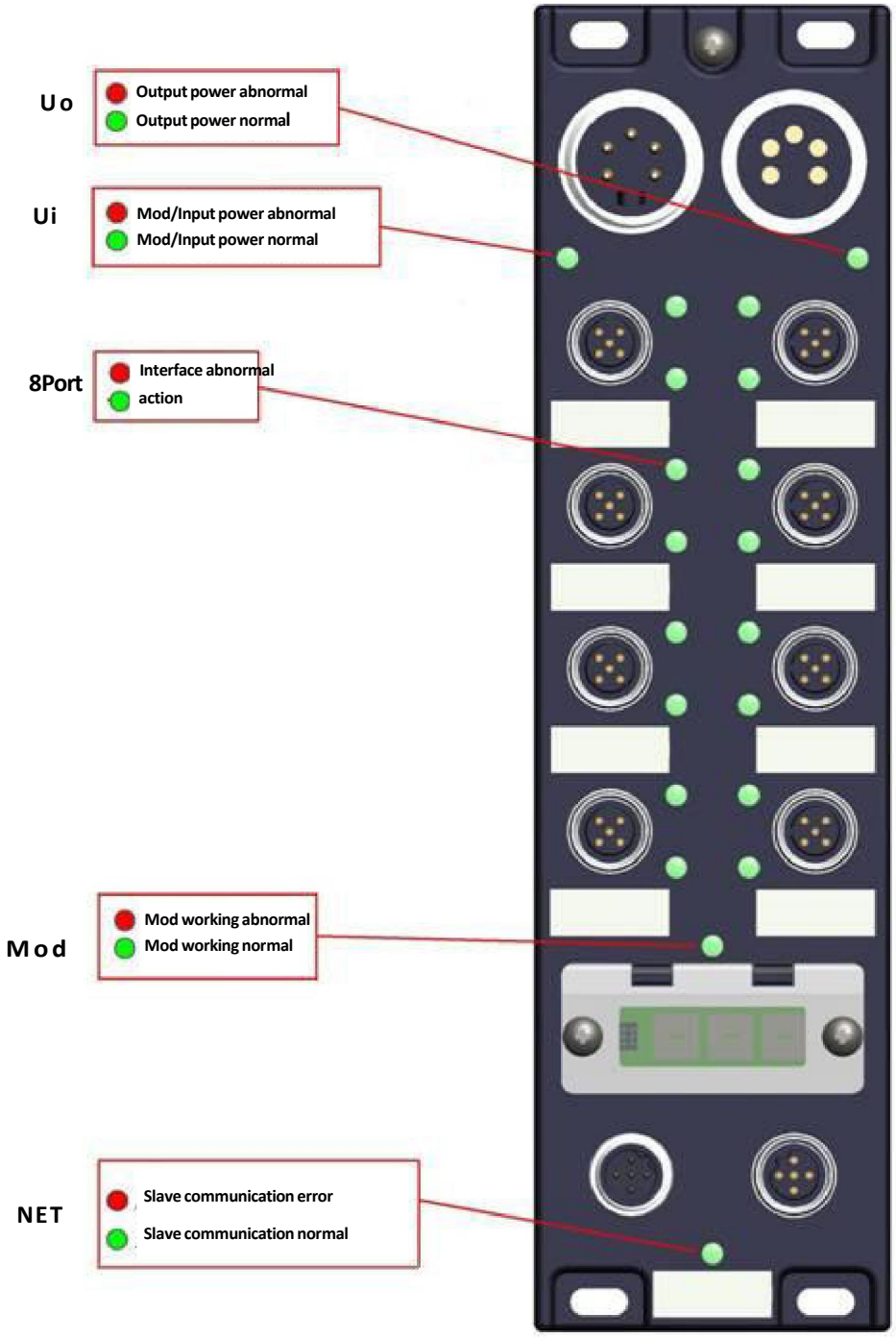
MOUNTING METHOD	4-hole screw mounting	**OPERATING TEMPERATURE**	-25 ... +70 °C
PROTECTION CLASS	IP67	**STORAGE TEMPERATURE**	-40 ... +85 °C
WEIGHT	483 g	**DIMENSIONS**	60 x 220 x 39 mm

APPROVALS

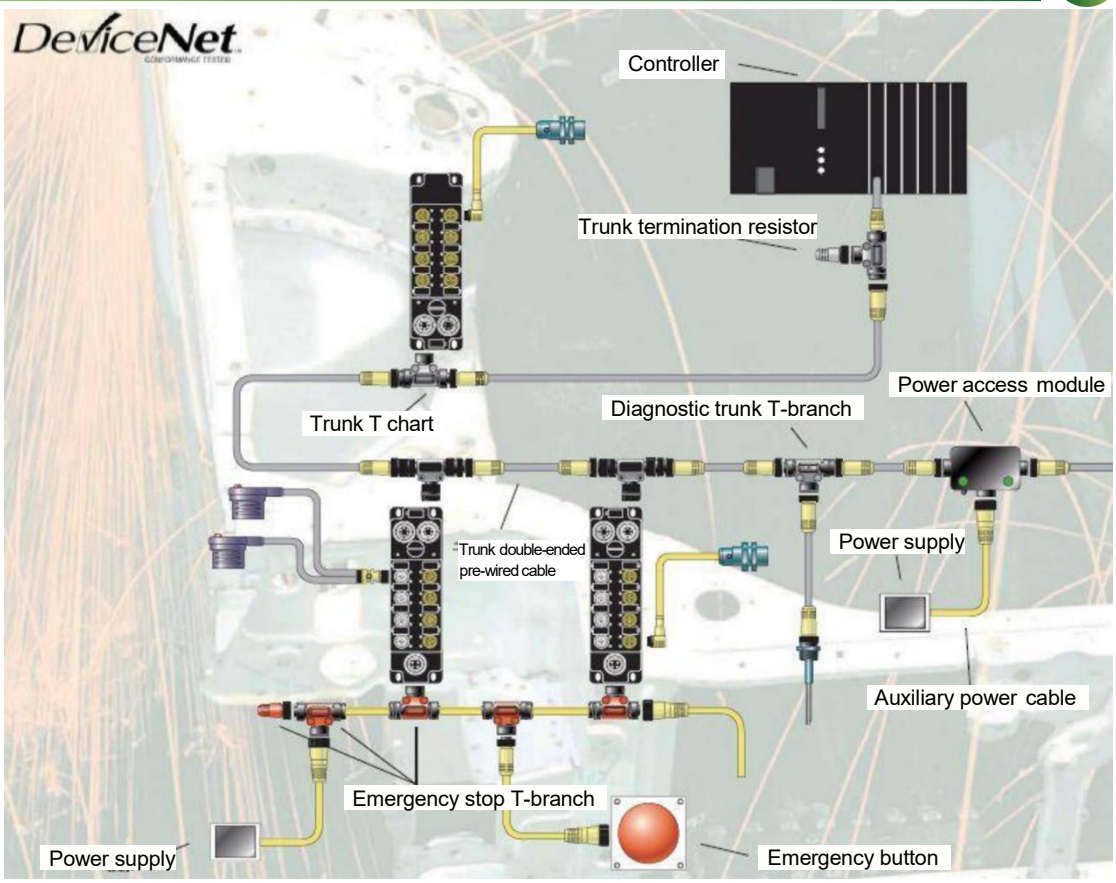
CE

2.2 LED Indication Function

The operating status of the module can be indicated by the indicator that comes with the module.

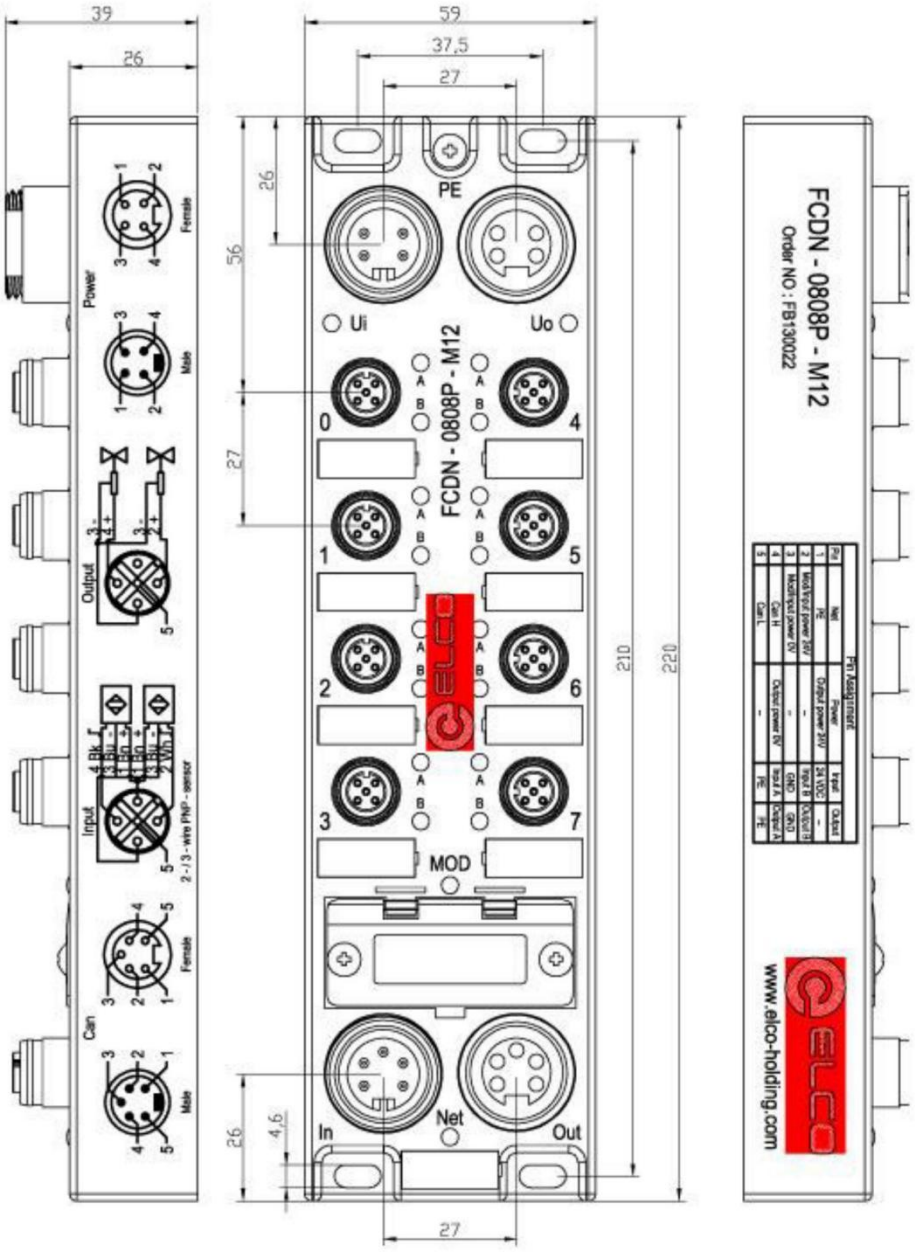


2.3 Conventional System Layout


DeviceNet
Controller
Trunk termination resistor
Power access module
Trunk T chart
Diagnostic trunk T-branch
Trunk double-ended
pre-wired cable
Power supply
Auxiliary power cable
Emergency stop T-branch
Power supply
Emergency button

3. Installation wiring

3.1 Installation dimension drawing



3.2 Installation position and dimension

Thanks to the high degree of protection of IP67 and excellent resistance to vibration and interference, the Compact67 can be installed in almost any position.

The Compact67 module has a uniform dimensions and the table below shows the module's mounting dimensions:

	Size
Mounting width	60mm
Installation height	220mm
Installation depth	39mm (No connector)

3.3 Set the Devicenet address and communication rate

The Devicenet address specifies the address of the Compact67 distributed I/O device of the Devicenet slave station on the network. It needs to open the plastic protective cover of the DIP switch to set the Devicenet address of the Compact67. To adjust the Devicenet address of the module, pay attention to the following points:

1) The address setting is determined by the rotary code and needs to be powered off.

2) The slave address located in the same Devicenet network is unique and cannot be repeated

3) The dialing address of the module must be the same as the setting address of the module in the configuration tool.

4) Address setting range: 1-63

5) The module will accept the changed Devicenet address only when the module is powered on.

There are a total of three rotary switches on the front of the module. The left sets the communication rate, and the right two sets the slave address, corresponding to the rotation value ×10, ×1, indicating the current value by the arrow indication.

For example, the Devicenet rate is automatically detected, and the address is set to 24 as shown below:

3.4 Compact67 wiring guide

Please connect according to the basic electrical specifications. For personal and equipment safety, we recommend disconnecting the power supply during the wiring operation.

3.4.1 Compact67 Protective grounding (PE)

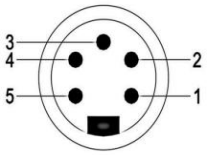
· A grounding screw PE is provided on the upper part of each module.

- Connecting the module to a protective ground can release the interference current to the ground and ensure module safety and EMC compatibility.
- Be sure to ensure a low impedance connection to the protective ground

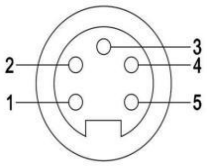
3.4.2 Compact67 Bus/power connection

All Compact67 modules are powered by standard 24VDC power supply with an input voltage range of 18~30VDC and are connected using standard 7/8" connectors.

1) Bus/Power access connector view (Male)



2) Bus/Power outlet connector view (Female)

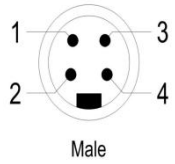


3) Bus/Power interface definition

Interface terminal number	Interface function	Voltage
1	Protected ground PE	-
2	Module and input signal power 1L+	24V
3	Module and input signal power 1M	0V
4	CAN H	-
5	CAN L	-

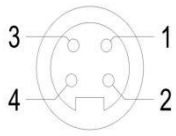
3.4.3 Compact67 bus cable connection

1) Auxiliary power access connector view (Male)



Male

2) Auxiliary power access connector view (Female)



Female

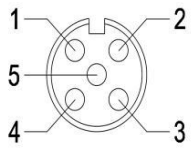
3) Auxiliary power interface definition

Interface terminal number	Interface function	Voltage
1	Output signal power 2L+	24V
2	-	-
3	-	-
4	Output signal power supply 2M	0V
5	-	-

3.4.4 Compact67 I/O cable connection

All Compact67 module I/O signals are connected via a standard 5-pin M12 connector with up to two signals (input or output) per port.

1) Signal Receiver I/O Connector View (Female)

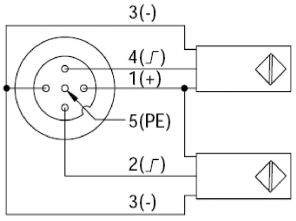


2) Bus interface definition

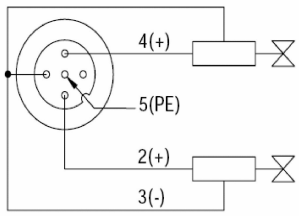
Interface terminal No.	Interface function	Remarks
1	Signal power supply 24V+	
2	Signal input B	Second signal
3	Signal power supply GND	
4	Signal input A	First signal
5	Shield grounding PE	

3) Wiring example

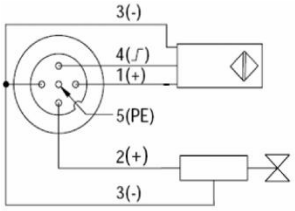
a) Dual input signal - that is, one connector is connected to two digital input signals. FCDN-1600P-M12、FCDN-0808P-M12、FCDN-16UP-M12 support this type of connection.



b) Dual output signal - that is, 1 connector is connected to 2 digital output signals，
FCDN-0808P-M12、FCDN-16UP-M12 support this form of connection.



c) Input and output signals - 1 connector for 1 digital input plus 1 digital output signal, FCDN-16UP-M12 supports this form of connection.



4. Configuration Commissioning

4.1 Module EDS files

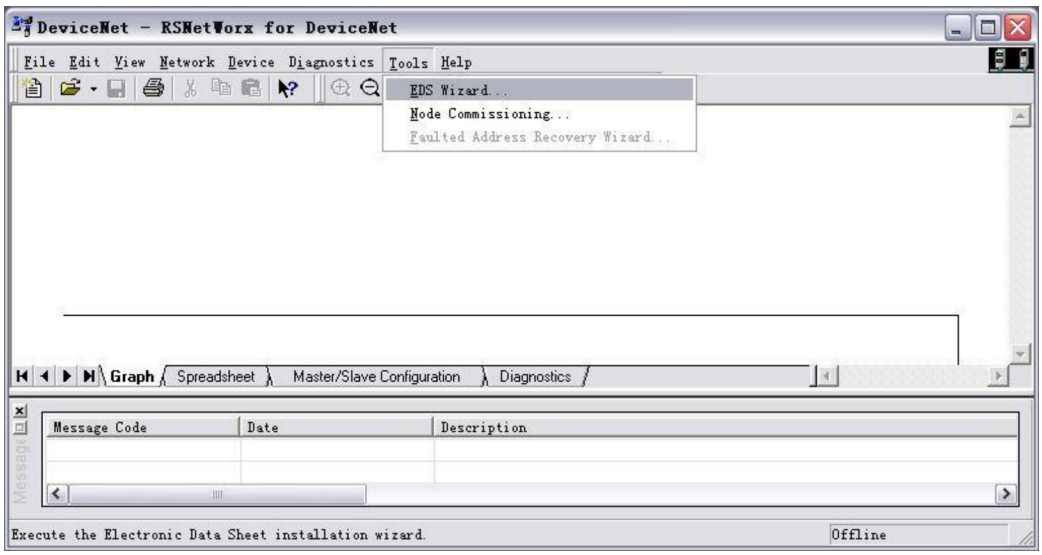
Using EDS files to configurate or scan Compact67 distributed I/O, EDS files are used to integrate Compact67 as a standard slave station into your system.

You can visit ELCO's website to get the latest EDS files or call the customer service hotline to contact technicians.

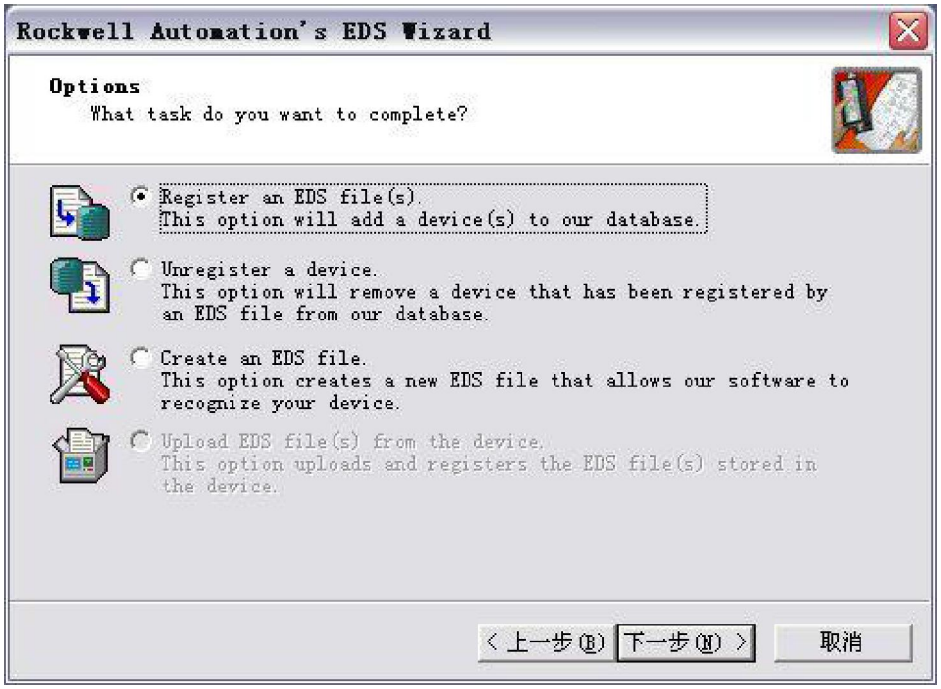
Integrating EDS files into the system depends on the configuration software you use. In general, RSNetWorx programming software of AB company used in

Devicenet system integrates EDS files according to the following steps:

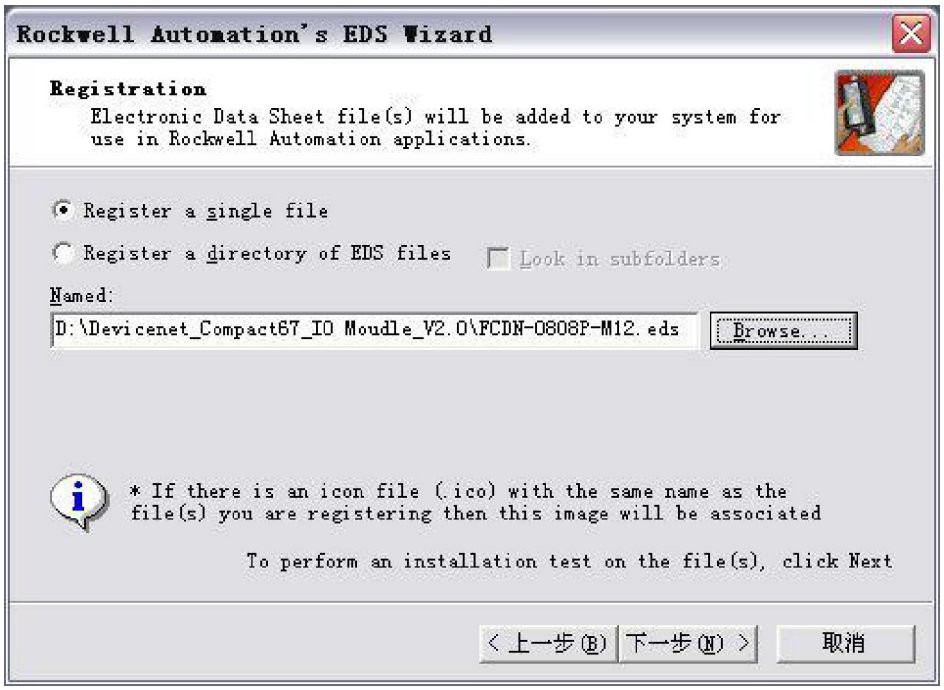
1) Run RSNetWorx and select "Tools > EDS Wizard" in the interface.



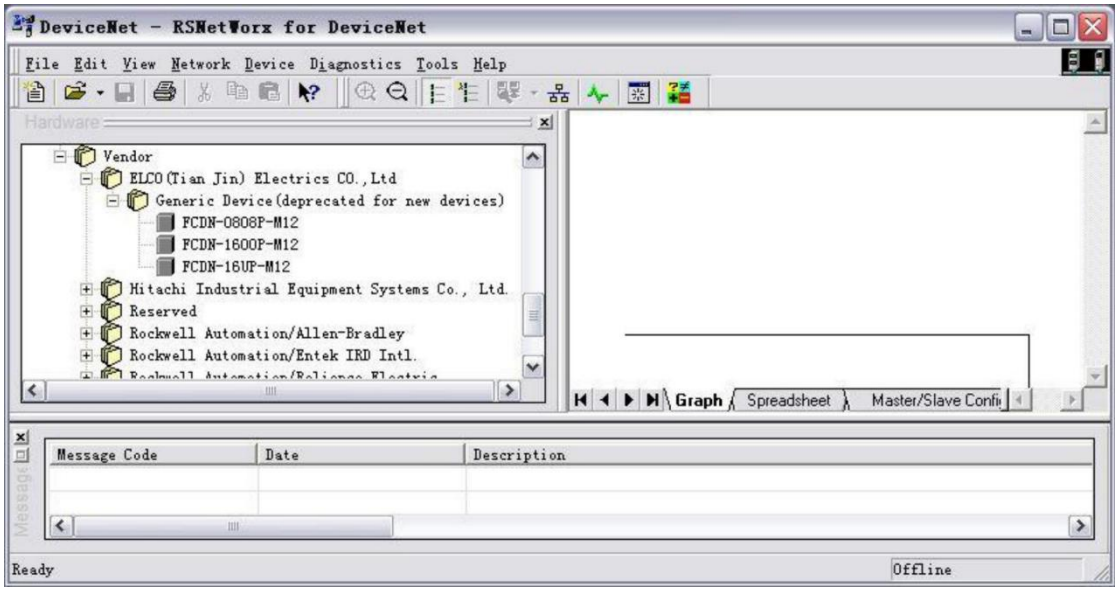
2) In the next dialog box, you can choose to install and uninstall the EDS file of the device according to your needs. Install EDS File, select "Register an EDS File(s)" and click Next to continue.



3) Select "Register a single file", and browse to the correct installation path, click on the next step and confirm to complete the EDS file installation.



4) Users can see a list of FCDN series modules in the hardware view on the left side of the window.



4.2 Signal address assignment

Each Compact67 module has 8 connectors (Con0-Con7) for connecting signal. Each connector has five pins (Pin1-Pin5). The following table indicates the

matchup between signal status and bytes transmitted of Devicenet.

1) 16-bit input module FCDN-1600P-M12

Byte	Bit	Connector	Data address	Diagnostic address
Input Byte 0	Bit 0	Con0.Pin4	1:I.Data[0].0	1:I.Data[0].16
	Bit 1	Con0.Pin2	1:I.Data[0].1	1:I.Data[0].17
	Bit 2	Con1.Pin4	1:I.Data[0].2	1:I.Data[0].18
	Bit 3	Con1.Pin2	1:I.Data[0].3	1:I.Data[0].19
	Bit 4	Con2.Pin4	1:I.Data[0].4	1:I.Data[0].20
	Bit 5	Con2.Pin2	1:I.Data[0].5	1:I.Data[0].21
	Bit 6	Con3.Pin4	1:I.Data[0].6	1:I.Data[0].22
	Bit 7	Con3.Pin2	1:I.Data[0].7	1:I.Data[0].23
Input Byte 1	Bit 0	Con4.Pin4	1:I.Data[0].8	1:I.Data[0].24
	Bit 1	Con4.Pin2	1:I.Data[0].9	1:I.Data[0].25
	Bit 2	Con5.Pin4	1:I.Data[0].10	1:I.Data[0].26
	Bit 3	Con5.Pin2	1:I.Data[0].11	1:I.Data[0].27
	Bit 4	Con6.Pin4	1:I.Data[0].12	1:I.Data[0].28
	Bit 5	Con6.Pin2	1:I.Data[0].13	1:I.Data[0].29
	Bit 6	Con7.Pin4	1:I.Data[0].14	1:I.Data[0].30
	Bit 7	Con7.Pin2	1:I.Data[0].15	1:I.Data[0].31

2) 8-bit input 8-bit output module FCDN-0808P-M12

Byte	Bit	Connector	Data address	Diagnostic address
Input Byte 0	Bit 0	Con0.Pin4	1:I.Data[0].0	1:I.Data[0].8
	Bit 1	Con0.Pin2	1:I.Data[0].1	1:I.Data[0].9
	Bit 2	Con1.Pin4	1:I.Data[0].2	1:I.Data[0].10
	Bit 3	Con1.Pin2	1:I.Data[0].3	1:I.Data[0].11
	Bit 4	Con2.Pin4	1:I.Data[0].4	1:I.Data[0].12
	Bit 5	Con2.Pin2	1:I.Data[0].5	1:I.Data[0].13
	Bit 6	Con3.Pin4	1:I.Data[0].6	1:I.Data[0].14
	Bit 7	Con3.Pin2	1:I.Data[0].7	1:I.Data[0].15
Output	Bit 0	Con4.Pin4	1:O.Data[0].0	1:I.Data[0].16
	Bit 1	Con4.Pin2	1:O.Data[0].1	1:I.Data[0].17
	Bit 2	Con5.Pin4	1:O.Data[0].2	1:I.Data[0].18
	Bit 3	Con5.Pin2	1:O.Data[0].3	1:I.Data[0].19

Byte 0	Bit 4	Con6.Pin4	1:O.Data[0].4	1:I.Data[0].20
	Bit 5	Con6.Pin2	1:O.Data[0].5	1:I.Data[0].21
	Bit 6	Con7.Pin4	1:O.Data[0].6	1:I.Data[0].22
	Bit 7	Con7.Pin2	1:O.Data[0].7	1:I.Data[0].23

3) 16-bit input/output configurable module FCDN-16UP-M12

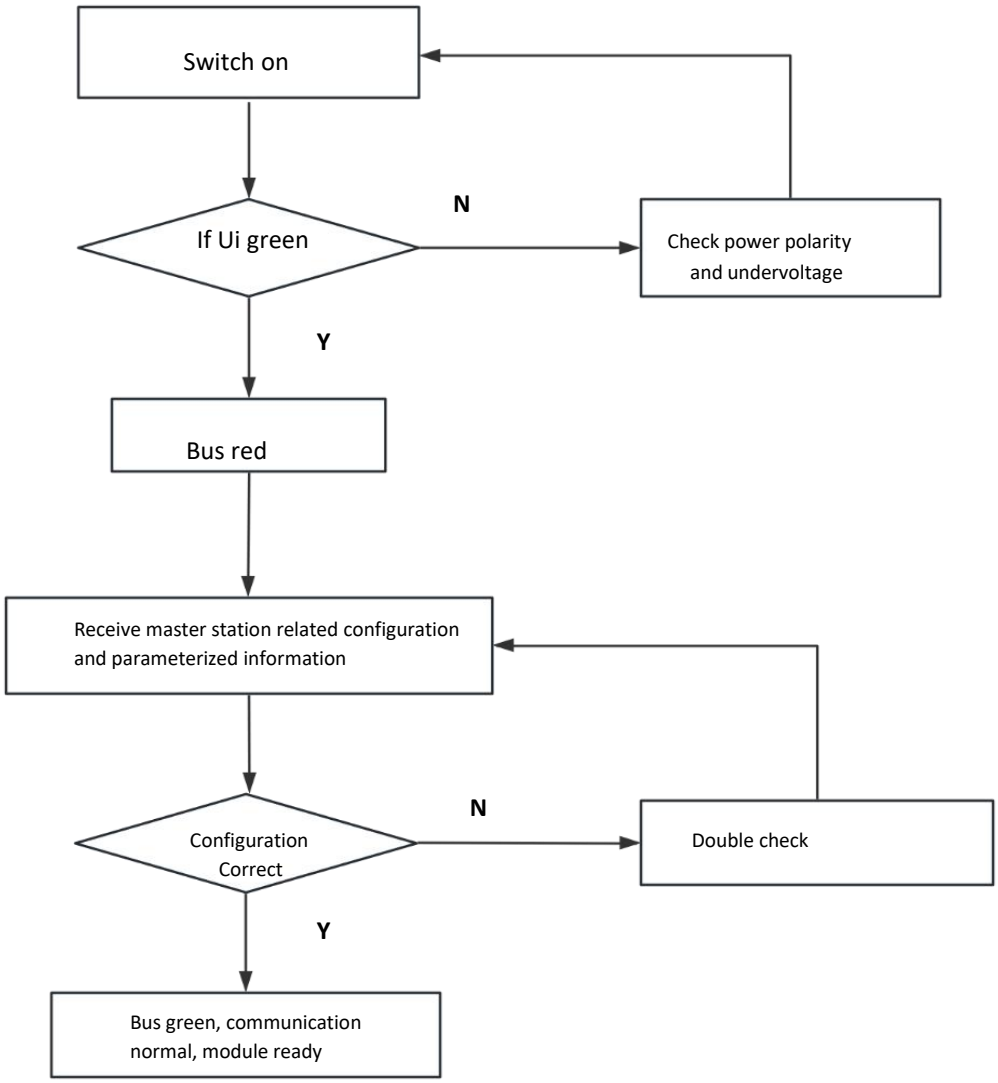
Byte	Bit	Connector	Data address	Diagnostic address
Input /Output Byte 0	Bit 0	Con0.Pin4	1:I.Data[0].0 1:O.Data[0].0	1:I.Data[0].16
	Bit 1	Con0.Pin2	1:I.Data[0].1 1:O.Data[0].1	1:I.Data[0].17
	Bit 2	Con1.Pin4	1:I.Data[0].2 1:O.Data[0].2	1:I.Data[0].18
	Bit 3	Con1.Pin2	1:I.Data[0].3 1:O.Data[0].3	1:I.Data[0].19
	Bit 4	Con2.Pin4	1:I.Data[0].4 1:O.Data[0].4	1:I.Data[0].20
	Bit 5	Con2.Pin2	1:I.Data[0].5 1:O.Data[0].5	1:I.Data[0].21
	Bit 6	Con3.Pin4	1:I.Data[0].6 1:O.Data[0].6	1:I.Data[0].22
	Bit 7	Con3.Pin2	1:I.Data[0].7 1:O.Data[0].7	1:I.Data[0].23
Input /Output Byte 0	Bit 0	Con4.Pin4	1:I.Data[0].8 1:O.Data[0].8	1:I.Data[0].24
	Bit 1	Con4.Pin2	1:I.Data[0].9 1:O.Data[0].9	1:I.Data[0].25
	Bit 2	Con5.Pin4	1:I.Data[0].10 1:O.Data[0].10	1:I.Data[0].26
	Bit 3	Con5.Pin2	1:I.Data[0].11 1:O.Data[0].11	1:I.Data[0].27
	Bit 4	Con6.Pin4	1:I.Data[0].12 1:O.Data[0].12	1:I.Data[0].28
	Bit 5	Con6.Pin2	1:I.Data[0].13 1:O.Data[0].13	1:I.Data[0].29
	Bit 6	Con7.Pin4	1:I.Data[0].14 1:O.Data[0].14	1:I.Data[0].30
	Bit 7	Con7.Pin2	1:I.Data[0].15 1:O.Data[0].15	1:I.Data[0].31

4.3 Module Startup Process

Check whether the following requirements for startup Compact67 distributed I/O module system are met:

- Compact67 module is power, bus and signal wired.
- Devicenet slave address of module is set by dial switch.
- Search Compact67 module in software and configure it to download to DN master station.
- Supply voltage for DN master station is switched on.

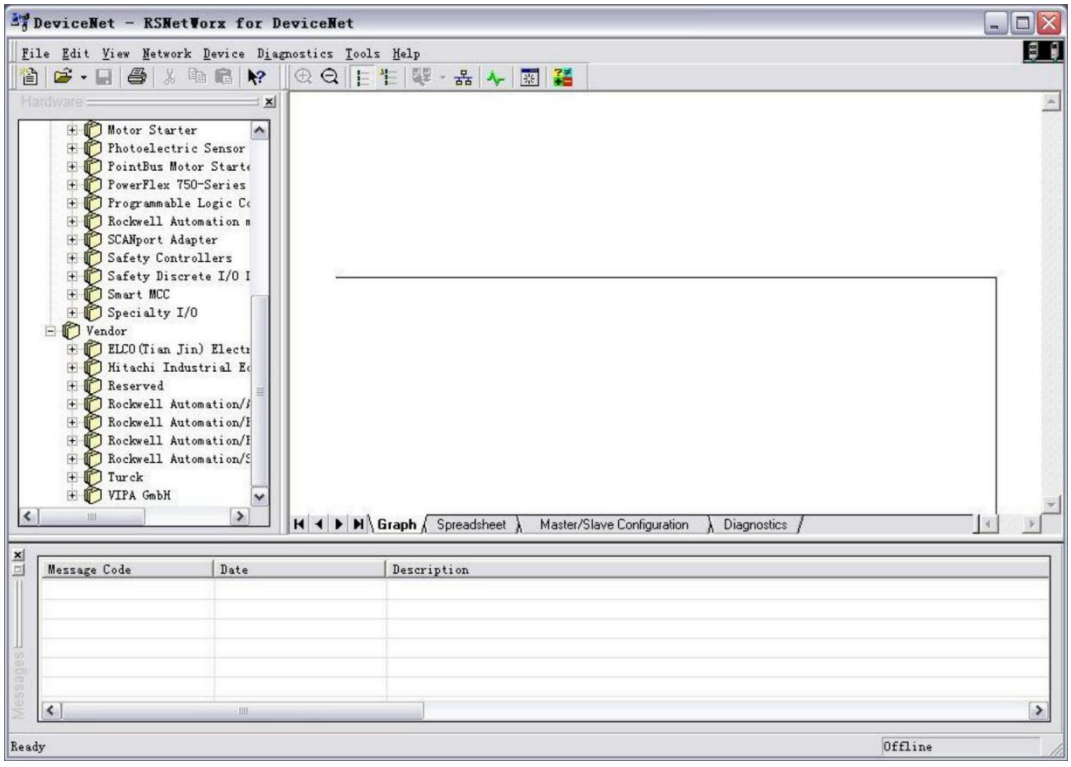
Startup of Compact67:



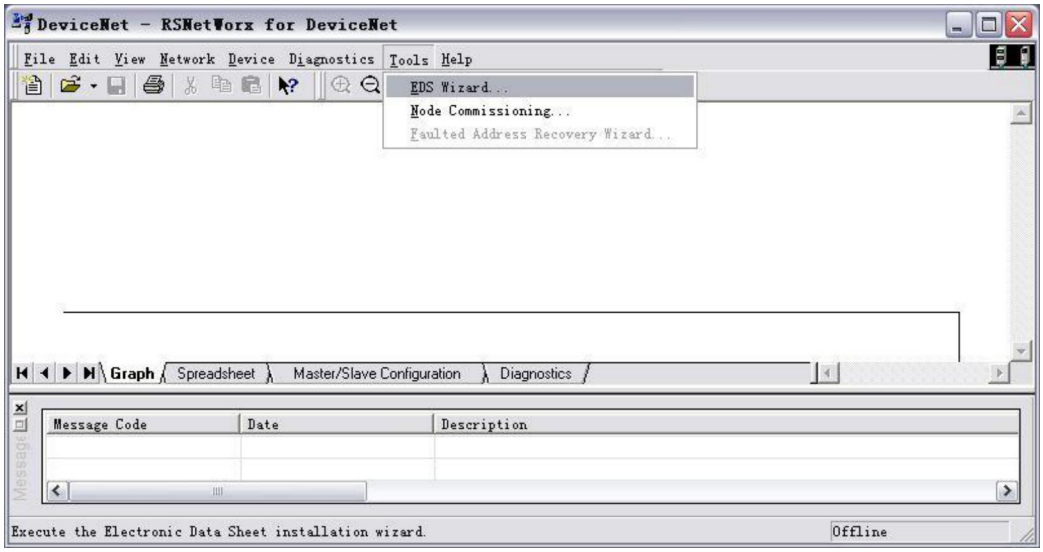
4.4 Module Configuration

This chapter makes users realize Compact67 distributed I/O system through configuration operation. In the example, ELCO FCDN-16UP-M12, as DN slave, connects DN master 1769-SDN module of AB company. We assume that power and bus are wired. The slave address of Compact67 module has been set to 07 by dialing.

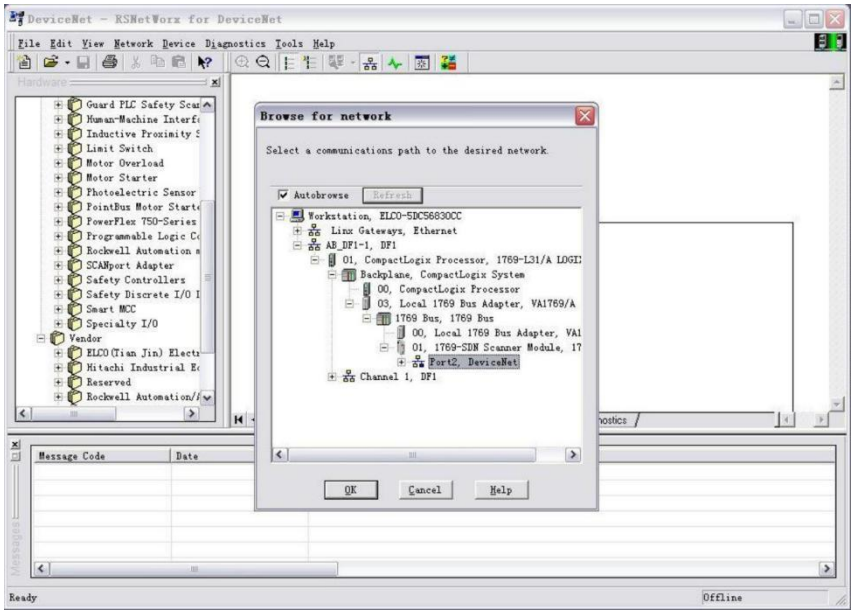
1) Open RSNetWorx for DeviceNet and create a new project.



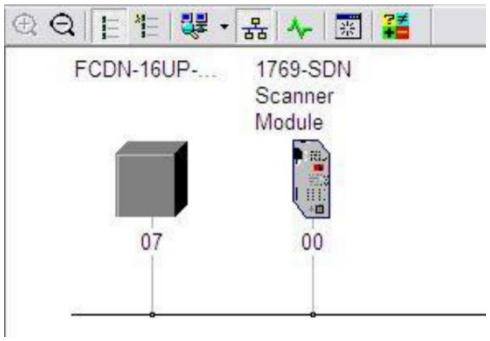
2) Install EDS file as directed in Section 4.1.



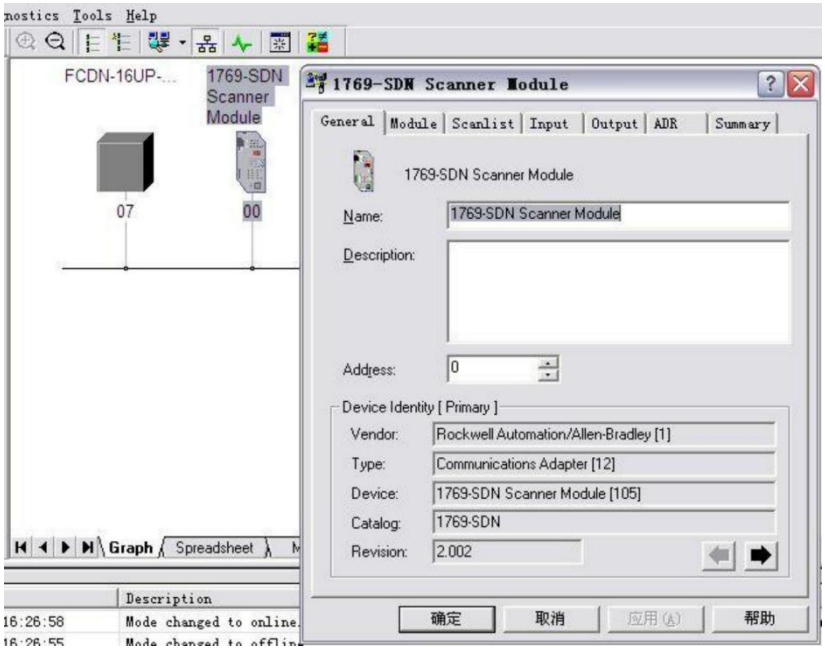
3) Click Online and select the appropriate module to scan the whole network.



4) Scan to 1769 module and 07 slave station.

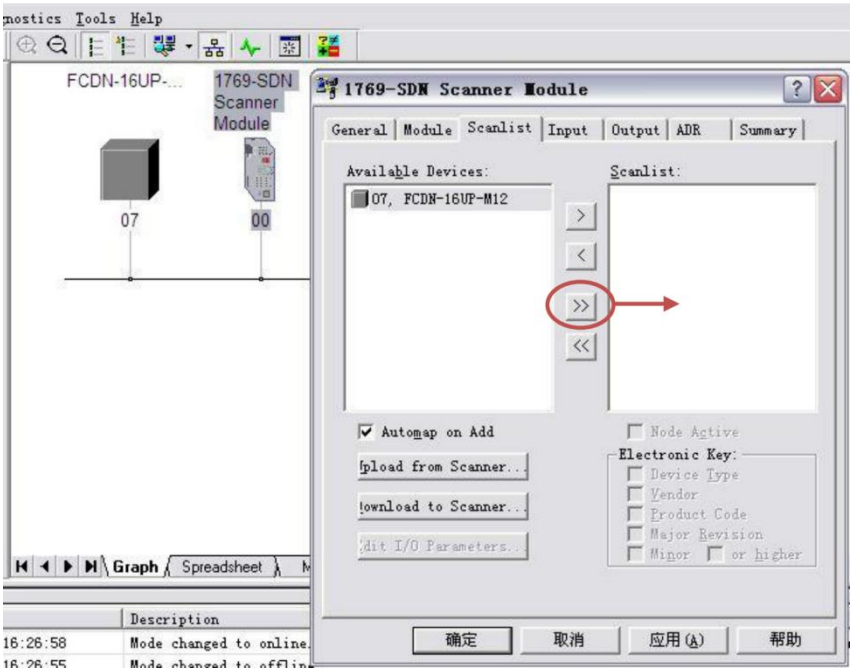


5) Double-click 1769-SDN module to open the address assignment interface

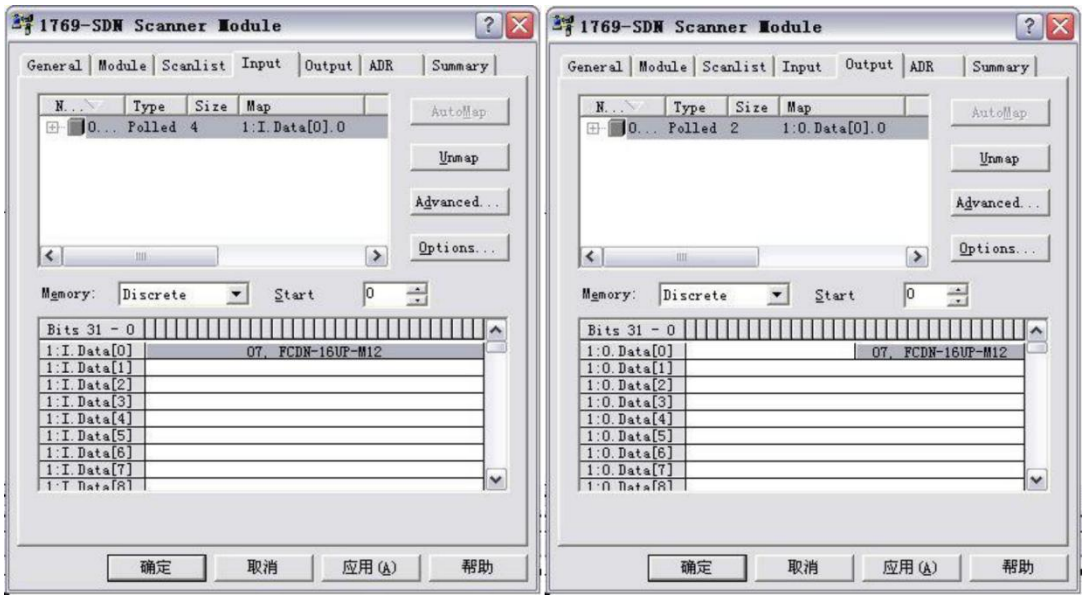


6) Select Scanlist and pop up the confirmation dialog box to sele”ct "Upload"

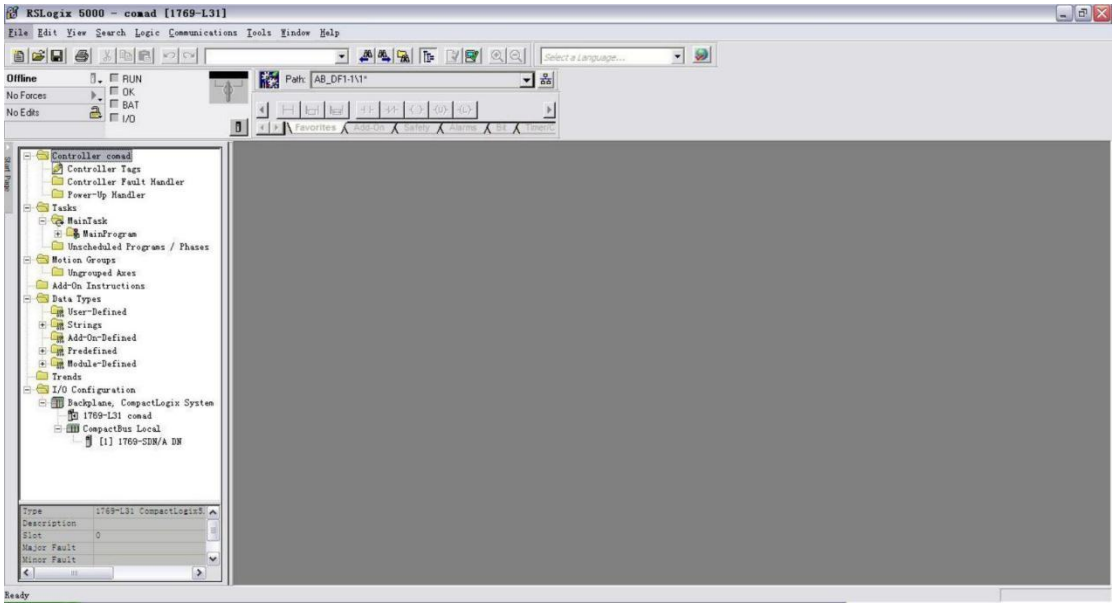
7) Add 07 FCDN-16UP-M12 to the Scanlist



8) In the Input and Output, you can also modify the IO address corresponding to Station 07.



9) Open RSLogix5000 software and configure hardware.



10) In order to activate the Devicenet network, you need to set up 1 for the following signal.