

MS300/MH300 CMM-PN02 PROFINET Communication Card Operation Manual

Application Drive Firmware Version: MS300 V2.02 / MH300 V2.00 or above CMM- PN02 Comm. Card Firmware Version: V1.0.1 or above

http://www.delta.com.tw/industrialautomation

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- ✓ This operation manual provides information on specifications, installation instructions, basic operations/configurations, and details on network communication protocols.
- ✓ The AC motor drive is a sophisticated product powered by electricity. For the safety of the operator and your mechanical equipment, only qualified electrical engineers can perform the installation/test runs and make parameter adjustments. If you have any question or concern, please contact your local Delta distributor. Our professional staff will be very glad to help you.
- ✓ Please read this manual carefully and follow the instructions completely to avoid device damage or personal injury.

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1 Introduction

1.1 Introduction to PROFINET IO Communication

PROFINET IO is a fieldbus, a family of industrial computer network protocols, and serves as a communication between programmable logic controllers (PLC) and distributed field equipment for EtherNet. This protocol recognizes three classes of devices, IO Controllers, IO Supervisors and IO Devices, and uses three different communication channels to exchange data: Standard UDP/IP & TCP/IP Channel, Real-Time (RT) Channel, and Isochronous Real-Time (IRT) Channel. **Standard UDP/IP & TCP/IP Channel** is used to parameterize and configure device and asynchronous operation; **RT Channel** is used for synchronous data transmission and warning; **IRT Channel** is applied to motion control.

1.2 Features

CMM-PN02 connects MS300/MH300 drive to PROFINET to exchange data with the host controller easily. This simple network solution saves cost and time for connection and installation of factory automation. Moreover, its components are compatible with suppliers'.

By installing CMM-PN02 in MS300/M300 through the main PROFINET device, you can:

- 1. Control the drive through PROFINET
- 2. Modify the drive's parameters through PROFINET
- 3. Monitor the drive's status through PROFINET

1.3 Network Functions and Specifications

EtherNet Specifications				
ltem	Specifications			
Interface	RJ45			
Number of ports	2 ports			
Communication Mode	IEEE 802.3			
Cable	Category 5e shielding 100 M			
Transmission speed	10/100 Mbps auto-negotiate			
Communication protocol	PROFINET			

Environmental Conditions

Item	Specifications
Noise immunity	ESD (IEC 61800-5-1, IEC 6100-4-2) EFT (IEC 61800-5-1, IEC 6100-4-4) Surge Test (IEC 61800-5-1, IEC 6100-4-5) Conducted Susceptibility Test (IEC 61800-5-1, IEC 6100-4-6)
Operating temperature	-10–50°C (temperature), 90% (humidity)
Storage temperature	-25–70°C (temperature), 95% (humidity)
Vibration/Shock resistance	International standards IEC 61800-5-1, IEC 60068-2-6/IEC 61800-5-1, IEC 60068-2-27

Electrical Specifications					
Item	Specifications				
Power supply voltage	5 V _{DC}				
Power consumption	0.8 W				
Insulation voltage	500 V _{DC}				
Weight (g; approx.)	27 (g)				

2 Product Appearance and Components

2.1 Exterior Dimensions



2.2 Introduction to Each Component



1.	Screw fastening hole	9.	Link PHY2 indicator (Port 2)	
2.	Positioning hole for communication card	10.	F/W indicator	

11.

12.

D/B indicator

PE grounding terminal

- 3. Control Panel connection port
- 4. RJ45 connection port (Port 2)
- 5. RJ45 connection port (Port 1)
- 6. BF out indicator
- 7. Ready out indicator
- 8. Link PHY1 indicator (Port 1)

2.3 LED Indicators

Name	Indicator Status		Indication
	Red LED	Always on	Disconnected with PROFINET Controller
BF (bus fault) indicator		Flashing	Normal connection, but abnormal communication with PROFINET Controller.
		Off	Normal connection with PROFINET Controller
RDY indicator	Red/Green	Always orange	PROFINET diagnostic
	LED	Always green	PROFINET card ready.
	Green LED	Always on	L/A1 has network signal.
L/A1 (Link/ Act1) indicator		Flashing	L/A1 is handshaking data.
		Off	L/A1 doesn't have network signal.
	Always on		L/A2 has network signal.
L/A2 (Link' Act2) indicator	Green LED	Flashing	L/A2 is handshaking data
		Off	L/A2 doesn't have network signal.

2.4 Definition of RJ45 Pin

RJ45 Pinout Diagram	PIN	Definition	Description
	1	Tx+	Positive pole for data transmission
	2	Tx-	Negative pole for data transmission
12345678	3	Rx+	Positive pole for receiving data
	4		N/C
	5		N/C
	6	Rx-	Negative pole for receiving data
	7		N/C
	8		N/C

2.5 MAC Address Definition



Definition		Description
	MAC1	Port 1 MAC Address
	MAC2	Port 2 MAC Address
	MAC3	Interface MAC Address

3 Installation and Wiring

This section introduces how CMM-PN02 connects to MS300/MH300 and to network.

3.1 Mounting Position of Communication Cards

MS300 Mounting Position of Communication Card



MH300 Mounting Position of Communication Card



3.2 Communication Cable

• Three types of cable length are available. As shown in the Fig.3-5, there are numbers on two ends of the communication cable near the connector. The connection methods of the communication card for different frames are shown in the table below. Read the descriptions and numbers on the cables before wiring.

	Mounting Position 1			Mounting Position 2		
Frame	Connect to control board connector	Connect to communication card connector		Connect to control board connector	Connect to communication card connector	
Α	1	2		3	4	
В	1	2		3	4	
С	3	4		3	4	
D	5	6		5	6	
E	3	4		3	4	
F	3	4		3	4	
Number 1, 3, 5: 0 control board c		Connect to Number 2, 4, 6: Connect to communication card connector		t to nector		
Core 2 2						
	Fig. 3-5					

3.3 MS300 Installation

3.3.1 MS300 Mounting Position 1 (See Section 3.1 for Details on Mounting Position) -Frame A–F

Installation method: **Back-mount** the communication card by connecting **flat cables** to the control board.

- Turn off the power of the motor drive, and then remove the front cover, as shown in Fig.3-6.
- Assemble the connection cable: Connect the connector at one end of the connection cable to the control board connector. Refer to Section 3.2 for more information on connection methods.
- Assemble the supported frame of the option card: Aim the two clips at the two slots on the motor drive, and then press downward to have the two clips engage the slots, as shown in Fig.3-7.
- Assemble the connection cable: Connect the connector at the other end of the connection cable to the connector of the communication card.
- Assemble the communication card: Have the terminal block and connector of the communication card face downward, aim the two holes of the communication card to the position column and press downward so that the three clips engage the communication card, as shown in Fig.3-8.
- Make sure that three clips properly engage the communication card and then tighten the screws (suggested torque value: 4–6 kg-cm [3.5–5.2 lb-in.] [0.39–0.59 Nm]), as shown in Fig.3-9.
- Assembly is completed, as shown in Fig.3-10.





3.3.2 MS300 Mounting Position 2 (See Section 3.1 for Details on Mounting Position) -Frame A–D (Not Applicable for Frame E and F)

Installation method: **Front-mount** the communication card by connecting **flat cables** to the control board.

- Turn off the power of the motor drive, and then remove the front cover, as shown in Fig.3-11.
- Assemble the communication card: Detach the upper cover of the mounting box for the communication card by slipping and make the terminal block and connector of the communication card face upward. Fix the front end of the communication card to the slots, and then rotate it, as shown in the Fig.3-12.
- Make sure that two clips properly engage the communication card on the backside, and then tighten the screws (suggested torque value: 4–6 kg-cm [3.5–5.2 lb-in.] [0.39–0.59 Nm]), as shown in Fig.3-13.
- Assemble the connection cable: Connect the connector at one end of the connection cable to the control board connector. Refer to Section 3.2 for more information on connection methods.
- Attach the front cover of the drive.
- Assemble the connection cable: Connect the connector at the other end of the connection cable to the connector of the communication card.
- Attach the upper cover to the mounting box for the option card, as shown in Fig.3-14.
- Assemble the mounting box for the option card: Aim the four clips of the mounting box for the option card at the slots on the upper cover of the motor drive, and then press downward to have the four clips engage the slots, as shown in the Fig.3-15.
- Assembly is completed, as shown in Fig.3-16.





3.4 MH300 Installation

3.4.1 MH300 Mounting Position 1 (See Section 3.1 for Details on Mounting Position) -Frame A–F

Installation method: **Back-mount** the communication card by connecting **flat cables** to the control board.

- Turn off the power of the motor drive, and then remove the front cover, as shown in Fig.3-17.
- Assemble the connection cable: Connect the connector at one end of the connection cable to the control board connector. Refer to Section 3.2 for more information on connection methods.
- Assemble the supported frame of the option card: Aim the two clips at the two slots on the motor drive, and then press downward to have the two clips engage the slots, as shown in Fig.3-18.
- Assemble the connection cable: Connect the connector at the other end of the connection cable to the connector of the communication card.
- Assemble the communication card: Have the terminal block and connector of the communication card face downward, aim the two holes of the communication card to the position column and press downward so that the three clips engage the communication card, as shown in Fig.3-19.
- Make sure that three clips properly engage the communication card, and then tighten the screws (suggested torque value: 4–6 kg-cm [3.5–5.2 lb-in.] [0.39–0.59 Nm]), as shown in Fig.3-20.
- Assembly is completed, as shown in Fig.3-21.



3.4.2 MH300 Mounting Position 2 (See Section 3.1 for Details on Mounting Position) -Frame A–D

Installation method: **Front-mount** the communication card by connecting **flat cables** to the control board.

- Turn off the power of the motor drive, and then remove the front cover, as shown in Fig.3-22.
- Assemble the communication card: Detach the upper cover of the mounting box for the communication card by slipping and make the terminal block and connector of the communication card face upward. Fix the front end of the communication card to the slots, and then rotate it, as shown in the Fig.3-23.
- Make sure that two clips properly engage the communication card on the backside, and then tighten the screws (suggested torque value: 4–6 kg-cm [3.5–5.2 lb-in.] [0.39–0.59 Nm]), as shown in Fig.3-24.
- Assemble the connection cable: Connect the connector at one end of the connection cable to the control board connector. Refer to Section 3.2 for more information on connection methods.
- Attach the front cover of the drive.
- Assemble the connection cable: Connect the connector at the other end of the connection cable to the connector of the communication card.
- Attach the upper cover to the mounting box for the option card, as shown in Fig.3-25.
- Assemble the mounting box for the option card: Aim the four clips of the mounting box for the option card at the slots on the upper cover of the motor drive, and then press downward to have the four clips engage the slots, as shown in the Fig.3-26.
- Assembly is completed, as shown in Fig.3-27.





3.4.3 MH300 Mounting Position 2 (See Section 3.1 for Details on Mounting Position) -Frame E and F

Installation method: **Front-mount** the communication card by connecting **flat cables** to the control board.

- Turn off the power of the motor drive, and then remove the front cover, as shown in Fig.3-28.
- Assemble the connection cable: Connect the connector at one end of the connection cable to the control board connector. Refer to Section 3.2 for more information on connection methods. Wire the cables as Fig.3-29 shows and make sure the core is placed in the groove.
- Assemble the communication card: Have the terminal block and connector of the communication card face upward. Fix the front end of the communication card to the slots, and then rotate it, as shown in the Fig.3-30.
- Make sure that the clip properly engages the communication card, and then tighten the screws (suggested torque value: 4–6 kg-cm [3.5–5.2 lb-in.] [0.39–0.59 Nm]), as shown in Fig.3-31.
- Assemble the connection cable: Connect the connector at the other end of the connection cable to the connector of the communication card, as shown in Fig.3-32.
- Assembly is completed, as shown in Fig.3-33.





3.5 Connecting to the Network



When the installation is finished, supply electricity to the drive. The Pr.09-60 of the drive should be able to display "PROFINET" with a current value of 12. If not, make sure your version of the drive is correct (MS300/MH300 needs v.2.04 or later versions) and the communication card is correctly connected.



4 MH300/MS300 Drive Settings

When you operate MS300/MH300 through CMM-PN02, you should set the communication card as the source of MS300/MH300 controls and settings. You need to use the keypad to configure the following parameter addresses to the corresponding values:

Keypad Parameter No.	Settings/ Displayed Value	Description of Function
Pr.00-20	8	Set communication card as the source of frequency command.
Pr.00-21	5	Set communication card as the source of control.
Pr.09-30 1		Decoding method is either 60xx or 20xx.
Pr.09-60 12		Communication card identification: When CMM-PN02 communication card is connected, the value of this parameter displays "12".

NOTE: To make PLC or the host controller to identify CMM-PN02, it is necessary to load the product description file of CMM-PN02 (GSDML). You can download it directly from Delta's official website.

5 PROFINET Communication Profile

This section describes the general setting model and the way to set the parameters of the motor drives by the host computer through CMM-PN02, refer to the following sections for the actual operations. This section is divided into the following items:

- 1. PROFINET comm. card info. (Identification & Maintenance functions (I&M))
- 2. MS300/MH300 real-time data access method
- 3. Motor drive handling during disconnection in synchronous mode
- 4. MS300/MH300 parameter reading and writing in non-real-time mode

5.1 PROFINET comm. card info. (Identification & Maintenance functions (I&M))

PROFINET provides Identification and Maintenance function (I&M) which supports machinery commissioning, parameter tuning and repairing. CMM-PN02 supports the I&M0 function which can be accessed using a read request from the I&M record. The following table shows the data structure when I&M0 record is returned:

Content	Size	Description	
Header	10 bytes	-	
Vendor ID	2 bytes	PROFINET Vendor ID of Delta, which is 0x03FB.	
Order ID	20 bytes	Order number	
Serial number	16 bytes	Serial number	
Hardware revision	2 bytes	Hardware revision	
Software revision	4 bytes	Revision of the software	
Soltware revision		(V1.2.3 shows four bytes in "V",1,2,3 sequence)	
Revision counter	2 bytes	Number of revisions	
Profile ID	2 bytes	0x00	
Profile specific type	2 bytes	No profile specific type (0x0000)	
I&M version	2 bytes	Version 1.1 (0x0101)	
Supported I&M functions	2 bytes	I&M0 is supported (0x0001).	

5.2 MS300/MH300 real-time data access method(List of control words and status words)

PROFINET communication provides a real-time channel (RT channel) for data transmission. After the host computer establishes this channel with the communication card, it can send and receive the data from the motor drive during a fixed period of time. CMM-PN02 provides the host computer with 60 bytes of input and output data through this channel according to the setting at Pr.09-30 of the motor drive. The corresponding methods are listed in the table below:

Output of host computer	Corresponding Address at the motor drive.	
Address Number	Pr.09-30 = 0	Pr.09-30 = 1
%Q (x + 0) ~ %Q (x + 1)	2000H	6000H
%Q (x + 2) ~ %Q (x + 3)	2001H	6001H
%Q (x + 4) ~ %Q (x + 5)	2002H	6002H
%Q (x + 6) ~ %Q (x + 7)	N/A	6003H
%Q (x + 8) ~ %Q (x + 9)	N/A	6004H
%Q (x + 10) ~ %Q (x + 11)	N/A	6005H
%Q (x + 12) ~ %Q (x + 13)	N/A	6006H
%Q (x + 14) ~ %Q (x + 15)	N/A	N/A
	N/A	N/A
%Q (x + 40) ~ %Q (x + 41)	user-defined address 1	user-defined address 1
	user-defined address n	user-defined address n
%Q (x + 54) ~ %Q (x + 55)	user-defined address 8	user-defined address 8
%Q (x + 56) ~ %Q (x + 57)	N/A	N/A
%Q (x + 58) ~ %Q (x + 59)	N/A	N/A

NOTE 1: x is the start address set by the host computer.

NOTE 2: The Q means output, one motor drive address corresponds to two bytes, and one host computer address corresponds to one byte in order of low byte to high byte.

NOTE 3: user-defined address can define the address of the motor drive in the host computer, for example, Pr.04-50 = 16#0432 = 1074, the more addresses are defined, the longer the synchronization time between the motor drive and the host computer. You can define the user-defined address in the TIA portal. Refer to the periodic communication in the next chapter.

Input of host computer	Corresponding Address at the motor drive.	
Address Number	Pr.09-30 = 0	Pr.09-30 = 1
%l (y + 0) ~ %l (y + 1)	2100H	6100H
%I (y + 2) ~ %I (y + 3)	2101H	6101H
%l (y + 4) ~ %l (y + 5)	2102H	6102H
%l (y + 6) ~ %l (y + 7)	2103H	6103H
%l (y + 8) ~ %l (y + 9)	2104H	6104H
%I (y + 10) ~ %I (y + 11)	2105H	6105H
%I (y + 12) ~ %I (y + 13)	2106H	6106H
%l (y + 14) ~ %l (y + 15)	2107H	N/A
	210xH	N/A
%I (y + 30) ~ %I (y + 31)	210FH	N/A
%I (y + 32) ~ %I (y + 33)	N/A	N/A
	N/A	N/A
%I (y + 40) ~ %I (y + 41)	user-defined address 1	user-defined address 1
	user-defined address n	user-defined address n
%l (y + 54) ~ %l (y + 55)	user-defined address 8	user-defined address 8
%I (y + 56) ~ %I (y + 57)	N/A	N/A
%l (y + 58) ~ %l (y + 59)	N/A	N/A

NOTE 1: y is the start address of the host computer.

NOTE 2: The I means input, one motor drive address corresponds to two bytes, and one host computer address corresponds to one byte in order of low byte to high byte.

NOTE 3: User-defined address can define the address of the motor drive in the host computer. For example, Pr.04-50 = 16#0432 = 1074. The more addresses are defined, the longer the synchronization time between the motor drive and the host computer. You can define the user-defined address in the TIA portal. Refer to the periodic communication in the next chapter.

Refer to the MS300/MH300 user manual for more information on the 200xH, 210xH, 600xH, 610xH addresses mentioned in the table above.

5.3 Motor Drive Handling when Disconnection

If the PROFINET card is disconnected after the motor drive is connected to the PROFINET card, it will trigger Eccb. After the card has established real-time channel with the host computer, if it is found that it can no longer transmit real-time data normally, the motor drive will be notified and Ecto will be triggered by the motor drive. When the two fault codes above are triggered, the motor drive will stop.

This communication card accomplishes non-real-time data transfer through PROFINET's Record Data Object. During the transmission, the host computer sends a Write/Read request through the service and operation fields. The request should access the Record Data Object 0x4D2 defined by CMM-PN02, and specify the read/write action of the parameters of the motor drive through the different contents of the Data Block. After the request is sent, if there is no problem with the packet and the CMM-PN02 is not busy, the card will reply with a Write/Read Response to let the host computer know the packet has been received.

Field(s)	Description	Range	Туре
Service	Request or Response service.	Request (0x00) Response (0x80)	UI8
Operation	Read or Write operation.	Write (0x08) Read (0x09)	UI8
Block Length	Length of the block.	00xFFFF	UI16
ARUUID	Identifier - time low - time mid - time high and version – clock – node	-	UI32 UI16 UI16 Qctet[2] Qctet[6]
API	Application Process Identifier	Device Access Point (0x000) PROFIdrive (0x3A00)	UI32
Slot	Slot of the Module Access Point (MAP/PAP)	0x01	U16
Sub-slot	Sub-slot of the Module Access Point (MAP/PAP)	0x01	U16
Padding	2 bytes		
Index	Index of the Record Data Object	0x0001–0x7FFF 0xB02E	U16
Data length	Length of the data block	00xFFFFFFF	UI32
Additional value 1 (response only)	Field for transferring additional data	-	UI16
Additional value 2 (response only)	Field for transferring additional data	-	UI16
Padding	24 bytes for request; 20 bytes for response.		
Data block	Used only with request and read response.		

When the host computer writes parameters, the content and flow of the data block should be as shown below:



When the host computer needs to read the parameters, the data block content and the flow are as follows. It needs to use write request to notify CMM-PN02 to read the parameters of the motor drive, and then use read request to read the parameters. Note that after telling the motor drive to read the data, CMM-PN02 needs some time (more than 5ms) to receive the data from the motor drive, and if there is read/write during this time, the data will be incorrect.



Write req. Data block	
16# FF	(must be FF)
16# 03	To read(must be 03)
16# 04	VFD parameter address (high)
16# 32	VFD parameter address (low)
Read resp. Data block	
16# AB	VFD parameter value (high)
16# CD	VFD parameter value (low)

6 Connection Configuration to Host Controller

This section introduces how Siemens STEP 7 and TIA PORTAL PLC integral software, as well as Siemens PLC S7-300 and S7-1500 use PROFINET to connect MS300/MH300 drives. The connection configuration shows as the figure below. Siemens PLC connects CMM-PN02 communication card of MS300/MH300 drive through the EtherNet.



6.1 Basic Configuration

- The Settings for Communication
- 1. Start your PC and set IP address configuration as static IP address. It is recommended to set the address to 192.168.xxx.xxx in the red box as the figure below shows.

Internet Protocol (TCP/IP) Pr	operties ? 🔀
General	
You can get IP settings assigned a this capability. Otherwise, you nee the appropriate IP settings.	automatically if your network supports d to ask your network administrator for
🔘 Obtain an IP address automa	atically
✓ ● Use the following IP address:	·
IP address:	192.168.16.201
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	
O Obtain DNS server address a	automatically
Our Contract → Con	r addresses:
Preferred DNS server:	
Alternate DNS server:	
	Advanced
	OK Cancel

 Use Siemens STEP 7 to look up the host controller's IP address. In the screen of HW Config, perform the function under PLC→EtherNet→Edit EtherNet Node as the figure below shows.

🖳 HW Config - [SIMATIC 300 Station (Configuration) S7_0508	F1]	
🕅 Station Edit Insert PLC Yiew Options Window Help		_ = ×
Download Ctrl+L		
Upload		Hardware Catalog
Download Module Identification		End: nt ni
2 Upload Module Identification to PG	_	Pmfile: Standard
XI MPIA Faulty Modules	_	
X2 PV-IC Module Information Ctrl+D		W PROFIBUS-PA
XZ PZ Operating Mode Ctil+I	🖂 (1) Delta	ROFINET IO
3 Set Time of Day		E SIMATIC 300
Monitor/Modify		E SIMATIC PC Based Control 300/400
Update Firmware		SIMATIC PC Station
Save Device Name to Memory Card	-	
Fthernet	Edit Ethernet Node	
	Unit Douine News	
<u>FROFIBUS</u>	Assign Device Name	
Save Service Data		
Slot M. Order number I address Q address Diagnostic:	address: Comment Access	
XI PN-IC 2041*	Full	
XI A Port 1 2040*	Full	
I INOL 256575 256575	Full	
		PROFIBUS-DP slaves for SIMATIC S7, M7, and C7 (distributed rack)
		<u></u>
Displays the address of the station(s) on Ethernet to be changed		
🛃 🖽 🖉 🧑 👘 SIMATIC Managar - S 🕠 H	W Config - ISIMAT	

Click Browse button to search the available device on the Internet.

H W Config - [SIMATIC 300 Station (Configuration) - S7_PN_		- C 🔀
Station Edst Insert ELC Yiew Options Mindow Help		_ 6 x
□ ☞ ≌~ ♥ ♥ ● ● ● ● ▲ ▲ ● □ % №?		
- m IIP		
	Edit Etheraet Note	at ni
2 CPU315-2 PN/DP	Ethemet node Nodes accessible online	e: Standard 💌
XI MPLOP X2 PN-JO X2 PI Port I	MAC gddress:	PROFIBUS DP PROFIBUS-PA
X2 F2 Povt 2	Set IP configuration	Additional Field Devices
	(* Use IP parameters	🖻 🧰 Delta Development Toolkit
	IP address: Gateway	
	Subnet mask:	
	Addrgar.	• HMI
	C Obtain IP address from a DHCP server	+ Detwork Components
	Identified by	Sensors Switching devices
<	C Clent ID C MAC address C Degice name	SIMATIC 300
(1) Delta	Cliegt ID:	SIMATIC 400 SIMATIC PC Based Control 300/400
Slot M. Order number I address Q address Diagnostics	Assien IP Conferences	SIMATIC PC Station
0 Delta 1234567 2042*		
X1 A Port 1 2040*	Assign device name	
2009* 1 1400 256575 256575	Device name: Assign Name	
	Reset to factory settings	
	Help	
	12	⊒ 34567 Ma Flastonnice Inc.
	D.	ha Development Toolkit SDML-V2 31-Delta-IO-Template-20170307 xml
Press F1 to get Help.	<u> </u>	
🛃 🕅 🏠 🌈 🔨 🚺 SIMATIC Manager 🦉 Edi	Ethemet Node J. 😂 0524 🔯 H.W. Config - [SIMA 🔥 #8865#88	□ 日 2 2 単語も多に気() > 器 上午 0931

When it finishes searching, a screen displays as shown in the figure below. The IP address displays 192.168.16.26.

If the IP address of your computer is set as a different one, it is recommended to reset your PC's IP address to make it consistent with PLC's domain.

📸 H 🗑 Config - [SIMATIC 300 Station (Configuration) S7_0508	1]	- 8 🗙
🖬 Station Edit Insert PLC Yiew Options Window Help		_ # ×
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		men a co de factor de Tit sera

NOTE: If the IP address of your computer is different from PLC's domain, you are unable to download the program to PLC.

3. Using Siemens TIA PORTAL to search PLC IP address. Start TIA PORTAL, select

Online & Diagnostics, and then click Project view.

M Siemens		_=×
		Totally Integrated Automation PORTAL
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Online & Diagnostics		
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	1.5	
▶ Project view		

Select **Online access**, choose your PC network interface card, and then click **Update accessible devices** continuously to search PLC.

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NOTE: When you start TIA PORTAL, do not enable wireless network because it may lead to TIA PORTAL's false detection. If it happens (physical interface card cannot be found), close the wireless network connection first and then restart TIA PORTAL.

4. Modify the name of CMM-PN02. The steps are the same as those for setting PLC address.

For STEP7, set the drive name as the figure below shows.

🙀 H 🦉 Config - [SIMATIC 300 Station (Configuration) S7_PN_T	st]	- a 🗙
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■0) UR	Edit Ethernet Node	- <u> </u>
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<u>A2F2</u> <u>3</u> <u>·</u>	Set IP configuration	Additional Field Devices
	© Use IP parameters	Delta Development Toolkit
	IP address: Gateway	
Set IP Address	Subnet mask: 255 255 255 0 C Use router	TPS-1 Development Toolkit Gateway
Set IF Address	Address 192.168.0.2	I HMI I IO
	C Obtain IP address from a DHCP server	Network Components
	Identified by	Sensols Switching devices
	Class TD C MAC address C Device name SI	MATIC 300 MATIC 400
(1) Delta		MATIC PC Based Control 300/400 MATIC PC Station
Slot M. Order number laddress Q address Diagnostic a 0 Delta 1234567 2042*	Assign IP Configuration	
XI PW-IC 2011* XI A Port I 2040*	Assign device name	
X1 Fort2 2039*	Device name: delta Assign Name	
		Cathle during many
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Press F1 to set Help.	JOSPIL	
🔢 開始 🌔 🧭 😺 SIMATIC Manager - 🛛 🦉 Edit	ithernet Node2 🎓 0524 🙀 HW Config - [SIMA 🕓 網路連線	🖿 🛛 🏅 🕑 服金 シンシン図 > 🏭 上午 09-35

For TIA PORTAL, set the device name of the host controller or CMM-PN02 as the figure below shows.

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Project Edit View Insert Online Options 1 Project 📑 🎦 💭 Save project 🔳 🐰 🗐 🋍 🗙 沟 ±	cols Window Help (연호 집 []] [] 및 및 정 Ø Goonline Ø Gooffine 🚮 [] [] [] [] [] [] [] []	Totally Integrated Automation PORTAL
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Devices		Options
Devices	Diagnostics General Diagnostic status Module Short designation: CPU 1516-3 PNIDP Article number: 6E57 516-3AN01-0AB0 Display PROFINET interface[X1] FIRTWARE: 3 PROFINET interface[X2] FIRTWARE: 3 Satisfies Assign name Reset: 0 Slot: 1 Module information Module information	Options CPU operator panel plc_1.profinet interface_2[192.16 RUN / STOP RUN ERROR STOP MAINT MRES Mode selector: RUN
	Device name: Module name: PLC_1 Plant designation: Location ID: Installation date: Wednesday, July 26, 2017 04:37	
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	General Functions Assign IP address Assign name Reset to factory settings	Module Short designation: Delta-40 Module information Device name: delta Manufacturer Information Manufacturer description:	CPU operator panel Not supported
Ling USB (S7USB) Ling TeleService (Automatic protocol detection)		Module role: Device	✓ Cycle time
▶ [∰ Card ReaderiUSB memory			Not supported

6.2 Speed Mode DEMO (S7-300 + STEP 7)

■ Using Siemens STEP 7 to finish PLC setting, connection test, and speed mode DEMO



a

SIMATIC Manager		_ ð
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	STEP 7 Wizard: "New Project"	
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	CPU315-2 PMDP 6ES7 315-2EH14-0AB0 CPU316-2 DP 6ES7 316-2AG00-0AB0	1. Select CPU Type and Order No.
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	Pieview<<	
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SIMATIC Manager		22
File PLC Yiew Options Window Help		
	STEP 7 Wizard: "New Project"	
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	OB10 Inve of Dey Interrupt 1	
	OB12 Time of Day Interrupt 2 OB13 Time of Day Interrupt 3	
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	• SIL CLAD CEBD	1. Geleci the Language for Gelecied Diocks
	Cueste with source files	
	S7_Paol Block Name Symbolic Name	
	SIMATIC 300 Station OB1 Cycle Execution TOP	
	S? Program(1) Blocks	
	<u>Pask</u> <u>Next</u> Physic Cancel Help	
	2. Select Next	
Press F1 to get Help.	ТСР/ЛР -> Вгое	dcom NetXtreme Gig

CMM-PN02 Operation Manual

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File PLC View Options Window Help				
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	STEP 7 Wizard: "New Pro What do you want to o Project name: Raising projects:	oject" sall your project? S7.PN_Test Mohav-Ti-Manvus	4(4) 1. Enter F	^o roject name
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rress Fi to get Help.			TCP/IP -> Broadcom NetXtreme (jig
SIMATIC Manag	er 🍟 4_new project wizard J. 🙆 0524			2 7 11 11 11 11 11 11 11 11 11 11 11 11 1

In HW Config, install GSDML and set up PROFINET framework as the figure below shows.

🌄 SIMA T	IC Manage	r - S7_PN_Test					
<u>File</u> Edit	Insert PLC	<u>V</u> iew Options <u>W</u> indow	Help				
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MS300/MH300 PROFINET Communication Card CMM-PN02

IN HT	Config - [SIMATIC 300 St	tation (Configuration) S	7_PN_Test					
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0		Customize	Ctrl+Al	t+E				
1 2	0) UR	Specify Module Configure Network Symbol Table Report System Error	Ctrl+A	t+T				Find: Erotile: Standard
XI	MEI/DP PN-10 PI Port 1	Edit Catalog Profile Update Catalog						PROFIBUS DP
12	? P2 Port 2	Install HW Updates		_				ROFINET IO SIMATIC 300
1		Install <u>G</u> SD File			Select GS	DML-V2.31-	Delta-ACMD_C2000-20171018.xml	E SIMATIC 400
		Find in Service & Suppor	t					SIMATIC PC Based Control 300/400 SIMATIC PC Station
		Create GSD file for I-Dev	ice					
Slot	(0) UR	Order number	Finnware	MPI address	I address	Q address	Comment	
2	CPU315-2 PN/DP 6	ES7 315-2EH14-0AB0	¥3.1	2				
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<u> </u> <u>11</u>								PROFIBUS-DP slaves for SIMA TIC 57, M7, and C7 (distributed rack)
Installs	new GSD files in the system and up	pdates the contents of the catalo	g.		Low			
1	Fika 🜔 🕑 🛛	SIMATIC Manager - S	🕤 İnsert i	'N IO System JP	0524		HW Config - [SIMAT	IIII · IIII · · · · · · · · · · · · · ·

When the installation of GSDML is completed, the right side in the figure below displays.

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MS300/MH300 PROFINET Communication Card CMM-PN02



다. IW Config - [SIMATIC 300 Station (Configuration) S7_PN_1	est]		
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Image: Control of the second secon	Note: As the host controller's IP address setting, you must same domain to connect your Properties - Ethernet interface Pt General Parameters IP address: Subnet mask: 19216801 Subnet mask: 255 255 0 Subnet: OK	IP address depends on this use the IP address in the PC to the host controller.	■ 本 End: Profile: Standard ProFIBUS DR ProFIBUS PA ProFIBUS PA ProFIBUS PA Delta Development Toolkit ● Delta Development Toolkit ● Delta IO Templak V1.0 ● Moke IO Device ● TPS-1 Development Toolkit ● Gateway ● HM I DO N Network Components Senore Switching devices SIMA TIC 2400 SIMA TIC PC Station 按下New按键進行下一步
10 11 Press F1 to get Help. 11			PROFIBUS-DP slaves for SIMA TIC S7, M7, and C7 (distributed rack)



B H W Config - [SIMATIC 300 Station (Configuration) S7_PN_T	est]		
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Image: CPU315-2 PM/DP XI M2/DP X2 PN4/O X2 PI Port I 22 P2 Port 2			End: Profile: Standard Profile: Standard PROFIBUS.PA PROFINET IO PROFINET IO PROFINET IO
	Properties - Ethernet interface PN-IO (R)	0/82.2)	
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10 11			PROFIBUS-DP slaves for SIMATIC S7, M7, and C7 (distributed rack)
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Press F1 to get Help.			
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MS300/MH300 PROFINET Communication Card CMM-PN02



NOTE: The host controller in PROFINET communication is identified by the name in communication cards. Therefore, if it does not match to the settings of the host controller, the communication fails.

Then, you can use **Compile** and **Download** icon to compile and download programs.

: Compile

i Download

When the program finishes downloading, you have to switch S7-300 to STOP Mode to be back at RUN Mode. If there is no problem with CMM-PN02 communication, the status of LED indicators for S7-300 shows as the figure below.



■ Testing the Start and Stop of the Drive

To verify if the host controller can control the drive through CMM-PN02, you must write the PLC program.

For STEP 7, the program-editing screen below illustrates an example of writing a program by using 60xx message format.

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- 1. PIW260 means 6102H (actual output frequency).
- 2. PQW256 means 6000H (control word).
- The writing of the program explains as follows.
 OB1 Program (Main Loop) is explained as follows:
 - a. Judging if PIW260 (6102H) equals to 6000. If YES, PQW256 (6000H) equals to 128 (0x80), which means the drive stops running; if NO, go to RES label;
 - b. Judging if PIW260 (6102H) equals to 0. If YES, PQW256 (6000H) equals to 129 (0x81); if NO, go to END label;

Therefore, the drive performs continuous actions of running until stop, and then starts running again.

Below is the STEP 7 program-editing screen and an example of writing a program by using 20xx message format.

🗱 LAD/STL/FBD - [OB1 "Cycle Execution" S7_0508-1\SIMATIC 300 Station\CPU315-2 PN/DP\\OB1]	
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L 6000	
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L PIW 282	
JCN END	
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	Internet Internet

- 1. PIW282 means 2103H (output frequency).
- 2. PQW276 means 2000H (control word).
- 3. The writing of the program explains as follows.
- OB1 Program (Main Loop) is explained as follows:
 - a. Judging if PIW282 (2103H) equals to 6000. If YES, PQW276 (2000H) equals to 1, which means the drive stops running; if NO, go to RES label;
 - b. Judging if PIW282 (2103H) equals to 0. If YES, PQW276 (2000H) equals to 2, which means the drive starts running; if NO, go to END label;

Therefore, the drive performs continuous actions of running until stop, and then starts running again.

6.3 Speed Mode DEMO (S7-1500 + TIA PORTAL)

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Select Project view.



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Portal view		

Select the path to save the GSDML file, select the GSDML file required to install, and then click **Install** button.

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When the installation is completed, select **Devices & networks** and double-click it to check if the screen below displays. If the following screen displays, the installation is completed. If not, you must install again.

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Select and double-click Add new device, the figure below displays.

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Select PLC's article No. and firmware version.



After you click **OK** button, a screen displays as shown in the figure below.

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In the screen above, select **Network view**, a screen displays as shown in the figure below.

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When the dragging is completed, a screen displays as shown in the figure below.

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Then, a screen displays as shown in the figure below. If not, remove the drawing line and try another network interface. (It must be exactly the same as the figure below shows so the PROFINET framework is successfully completed.)

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Double-click on the icon of CMM-PN02 card and enter the Device view, you can set the address x,y of the motor drive as described in Chapter 5 in the green box below. Besides, if your PLC has more than one POU, you can select the POU that the IO read/write corresponds to in the green box below.

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General IO tags System constants	Texts						
General							
Hardware interrupts							_
Module parameters Input addresses	es						
	Start address: 200						
	End address: 259						
Or	ganization block: Main						
•	Process image: PIP 1						
Output addre	sses						
	Start address: 200						
	End address: 259						
Or	ganization block: Main						
	Process image: PIP 1						

Now you can start to test the connection. Follow the steps as shown in the figure below to compile and download.

M Siemens - C:\Users\marcus.lu\Documents\Automation\Project12\F	oject12		_ #X
Project Edit View Insert Online Options Tools Window He Project Edit View Insert Online Options Tools Window He	a 🖉 🙀 🕼 Go online 🖉 Go offline 🛔 🖪 🖪 😵 🚍 🛄		Totally Integrated Automation PORTAL
Project tree II Project124 De	ices & networks	_ . .	Hardware catalog 🛛 🗊 🕨
Devices	🛃 Topology vie	w 🛔 Network view 🛯 Device view	Options 🖭
📑 🖸 🖸 🚺 📰 🖬 Network	onnections 🔣 HMI connection 💌 🕎 📆 🕄 🔍 🛨	🔤 🛛 Network ove 🗸 🕨	Hara
201	4 IO system: PLC_1.PROF	NET IO-System (100) 🛆 🛛 💡 Device	✓ Catalog
Project12		■ \$71500/ET2.	_ ⊲earch> 🙀 🕅
Add new device	Della Companya	▶ PLC_1	Eiltar
Devices & networks	Delta IO Templa	▼ GSD device	
■ PLC_1 [CPU 1516-3 PN//DD1 1		Delta	
Device configur	Export module labeling strips		
Onen block/PLC data type F7	Q Properties Alt+Enter	-	Diversion Casterna
Program blocks		*	Natural agenters
Technology obj(% Cut Ctri+X Ctri+X Ctri+X			Detecting & Menitoring
External source Copy Ctri+C			Distributed I/O
PLC tags			Field devices
Lee PLC data types X Delete Del			Charfield devices
Watch and force Rename F2			
Online backups Provide Go to topology view	> 100%		i i i i i i i i i i i i i i i i i i i
Go to network view 2	3		l sk
Program info	Hardware and software (only changes)	🚺 Info 追 🗓 Diagnostics	۱ <u>۳</u>
Device proxy da Download to device	Hardware (only changes)		
PLC alarms Backup from online device	Hardware (rebuild all)		1 1
🛅 Text lists 💋 Go online Ctrl+K	Software (only changes)		i i i i i i i i i i i i i i i i i i i
Go offline Ctrl+M	Software (rebuild all blocks)		- In Inc.
Details view Online & diagnostics Ctrl+D	Software (reset memory reserve)	Go to ? Errors Warnings	ŭ
🕵 Snapshot of the monitor values			
Name Apply snapshot values as start values			
Device configuration			
U Online & diagnostics			
Program blocks			
Technology objects			
External source files			> Information
Print Ctrl+P			t Project1 2 energed
Portal view		V Projet	tt Project 12 opened.
😚 🤗 🖩 💿 收件匣 🧿 S 商務 🕌 PROFL.	PROFL 🥪 自動 🕢 未命 🕫 未命 📢 PROFL.	📲 DELT 🌇 Sieme 🗣 剪取 🗣 剪取	다 🖆 🕐 🏅 🖕 上午 10:58

When S7-1500 is successfully connected, the status of LED and LCD panel shows as the figure below.



■ Testing the Start and Stop of the Drive

To verify if the host controller can control the drive through CMM-PN02, you must write PLC program.

For TIA PORTAL,	the program-editing s	screen below	illustrates a	an example of	writing a pro	ogram
by using 60xx mes	ssage format.					

V۵	Siemens - C:\Users\marcus.lu\Documents\Auto	omation\3aı	n01_20>	xx\3an0	1_20xx										- 1	'×
Pr	roject Edit View Insert Online Options	Tools Wind	dow He	elp								Tot	ally	Integrated Autom	ation	
	🕙 🎦 🔚 Save project 💄 🐰 🗉 🛅 🗙 🌎 :	• (* ± 🖥) 🖳 📮	🖡 💋 Go onl	ine 🔊 Go offline	拾 🖪 🖪 🗶					100	any	F	ORTAI	
	Project tree	(3an01_2	20xx ≯	PLC_1	[CPU 1516	-3 PN/DP] 🕨 Pro	ogram blocks 🔸	Main [OB1]				_ # =>	< Ir	nstructions	∎ ∎ ►	
	Devices												0	ptions		
	B O O E E	i ing ing		₽₀	= 🚍 🚍 🛛	🔊 📲 ± 📲 ± 🔚	😥 🥙 💊 🖑	영문 😍 🧤 🍾 🖉	e 😴 🛛	2				•		Inst
2		Main											>	Favorites		
Ē	▼ 🔄 3an01_20xx	~ Ni	ame			Data type	Default value	Comment					V	Basic instruction	15	١ <u>ٿ</u>
l le	💣 Add new device							•				in the second se	nii Na	ame		5
5	Devices & networks	CALL												Bit logic operatio	inc	
L =	PLC_1 [CPU 1516-3 PN/DP]												-	Timer operations		<u>ę</u> ,
ĬĔ	Device configuration	= ·										•	<u>-</u>	+1 Counter operatio	ins	e
	😵 Online & diagnostics	▼ Ne	twork 2	2:										Comparator oper	rations	stin
	🔻 🛃 Program blocks	Con	nment										•	1 Math functions		9
	💣 Add new block												•	Move operations		
	📲 Main [OB1]		1	L	"Tag_4"					\$IW260			•	Conversion oper	ations	
	Technology objects		3	T	6000					6000			•	Program control	operati	้อร
	External source files		4	JCN	RES								•	Word logic opera	tions	ks
	PLC tags		5	L	128					128			•	ETC Legacy		
	PLC data types		6	т	"Tag_5"					%QW256			•	STL Mnemonic		
	Watch and force tables		7 RES:	: NOP	0									_		E
	Online backups		8	L	"Tag_4"					%IW260						rar
	Traces		9	L	0					0			=			ies
	Program info	1	0	==I	PND											
	Device proxy data	1	2	T	129					129						
	PLC alarms	· 1	3	т	"Tag 5"					\$0W256						
	✓ Details view	1	4 END:	NOP	0					-						
		1	5													
	Name Address								100%		-		Ě.	1		
			_	_				[100%		i	<u></u>			>	
								Q. Properties	i Inf	o 追 🛛 🖞 Dia	gnostics			Extended instruct	ctions	
		Gener	ral 🔒	Cross	-references	Compile	Syntax						>	Technology		
			1 Sho	ow all me	ssages								>	Communication		
													>	Optional packag	jes	
	Portal view 🔣 Overview	- Main									<	Project 3an(01_20	0xx opened.		

- 1. IW260 means 6102H (actual output frequency).
- 2. QW256 means 6000H (control word).
- 3. The writing of the program explains as follows.

OB1 Program (Main Loop) is explained as follows:

- a. Judging if IW260 (6102H) equals to 6000. If YES, PQW256 (6000H) equals to 128 (0x80), which means the drive stops running; if NO, go to RES label;
- b. Judging if PIW260 (6102H) equals to 0. If YES, PQW256 (6000H) equals to 129 (0x81); if NO, go to END label;

Therefore, the drive performs continuous actions of running until stop, and then starts running again.

Example 2: (output deviation x = output deviation y =276)

Below is the TIA PORTAL program-editing screen and an example of writing a program by using 20xx message format.

Mi Siemens - C:\Users\marcus.lu\Documents\Auton	ation\3an01_20xx\3an01_20xx	_ 🖬 >
Project Edit View Insert Online Options To	ols Window Help	Totally Integrated Automation
📑 📑 🖬 Save project 📕 🐰 🗉 🗎 🗙 🍤 🛨	🖓 🗄 🛄 🛅 🖳 🔊 Goonline 🖋 Gooffline 🏰 🖪 🖪 😵 📃 🛄	PORTAL
Project tree 🔲 🖣	3an01_20xx → PLC_1 [CPU 1516-3 PN/DP] → Program blocks → Main [OB1]	💶 🖬 🗮 🗙 Instructions 🛛 🔳 🕨
Devices		Options
	성 전 관 관 백 臣 🛱 늘 💬 웹 ± 월 ± 🗐 😥 ピ 등 센 얘 정 님 님 음 જ 1월	5 · · · · · · · · · · · · · · · · · · ·
2	Main	> Favorites
▼ 📑 3an01_20xx 🔨	Name Data type Default value Comment	✓ Basic instructions
Add new device		Name
Devices & networks		Ceneral
PLC_1 [CPU 1516-3 PN/DP]		Bit logic operations
🗧 📑 Device configuration	•	Imer operations
🖳 Online & diagnostics	 Network 2: 	Counter operations
🔻 🛃 Program blocks	Comment	Comparator operations
📥 Add new block		Math functions
🏤 Main [OB1]	1 L "Tag_3" %IW282	Move operations
Technology objects	2 L 6000 6000	Conversion operations
External source files		Program control operation
🕨 🚂 PLC tags	5 T. 1 1	Word logic operations
E PLC data types	6 T "Tag 2" \$0%276	Shift and rotate
Watch and force tables	7 RES: NOP 0	Find Legacy
Online backups	8 L "Tag_3" %IW282	
🕨 🔄 Traces	9 L 0 0	=
🔤 Program info	10 ==I	
Device proxy data	11 JCN END	
M PLC alarms		
✓ Details view	13 1 149_2 \$\$\vert vert vert vert vert vert vert vert	
		×
Name Address	100%	······································
	🔍 Properties 🚺 Info 🔒 💟 Diagnos	tics I = V Extended instructions
	General i Cross-references Compile Syntax	> Technology
	Show all messages	> Communication
		> Optional packages
Portal view Dverview	Main	✓ Project 3an01_20xx opened.

- 1. IW282 means 2103H (output frequency).
- 2. QW276 means 2000H (control word).
- 3. The writing of the program explains as follows.
 - OB1 Program (Main Loop) is explained as follows: a. Judging if IW282 (2103H) equals to 6000. If YES, QW276 (2000H) equals to 1, which
 - means the drive stops running; if NO, go to RES label;b. Judging if IW282 (2103H) equals to 0. If YES, QW276 (2000H) equals to 2, which means the drive stars running; if NO, go to END label;
- Therefore, the drive performs continuous actions of running until stop, and then starts running again.

Example 3: (Output deviation X = Output deviation y = 200)



If you use a ladder diagram, you can implement the program below.

The first row maps 2105H of the motor drive through %IW210, %IW240, %IW254. It defines read parameter 1 and read parameter 8 and puts them into internal variable %MW.

The second to third rows are for the motor drive control writing. Take address 2000 as an example, when the second row indicates 0~3 seconds, use %QW200 to map 2000H to start the motor drive. Then use %QW202 to map 2001H of the motor drive to set the frequency command to 11.01Hz. When the third row indicates 3~12 seconds, stop the motor drive and set the frequency command to 32.01Hz.

The fourth row and the fifth row are for the motor drive periodic parameter writing. Increase %QW240 and %QW252 regularly so that the motor drive's user-defined writing parameter 1 and user-defined writing parameter 7 can be increased.

NOTE: For the address setting of the user-defined parameters, refer to the description of parameter reading and writing in the following sections.

6.4 Demonstration of Reading/Writing Synchronous and Asynchronous Parameters (S7-300 + TIA PORTAL)

■ Settings for Reading and Writing Synchronous Parameters of the Drive

The following example is demonstrated by using Siemens CPU315-2 PN/DP and TIA Portal V13 SP1. Refer to examples from previous chapter for the periodic programming implementation.

1. Follow the four steps as shown in the figure below to open Module Parameters.

Project Edit View Insert Online Options	Tools Window	Help	nline 🖉 Go offline 🛛 🛔 📭	× = 11			Totally Integrated /	Automation PORTAL
Project tree	□	.C_1 [CPU 315-2 PN	I/DP] > Distributed I/O > PR	OFINET IO-System (10	0): PN/IE_1 → delta	_ = = ×	Hardware catalog	∎ 🗉 🕨
Devices			21	Topology view 🛔 🛔	Network view 🛛 🕅 De	evice view	Options	l
B 0 0	🔳 🖬 👪 🗖	elta		: 🖬	Device overview	1		
Acyclic_Write_Test Add new device Devices & networks Englec_1 [CPU 315-2 PN/DP]		Barb	-		Module delta PN-IO IN/OUT_1		 ✓ Catalog <search></search> ✓ Filter → ☐ Head module 	ing and
Device configuration Device configuration Device configuration Device configuration Device for the device of the device o		•						
Watch and force tables Watch and force tables Witch and force tables Witch backups Witch and force tables Program info PLC alarms		_1 [Module]	> 100%	▼ 3	< III) 		
Text lists Text lists Time Local modules Time Distributed I/O Time Common data Time Common data Time Common data	✓ Gene Ca Input	ral talog information	Module parameters Device Specific Parame	ters				
Canguages & resources Canguages & resources Canguages Card Reader/USB memory	- 1/O ac	dresses	Data Inputi (VFD->PI Data In Data In Data In Data In Data In	NO1): 65535 put2: 65535 put3: 65535 put4: 65535 put4: 65535				
> Details view			< m			>	> Information	
Portal view Overview	💶 Main	Watch table_1	delta			🗸 Pro	ject Acyclic_Write_Test open	ed.

2. The figure below shows a complete parameter table. You can synchronously read or write the parameters of the drive by setting up this table. If the value of the parameters is 65535(0xFFFF), there is no parameter reading or writing.

IN/OUT_1 [M	odule]		Rec Pro	perties	🗓 Info 🕦 🗓 Diagnostic	s 🗖 🗖 🖛
General	IO tags	System constants	Texts			
- General		Module parameter	s			^
Catalog in Inputs Module para	nformation	Device Specific	Parameters			=
I/O addresse	s	Data Input	I (VFD->PN01):	65535		
			Data Input2:	65535		
			Data Input3:	65535		
			Data Input4:	65535		
			Data Input5:	65535		
			Data Input6:	65535		
			Data Input7:	65535		
			Data Input8:	65535		
		Data Output	(PN01->VFD):	65535		
		C	Data Output2:	65535		
		C	Data Output3:	65535		
			Data Output4:	65535		
		C C	Data Output5:	65535		
		C	ata Output6:	65535		
		C	ata Output7:	65535		
			ata Output8:	65535		
						~
		< III				>

3. The figure below shows that you read Pr.01-00, Pr.01-10 and Pr.09-00 and write Pr.01-00 and Pr.09-00.

Device Specific Parameters		
Data Input1(VFD->PN01):	256	01-00(0x0100)
Data Input2:	266	01-10(0x010A)
Data Input3:	65535	
Data Input4:	65535	
Data Input5:	65535	
Data Input6:	65535	
Data Input7:	65535	
Data Input8:	2304	09-00(0x0900)
Data Output1(PN01->VFD):	256	01-00(0x0100)
Data Output2:	65535	
Data Output3:	65535	
Data Output4:	65535	
Data Output5:	65535	
Data Output6:	65535	
Data Output7:	65535	
Data Output8:	2304	09-00(0x0900)

Thus, to synchronously read or write the drive parameters through the PLC program, simply add 40 bytes to the start address of the I/O address. The added value is the home position of the parameter table. Take the figure above as an example, to read the values from Pr.01-00 in the PLC program, read %IW296:P. Similarly, to write the values in Pr.01-00 in the PLC program, write %QW296:P.

If you do not know the start address of the I/O address, refer to the figure below and follow the four steps to open the I/O Address.

oject Edit View Insert Online O	tions Tools W	indow Help EL NN NG DN NS a	Go online 🔊 (io offline				Totally Integrated A	Automation
Project tree			5-2 PN/DP] ▶ 1	Distributed I/O 🔸	PROFINET IO-Syste	em (100): PN/IE_1)	delta 💶 🖬 🖬 🕽	X Hardware catalog	
Devices					Topology view	Network view	Device view	Options	
100		delta		₩ 🖌 🖽	€ ±	Device ov	rerview 1	-	
						A Modul	le	✓ Catalog	
CMC-PN01_Cyclic_Read_Write						≡ v de	lta	<search></search>	itig itif
Add new device							PN-IO	C Eilter	
Devices & networks			53			IN	OUT 1	riiter	
PLC_1 [CPU 315-2 PN/DP]			Ser			2		Head module	
Device configuration						2			
Online & diagnostics						-			
Program blocks									
Technology objects						-		_	
External source files									
PLC tags									
PLC data types									
Watch and force tables								_	
Online backups									
Device proxy data						~			
Program info		< 11	>	100%	· · · · · · ·	- - < m		>	
PLC alarms		IN/OUT_1 [Module			Q Properties	🔁 Info 👔 😨 Diac	inostics		
Text lists					2		,		
Local modules		General	ags Syster	n constants	exts 3				
Distributed I/O		▼ General	10	addrassas				^	
Common data		Catalog informat	ion	audiesses				I	
Documentation settings		Inputs	In	put addresses					
languages & resources		Module parameters		_			-		
		I/O addresses 4	•	Star	taddress: 256				
Card Reader/USB memory		· · · · ·		En	address: 315				
Card Readenoss memory			•		10001033. 515				
				Proce	ss image: None		· · ·		
				Interrupt O	a number: 40		-		
> Dotails view								V Information	

- 4. After you finish setting up the parameter table, recompile the programs and download them to the PLC program, and then reboot the drive to make CMM-PN02 receive the updated parameter settings.
- 5. When CMM-PN02 is connected to the PLC program successfully, you can test the reading or writing of the set parameter by using the Watch Table. Refer to the figure below for The Watch Table.

Follow the four steps below to verify if the settings for the parameter table are applicable and if reading or writing the drive parameters is successful (Use the keypad to verify.).



NOTE 1: The figure above shows that %IW312 is the status value returned when the parameter table reads or writes the parameters. Low byte is the status value of reading, whereas high byte is the status value of writing. Take the figure above as an example, if the status value is 0x8183, the values of 1, 2, and 8 in the parameter table are successfully read and the values of 1 and 8 are successfully written. Thus, the success or failure of the parameter reading/writing depends on this status value.

NOTE 2: %IW312 = I/O start address + 56 (the I/O start address in this example is 256).

NOTE 3: Depending on the immediacy of the data, you can choose to write the parameters periodically or non-periodically,

Non-Periodic Parameter Read/Write Setting of the Motor Drive

Non-Periodic writing:

 As shown in the figure below, first set up the corresponding connection configuration. Left-click the red box in the figure from top to bottom and record the hardware identifier of the PN-IO.

		P Topolo	av view	A Network view	Device	view
Network Connections HMI connection	on 💌 🔣 📆 🖽 🛄	.e. ±		Network overview	N	4
	4 IO system: PLC_1.	PROFINET IO-System	(100) ^	Device		Type
			=	▼ \$71500/ET	200MP station 1	571
				► PLC 1	cooling station_r	CPL
PLC_1 delta				 GSD device 	1	GSI
PLC_1.PROFINET	IO-Syste					
ta fdelta CMMJO 1/2 321	[≱] 100%		× 		matic	
III ta [delta CMM-IO V2.32] General IO tags System const how hardware system constants	100% stants	v⊽	erties	K M Linfo 🚺 🖞 Dia	gnostics	
III ta [delta CMM-IO V2.32] General IO tags System cons how hardware system constant	tants Texts	Hardware identi.	v perties Used by	K III Linfo 1 V Dia Comment	gnostics	
■ ta [delta CMM-IO V2.32] ieneral IO tags System const now hardware system constant Name Mame delta-PN+IO-Port_1RJ45	Texts	Hardware identi. 260	Used by PLC_1	K M Linfo 👔 🖞 Dia Comment	gnostics	a 1
a [delta CMM-IO V2.32] eneral IO tags System constant whardware system constant Name a delta-PN+IO-Port_1RI45 delta-PN+IO-Port_2RI45	≥ 100% Texts Type Hw_Interface Hw_Interface	Hardware identi. 260 261	Verties	K M Linfo L V Dia Comment	gnostics	
	► Texts Type Hw_Interface Hw_Interface Hw_Interface	Hardware identi. 260 261 259	Used by PLC_1 PLC_1 PLC_1	۲ الله الله الله الله الله الله الله الل	gnostics	a :
	Stants Texts Type Hw_Interface Hw_Interface Hw_Interface Hw_SubModule	Hardware identi. 260 261 259 258	Used by PLC_1 PLC_1 PLC_1 PLC_1	Comment	gnostics	
	∑ 100% stants Type Hw_Interface Hw_Interface Hw_SubModule Hw_SubModule	Hardware identi. 260 261 259 258 262	Vised by PLC_1 PLC_1 PLC_1 PLC_1 PLC_1	Comment	gnostics	

NOTE: In the older versions of TIA PORTAL, the ID values of the function blocks above can be read in the following locations.

	□	CPU 1516-3 PN/DP] > Distributed I/O >	PROFINET IO-System (10	0): PN/IE_1 →	delta 💶 🖬 🖬 🗙	Hardware catalog	
Devices		1	F Topology view 🛛 🛔 N	letwork view	Device view	Options	
900	🛄 🐋 🏕 delta	🛛 🖬 🖻 🚄 🖽 Q.±	3	Device over	rview		- [
			^	V) Module		✓ Catalog	
SFB53_1516-3_Test	~			T Mooule		Searcha	
Add new device				- Deld		General	
📥 Devices & networks				110	117.1	Filter	
* [] PLC_1 [CPU 1516-3 PN/DP]	and the second	67		Nev.	001	Head module	
Device configuration							
Q Online & diagnostics				1			
Program blocks							
Add new block		10000		<u>.</u>			
🔹 Main [081]							
Data_block_2 [D83]							
System blocks							
Technology objects							
External source files			_				
PLC tags			*				
Ce PLC data types	< =	> 100%	· · · · · · · · · · · · · · · · · · ·	¢ 11	>		
Watch and force tables	delta [Module]		Properties	Diago	ostics 1	1	
Online backups			Shoperoes Sta	o ol Monado	usues		
🕨 🔄 Traces	General	O tags System constants Texts					
Program info	Hardwa	are identifier					
🕨 🏢 Device proxy data	 Port 2 - RJ4 	45 [X1 P2 R]					
PLC alarms	Genera	Hardware identifie	t				
	Port int	erconnection					
Text lists	Port op	tions Hardware	identifier: 262				
Text lists Text lists Text lists		are identifier					
Text lists Text lists Text lists Text lists Text lists	Hardwa						
Text lists Text lists Call modules Call modules Call modules Call modules Call modules Common data	Hardwa Hardware ide	ntifier					
Text lists Local modules Common data Documentation settings	Hardware ide Identification & I	entifier Maintenance					
Text lists Local modules Common data Common data Common data Common data Common settings Common sett	Hardwa Mardware ide Identification & I	Antifier Maintenance					

2. As shown in the figure below, after turning on the OB1, drag the WRREC in the extended instruction on the right side into the network.



3. Follow the three steps in the figure below to add Array DB.

Project tree	□	💶 🖬 🖬 🗙 Instructions
Devices	Add new block	×
B] 글 & & # # E E E = - 2 ± 월 ± 년 (Name:	
	Main wr_data	
▼ 🔄 PN_acyclic data	Name Data type Default	
Add new device	Type: 📑 Array DB	•
💑 Devices & networks		
PLC_1 [CPU 1516-3 PN/DP]		
Device configuration	Comment Organization Number: 2	▲
Q Online & diagnostics	Diock () Manual	
Software units	%DB1	
 Program blocks 	"WRREC_DB"	
Add new block	WRREC ARRAY data type: Byte	*
Main [OB1]	Variant III Array limit 0 B	
 System blocks 	EN ENO Function block Analysister Complexed and	10.0.000
Program resources	false REQ DONE false Champier 0.5,	1.40, 0.333
WRREC_DB [DB1]	0 ID BUSY false Description:	
Technology objects	0 INDEX ERROR false Data blocks (DBs) save program da	ta.
External source files	RECORD STATUS 16#0	
PLC tags	Function	
PLC data types	Torcoon	
Watch and force tables	w Natural 2	
Online backups		
Traces	WRREC SER (SERS3)	
OPC UA communication	Marcon Day 2001	
Device proxy data	General Texts Data block	
Program info	General more	
PLC supervisions & alarms	General Additional information	
PLC alarm text lists	Additional information	
Local modules	Narr 🥃 Add new and open	OK Cancel
Distributed I/O		

4. Left click to drag and drop the new Array into the corresponding pane of the block and fill in the relevant information of the packet being sent. The REQ here indicates whether the function is enabled or disabled. The ID here can use the hardware number recorded in the first step. The INDEX here is the number of the record data object. The CMM-PN02 can use the function number 1234 to notify the motor drive that it needs to do parameter writing. Note that the length of writing parameter should be 6.

Project tree	< PN_	acyclic da	ata 🕨	PLC_1	[CPU '	1516-3 PN/DF	P] 🕨 PI	rogram bloc	ks ▶	Main [OB	1]	
Devices												
1 1 1	1	<mark>⊮X</mark> ∌ ≡) II.,	E 🗄		🗩 🗶 ± 🗶 ±	: 법험 ±	= 😰 🥙	6 0 (di 🕼 🤣	⊊ I _≣	1 = (
	1	Main										
▼ 🔄 PN_acyclic data	^	Name				Data type		Default va	lue	Comment		
Add new device		1	1	1					-			
Devices & networks	- H-		- ??	-→	-							
PLC_1 [CPU 1516-3 PN/DP]												
Device configuration		Comment										
Q Online & diagnostics												
Software units						%DB1						
Program blocks	=					"WRREC_DB"						
💕 Add new block						WRREC						
- Main [OB1]						Variant						
wr_data [DB2]		_		EN	_		EN	0				_
 System blocks 			%M3.	0			DON	IE —I false				
 Program resources 			"Tag_1	- REC	2		BUS	Y — false				
WRREC_DB [DB1]			25	9 — ID			ERRO	R - false				
Technology objects			123	4 — IND	EX		STATU	IS — 16#0				
External source files				6 — LEN	4							
PLC tags		\	%DB	2								
PLC data types			wr_data	- REC	ORD							
Watch and force tables												
Online backups												

- 5. Recompile the PLC program and download it to the PLC.
- 6. Refer to the figure below, set the array value of wr_data via Watch Table, then go to the motor drive to verify whether the corresponding parameter is written or not.

i	Name	Address	Display format	Monitor value	Modify value	9
1	"rd_data".THIS[0]		Hex	16#10		
2	"rd_data".THIS[1]		Hex	16#01		
3	"wr_data".THIS[0]		Hex	16#FF		
4	"wr_data".THIS[1]		Hex	16#06	16#06	M 🔺
5	"wr_data".THIS[2]		Hex	16#04		
5	"wr_data".THIS[3]		Hex	16#33		
7	"wr_data".THIS[4]		Hex	16#22	16#22	🗹 🔺
В	"wr_data".THIS[5]		Hex	• 16#33	16#33	🗹 🔺
9	"Tag_12"	%MW33	DEC	6	6	🗹 🔺
10	"Tag_10"	%M3.0	Bool	TRUE	TRUE	🗹 🔺
11	"Tag_9"	%M3.1	Bool	TRUE	TRUE	🗹 🔺
12		<add new=""></add>				

- **NOTE:** The demonstration above uses FF 06 YY YY XX XX to write motor drive parameters.
 - (YY YY stands for parameter group and number, e.g. 16#0433 is Pr.04-51.)
 - (XX XX represents the value to be written, e.g. 16#22 33)

Non-Periodic reading:

1. When OB1 is turned on, fill in the RDREC function underneath the original WRREC in a non-periodic writing method.

							Opti	ions		
x = = = =	= 🛱 🗃 🖂 😫 🕿	• 58 • E 😥 🖉	- ()∰ (# -12) (i l= 1= €	et 🔒 🤓 🔒	=4	- PA	tia Lia	5a · 🗖	1
Aain							NE	avoritor		-
Name	Data type	Default	alue Comment				1	avontes		ł
			Internal Internal				~ 8	Sasic Instructions	-	1
	→ <u>-</u>					1997	Name	e I Canadi	Description	
	_		Call options			×		Bit logic operations		
Network 1:				Data block		-		Timer operations		
Comment				Name	RDREC_DB			Counter operations		
	1200		DB	Number	3		1 1	Comparator operations		
	%DB1		Single	(Manual) 1	Math functions		
	WAREC_DO		instance	1	Automatic		1	Move operations		
	Variant			If you call the t	function block as a single instance	the function) B	Conversion operations		
	FN	ENO -	_	block saves its	s data in its own instance data blo	ck.	+ =1	Program control operati		
%M3.0							2	1 Mard Incia an anationa		į
"Tag_1" -	REO	BUSY					VE	stended instructions		l
259 -	- ID	ERROR -false					Name	A A A A A A A A A A A A A A A A A A A	Description	
1234 -	INDEX	STATUS - 16#0						Process image	Description	
6	LEN						- F	Distributed I/O		
%DB2							-	DP & PROFINET		
"wr_data"	RECORD						-	- RDREC	Read data	
				mare				- WRREC	Write data	l
				more				ETIO	Read proc	
					Or	Cancel		SETIO	Transfer p.	
			-			Concer	<	111	:	1
Network 2:							~ T	echnology		l
Comment							Name	e	Description	1
							1	Counting and measurem.	-	
							•	PID Control		
							•	Motion Control		
				-	100%		2	I SINAMICS		i
tonti								Communication		ļ
n [OB1]				Q Propertie	es 🚺 Info 🚺 🕑 Diagno	stics	1,0	ommunication	_	į

2. Add a new ARRAY data (It's called rd_data) and fill in the corresponding values for the API to read. The REQ here indicates whether the function is enabled or not. The ID here can use the hardware number recorded at the beginning. The INDEX here is the number of the record data object. The CMM-PN02 can use the function number 1234 to notify the motor drive that it needs to do parameter writing. Note that the length of this WRREC write should be 4.



- 3. Recompile and download the PLC program.
- 4. Test if the program is set up successfully via Watch Table. Refer to the figure below for setting.

i	Name	Address	Display format	Monitor value	Modify value	9
1	"rd_data".THIS[0]		Hex	16#10		
2	"rd_data".THIS[1]		Hex	16#01		
3	"wr_data".THIS[0]		Hex	16#FF		
4	"wr_data".THIS[1]		Hex	16#03	16#03	🗹 🔼
5	"wr_data".THIS[2]		Hex	16#04		
6	"wr_data".THIS[3]		Hex	16#33		
7	"wr_data".THIS[4]		Hex	16#10		
8	"wr_data".THIS[5]		Hex	16#01		
9	"Tag_12"	%MW33	DEC	4	4	🗹 🔺
10	"Tag_10"	%M3.0	Bool	TRUE	TRUE	🗹 🔺
11	"Tag_9"	%M3.1	Bool	TRUE	TRUE	M 🚹
12		<add new=""></add>				

- **NOTE 1:** Before reading the parameters in the demonstration above, you need to call the WRREC function block to write FF 03 YY YY to change the mode of the communication card. Then call the RDREC function block to read the parameters of the motor drive (YY YY stands for the parameter group and the number, e.g., 16#0433 is the Pr.04-51.).
- **NOTE 2:** The user can set REQ to decide whether to read the parameter or not.