Compact67 I/O Module

----Profibus DP Manual

Preface

Scope of application of this manual:

It's for ELCO Compact67 distributed I/O device with Profibus DP protocol. From the information in the manual, you can operate the Compact67 module on the Profibus DP bus as a distributed I/O device connection controller (PLC, DCS, etc.).

Basic knowledge required:

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

Guide:

This manual describes the hardware and use of the Compact67 distributed I/O device under the Profibus DP protocol. Covered topics are:

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

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 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/

Disclaimer of liability:

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 Profibus DP I/O 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 housing with standardized

installation allows a 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	FCDP-1600P-M12	16-point PNP input or passive contact Short circuit protection, diagnosis
2	FCDP-0808P-M12	8-point PNP input or passive contact 8-point active output Short circuit protection, diagnosis
3	FCDP-16UP-M12	16-point input and output, configurable Short circuit protection, diagnosis

2. Technical Parameters

2 .1 Hardware parameters

FCDP-1600P-M12

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67 Profibus-DP	**OPERATING MODES**	Sync- and freeze mode are support
DESCRIPTION	16 input PNP, 8 x M12	**TRANSFER RATE**	9.6 Kbps ... 12 Mbps
PROTOCOL	Profibus-DP	**ADDRESS SETTINGS**	1...125, 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**	-
BUS COMMUNICATION	2 x M12 B-code 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

FCDP-0808P-M12

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67 Profibus-DP	**OPERATING MODES**	Sync- and freeze mode are support
DESCRIPTION	8 input + 8 output, PNP, 8 x M12	**TRANSFER RATE**	9.6 Kbps ... 12 Mbps
PROTOCOL	Profibus-DP	**ADDRESS SETTINGS**	1...125, 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 M12 B-code 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

FCDP-16UP-M12

ARTICLE PROPERTIES

PRODUCT TYPE	Compact67 Profibus-DP	**OPERATING MODES**	Sync- and freeze mode are support
DESCRIPTION	16 configurable input / output, PNP, 8 x M12	**TRANSFER RATE**	9.6 Kbps ... 12 Mbps
PROTOCOL	Profibus-DP	**ADDRESS SETTINGS**	1...125, 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 M12 B-code 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

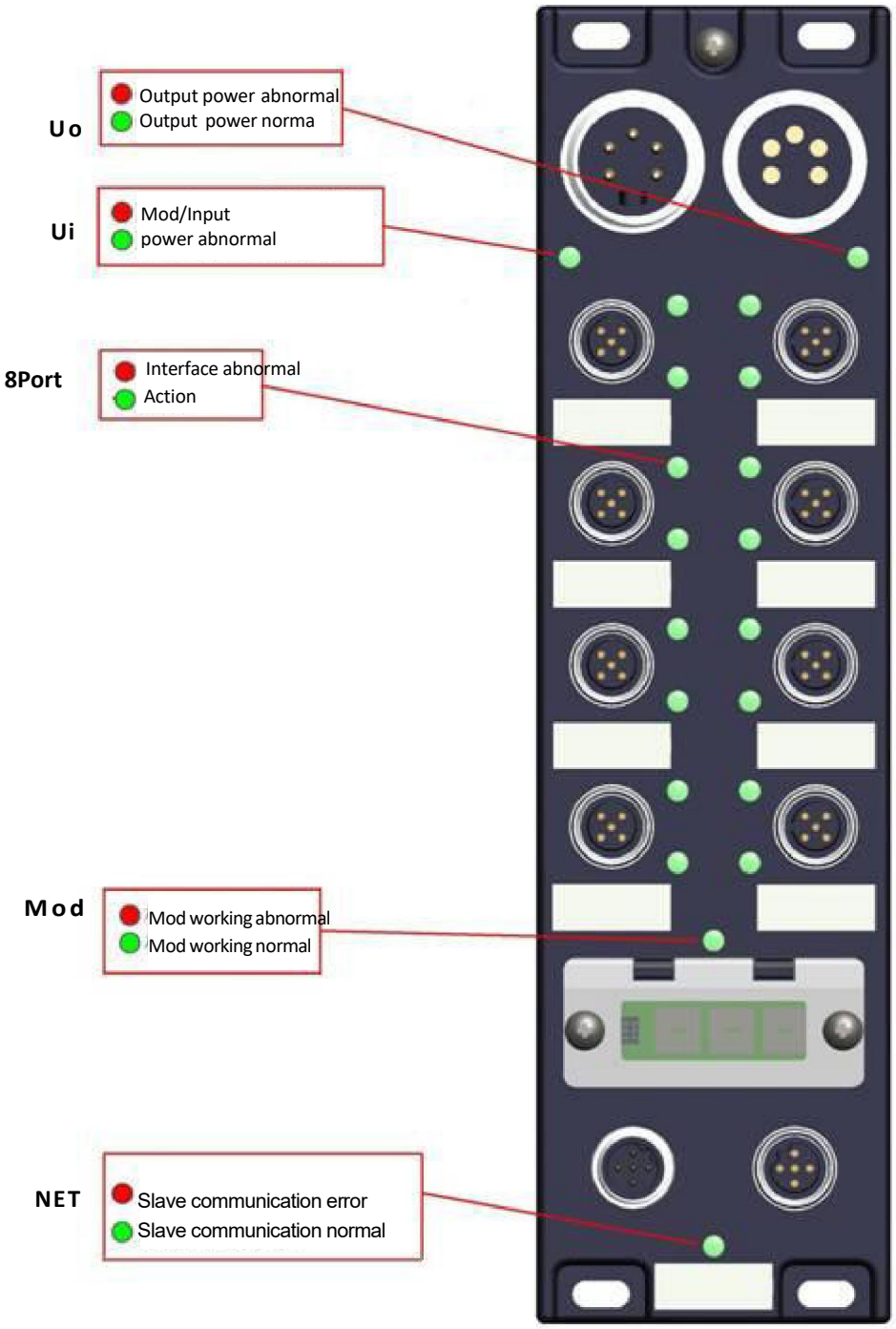
MOUNTING METHOD	4-hole screw mounting	**OPERATING TEMPERATURE**	-25 ... +70 °C
PROTECTION CLASS	IP67	**STORAGE TEMPERATURE**	-40 ... +85 °C
WEIGHT	483 g	**DIMENSIONS**	60 x 220 x 39 mm

APPROVALS

CE

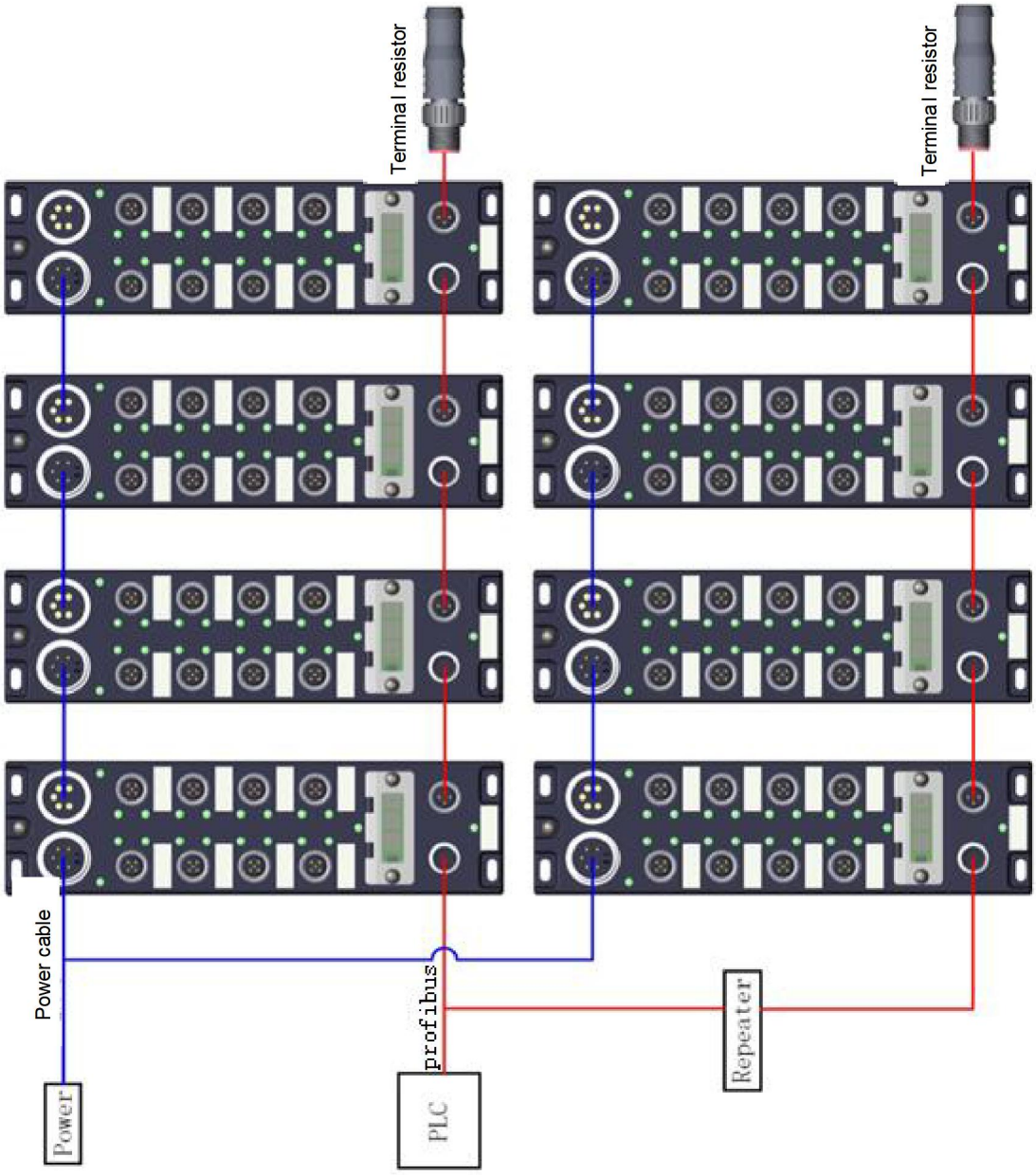
2.2 LED Indication Function

The operating status of the module can be displayed by the LED indicator.



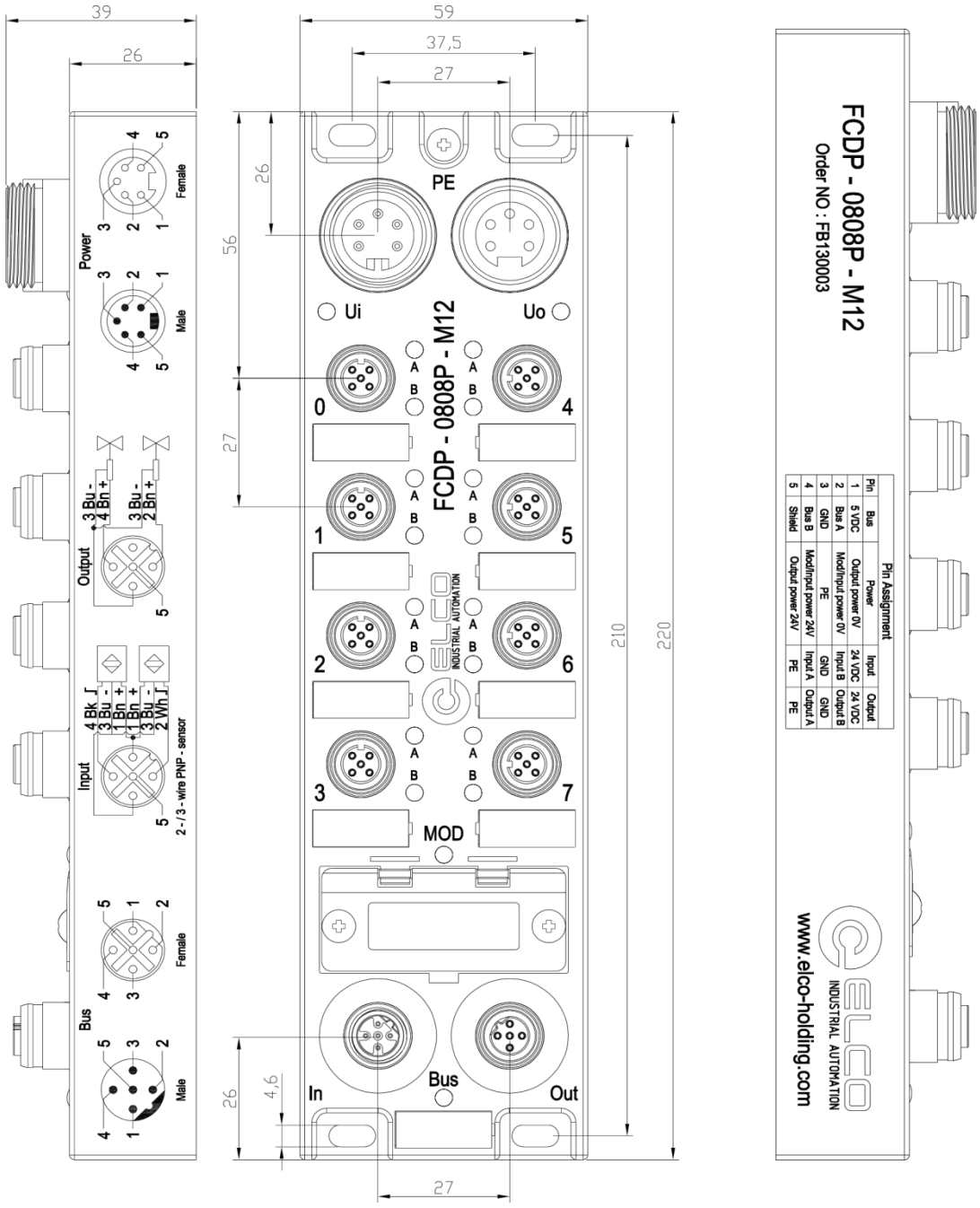
2 .3 Conventional System Layout

The following figure shows the conventional Profibus system module connection by an example. The 24VDC power supply is used to power the 8 modules in two ways. The Profibus network is also divided into two parts. The further 4 modules can also use the repeater to expand the connection distance.



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 Profibus address

The Profibus address specifies the address of the Compact67 distributed I/O device

of the Profibus DP on the network. It needs to open the plastic protective cover of the

DIP switch to set the Profibus address of the Compact67. To adjust the Profibus 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 Profibus network is unique and cannot be repeated

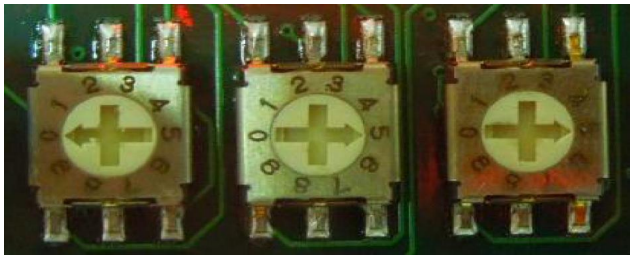
3) The dialing address of the module must be the same as the setting address of the module in the configuration tool.

4) Address setting range: 1-125

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

There are a total of three rotary switches on the front of the module. Three rotations from left to right are×100, ×10, ×1. The current value is indicated by an arrow.

For example, Profibus address is set to 55 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 guarantee a low impedance connection to the protective ground

3.4.2 Compact67 power supply connection

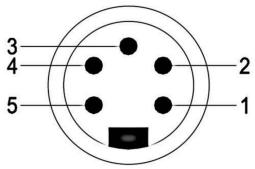
All Compact67 modules are powered by standard 24VDC power supply with an input voltage range of 18~30VDC and are connected using standard 7/8"

connectors. The power supply is divided into two parts: module and input signal

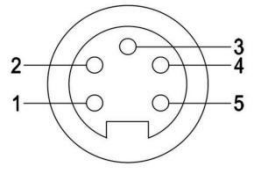
power Ui (1L+, 1M), and output load power Uo (2L+, 2M). The positive poles of

the two power sources are electrically isolated from 1L+ and 2L+, and the common points are internally connected between 1M and 2M.

1) Power access connector view (Male)



2) Power outlet connector view (Female)



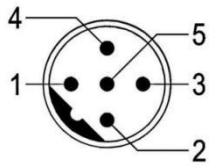
3) Power interface definition

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

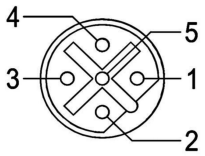
3.4.3 Compact67 bus cable connection

The Compact67 module supporting the Profibus-DP protocol transmits signals via a standard shielded twisted pair Profibus cable and is connected using the B-Code type M12 connector.

1) Bus Access BUS In Connector View (Male)



2) BUS Out Connector View (Female)



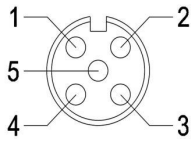
3) Bus interface definition

Interface terminal number	Interface function	Cable color
1	Not used	
2	Bus signal Bus-A	Green
3	Not used	
4	Bus signal Bus-B	Red
5	Shield	Shield

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)

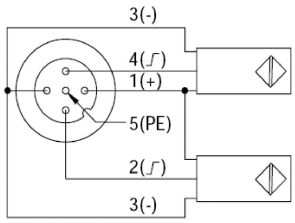


2) Bus interface definition

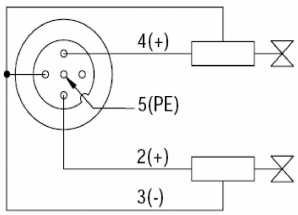
Interface terminal No.	Interface function	Remarks
1	Signal power supply 24V+	
2	Signal input B	Second signal
3	Signal power supply GND	
4	Signal input A	First signal
5	Shield grounding PE	

3) Wiring example

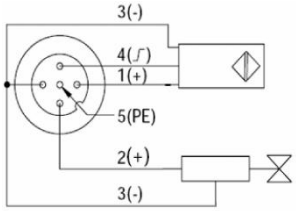
a) Dual input signal - that is, one connector is connected to two digital input signals. , FCDP-1600P-M12, FCDP-0808P-M12 and FCDP-16UP-M12 support this type of connection.



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



c) Input and output signals - 1 connector for 1 digital input plus 1 digital output signal, FCDP-16UP-M12 2 supports this form of connection.



4. Configuration commissioning

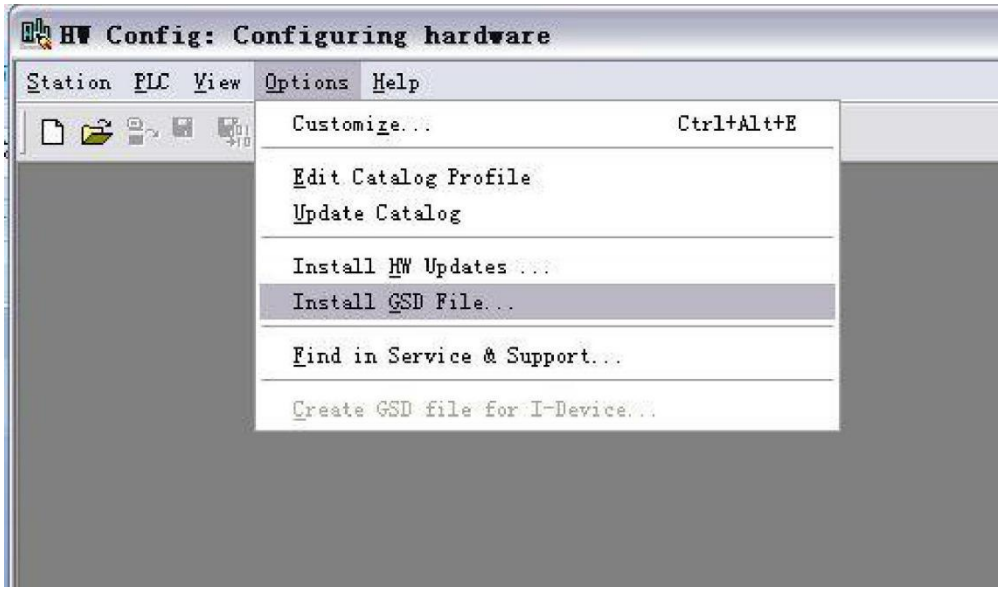
4.1 GSD file

You configure Compact67 distributed I/O using the GSD file. The GSD file is used to integrate Compact67 into your system as standard slave. You can visit ELCO's website to get the latest GSD file or call the customer service hotline to contact technicians.

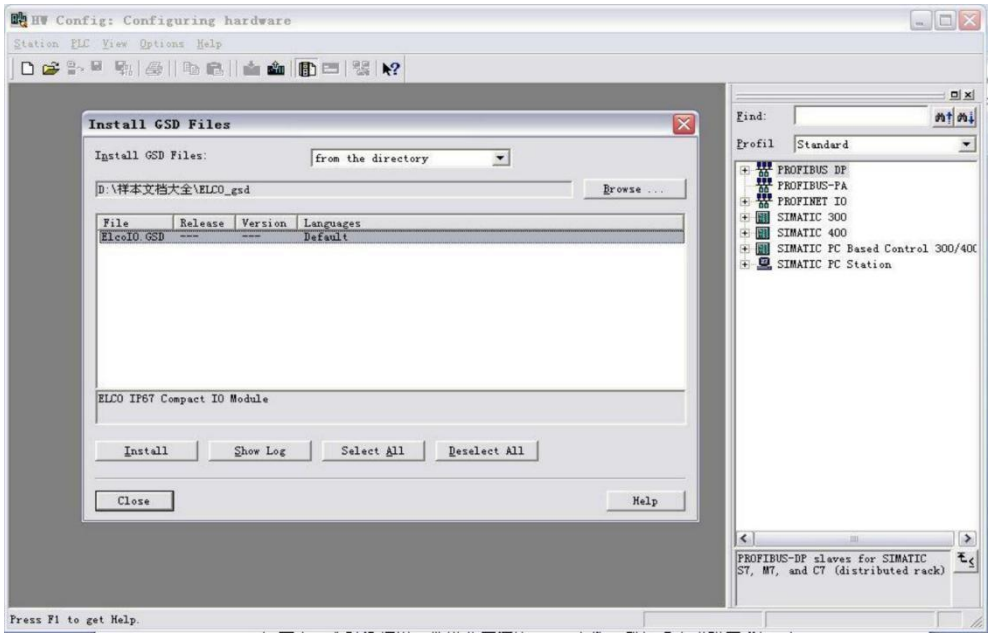
Integrating GSD file into the system depends on the configuration software you use.

In general, Step7 programming software of Siemens used in Profibus system integrates GSD file according to the following steps:

1) Run Step7, then select "Options>Install New GSD File" in HW Config.

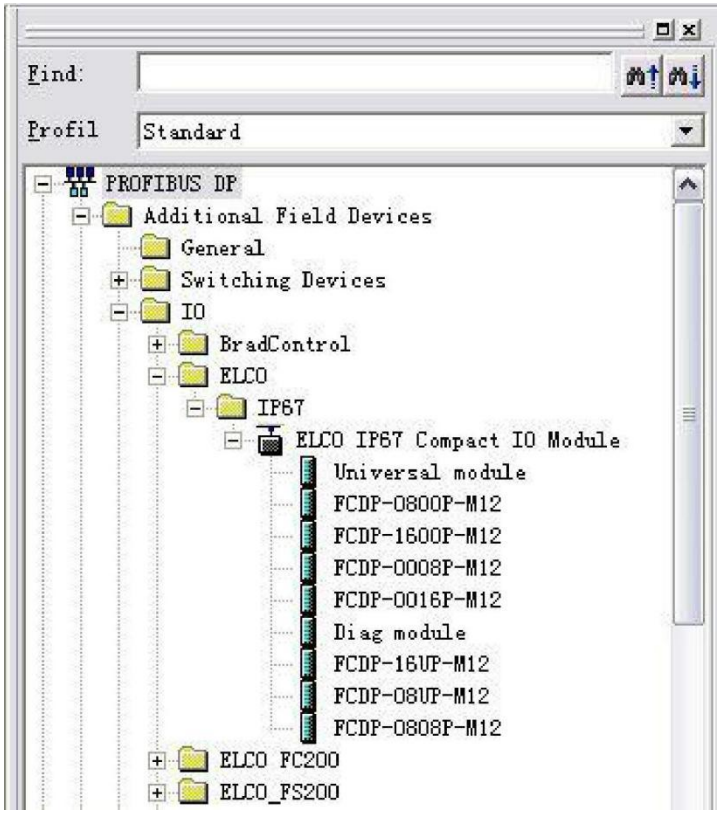


2) On the next dialog box, select the GSD file to install, and confirm with "OK".



3) Newly installed Compact67 module appears in the hardware catalog of the folder

"Additional Field Devices>IO>ELCO>IP67".



4) Users can configure Compact67 module in Step7 according to the actual situation.

4.2 Signal assignment

Each Compact67 module has 8 connectors (Con0-Con7) for connecting signals.

Each connector has five pins (Pin1-Pin5). The following table indicates the matchup between signal status and bytes transmitted of Profibus-DP.

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

Byte	Bit	Connector	e. g.
Input Byte 0	Bit 0	Con0.Pin4	I 0.0
	Bit 1	Con0.Pin2	I 0.1
	Bit 2	Con1.Pin4	I 0.2
	Bit 3	Con1.Pin2	I 0.3
	Bit 4	Con2.Pin4	I 0.4
	Bit 5	Con2.Pin2	I 0.5
	Bit 6	Con3.Pin4	I 0.6
	Bit 7	Con3.Pin2	I 0.7

Input Byte 1	Bit 0	Con4.Pin4	I 1.0
	Bit 1	Con4.Pin2	I 1.1
	Bit 2	Con5.Pin4	I 1.2
	Bit 3	Con5.Pin2	I 1.3
	Bit 4	Con6.Pin4	I 1.4
	Bit 5	Con6.Pin2	I 1.5
	Bit 6	Con7.Pin4	I 1.6
	Bit 7	Con7.Pin2	I 1.7

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

Byte	Bit	Connector	e. g.
Input Byte 0	Bit 0	Con0.Pin4	I 0.0
	Bit 1	Con0.Pin2	I 0.1
	Bit 2	Con1.Pin4	I 0.2
	Bit 3	Con1.Pin2	I 0.3
	Bit 4	Con2.Pin4	I 0.4
	Bit 5	Con2.Pin2	I 0.5
	Bit 6	Con3.Pin4	I 0.6
	Bit 7	Con3.Pin2	I 0.7
Output Byte 0	Bit 0	Con4.Pin4	Q 0.0
	Bit 1	Con4.Pin2	Q 0.1
	Bit 2	Con5.Pin4	Q 0.2
	Bit 3	Con5.Pin2	Q 0.3
	Bit 4	Con6.Pin4	Q 0.4
	Bit 5	Con6.Pin2	Q 0.5
	Bit 6	Con7.Pin4	Q 0.6
	Bit 7	Con7.Pin2	Q 0.7

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

Byte	Bit	Connector	e. g.
Input/Output Byte 0	Bit 0	Con0.Pin4	I 0.0 Q 0.0
	Bit 1	Con0.Pin2	I 0.1 Q 0.1
	Bit 2	Con1.Pin4	I 0.2 Q 0.2
	Bit 3	Con1.Pin2	I 0.3 Q 0.3
	Bit 4	Con2.Pin4	I 0.4 Q 0.4
	Bit 5	Con2.Pin2	I 0.5 Q 0.5
	Bit 6	Con3.Pin4	I 0.6 Q 0.6
	Bit 7	Con3.Pin2	I 0.7 Q 0.7
Input/Output Byte 1	Bit 0	Con4.Pin4	I 1.0 Q 1.0
	Bit 1	Con4.Pin2	I 1.1 Q 1.1
	Bit 2	Con5.Pin4	I 1.2 Q 1.2
	Bit 3	Con5.Pin2	I 1.3 Q 1.3
	Bit 4	Con6.Pin4	I 1.4 Q 1.4
	Bit 5	Con6.Pin2	I 1.5 Q 1.5
	Bit 6	Con7.Pin4	I 1.6 Q 1.6
	Bit 7	Con7.Pin2	I 1.7 Q 1.7

4.3 Module startup process

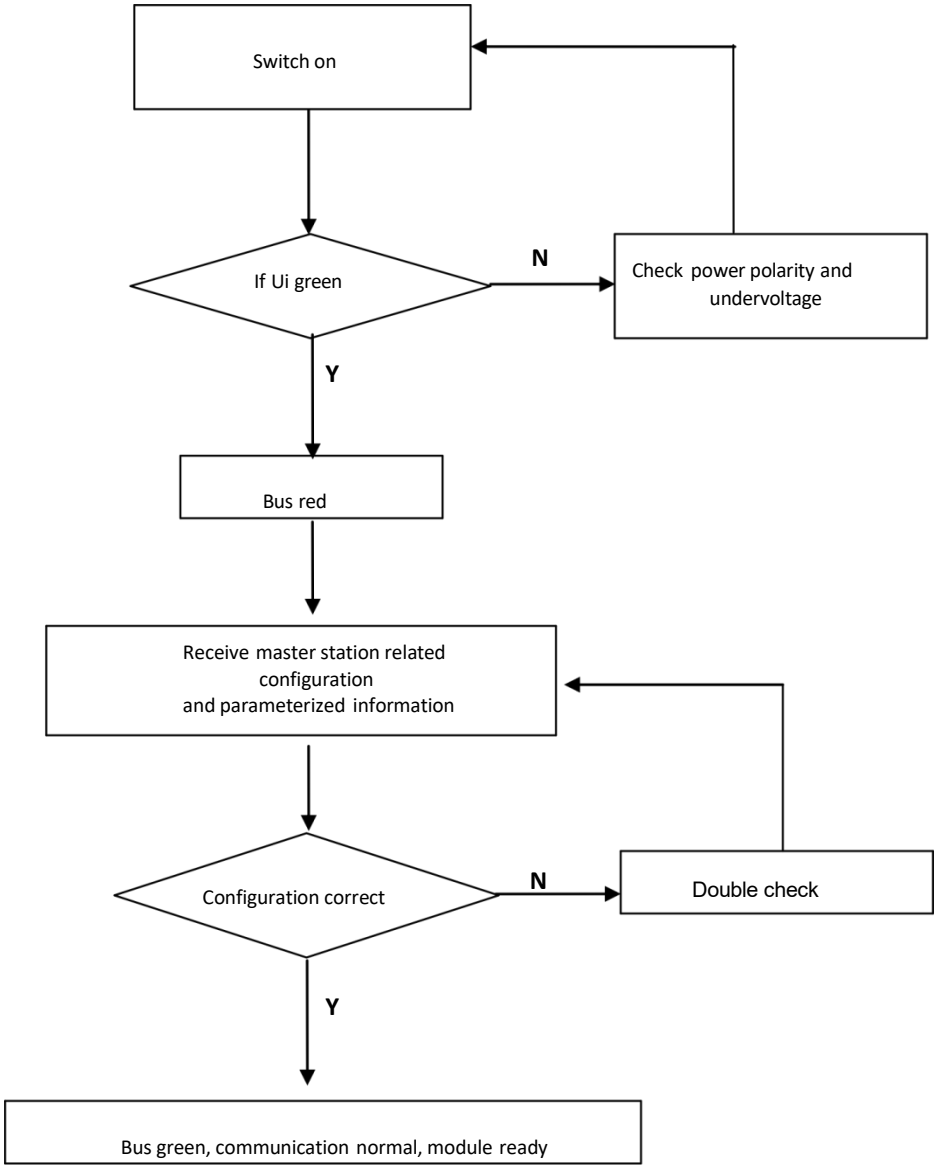
Check whether the following requirements for the startup of the Compact67 distributed I/O module system are met:

· Compact67 module is power, bus and signal wired.

· DP slave address of module is set by dial switch.

· Compact67 module is configured in software and download into the DP master station. · Supply voltage for DP master station is switched on.

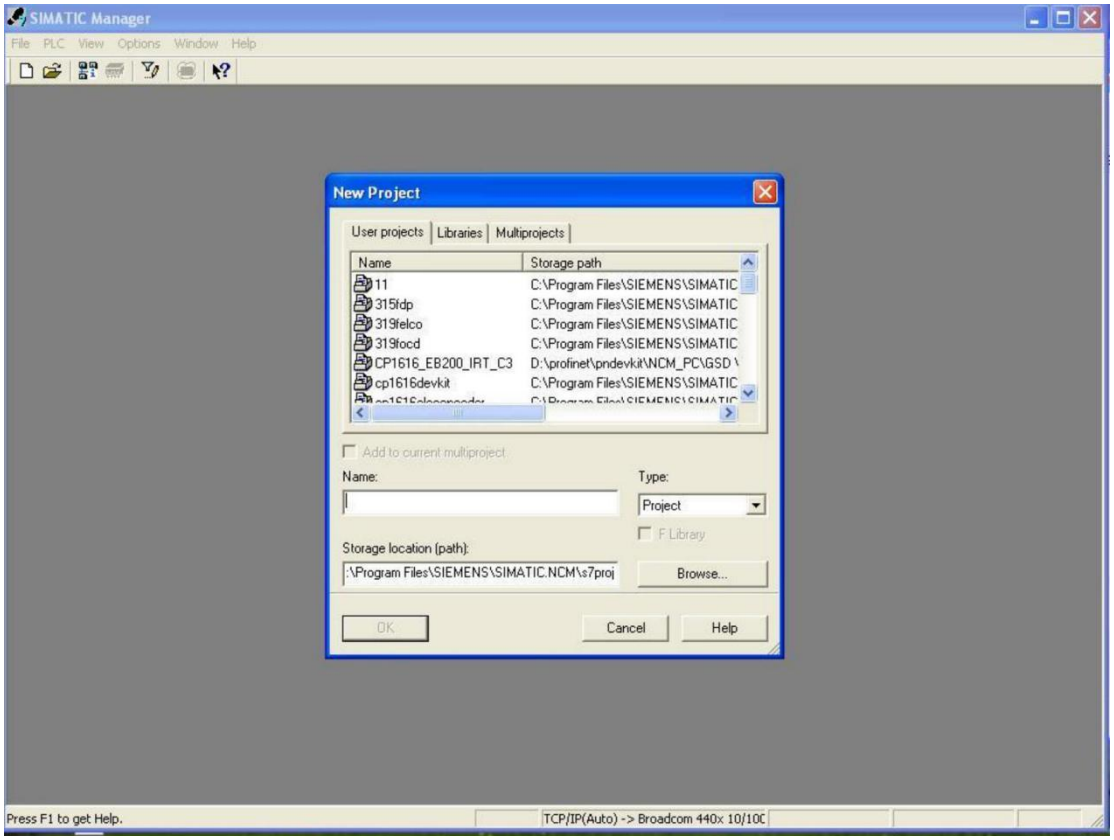
Startup of Compact67:



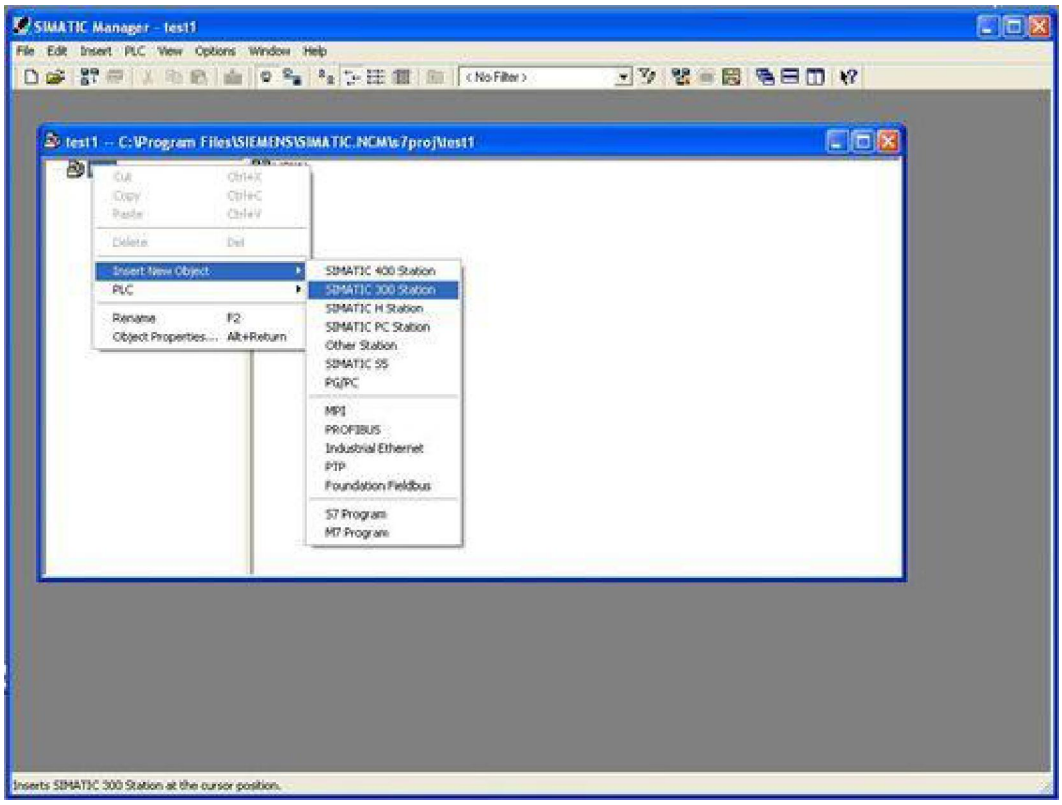
4.4 Module Configuration

This chapter makes users realize Compact67 distributed I/O system through configuration operation. In the example, ELCO FCDP-16UP-M12, as DP slave, connects DP master CPU315-2DP of Siemens. We assume that power and bus are wired. The slave address of Compact67 module has been set to 07 by dialing. We show the specific software configuration and debugging process in the form of pictures.

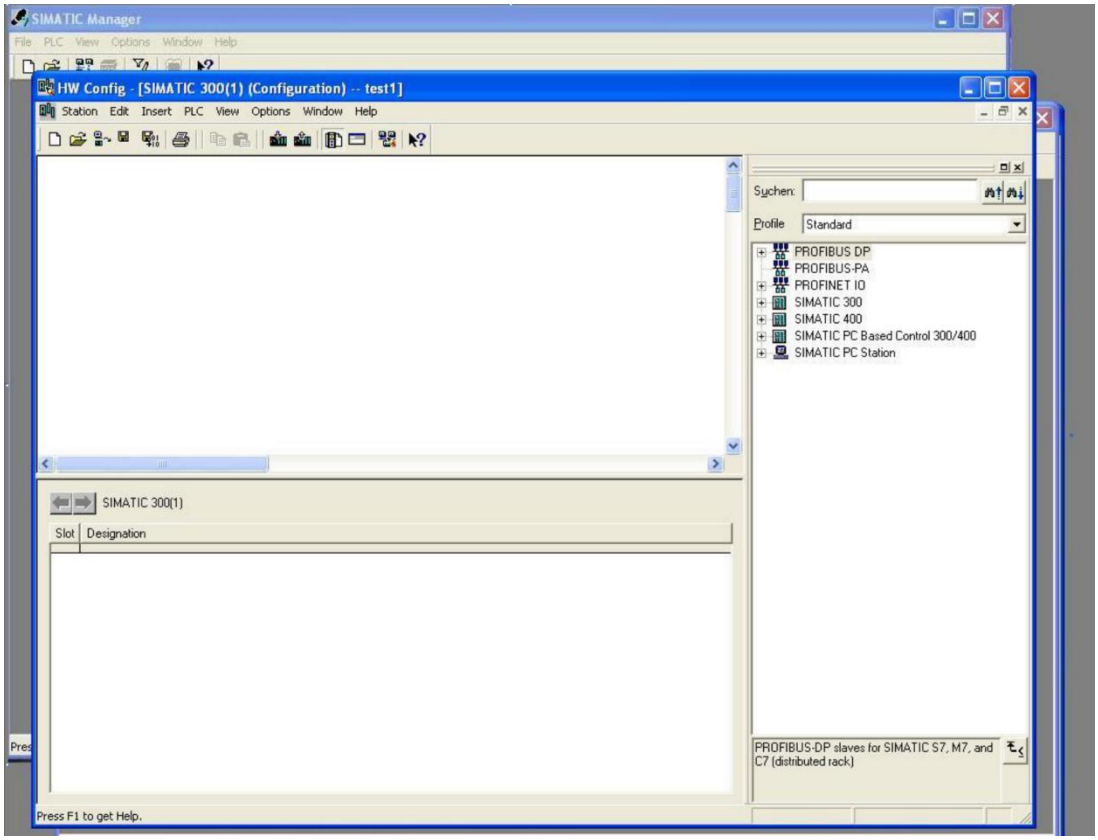
1) Create a new Step7 project.



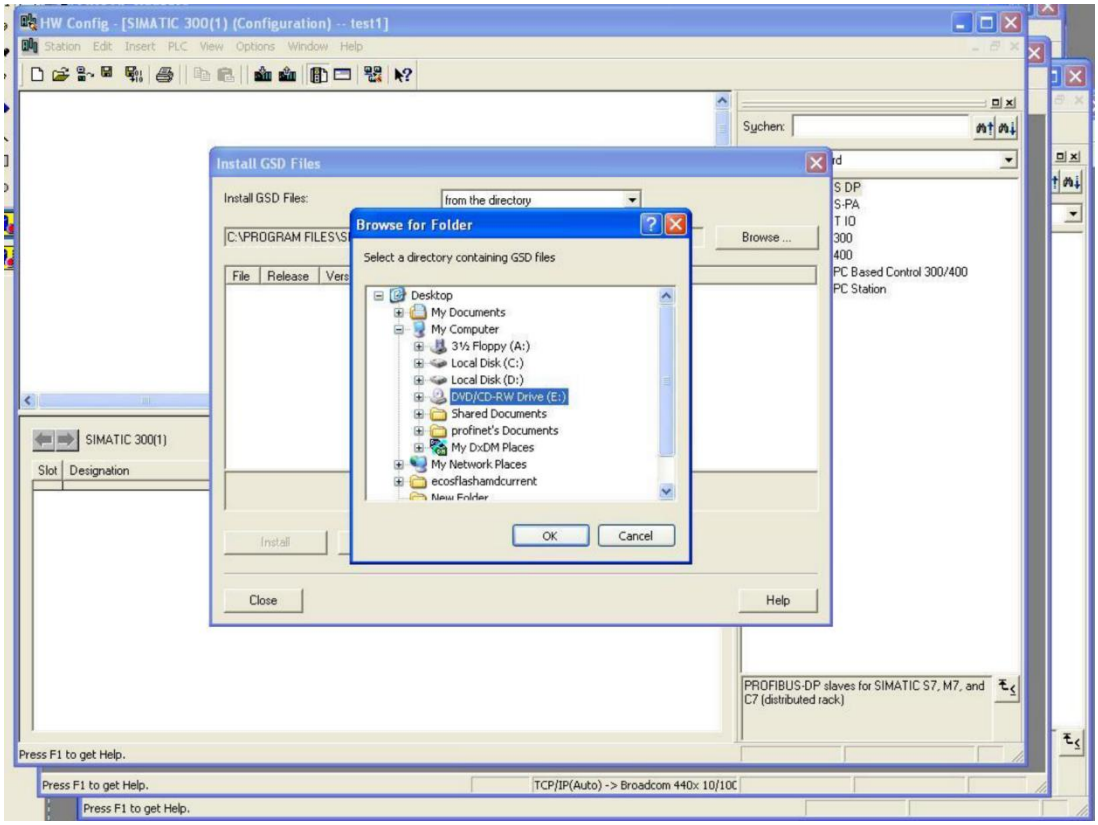
2) Add new Simatic300 station.



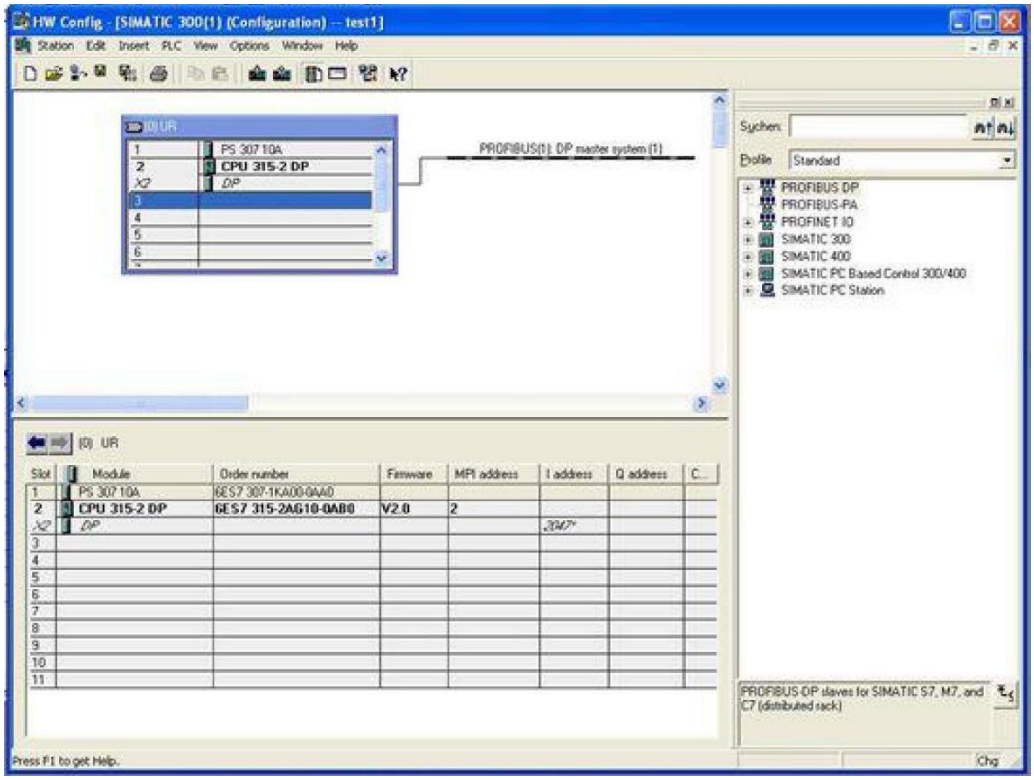
3) Double click ”Hardware” to startup hardware configuration tool.



4) Refer to section 4.1 to install the GSD file.

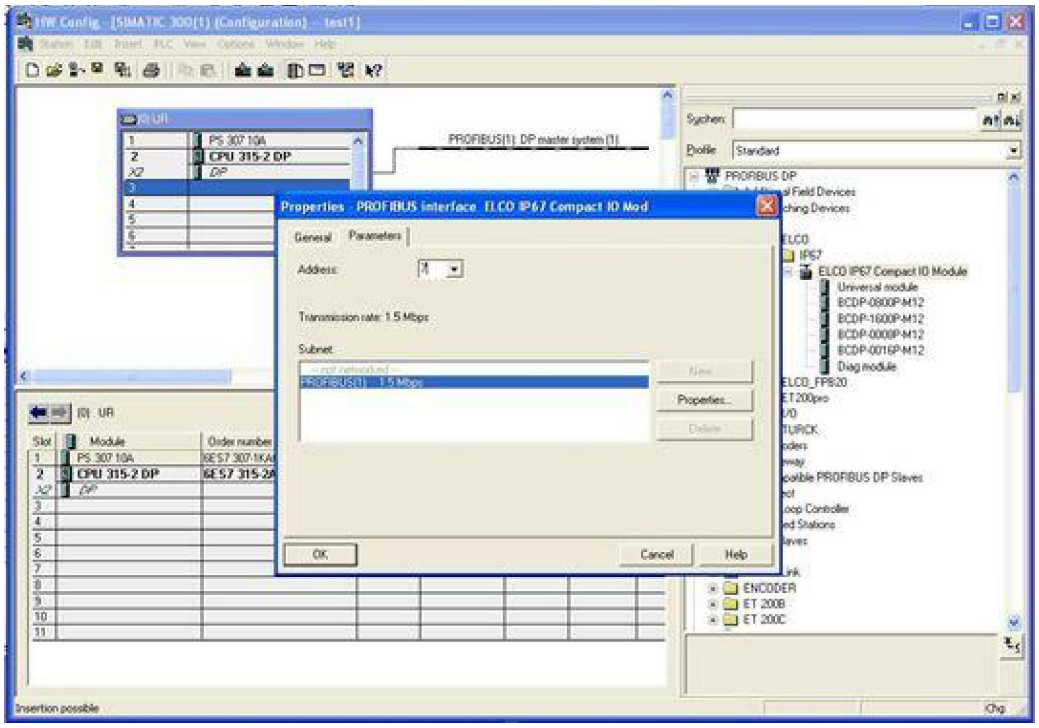


5) Change hardware configuration, select suitable slot, power and CPU in Catalog dialog box, and set CPU, bus, etc

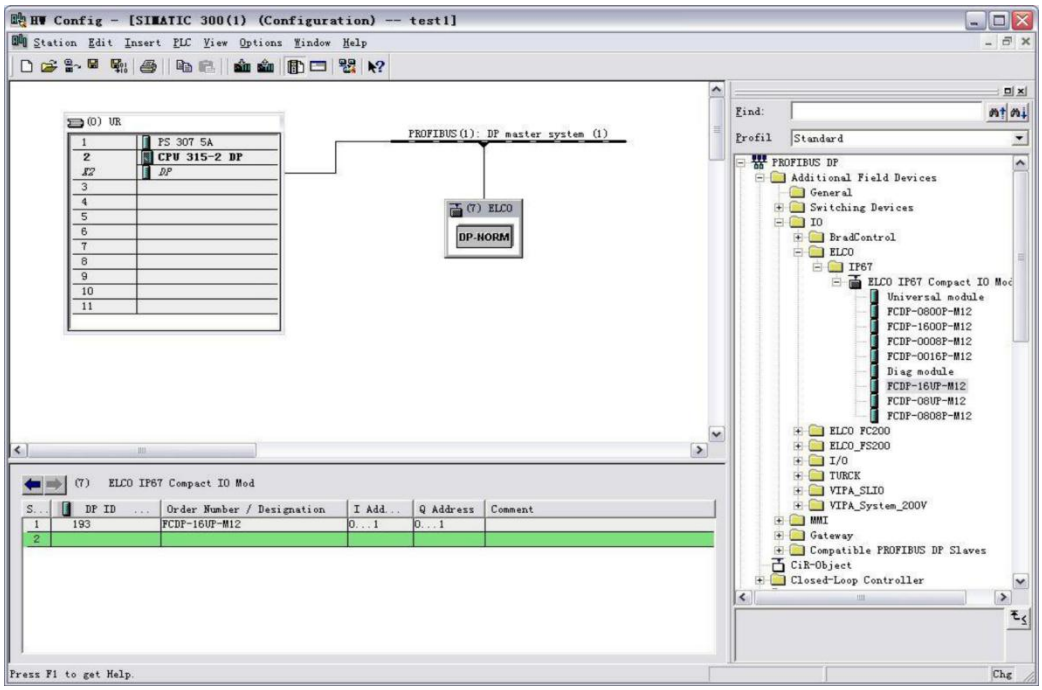


6) In Catalog box, select "ELCO IP67 Compact IO Module" to add to PROFIBUS

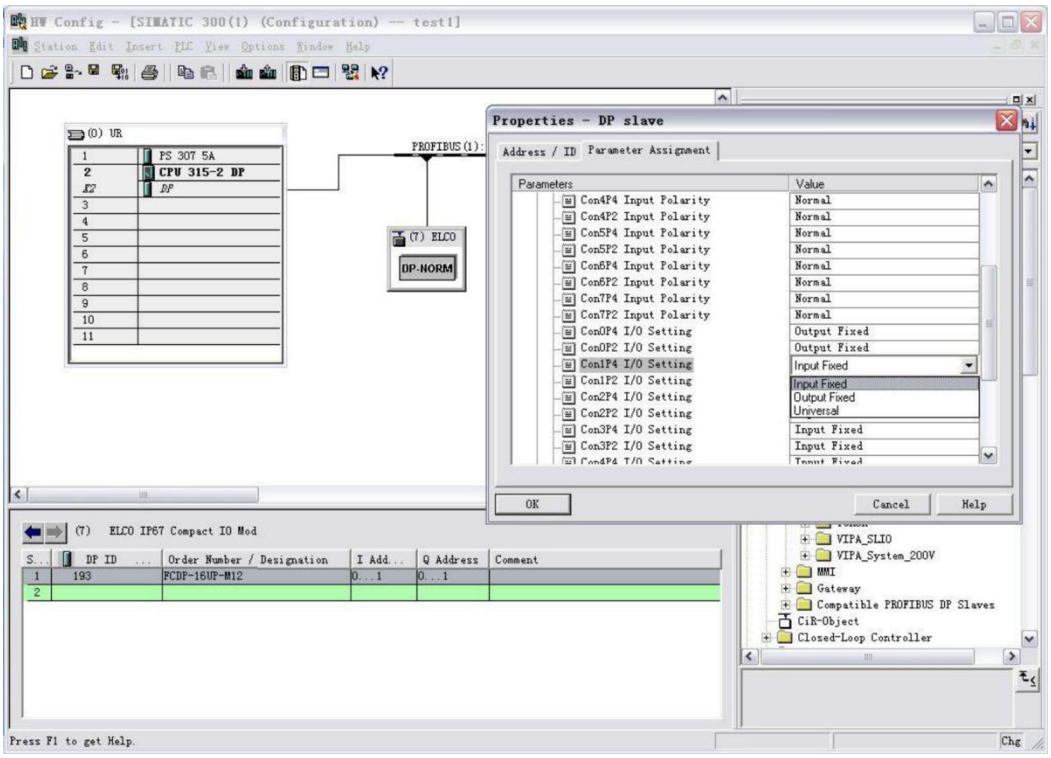
network in the directory of "Profibus DP>Additional Field Devices>IO>ELCO>IP67". Please note that address set and hardware rotary encoder must share the same: 07.



7) In the Catalog window, add the model "FCDP-16UP-M12" we used in the " ELCO IP67 Compact IO Module" directory to the first slot of the Compact67 module and assign the input and output addresses.



8) Double-click the newly added "FCDP-16UP-M12" and in the new pop-up Properties window, select Parameter Assignment tab to assign the module parameters.



Note: The FCDP-16UP-M12 is input/output definable module. Here you can define whether to use as input or output by modifying the "Input Fixed" and "Output Fixed" of each signal port. The other two models, FCDP-1600P-M12 and FCDP-0808P-M12, cannot be modified.

9) Download configuration to PLC after saving

5. Alarm

5.1 LED display

Users can realize the status of module by LED display of Compact67 distributed I/O.

LED indication				Meaning	Solution
Ui	Uo	Bus	MOD		
OFF	-	-	-	Wrong module power supply connection	Check module power supply
-	OFF	-	-	Wrong output auxiliary power supply connection	Check auxiliary power supply
Red	-	-	-	Power supply of module low than 18V	Replace module power supply
-	Red	-	-	Output auxiliary power supply low than 18V	Replace auxiliary power supply
-	-	-	Red	I/O short-circuit or overload	Check sensor or load
				Power supply of module or auxiliary power supply is low (<18V)	Check power supply
				Other module failure	
Green	Green	Red	-	Normal module and auxiliary power supply, but fail to communicate with profibus master	Check Profibus DP cable
					Check Profibus DP address set
					Check slave configuration
Green	Green	Green	Green	Module ready	-

5.2 Diagnostic information

The diagnostic function of Compact67 distributed I/O module conforms to the relevant diagnostic function standard of Profibus slave station. Its definition is described in

IEC61784-1:2002 ED1 CP3/1. The diagnostic information of Compact67 module can be read out from Profibus master station through SFC13 function block.

Diagnostic information consists of three parts. The first part is that the standard

diagnostic block is composed of six bytes. The second part describes the warning information related to the module. The third part indicates the diagnostic information of each channel.

1) Standard diagnosis block

Byte	Bit	Description
Byte 0	Bit7	Diag.Master_Lock: (1) = Slave has been parameterized by another master. This bit to be set by the master itself.
	Bit6	Diag.Prm_Fault: (1) = Slave got wrong parameterizafion.
	Bit5	Diag.Invalid_Slave_Response: (0) = Set by slave. Diag.Invalid_Slave_Response: (1) = Set by master in case of fault.

	Bit4	Diag.Not_Supported: (1) = Slave doesn't support the required funcfion.
	Bit3	Diag.Ext_Diag: (0) = Slave sends standard diagnosis data only (6 bytes). Opfionally with extended diagnosis without faults. Diag.Ext_Diag: (1) = Slave indicates serious faults, usually with extended diagnosis data.
	Bit2	Diag.Cfg_Fault: (1)= Slave has mismatching configura VIon data
	Bit1	Diag.Sta VIon_Not_Ready: (1) = Slave not ready for data exchange
	Bit0	Diag.Sta VIon_Non_Existent: (1) = Slave doesn't exist. This bit to be set by the master itself.
Byte 1	Bit7	Diag.Deac VIvated: (1) = Diagnosis deac VIvated. This bit to be set by the master itself.
	Bit6	Reserved
	Bit5	Diag.Sync_Mode: (1) = Slave is in SYNC mode.
	Bit4	Diag.Freeze_Mode: (1) = Slave is in FREEZE mode.
	Bit3	Diag.WD_On: (1) = Slave reports exceeded watchdog VIme.
	Bit2	DP: (1) = shall always be set
	Bit1	Diag.Stat_Diag: (1) = Slave not able to provide valid diagnosis data. Master repeats diagnosis requests while in Data Exchange mode un VIl this bit is set (0).
	Bit0	Diag.Prm_Req: (1) = Slave requests parameteriza VIon. There upon the master starts a new run-up for that slave.
Byte 2	Bit7	Diag.Ext_Diag_Overlow: (1) = Slave has more diagnosis data than fit into the bufer.
	Bit6 . Bit0	Reserved
Byte 3		Diag_Master_Add: (0 125) = Address of the master that has parameterized the slave. Diag_Master_Add: (255) = The slave has not yet been parameterized.
Byte 4 Byte 5		IdentNumber: High and low byte of the slave's ident number that is to be provided by the PROFIBUS business of 什ce.

2) Module status block

Byte	Bit	Description
Byte 6	Bit7=0 Bit6=0	Selec VIon: (0) = Device Related Diagnosis
	Bit5 Bit0	Block_Length: Number of bytes of the following Extended Diagnosis block including this header byte the length of block is 5
	Bit7=1	Iden VIfier: (1) = Status

Byte 7	Bit6=0 Bit5=0 Bit4=0 Bit3=0 Bit2=0 Bit1=1 Bit0=0	Status_Type: (2) Modul_Stat
Byte 8	0	Slot_Number: Data type: Unsigned8; Range: (0)
Byte 9	Bit7=0 Bit6=0 Bit5=0 Bit4=0 Bit3=0 Bit2=0	status_Specifier: (0) no further differentiation Extended
	Bit1=0 Bit0=0	Reserved: (0) Shall be set
Byte 10	0	Module status ok

3) Channel diagnosis block

Byte	Bit	Description
Byte 10+n*3	Bit7=1 Bit6=0	Diagnosis HeaderSelection: (2) = Channel Related Diagnosis
	Bit5-bit0	Identifier_Number: Range (0-63); (Identifier corresponds to module),
Byte 11+n*3	Bit7 Bit6	ChannelInputOutputSelection: (0) reserved(1) Input(2) Output(3)
	Bit5-bit0	10Channel_Number: Range (0-63)
Byte 12+n*3	Bit7 Bit6 Bit5	DiagnosisChannelType: (0) unspecific, may be used for any type (1) bit (2) 2 bit (3) 4 bit (4) byte (5) word (6) 2 words (7) reserved
	Bit4 Bit3 Bit2 Bit1 Bit0	20Error_Type: Range (0-31) Short circuit(1) Undervoltage of Module power supply (2)Undervoltage of auxiliary power supply (18) (Definition via GSD entries)

Note: Each channel related diagnostic data block consists of 3 bytes, and N is the channel number for alarm.