

VFD-C2000 PROFINET Communication Card

Operation Manual



20181106



- ✓ 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 are allowed to 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

CMC-PN01 connects C2000 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 CMC-PN01 in C2000 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
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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 Teat (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					
ltem	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





- 2. Positioning hole for communication card
- 3. Ready out indicator
- 4. MT out indicator
- 5. SD indicator
- 6. BF out indicator
- 7. ACT PHY2 indicator (Port 2)
- 8. Link PHY2 indicator (Port 2)



9. ACT PHY1 indicator (Port 1)

10.	Link PHY1 indicator (Port 1)
11.	ON/OFF Switch
12.	Fool-proof groove on the communication card
13.	RJ45 connection port (Port 2)
14.	RJ45 connection port (Port 1)
15.	Control panel connection port

2.3 LED Indicators

Name Indicator Status		ator Status	Indication	
		Always on	PN Stack normal activation	
Ready out indicator	Yellow LED	Flashing	PN Stack normal activation, waiting for synchronizing with MCU.	
		Off	PN Stack abnormal activation	
MT out indicator	Green LED	-	-	
SD indicator	Red LED	-	-	
		Always on	Disconnected with PROFINET Controller	
BF out indicator	Red LED	Flashing	Normal connection, but abnormal communication with PROFINET Controller.	
		Off	Normal connection with PROFINET Controller	
	Orange LED	Always on	Connected and is exchanging data with Master regularly	
ACT PHY1 indicator		Flashing	Not connected but is handshaking data with Master	
		Off	Initial status	
LINK PHY1	Green LED	Always on	Normal network connection	
indicator		Off	Not connected to network	
	Orange LED	Always on	Connected and is exchanging data with Master regularly	
ACT PHY2 indicator		Flashing	Not connected but is handshaking data with Master	
		Off	Initial status	
LINK PHY2		Always on	Normal network connection	
indicator		Off	Not connected to network	

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 Label



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

3 Installation and Wiring

This section introduces how CMC-PN01 connects to VFD-C2000 and to network.

3.1 Installation

How to connect CMC-PN01 to VFD-C2000:

- Shut off the power supply to the AC motor drive.
- Open the front cover of the AC motor drive.
- Place the insulation spacer into the positioning pin at Slot 1 (see Figure 1), and line-up the two holes on the PCB at the positioning pin. Press the pin to clip the holes on the PCB (see Figure 2).
- Ensure the PCB is securely placed, and then fix the screws with 6–8 kg-cm of torque (5.21–6.94 lb-in.) as shown in Figure 3.



Figure i

3.2 Unloading

How to detach CMC-PN01 from VFD-C2000:

- Shut off the power supply to the AC motor drive.
- Open the front cover of the AC motor drive.
- Remove the two screws (see Figure 4).
- Pull to open the card clip and put a flat-head screwdriver into the groove to pry the PCB off the card clip (see Figure 5).
- Release the other card clip to remove the PCB (see Figure 6).



Figure 4

Figure 5

Figure 6

3.3 Connecting to the Network

The wiring of CMC-PN01 shows as follows:



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 (C2000 needs 2.04 or later versions) and the communication card is correctly connected.

09-60
12
PROFINET
0~12 ADD

4 VFD-C2000 Drive Settings

When you operate VFD-C2000 through CMC-PN01, you should set the communication card as the source of VFD-C2000 controls and settings. You need to use the keypad to configure the following parameter addresses to the corresponding values:

KeypadSettings/Parameter No.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 CMC-PN01 communication card is connected, the value of this parameter displays "12".		

Note: To make PLC or the host controller identify CMC-PN01, it is necessary to load the product description file (GSDML). You can download it directly from Delta's official website.

5 PROFINET Communication Profile

- 1. Synchronous parameter access in Delta-specific mode
- 2. Asynchronous parameter access
- 3. Identification & Maintenance functions (I&M)
- 4. Disconnection Treatment

5.1 Synchronous Parameter Access in Delta-specific Mode (Tables for Control Word and Status Word)

Table 1: 60xx Out	nut Message	(Host Controlle	r→Drive)	(Pr 09-30-1)
	put message			(F1.09-30-1)

Bytes	Order	Address	Attribute	bit	Value	bit	User Rights	Speed Mode	Position Mode	Home Mode	Torque Mode	Notes
					0			fcmd=0	None	Stop Home	Tcmd=0	
					Pulse 0							
				0	1	CMD_ACT	4	fcmd=Fset(Fpid)			Tcmd=Test	Requires SERVO_ON=1
					Pulse 1				POScmd= POSset	Execute Home once		Requires SERVO ON=1
								FWD run	Change when			
					0			command	drive stops			
				1		EXT_CMD1	4	REV run	Immediate			
					1			command	change			
									Absolute			
					0				movement			
				2		EXI_CMD2	4		Relative			
					1				movement			
								drive runs till	drive runs till	Continue to	Feed	
					0			target speed	target position	return to home	(Continue to run	
								reaches	reaches		to target torque)	
0	LSB			2			2	drive stops by	Lock (drive	drive stops at	Lock (torque	
				3		HALI	3	declaration	stops at current	current	stops at current	
					1			setting	position by	position by	speed)	
									declaration	declaration		
									setting)	setting		
								drive runs till				
					0			target speed				
		6000h	RW	4		LOCk	4	reaches				
								frequency stops				
					1			frequency				
					0							
				5	1	106	4	300 011	300 011	300 011	300 011	
				Ũ	Pulse 1		· ·	JOG RUN	JOG RUN	JOG RUN		
					0			None	None	None	None	
				6	1	QSTOP	2	Quick Stop	Quick Stop	Quick Stop	Quick Stop	
					0			Servo OFF	Servo OFF	Servo OFF	Servo OFF	
				7	1	SERVO_ON	1	Servo ON	Servo ON	Servo ON	Servo ON	
					0000			Main speed	Main position		Main torque	
				11 0	0001	OF AD	4	1 st –15 th speed	1 st –15 th position			
				11-0	1111	GEAR	4	and frequency	selection			
								selection				
					00			1st Acceleration	1st Acceleration			
								time	time			
								2nd Acceleration	2nd			
1	MSB				01			time	Acceleration			
				13–12		ACC/DEC	4		time			
					10			3rd Acceleration	3rd Acceleration			
						•		Ath Acceleration	Ath Acceleration			
					11			time	time			
								Multi-step	Multi-step		Multi-step	
				14	0	EN_SW	4	command and	command and		command and	
L						•				•		•

								acceleration/	acceleration/		acceleration/	
								deceleration time	deceleration		deceleration time	
								switching are not	time switching		switching are not	
								allowed	are not allowed		allowed	
								Multi-step	Multi-step		Multi-step	
								command and	command and		command and	
					1			acceleration/	acceleration/		acceleration/	
					I			deceleration time	deceleration		deceleration time	
								switching are	time switching		switching are	
								allowed	are allowed		allowed	
				45	Dulas 1	DOT	4	Clear array and		Clear error	Clear array and	
				15	Puise I	K31	4	Clear error code	Clear error code	code	Clear error code	
2	LSB	00041	DW				Mode					
3	MSB	600'IN	RW				Cmd					
4	LSB					Mala aite	Malasitu	Speed command	Profile velocity		Profile velocity	
_	MSB	6002h	RW			Velocity	Velocity	(without	(without		(without	
5						Cma	Cma	numbers)	numbers)		numbers)	
6	LSB	00001	5.47									
7	MSB	6003h	RW									
8	LSB											
9	MSB	6004h	RW				Pos		Position			
10	LSB					Pos Cmd	Cmd		command			
11	MSB	6005h	RW						(with numbers)			
12	LSB										Torque	
	MSB	6006h	RW			Torq Cmd	Torq				command	
13						-	Cmd				(with numbers)	
14	LSB											
15	MSB	6007h	RW					Reserved	Reserved	Reserved	Reserved	
16	LSB											
17	MSB	6008h	RW					Reserved	Reserved	Reserved	Reserved	
18	LSB											
19	MSB	6009h	RW					Reserved	Reserved	Reserved	Reserved	
.0		I		I	1	I				1		1

Table 2: 61xx Input Message (Drive→Host Controller) (Pr.09-30=1)

Bytes	Order	Address	Attribute	bit	Value	bit	Speed Mode	Position Mode	Home Mode	Torque Mode	Notes				
				0	0	ARRIVE	Frequency command not reached	Position command not reached	Zero command unfinished	Torque command not reached					
							Frequency	Position	Zero	Torque					
					1		command	command	command	command					
							arrival	reached	completed	reached					
				1	0	DIR	FWD	FWD	FWD	FWD					
						1			1		REV	REV	REV	REV	
					0		No	No	No	No					
				2		WARN	Warning	Warning	Warning	Warning					
0	LSB				1		occurred	occurred	occurred	occurred					
			n R		0		No error	No error	No error	No error					
		6100h		з	0	FRROR	Frror	Frror	Frror	Frror					
		6100n		3	1	Ention	occurred	occurred	occurred	occurred					
					0		None	None	None	None					
				5	1	JOG	On JOG	On JOG	On JOG	On JOG					
					0		None	None	None	None					
				6	4	QSTOP	On Quick	On Quick	On Quick	On Quick					
					1		Stop	Stop	Stop	Stop					
					0		PWM	PWM	PWM	PWM					
				7	0	SERVO_ON	OFF	OFF	OFF	OFF					
					1		PWM ON	PWM ON	PWM ON	PWM ON					
					0		Ready	Ready	Ready	Ready					
				8	0	Ready	OFF	OFF	OFF	OFF					
1	MSB			Ū	1	Ready	Ready	Ready	Ready	Ready					
					•		ON	ON	ON	ON					
				15–9											
2	LSB	6101h	R			Mode Cmd									
3	MSB														
4	LSB	6102h	R			Velocity	Actual	Actual	Actual	Actual					
5	MSB					cmd	output	output	output	output					

						frequency	frequency	frequency	frequency	
6	LSB	6100h	Р							
7	MSB	01030	ĸ							
8	LSB	6104h	D			Astual	Astual	Astual	Astual	
9	MSB	010411	К		Boo Cmd	Actual	Actual	Actual	Actual	
10	LSB	6105h	D		FOS CITIQ	(absoluto)	(absoluto)	(absolute)	(absoluto)	
11	MSB	010011	К			(absolute)	(absolute)	(absolute)	(absolute)	
12	LSB	6106h	D		Tora Cmd	Actual	Actual	Actual	Actual	
13	MSB	010011	К			torque	torque	torque	torque	
14	LSB	6107h	D			Percented	Becorried	Beconvod	Beconvod	
15	MSB	010711	К			Reserved	Reserved	Reserved	Reserved	
16	LSB	6109h	D			Percented	Basariad	Beconvod	Beconvod	
17	MSB	010011	К			Reserved	Reserved	Reserved	Reserved	
18	LSB	6100h	D			Percented	Basariad	Beconvod	Beconvod	
19	MSB	010911	К			Reserved	Reserved	Reserved	Reserved	

Table 3: 20xx Output Message (Host Controller→Drive) (Pr.09-30=0)

Bytes	Order	Command	Address	Attribute	e Value		Definition	Description
						00: No function	Operation command unchanged	1. Bits in this column are used for
						01: Stop	Stop operation command	operating actions. The commands are
						10: Run	Normal command operation	one-shot and run only when VFD
							·	receives commands. Therefore, Master
								only needs to issue the command once.
					b1–10			VFD always runs the command issued by
								Master unless new commands are
						11: JOG+Run	JOG command	issued
								2 Bits in this column work only when VED
								2. Bits in this column work only when vi b
								sets parameter selection operation
					1010			command source as communication.
					b3-b2	Not used		
						00: No function	Direction command unchanged	1. Bits in this column are used for
						01: FWD	FWD direction command	operating actions. The commands are
						10: REV	REV direction command	one-shot and run only when VFD
0	LSB							receives commands. Therefore, Master
								only needs to issue the command once.
					b5–b4			VFD always runs the command issued by
							Change current direction	Master unless new commands are
						11:Change direction	command	issued.
								2. Bits in this column work only when VFD
								sets parameter selection operation
								command source as communication
							1 st acceleration/decoloration time	command source as commanication.
						00: 1st Accel./Decel. time	a acceleration/deceleration time	Bits in this column are used for switching
							selection	acceleration or deceleration time through
						01: 2nd Accel./Decel. time	2 nd acceleration/deceleration	communication when VFD operates.
					b7–b6		time selection	Parameter VFD can provide four kinds of
						10: 3rd Accel /Decel_time	3 rd acceleration/deceleration time	settings for acceleration or deceleration
							selection	time and use one-shot method to switch
		Operation				11: 4th Accol /Decol time	4 th acceleration/deceleration time	by bits in this column
		Command	2000h	W		TT: 411 Accel./Decel. unie	selection	
		Command				0000: Main speed		
						0001: 1st step speed		
						0010: 2nd step speed		
						0011: 3rd step speed		
						0100: the step speed		1. Bits in this column are used for
						0100: 4th step speed		switching VFD's operation frequency
						0101: 5th step speed		through communication. Parameter VFD
						0110: 6th step speed		can provide 15 kinds of settings for
					b11 b8	0111: 7th step speed	Multi-step speed and frequency	operating speed and use one-shot
					011-00	1000: 8th step speed	switching selection	method to switch by bits in this column.
						1001: 9th step speed		2. You have to set 2000h b12=1 or you
						1010: 10th step speed		cannot use this multi-step speed and
						1011: 11th step speed		frequency switching function through
						1100: 12th stop speed		communication.
						1100. 12th step speed	•	3. If you want to know the current running
1	MSB					1101: 13th step speed		speed of this multi-step speed and
'						1110: 14th step speed	4	frequency switching function check
						1111: 15th step speed		address 2017h.
							Enable multi-step speed and	
					h12	1: Epoblo b11 b6	frequency and acceleration or	
					012		deceleration time switching	
							function	
						00: No function		Bits in this column are used for enforcedly
						01: Operation command controlled		switching operation command source
						by PU		through communication. If VFD operation
						10: Operation command by Pr	Switching for operation command	source setting is not controlled by
			1		b14–b13	softing	source	communication you can use the hits in
			1			Johang	1	this column to enforcedly switch to
						11: Switch between PU and Pr.		communication or restore to parameter
			1			setting		setting
					h15	1		oouniy.
-	1.00			<u> </u>	015 		<u> </u>	4 Dita in this column are used for in
2	LSB							1. Bits in this column are used for issuing
								setting commands to VFD through
		Speed						communication. The default unit for this
		Set Point	2001h	w	h15-b0	VED Set Point Command	VED multi-unit setup command	setting is Hz or otherwise (can be known
3	MSB Set Point 2001h W			010-00			from 211Dh bit12). If the units are Desc,	
		Command						address 2123h–2124h can be read.
			1					2. Bits in this column work only when VFD
1			1	1	1		1	frequency source parameter is set as the

								way of communication.		
					b0	1:EF (external fault) ON	External Fault (EF) enabled	 This bit is used for triggering an external fault to VFD to stop the running status. The method for stopping can be set by VFD parameter. This bit operates by on-shot method and this fault can only be restored by Fault Reset command. 		
4	LSB	VFD	00001		b1	1: Reset	Fault Reset command	This bit is used for resetting the status from Fault to Ready.		
		Command	2002n	vv	b2	1: b.b. ON	External B.B. (Base Block) enabled	This bit is used for triggering an external B.B. to VFD to pause the running status. When bit=0 (BB is dismissed), VFD immediately returns to its former status.		
					b3	1: HAND-ON/LOC-ON command	HAND/LOCAL frequency operation source enabled	Whether switching HAND/AUTO or LOC/REM would lead to running STOP		
					b4	1: AUTO-ON/REM-ON command	AUTO/REMOTE frequency operation source enabled	depends on motor drive's parameter settings.		
5	MSB				b15–b5	Not used				
6 7	LSB MSB		2003h	W	b15–b0	Reserved	Reserved	Reserved		
8	LSB		2004h	W	h15_h0	Reserved	Reserved	Reserved		
9	MSB		200411		510 50	10001700	10001100	Keserved		
10	LSB		2005h	w	b15–b0	Reserved	Reserved	Reserved		
11	MSB									
12	MSB		2006h	W	b15–b0	Reserved	Reserved	Reserved		
14	LSB									
15	MSB		2007h	W	b15–b0	Reserved	Reserved	Reserved		
16 17	LSB MSB		2008h	w	b15–b0	Reserved	Reserved	Reserved		
18 19	LSB MSB		2009h	W	b15–b0	Reserved	Reserved	Reserved		

Table 4: 21xx Input Message (Drive→Host Controller) (Pr.09-30=0)

Bytes	Order	Command	Address	Attribute	Value		Definition	Description																
0	LSB	Fault	2100h	Р	b7–b0	Error Code	Fault codes	Bits in this column are used for checking if VFD occurs any fault, and using the fault codes to substitute 32XXh to obtain the description strings for the fault.																
1	MSB	Status	21000	ĸ	b15–b8	Warn Code	Warning codes	Bits in this column are used for checking if VFD occurs any warnings, and using the warning codes to substitute 33XXh to obtain the description strings for the fault.																
					b1–b10	00: RUN LED light off, STOP LED light up (Drive Stop) 01: RUN LED blink, STOP LED light up (Drive Decelerate during the drive stopping) 10: RUN LED light up, STOP LED blink (Drive standby) 11: RUN LED light up, STOP LED light off (Drive Run)	Run and stop status	Bits in this column are used for checking VFD's running status in order to control its LED display.																
					b2	1: JOG active	JOG running																	
2	LSB				b4–b3	00: REV LED light off, FWD LED light up (Forward) 01: REV LED blink, FWD LED light up (Reverse to Forward) 10: REV LED light up, FWD LED blink (Forward to Reverse) 11: REV LED light up, FWD LED light off (Reverse)	Operation direction status	Bits in this column are used for checking VFD's running direction status in order to control its LED display.																
		Operation Status	2101h	R	b5	1: Factory parameters opened	Factory parameter ON/OFF status (not used)																	
					b6	Reserved																		
					b7	1: Operation command controlled by external terminal		Bits in this column are used for checking whether VFD's current operation command source is external terminal or not. If bit=1, external terminal has the highest processing priority. Master communication can obtain control rights only when it switches operation command source by 2000h b14–13.																
					b8	1: Main Freq. controlled by communication		Bits in this column are used for checking the current																
					b9	1: Main Freq. controlled by external terminal (AI)		VFD frequency command source.																
																					b10	1: Operation command controlled by Communication		Bits in this column are used for checking whether the current VFD operation command source are communication or not.
3	MSB				b11	1: Parameters been locked	Parameter Lock ON/OFF status	Bits in this column are used for checking whether VFD's parameters are locked or not. If bit=1, the values for reading parameters are always 0.																
					b12	0: AC drive stop, 1: AC drive run	VFD actual running output status (RUNNING=1)																	
					b13	Jog command	JOG running																	

							command	
							status	
							(CMDJOG=1)	
					b14			
					b15			
4	LSB							Bits in this column are used for displaying VFD's
5	MSB		2102h	R	b15–b0	Frequency Command		current running frequency command values (2dot value) with its unit Hz.
6	LSB							Bits in this column are used for displaying VFD's
7	MSB		2103h	R	b15–b0	Output Frequency		current output frequency values (two-dot value) with its unit Hz.
8	LSB							Bits in this column are used for displaying VFD's
9	MSB		2104h	R	b15–b0	Output Current		current output current values (one-dot value) with its
40	1.00							unit A.
10	LSB		2105h	P	b15 b0	DC BUS Voltago		Bits in this column are used for displaying VFDs
11	MSB		210311	ĸ	013-00	DC BCS Vollage		its unit V
12	LSB							Bits in this column are used for displaying VFD's
13	MSB		2106h	R	b15–b0	Output Voltage		current output voltage values (one-dot value) with its unit V.
14	LSB	VED	0407	-		Multi-steve even al		Bits in this column are used for displaying VFD's
15	MSB	Variable	2107h	ĸ	D15-DU	Multi-step speed		current multi-step speed and frequency values.
16	LSB	Monitor	2109h	D	b15 b0			
17	MSB		210011	ĸ	013-00			
18	LSB		2109h	R	h15_h0	Value of the counter		
19	MSB		210011		5.0 50			
20	LSB		210Ah	R	b15-b0	Power factor angle (0–180.0		
21	MSB					degree)		
22	LOD		210Bh	R	b15–b0	Torque (xxxx.x N-M)		
23	I SB							
25	MSB		210Ch	R	b15–b0	Motor speed (rpm)		
26	LSB							
27	MSB		210Dh	R	b15–b0	PG teedback pulse count		
28	LSB		21056	Р	b15 b0	PC reference pulse count		
29	MSB		ZIUEN	ĸ	00-010	FG reference pulse count		
30	LSB		210Eb	R	b15_b0	Output Power (vy vyk\\/)		
31	MSB		210111		010-00			

Table 5: Disconnection Treatment (CMC-PN01→Drive)

Address	Attribute	١	/alue	Definition	Description
2505h	R	P9-63	Card Fault	This section is only allowed to be written by the card.	This address can correspond to VFD's communication parameter.

5.2 Asynchronous Parameter Access

Host controller PROFINET sends a write request first, then CMC-PN01 determines whether the host controller needs to read or write in accordance with the Operation field in the packet, and read or write drive's parameters through the contents of Data Block.

If there is no problem for the packet and CMC-PN01 is not in a busy mode, CMC-PN01 sends a write response to make the host controller be aware that CMC-PN1 has received the packet delivered and performed corresponding actions accordingly.

If the host controller requests to read the parameters, CMC-PN01 needs to send a read request after sending a write response. Then CMC-PN01 reads the corresponding parameters of the drive and replies to the host controller in the packet of read response.

The table below shows the definitions of the packet:

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.						

The timing diagram of parameter access shows as follows:



5.3 Identification and Maintenance Functions (I&M)

Identification and maintenance (I&M) is to provide you with supports in adjustment, test, parameterization and repair.

CMC-PN01 supports I&M0 functions and access by read requests that record data objects.

The table below shows the data structure of I&M0 functions:

Content	Size	Description
Header	10 bytes	-
Vendor ID	2 bytes	PROFINET Vendor ID of Delta, which is 0x03BF.
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
Revision counter	2 bytes	Number of revision
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).

5.4 Disconnection Treatment

When PROFINET is disconnected, CMC-PN01 performs the following settings to ensure safety.

- 1. Set $2505H = 81 \rightarrow Ecto$ indicates CMC-PN01 occurs a disconnection failure
- 2. Set 6000H = 0
- 3. Set 2000H = 1

When PROFINET connection restores, it resumes performing commands from the host controller.

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 C2000 drive. The connection configuration shows as the figure below. Siemens PLC connects CMC-PN01 communication card of C2000 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.

iternet	Protocol (TCP/IP)	Properties ?
General		
You car this cap the app	i get IP settings assigne ability. Otherwise, you r ropriate IP settings.	ed automatically if your network supports need to ask your network administrator for
O OĐ	tain an IP address auto	omatically
💽 Us	e the following IP addre	958:
IP ad	dress:	192 . 168 . 16 . 201
Subn	et mask:	255 . 255 . 255 . 0
Defa	ult gateway:	<u> </u>
ODE	tain DNS server addres	ss automatically
📀 Us	e the following DNS se	rver addresses:
Prefe	rred DNS server:	
Alterr	nate DNS server:	
<u> </u>		
		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.

🖳 H.W. Config - [SIMATIC 300 Station (Configuration) S7_0508	ŋ —	
🕅 Station Edit Insert PLC Yiew Options Window Help		- a ×
Download Ctrl+L		
		Hardware Catalog
Download Module Identification		End: nt ni
2 CPU:		Profile: Standard
XI MPIA Faulty Modules		
AZ <u>I PW-10</u> Module Information Ctrl+D		PROFIBUS-PA
X2 P2 Port2 ClearReset	\geq (1) Delta	BY PROFINET IO STATE 200
3 Set Time of Day		E SIMATIC 500
MonitorModify		I III SIMATIC PC Based Control 300/400
Update Firmware		
Save Device Name to Memory Card		
Pthemet	Edit Ethernat Moda	
PROFIBUS	Venty Device Name Assign Device Name	
Save Service Data		
(1) Dena		
Slot M. Order number I address Q address Diagnostic a	Idress: Comment Access	
XI RN-IC 2042*	Fall	
XI A Port I 2040*	Full	
X1 A Port2 2039*	Fall	
2 3 21000 2500575 2500575	1 62	
		PROFIBUS-DP slaves for SIMATIC S7, M7, and C7 (distributed rack)
Displays the address of the station(s) on Ethernet to be changed		
Paper of the station	I Config - ISIMAT	

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

Reality Config - [SIMATIC 300 Station (Configuration) - S	/_PN_Test]	- C 🔀
Station Edit Inseit BLC Yew Options Mindow Help		
	N?	
🗩 (0) UR	Edit Ethernet Wode	ka ja
1	Ethamat anda	niut
2 CP0315-2 PN/DP XI MEMOP	Nodes accessible online	e: Standard 💌
λ2 <u>RN-10</u> λ2 FI Rot I	MAC gddrem:	S PROFIDUS DP
X2 P2 Port 2	Set IP configuration	Additional Field Devices
	(* Use I <u>P</u> parameters	🖻 🔄 Delta Development Toolkit
	IP address: Galeway G Dg not use router	
	Subnet mask:	Cateway
	Annual bearing and a second se	e 🔤 10 Natural Contents
	○ Obtain IP address from a DHCP server Identified by	• Sensors
<	C Cherrith C MAC address C Device same	Switching devices SIMATIC 300
(1) Date	Client ID:	SIMATIC 400
The Monte States Continue In		SIMATIC PC Based Control 500400
0 Delta 1234567 204	2* Aprign IP Configuration	
XI PH-JC 204. XI & Bert J 204	Amign device name	
XI / Port2 203	Device name:	
1 1 1NOL 256375 256375	Anga Ante	
	Reset to factory settings	
	Eest	
	Close Help	
		1627
	12-2 Delt Delt	a Electronics, Inc.
Down FI to get Halp	lost	Male 14.31-Leure CF Template-20170307 Xml
THE PARTY OF THE STRATE MANAGE	N EAR Ethernet Node 1 1004	
anna ne mangar-	The court brow 2 warmen	man - seman s s feld a si man

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.

Image:	19 IIW Config - [SIMATIC 300 Station (Configuration) \$7_0508	ü -	_ # X
Display Fild Ellerant Mole Image: State Control Cont			
Image: Cr0315 2 2 BBDP Image: Cr0315 2 2 BBDP Image: Cr0315 2 2 BBDP MAC gddam: Borea Image: Cr0315 2 BBDP MAC gddam: Borea Image: Cr0315 2 BBDP MAC gddam: Borea Image: Cr0315 2 BBDP Image: Cr0315 2 BBDP Image: Cr0315 2 BBDP		E.	van Caialog
Image: State in the state i		Edil Elhernet Rode	
With Strip With Strip <td>2 CPU315-2 PN/DP</td> <td>Ethemet node Nodes accessible online</td> <td>s: Standard 💌</td>	2 CPU315-2 PN/DP	Ethemet node Nodes accessible online	s: Standard 💌
Arei Provide	X2 PH-JO	MAC gddaess: Browne	PROFIBUS DP PROFIBUS-PA
Browner Methode - 1 Moder Browner - 1 Methode - 1 Moder Browner - 1 Methode	A2 FI A2 F2 Fort2		PROFINET IO
SMATIC FC Based Counted JOARD SMATIC FC Based Counted JOARD SMATIC FC Based Counted JOARD SMATIC FC Based Counted JOARD Fight search Fight search Fight search Rest to factory settings Rest to	3	Browse Network - 1 Nodes	SIMATIC 300 SIMATIC 400
192 169 16 26 294 63:36:39:60:84 27:300 prem Image: State of the		Start D. IR address MAC address Device hore - Name	SIMATIC PC Based Control 300/400 SIMATIC PC Station
Profile Profile Rest to factory writing: Does Rest to factory writing: Does Rest to factory writing: Does		192.168.16.25 28-63-36-39-60-E4 57-300 pn-so Store	
Piper File Prest File og Hildy			
Image: Control of the set of the control of the set of the control of the set o		🖾 Fast search	
Image: Concel Image: Concel<			
I) Dels Stat H. Order number I address Q address Diagonatic of the provided state of the provid	<		
Stot M. Order number 1 address Dagoonic s N. Delta 1236567 2002* 2002* N. H. Prit // 2001* Bab MAC address: 128:63:36:39:60:E4 N. J. Prit // 2002* DK Cancel Halp N. J. Prit // 2003* OK Cancel Halp N. Order number 256:.573 256:.573 OK Cancel Halp Reset to factory settings Brest Brest Close Help Pres PL to get Help. EXEMPTION for participants Brest to factory settings Stat TIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transition for SIMATIC S7, M7, and C7 (distributed rack) Transit S1	(1) Della		
Delte IZ34567 2007* RV:1 2000* At A Port2 2000* OK Cancel Help 0K Close Help	Slot M. Order number I address Qaddress Diagnostic a		
Mrt / Prof. Doc Doc Doc Help // Prof. 256575 256575 OK Cascel Help // JWOR 256575 256575 OK Cascel Help Reset to factory settings Brest Brest Brest Goo Help Pres FL to get Help. Cascel Help Free FL to get Help. Free FL to get	0 Deta 1234567 2042* XI PH-10 2041*	Flash MAC address: 120.42.36.20.40.24	
At A Prof.4 Caucel Help I JAVOU 236373 236373 Caucel Help Reset to factory settings Reset Reset to factory settings Reset Reset to factory settings Close Help Reset to factory settings Reset to factory settings Reset to factory settings Reset to factory settings PROFIBUS-DP aloves for SIMATIC S7, M7, and C7 (distributed rack) 4 4 4 4 Press FL to get Help. Reset to factory restings Reset to factory settings Reset to factory settings 4 Press FL to get Help. Reset to factory restings Reset to factory settings 4 4	XI A Port I 2040*		
Reset to factory settings	1 1WOL 256575 256575	OK Cancel Help	1
Prese H to get Help.			
PROFIBUS-DP slaves for SIMATIC 57, M7, and C7 (distributed rack)		Reset to factory settings	
Close Help PROFIBUS-DP daves for SIMATIC \$7, M7, and C7 (distributed rock) T Press FL to get Help. T		Rest	
PROFIBUS-DP slaves for SIMATIC S7, M7, and C7 (distributed rack)		Eloze Help	
Proof PL to get Help.			
Pres PL to get Help.		1	PROFIBUS-DP slaves for SIMATIC \$7, M7, and C7 (distributed rack)
THE CONSTRATIC Messager - S. R. HW Config- ISIMAT	Press F1 to get Help.		
	🛃 🛲 🖉 🥴 🚺 SIMA TIC Masager - S. 📑 H	/ Config - [SIMA T	2 10.00 (10.00) (10.00) (10.00)

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
Start 🦃		
Devices & State	Show all devices	
PLC	Colline status	
Alation A Dechirology	20	
Drive parameterization	Accessible devices	
Visialization 1		
Online & Andrew Online & Andre		
	Help	
	1.50	
Project view		

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

roject tree E	<	Tasks	
Devices		Options	
900	-+-		1
		Y Find and replace	C
Online access			
Y Displayhide interfaces		Find:	
TwinCAT-Intel PCI Ethernet Adapter (Giga	N. Contraction of the second s		2
Update accessible devices		Whole words only	
plc_1.profinet interface_2 [192.168.1.1]		C Match case	
Intel(R) Wireless-N 7260	NI		
PC Adapter [MP1]		[_] Find in substructures	
Conternal [Local]		Find in hidden texts	
LICE ICTUENT		Use wildcards	
TaleSenice (Automatic protocol detection)		Use regular expressions	
Card Reader/USB memory			
-		Whole document	
	Properties Junfo Diagnostics	From current position	
	General Cross-references Compile	Selection	
		(1) Desen	
	🔯 🦺 🚺 Show all messages	Our	
		C) up	
1 H 1	A Message Go to 7	Find	
Details view	Scanning for devices on interface twinck Hintel PCI Ethernet Adapter (Gigabit) was started.	Replace with:	
**************************************	Scanning for devices completed for intenace initial rate cinemet Adapter (algebra), r.a.		
Name		Paplace Deplace all	
		[sepace][sepace as]	
		>>> Languages & resources	

- 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 CMC-PN01. 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_1	[est]		🗖 🗗 🗙
Di Station Edit Insert PLC View Options Window Help			- # ×
📼 (I) UR	Filit Pilormet Node	*	
	Euri Emernet Note		
2 CPU315-2 PN/DP	Ethernet node	Nodes accessible online	le: Standard
XI MERUP X2 PN-JO	M&C address 74-00-50-00-FC-F1	Paraura	PROFIBUS DP
X2 PI Port I		LTOWS	PROFIBUS-PA
X2 PZ PortZ	- Set IP configuration		Additional Field Devices
	• Use IP parameters		E IO
		Gateway	+ E Delta IO Template V1.0
	IP address: 192.168.0.2	Do not use router	Molex I/O Device TPS-1 Development Toolkit
Set IP Address	Subnet mask: 255.255.255.0	⊂ <u>U</u> se router	- Gateway
		Address: 192.168.0.2	
	C Obtain IP address from a DHCP server		Intwork Components
	Identified by		+ Sensors
<	C Dient ID C MAC address	C Device name	SIMATIC 300
(1) Delta	Client ID:		 SIMATIC 400 SIMATIC PC Based Control 300/400
Slot M Order number Laddress O address Diagnostic a			SIMATIC PC Station
0 Delta 1234567 2042*	Agaign IP Configuration		
XI PN-IO 2041* XI A Port I 2040*	Assign device name		
X1 F Port 2 2039*	Device name:	Arrian Nama	
I 10100 236		Asagir name	
	- Reset to factory settings		Set the device name
		Reset	
	Chan	Help	
			1234567 Tela Flectronics Inc
			Delta Development Toolkit GSDML-V2 31-Delta-IO-Template-20170307 xml
Press Fi to set Help			
THE BEACH OF IS A STALL THE MARKET AND THE DAY	Rh		

For TIA PORTAL, set the device name of the host controller or CMC-PN01 as the figure below shows.

V۵	Siemens			_ • ×
Pr	oject Edit View Insert Online Options To	ools Window Help	Totally Inte	grated Automation
E	ት 🞦 🔒 Save project 🚇 🐰 🗐 🛍 🗙 🥱 ±	(#± 🖥 🗓 🖬 🖳 💋 Go	online 🖉 Go offline 🔚 🖪 🖪 🔛	PORTAL
	Project tree 🔲 🖣	217-V > plc_1.profinet inter	ace_2 [192.168.1.1] → plc_1.profinet interface_2 [192.168.1.1] 🛛 🗕 🖬 🗮 🗙 Online tools	₽ ₪ ►
	Devices		Options	0
so.	· · · · · · · · · · · · · · · · · · ·	 Diagnostics 	General	
stic		General	□ CPU operator pane	e t
ĥ	▼ 🙀 Online access	Diagnostic status	Module	2 [192 16
Dia	Y Display/hide interfaces	Cycle time	Short designation: CPU 1516-3 PN/DP	PUN
8	Intel(R) Ethernet Connection I217-V	Memory	Article number: 6ESZ 516-3AN01-0AR0	
ų.	 De la constance accessible devices De la constance accessible devices 	Display	Hardware: 3	SIOP
ō	🖞 Online & diagnostics	PROFINET interface[X1]	MAINT	MRES G
	Program blocks	PROFINET interface[X2] Europtions	Mode selector: PUN	m
	Technology objects	Assign IP address	Node Selector. Norv	
	Lee PLC data types Colling card data	Set time	Rack: 0	brai
	Intel(R) Wireless-N 7260	Firmware update	Slot: 1	les
	PC Adapter [MPI]	Assign name		
	🕨 🎦 PC internal [Local]	Reset to factory settings		
	PLCSIM [PN/IE]	Save service data	Module information	
	USB [S7USB]	Surf Series Cold		
	Card Reader/USB memory		Device name:	
			Module name: PLC_1	
	< m >		Plant designation:	
	✓ Details view	1	Location ID:	
			Installation date: Wednesday, July 26, 2017 04:37	
	Name			
			Properties Tillafo Diagnostics	
		Caparal Cross reference		
			S Compile	
		Show all messages	Memory	
	A Portal view	Online & dia	- Control of the second s	completed for int
		oninie a dia	Scanning for devices of	completed for int



Project tree	□ (Jernet Adapter (Gigabit). *	deira (nn-an-we-so-ac-na) 🥡 deira (nn-an-we-so-ac-na	I Online tools II -
Devices				Options
900		Diagnostics	General	
		General		✓ CPU operator panel
• Sea Online access		Functions	Module	
Y Displayihide interfaces		Assign IP address	and the second	Not supported
Intel(R) Dual Band Wireless-N 7265		Assign name	Short designation: Delta-IO	
 TuinCăTintel PCI Ethernet Adapter (Ginahit) 		Reset to factory settings		
Provide accessible devices			Module information	
plc_1.profinet interface_1 [192.168.0.6]				
delta [00-30-A8-28-3C-09]			Device name: delta	
Online & diagnostics			Market and the star	
C Adapter [MP]			Manufacturer information	
PC internal [Local]			·	
PLCSIM (PROIE)	P. 2		sandiacturer description.	
Cost (57058)			Module role: Device	Y Cycle time
Card Panderil (R mamoni	No.			- Cycle unie
Card Readenoise 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





Blocks

Next >

2. Select Next

Finish

Cancel

Help

TCP/IP -> Broadcom NetXtreme Gig ...

in ? 🕄

< <u>B</u>ack

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Press F1 to get Help.

🛃 開始 🔰 🌔 🕑

SIMATIC Manager

SIMATIC Manager						×
File PLC View Options Window Help						
	6					
	STEP 7 Wizard: "New Pro	rject"				
	ý What do you want to c	all your project?	4(4)			
	Project name:	S7_PN_Test	1. E	Enter Project name		
	Existing puojects:	Molen-TI-Maxous S7_0120 S7_0306				
		Check your new project in the preview.				
		Click "Finish" to create the project with the	displayed structure.			
			Pievie <u>w</u> <<			
	and a second					
	S7_PN_Test	Block Name Symbolic Name				
	E CPU315-2 PN/DP	Cjoir Cjoir Internation	•			
	S? Program(1)					
			1			
	< Back Next>	Finish Cancel	Help			
	2.	. Click Finish button to complete p	project settings			
			8 			
Press F1 to get Help.			TCP/IP -> Broadcom NetX	treme Gig		1
1月月始) 🧷 🙆 🔡 SIMATIC Manager 🦉 4_new	v project wizard J 👘 🚞 0524			- 2 ° - 1	8888558 0 28	上午 08:48

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

SIMA TI	C Manager - S7_PN	_Test									- 7 X
<u>File E</u> dit]	[nsert P <u>L</u> C <u>V</u> iew <u>C</u>	ptions <u>W</u> indow	Help								
🗋 🗃 🖁	1 🛲 🕺 🖻 🖻	🔬 🔉 🖁	<u><u>D</u><u>D</u> <u>a-</u> <u>a-</u> <u>a-</u> <u>a-</u> <u>a-</u> <u>a-</u> <u>a-</u> <u>a-</u></u>	Keller >	🗾 🏹 🔡 🖲	18 E D N?					
	37	C-VProgram Fil 300 Station 300 Station 7 Program(1) Sources Blocks	a <u>a</u> ":- :::	(₩ CPU315-2 PM/DP)							
Press F1 to get	t Help.	(Takena		TCP/IP -> Broadcom NetXtrer	me Gig	-		-
🦺 開始		SIMATIC	Manager - S	🍟 5_new project wizard J	0524			in 2 ÷	19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2 B 🛛 > 🕫	上午 08 51

HW Config - SIMATIC	300 Station (Configuration)	S7_PN_Test]					
I Station Edit Insert PLC	Yiew Options Window Help						-	a x
	Customige	Ctrl+A	lt+E					
0) UR 1 2 CPU315-2	Specify Module Configure Network Symbol Table PN/DP Report System Error	Specify Module Configure Network Symbol Table Ctrl+Alt+T Report System Error					Eind: A	□× † mi
XI MEI/DP X2 PN-IO X2 PL Pwt I	Edit Catalog Profile Undate Catalog						PROFIBUS DP PROFIBUS-PA	_
X2 F2 Port 2	Chern county						🕀 🗱 PROFINET IO	
3	Install <u>G</u> SD File			- Select GS	DML-V2.31	Delta-ACMD_C2000-20171018.xml	E SIMATIC 300	
	Find in Service & Suppo	rt					SIMATIC PC Based Control 300/400 SIMATIC PC Station	
	Create GSD file for I-De	Vice						
(0) UR Slot Module	Order number	Firmware	MPI address	I address	Q address	Comment		
2 CPU315-2 PN/DP	6ES7 315-2EH14-0AB0	₹3.1	2					
XI MPI/DP		_	2	2047*				
X2 PN-10 X2 Port I			-	2046*				
X2 F Port 2				2044*				
3		-	-					
5		-					•	
6								
7				-				
9				-				
10							PROFIBILS DP slaves for STM & TIC S7 M7 and C7 (distributed rack)	Ŧ.
11								-1
Installs new GSD files in the system	and updates the contents of the catal	og.						
計開始 🖉 🙆	SIMATIC Manager - S	🖉 Insert	PN IO System JP	0524		HW Config - [SIMAT	🖮 🛛 🏅 🔠 🖉 🌭 🏷 🏹 🖉 上千(8:54

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

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X 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.



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 CMC-PN01 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 CMC-PN01, you must write the PLC program.

For STEP 7, the	program-editing	screen	below	illustrates	an	example	of	writing	а	program	by
using 60xx messa	age 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.

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- 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)

Create Project.

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Select Project view.



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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.

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

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As the figure below shows, move the mouse to position 1 and drag it to draw a line to position 2.

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

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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 CMC-PN01, you must write PLC program.

For TIA PORTAL,	, the program-editing scree	n below illustrates	an example of	writing a program
by using 60xx me	essage format.			

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- 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.

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

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- 1. IW282 means 2103H (output frequency).
- 2. QW276 means 2000H (control word).
- 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.

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.

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

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Distributed I/O	Catalog infor	nation			
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Languages & resources	I/O addresses	Data Input1(VFD->PN01):	65535		
Online access		Data Input2:	65535		
Card Reader/USB memory		Data Input3:	65535		
		Data input+:	62525		
		Data Input5:	65535	×	
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	and the second se			and the second se	

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	lodule]		Real Pro	perties	🗓 Info 😧 🗓 Diagnostics	
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- General		Module parameter	'S			^
Catalog ir Inputs	nformation	Device Specific	Parameters			=
Module para	meters	Data Input	1(VFD->PN01):	65535		
no addresse			Data Input2:	65535		
			Data Input3:	65535		
			Data Input4:	65535		
			Data Input5:	65535		
			Data Input6:	65535		
			Data Input7:	65535		
			Data Input8:	65535		
		Data Output	1(PN01->VFD):	65535		
		1	Data Output2:	65535		
		1	Data Output3:	65535		
			Data Output4:	65535		
			Data Output5:	65535		
		1	Data Output6:	65535		
		1	Data Output7:	65535		
		- 1	Data Output8:	65535		
						~
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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.

Project bat View insert online of Project tree Devices B O O	× 10013 vindo × 1013 (114 1) × 1013 (114 1) ↓ 1013 (114 1)		e Ø Gooffline 🔐 🖪 🖝 🗮 🛄 P] → Distributed I/O → PROFINET IO-Syst		Totally Integrated Auto	PORTAL
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Online backups						3
Device proxy data				~		8
Program info	<		> 100%		>	23
PLC alarms	IN		Reporties	📜 Info 🚺 🗓 Diagnostics		
Text lists		Conoral 10 tags	Sustam constants Touts 3	-		C
Local modules		General TO tags	System constants Texts		Enc.	11
Distributed I/O	-	General	I/O addresses		^	9
Common data		Catalog information	#0 duitesses			5
Documentation settings		Inputs	Input addresses			
Languages & resources	_	Module parameters				
Online access		I/O addresses 4	Start address: 256			
Card Reader/USB memory			End address: 315			
			Designed Internation March			
			riocess mage			
			Interrupt OB number: 40		100	
> Details view			<		> > Information	
Portal view	delta				Project CMC-PN01 Ovelic Read Write	

- 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 CMC-PN01 receive the updated parameter settings.
- 5. When CMC-PN01 is connected to the PLC program successfully, you can test the reading or writing of the set parameter by using the Watch Table. The Watch Table shows as the figure below.

Follow the four steps as shown below to verify if the settings for the parameter table are workable and if reading or writing the drive parameters is successful (can be used with the keypad to verify).

VA.	Siemens - D:\Renesas\Siemer	ns\CMC-P	N01_Cyclic_Read_Write	CMC-PN01_Cyclic_Read	d_Write									- • >
Pro	oject Edit View Insert Or P 🎦 🛃 Save project ا 🐰	ine Op	tions Tools Window	Help 🚹 🖳 🞇 🚿 Go onlin	ne 💋 Go offline	<u>۸ ال ال × ا</u>	3 III				Totally Ir	ntegr	ated Automation POR	TAL
			CMC-PN01_Cyclic_Rea		(PU 315-2 PN/DP)						- • •	×	Testing 📑 🛙	1 🕨
	Devices			1									Options	2
	00		# # 10 Lo 9.	% \$7 [₩] 1							~			Testi
. E			i Name 4	Address	Display format	Monitor value	Mor	itor with trig	Modify with trigge	Modify value	9 0	0	✓ CPU operato	or 3
	CMC-PN01_Cyclic_Kead	<u> </u>	2	761W290:F	Hex	16#E9EC	Perr	nanent	Permanent			11	PLC_1 [CPU 315-	2 PN/
e f	Bevicer & networks		3	%IW310:P	Hex	16#0002	Perr	nanent	Permanent			19-	Error	
2			4	%/W312-P	Hex	16#8183	Perr	nanent	Permanent		1 40 1	lea		-as
9	Device configurati	-	5	%OW296:P	Hex	00	Perr	nanent	Permanent	16#1338		11	RUN	ks
a	V. Online & diagnosti		6	%OW310:P	Hex	00	Perr	nanent	Permanent	16#0002		19	STOP	
	Program blocks	•	7	Add new>		U U				2			FORCE	
	Technology objects			(<u></u>)	Modify									
	External source files				moury								Mode selector:	RUN
	PLC tags				Monitor all									es
	PLC data types				Monitor now									
	 Watch and force ta 				Pinsert row									
	Add new watc				Add row							_		
	Force table		<		🗶 Cut	Ctr	rl+X					>		
	Watch table_1				🚺 Сору	Ctr	rl+C	O Prone	rties *i Info	Diagnostic				
	Online backups			2 F 2	Paste	Ctr	rl+V	Sinope	intes Sinto	i binghostic.				
	Device proxy data		General Cross-	-references Com	X Delete		Del							
	Program info		🕄 🔔 🕕 Show all m	essages 💌	Rename		F2							
	PLC alarms				Cross-reference	e information Shift+	F11							
	Text lists		I Message		Expanded Mor) Go to	Date	Time		6		
	Distributed 1/0		📀 DB2 has b	een deleted successfully	IN CAPBILLED MOD	ie.	_	2	7/15/2018	2:19:06 PM		^		
	Common data		📀 DB1 has b	een deleted successfully	1.				7/15/2018	2:19:06 PM				
	Documentation settin		S Main (OB1	1) was loaded successful	ly.				7/15/2018	2:19:06 PM		1.00		
	Languages & resources		PLC_1 sta	rted.					7/15/2018	2:19:19 PM		=		
	Online access	-	Scanning for dev	vices completed for interf	ace Intel(R) Etherne	t Connection 1217-V. F	Found	1 d	7/15/2018	2:18:56 PM				
	< III	>	Loading comple	ted (errors: 0; warnings: 0	0).				7/15/2018	2:19:19 PM				
	> Details view		Connected to PL	C_1, address IP=192.168.	.0.1.				7/15/2018	2:19:52 PM			<	>
	1 Dertal view	Dueniew	delta	Watch table 1							and as Dire		ID 1021	time.
	Portal view	Vectolety	100 0010	00 Watch table_1				94		V Conn	ected to PLC_	1, add	ress in=192.1	a min

X Note: 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, as can be seen, the success or failure of the parameter reading/writing depends on this status value.

- % %IW312 = I/O start address + 56 (the I/O start address in this example is 256).
- X If you do not need to write the parameters synchronously (with time constraint), it is suggested to write the parameters asynchronously (without time constraint).

Settings for Reading and Writing Asynchronous Parameters of the Drive

Asynchronous writing: Follow the steps as

t Edit View Insert Online O 🖥 🔒 Save project ا 🐰 🗐 🛅	ptions Tools Window Help 🗙 🎝 ± (# ± 🖥 🗓 🔓	🔹 🙀 🂋 Go online 💋 Go offline	<u>₩</u>		Tota	Ily Integrated Auton	nation PORTA
oject tree	CMC-PN01_Cyclic_R	ead_Write Define tag	Ctrl+Shift+I 1 bloc	ks ▶ Main [OB1]	_ # = X	Testing	∎∎ኑ
Devices		Rename tag	Ctrl+Shift+T			Options	
00	⊟⊉ <mark>kå k</mark> ä ≇ ≇ ‰ Main	Rewire tag	Ctrl+Shift+P Ctrl+X	<i>i</i> [#] 0 ⁰ 00 Π	3	> CPU operator pa	nel
CMC-PN01_Cyclic_Read_Write	A Name	III Copy III Paste	Ctrl+V value	Comment		Call environment	t
Devices & networks	@	→ → K Delete Go to	Del			 > Breakpoints > PLC register 	
Device configuration	▼ Block title: *Main Comment	Program Swe Cross-reference inf	formation Shift+F11			✓ Call hierarchy	
Add new block	Comment	· · · · · · · · · · · · · · · · · · ·	Ctrl+R 2				
Comparison of the second	Main [OB1]		S. Proj	oerties	Diagnostics	No call path avail	lable
Watch table_1 Online backups Device proxy data	General General Information	General					
Program info PLC alarms Text lists Comp Local modules Distributed I/O	Compilation Protection Attributes		Name: Main Type: OB Language: LAD				
Common data	~		manual				

Enter the commands below into STL Network, and then a screen displays as shown in the figure below. Then, click OK button.

"WRREC", DB53 CALL REQ :=M41.7 :=2042 ID INDEX :=16#4d2 LEN :=6 DONE :=M41.1 BUSY :=M41.2 ERROR := M41.3 STATUS:=MD46 RECORD:=P#DB2.DBX 2.0 BYTE 6

Window Siemens D:Renesas/Siemens/CMC-PN01_Cyr Project Edit View Insert Online Options Image: State project <	c_Read_WriteKCMC-PN01_Cyclic_Read_Write ols Window Help C# ± 5 ID ID B B S Goonline & Gooffline 🛵		_ ■ × Totally Integrated Automation PORTAL
Project tree	CMC-PN01_Cyclic_Read_Write PLC_1 [CPU 315-2 PN/D	P] → Program blocks → Main [OB1]	Testing Tub
Devices			Options
🖻 🖸 🖸 🖻	á 🗚 🖻 👻 🌭 🖿 🗖 🚍 🗩 📲 🖬 🕼 🥙		
2	Main		> CPU operator panel
▼ CMC-PN01 Cyclic Read Write	Name Data type Of	fset Default value Comment	Call amironment
Add new device	I I I I I I I I I I I I I I I I I I I		Can environment
Devices & networks	Call options	×	Breakpoints
PLC 1 [CPU 315-2 PN/DP]	Data block		> PLC register
Configuration	Name DEE	-	^ ∨ Call hierarchy d
Conline & diagnostics	DP Number		2 <u>1</u>
🔻 🛃 Program blocks 🔤	Single	v	E E
Add new block	instance	Jal	
📲 Main [OB1]	Auto	matic	
🔻 🕁 System blocks	Network 2: The called function bl	ock saves its data in its own instance	Tage 1
🕨 🔂 Program resources	Comment data block.		sks
Technology objects			
External source files	1 C	%DB 53	
🕨 🚂 PLC tags	2 More		T E
🕨 💽 PLC data types	3.1	-8	
Watch and force tables	4 10 FORM		
💣 Add new watch table	viain [OB1]	Diagnostics	No call path available
Force table	General	OK	
Watch table_1	General		
🕨 🙀 Online backups	Information General		
Device proxy data	Time stamps		
Program info	Compilation	Name: Main	
PLC alarms	Protection	Track OR	
Text lists	Attributes	iype: OB	
Local modules	Lar	guage: LAD	
Distributed I/O	N	umber: 1	
Common data		🔿 manual	
> Details view		automatic	*
Portal view 🔣 Overview	delta 🔠 Watch table_1 📲 Main	Cor	nnection to PLC_1 terminated.

2. Follow the three steps as shown in the figure below to add DB.



※ Note: The two DB values in red boxes as shown in the figure below should match.

roject tree		C-PN01_Cyclic_Read_Write → PLC_1 [CPU 315-2 PN/DP] → Program blocks → Main [OB1]	_ # = X	Testing	∎ □ ►
Devices				Options	
300		_X # # != = = = = = = = = # = = # != # !=			
		Main		> CPU opera	tor panel
CMC-PN01_Cyclic_Read_Write	^	Name Data type Offset Default value Comment		> Call enviro	nment
Add new device			R 7	> Developed	
Devices & networks		L		> Breakpoint	s
PLC_1 [CPU 315-2 PN/DP]		* -		PLC register	r
The vice configuration			^	✓ Call hierar	chy
😼 Online & diagnostics		Network 2:			
🔻 🛃 Program blocks	=	Network 2			
Add new block		Comment			
Hain [OB1]		1 CALL WORFC "DR53" a	081		
🔻 🔄 System blocks		2 Any			
 Program resources 		3 REQ :="Tag 1" %M	41.7		
👌 Data_block_2 [DB2]		4 ID :=2042 2	042		
🗃 DB53 [DB1]		5 INDEX :=16#4d2 16	#4d2 =		
Technology objects		6 LEN :=6	6		
External source files		7 DONE :="Tag_2" %M	41.1		
PLC tags		8 BUSY :="Tag_3" %M	41.2		
PLC data types		9 ERKOR :="Tag_4" \$M	41.3 m/c	No call pat	h available
 Watch and force tables 			12 O BYTE 6		
Add new watch table		13	×		
Force table		100%	milim		
Watch table_1		in [OB1] Q Properties 11 Info (1) V Diagno	stics		
Online backups		Summed and the second			
Device proxy data		Jeneral			
Program info		eneral General	^		
PLC alarms		nformation	1		
Text lists		ime stamps 🔳			
Local modules	~	Compilation Name: Main			
Details view		rotection Type: 08			

- 3. Recompile the programs and download them to the PLC program.
- 4. Test if the programming is workable by using the Watch Table. Refer to the settings in the figure below.

A Siemens - D:\Renesas\Siemens\CMC-	PN01_C	yclic_Re	ead_Write\CMC-	PN01_Cyclic_Read_	Write							- 6
Project Edit View Insert Online C	Options	Tools	Window Help	n m Storester	S C M					Tot	ally Integrated A	Automation
Project tree	C ≺		PN01_Cyclic_i	Read_Write 🕨 PLC	_1 [CPU 315-2	A? III III III III PN/DP] ▶ Watch and	d force tables 🕨	Watch table_1		_ # = X	Testing	
Devices											Options	
1900		1	19 Lo 9	1 2 m m								
5	-		Address	Display format	Monitor value	Monitor with trig	Modify with trigge	Modify value	4	Comment	✓ CPU operate	or panel
▼ T CMC-PN01 Cyclic Read Write		1	%IW296:P	Hex	16#0000	Permanent	Permanent			01-00		
Add new device	_	2	%IW298:P	Hex	16#E9A0	Permanent	Permanent			01-10	PLC_1 [CPU 315	-2 PN/DP]
B Devices & networks		3	%IW310:P	Hex	16#0008	Permanent	Permanent		0 9	09-00	Error	
PLC 1 [CPU 315-2 PN/DP]		4	%IW312:P	Hex	16#0183	Permanent	Permanent			Read Write	PLIM	PUN
Device configuration	-	5	%QW296:P	Hex	00	Permanent	Permanent	16#1338		01-00	KUN	RUN
Q Online & diagnostics		6	%OW310:P	Hex	00	Permanent	Permanent	16#0002	Ā	09-00	STOP	STOP
Program blocks		7	%M41.7	Bool	TRUE	Permanent	Permanent	TRUE			FORCE	MRES
Add new block	-	8	%DB2.DBB2	Hex	16#FF	Permanent	Permanent	16#FF				
Main [OB1]		9	%DB2.DBB3	Hex	16#06	Permanent	Permanent	16#06			Mode selector:	RUN P
 System blocks 		10	%DB2.DBB4	Hex	16#01	Permanent	Permanent	16#01				
Program resources		11	%DB2.DBB5	Hex	16#0A	Permanent	Permanent	16#0A				
Data block 2 [D	ē.	12	%DB2.DBB6	Hex	16#E9	Permanent	Permanent	16#E9				
B DB53 [DB1]		13	0 %DB2.DBB7	Hex	16#A0	Permanent	Permanent	16#A0				
Technology objects		14	<add new=""></add>									
External source files												
PIC tags		-										
PIC data tines												
Watch and force tables												
Add new watch table												
Fill Force table			<			8				>		
Watch table 1						0	Properties	Info R Di	annostics			
Online backups				(r			rioperdes 12		agnostics		-	
Device provy data		Ge	eneral Cros	ss-references	Compile							
Program info		\odot	💧 📵 Show all	messages	•							
PI Calarms												
E Text lists		1	Message				Got	o ? Dat	e Tin	1e		
<	>	0	Connected to	PLC 1. address IP=19	2 168 0 1			7/1	5/2018 4.	0.03 PM		
> Details view		1								×	<	
	-											

The example of writing the drive parameters above is demonstrated by FF 06 YY YY XX XX.
 (YY YY indicates the parameter group and parameter number. For example, 01-00 means parameter group 01 and parameter number 00.)
 (XY XY means the written values. For example, 12.88 – 0x1288.)

- (XX XX means the written values. For example, 13 88 = 0x1388.)
- ※ You can choose to write the values or not by setting REQ.

Asynchronous reading:

1. Open OB1 and Insert STL Network. Enter the commands below into STL Network, and then a screen displays as shown in the figure below. Then, click **OK** button.

CALL "WRREC", DB53 REQ :=M41.7 ID :=2042 INDEX :=16#4d2 LEN :=4 DONE :=M41.1 BUSY :=M41.2 ERROR :=M41.3 STATUS:=MD46 RECORD:=P#DB4.DBX 2.0 BYTE 4

CALL "RDREC", DB52 REQ :=M31.7 ID :=2042 INDEX :=16#4d2 MLEN :=2 VALID :=M31.1 BUSY :=M31.2 ERROR :=M31.3 STATUS:=MD36 LEN :=MW34 RECORD:=P#DB3.DBX 2.0 BYTE 2



2. After you click **OK** button, a screen displays as shown in the figure below. Note the values in red boxes.

Devices Options Main Data type Office: Deta type	oject tree		CMC-PN01_Cycli	c_Read_Write → PLC_1 [CPU 3	15-2 PN/DP] → Program blocks → Main	[OB1] _ 🖬	×∎ ×	Testing 🗖 🛛
Image: Control (cycle, Red, Write) Image: Control	Devices							Options
Main > CPU operator panel CNCFN01_Cyclic_Read_Write Name Data type Offset Default value Comment > Call environment Main Devices & networks > Devices & networks > Devices & networks > Place reakpoints ID Device configuration 4 ID Device configuration 2042 > Place register ID Device configuration 5 ID Device configuration 2042 > Place register ID Device configuration 5 ID Device configuration 2042 > Place register ID Device configuration 6 ID Device register 10 Stattts := rtrag_3" 4tki1.12 ID Device register 10 Stattts := rtrag_5" 4tki1.12 10 Stattts := rtrag_4" 4tki1.13 ID Device register 10 Stattts := rtrag_5" 4tki1.12 10 11 Record := rtrag_5" 4tki1.12 ID Device register 13 CALL REREC , rtbs2" 4tki1.12 10 11 12 12 13 12 13 12 14 13 12 14 </td <td>00</td> <td></td> <td>HÌ HÌ 学 👻 🛙</td> <td>‱ ⊨ Ξ Ξ 🗩 🧏 ± 🗟 ± 🗟</td> <td>= 😥 🥙 📞 🦛 👽 🖣 🐂 🔗 °</td> <td>\$ III</td> <td></td> <td></td>	00		HÌ HÌ 学 👻 🛙	‱ ⊨ Ξ Ξ 🗩 🧏 ± 🗟 ± 🗟	= 😥 🥙 📞 🦛 👽 🖣 🐂 🔗 °	\$ III		
CALCHO1_Cyclic, Read, Write A Name Data type Offset Default value Comment > Call environment Device configuration Work and for a big on thick ID ::=2042 2042 > PLC register Work and new block IER IER IER IER IER Call Environment > PLC register Work and new block IER			Main					> CPU operator panel
^A Add new device ^A Cut] CMC-PN01_Cyclic_Read_Write	^	Name	Data type	Offset Default value Commen	it		> Call environment
Devices & networks Cut Devices & networks Cut Devices & networks Devices RNDPi Devices configuration Devices RNDPi Devices configuration Devices configuration Devices RNDPi Devices configuration Devices RNDPi Devices RNDPi	Add new device		1.1		howed howed		1 1	
PLC 1 [CPU 315 2 PN/DP] ID i=2042 2042 2042 V Call hierarchy 2042 V Call hierarchy 4 V System blocks 4 V System blocks 10 V System blocks 11 V System blocks 12 V Technology objects 13 V Program resources 13 V Program resources 14 V Program source files 14 V No call path available 10 V Value had force table 2042 V No call path available 10 V Value **Tag_1** 100* V Value **Tag_1** 100* V Value **Tag_1	Devices & networks		CALL					> Breakpoints
ID Device configuration 2042 Wo Online & diagnostics 10 Image: Construction 10 <	PLC_1 [CPU 315-2 PN/DP]		(1000)					> PLC register
W Online & diagnostics INDEX := (15432) Program blocks 4 Add new block 8 BUSY := "Tag_2" 8 M41.1 BUSY := "Tag_4" 8 M41.3 BUSY := "Tag_5" 8 M046 P#DB4.DEX2.0 BYTE 4 9 BECCRD := #104.1EX2.0 BYTE 4 9 BUSY := "Tag_6" 10 INDEX := 164.422 10 BUSY := "Tag_7" 8 M31.1 BUSY := "Tag_1" 9 VALID := Tag_7" 8 M31.2 BUSY := "Tag_1" 9 VALID := Tag_1" 9 With table_1 10 BUSY := "Tag_1" 9 BUSY := "Tag_1" 9 VALID := Tag_1" 9 VALID := Tag_1" 9 BUSY := "Tag_1" 9 BUSY := "Tag_1" 9 BUSY := "Tag_1" </td <td>Device configuration</td> <td></td> <td>4</td> <td>ID :=2042</td> <td></td> <td>2042</td> <td>^</td> <td>✓ Call hierarchy</td>	Device configuration		4	ID :=2042		2042	^	✓ Call hierarchy
Image: Program blocks Image: Program b	V. Online & diagnostics		5	INDEX :=16#402		16#402		
Add new block Busy := Trag_3" Busy := Trag_5" Busy := Trag_6"	- Rrogram blocks		7	DONE te"Tag 2"		BM41 1		
* Main (OB1) 9 ERROR :="Tag_4" Notes * System blocks 10 STATUS :="Tag_5" Nt046 * Technology objects 11 RECORD :=PADB4.DBX2.0 BYTE 4 PaDB4.DBX2.0 BYTE 4 * Technology objects 11 RECORD :=PADB4.DBX2.0 BYTE 4 PaDB4.DBX2.0 BYTE 4 * Technology objects 11 RECORD :=PADB4.DBX2.0 BYTE 4 PaDB4.DBX2.0 BYTE 4 * Technology objects 11 RECORD :=PADB4.DBX2.0 BYTE 4 PaDB4.DBX2.0 BYTE 4 * Technology objects 12 CALL RDREC , "DBS2" No call path available * Technology objects 12 CALL RDREC , "DBS2" 2042 * Maid new watch table 13 MLEN :=22 2 2 * Walk table_1 * WALID :=Tag_0" % M31.1 2 8 M31.3 * Wolk table_1 * WALID :="Tag_0" % M31.3 1 1 * Wolk table_1 * WALID :="Tag_0" % M31.3 1 <t< td=""><td>Add new block</td><td>=</td><td>8</td><td>BUSY :="Tag_3"</td><td></td><td>\$M41.2</td><td></td><td></td></t<>	Add new block	=	8	BUSY :="Tag_3"		\$M41.2		
* System blocks 10 STATUS :="Tag_5" %D46 * Program resources 11 RECORD :=P#D84.DBX2.0 BYTE 4 P#D84.DBX2.0 BYTE 4 * Program resources 11 RECORD :=P#D84.DBX2.0 BYTE 4 P#D84.DBX2.0 BYTE 4 * Program resources 11 RECORD :=P#D84.DBX2.0 BYTE 4 P#D84.DBX2.0 BYTE 4 * Program resources 11 RECORD :=P#D84.DBX2.0 BYTE 4 P#D84.DBX2.0 BYTE 4 * Program resources 12 No call path available No call path available * Program resources 11 RECORD :=P#D84.DBX2.0 BYTE 4 P#D84.DBX2.0 BYTE 4 * Program resources 11 RECORD :=P#D84.DBX2.0 BYTE 4 No call path available * Program resources 10 :=2042 164422 ImDex :=164422 * Match able _1 11 :=2042 2 ImDex :=164422 ImDex :=164422 * Online backups 21 ERCORD :=Prog_0" No call path available No call path available * Record providata 22 STATUS := "Tag_10" No call path available No call path available * Record modules Enternal 100" ImOut: Any ImOut: Any ImOut: Any Imout: Any	- Main [OB1]		9	ERROR :="Tag 4"		\$M41.3		
Image: Second	▼ System blocks		10	STATUS :="Tag 5"		%MD 4.6		
12 CALL BURCC, "DB52" 13 CALL BURCC, "DB52" 14 Any 15 REQ :="Tag_6" 16 ID :=2042 16 ID :=2042 16 ID :=2042 17 IKDEX :=164 4d2 18 MLEN :=2 19 VALD :="Tag_6" 19 VALD :="Tag_6" 19 VALD :="Tag_6" 19 VALD :="Tag_6" 100 BY 100 :=:Tag_7" 11 ERROR :="Tag_6" 12 ERROR :="Tag_6" 13 VALD ::=Tag_7" 14 MEEN :=2 15 RECORD :=PHOBS.DBX2.0 BYTE 2 100% IND0%	Program resources		11	RECORD :=P#DB4.DBX2.0 BY	TE-4	P#DB4.DBX2.0 BYTE 4		
13 CALL RDRCC, "DB52" \$DB2 14 Any \$DB2 14 Any \$MS1.7 15 RC data types 2042 16 ID :=2042 2042 17 INDEx:=166 f412 1644d2 18 MLEN :=2 2 19 VALID :=Taq_0" \$M31.1 10 Watch table 19 19 VALID :=Taq_0" \$M31.2 10 BUSY := "Taq_0" \$M31.3 11 ERROR := Taq_0" \$M31.3 12 ERROR := "Taq_10" \$M344 22 STATUS := "Taq_11" \$M364 24 RECORD := "Taq_11" \$M364	Technology objects		12	B				
14 Any 14 Any 15 REQ :="Tag_6" 15 REQ :="Tag_6" 16 ID :=2042 16 ID :=2042 17 INDEX :=16442 18 MLEN :=2 19 VALID :="Tag_6" 19 VALID :="Tag_7" 10 BUSY :="Tag_6" 11 20 12 ERROR :="Tag_6" 13 IEROR :="Tag_7" 14 No call path available 15 REQ :="Tag_6" 16 ID :=2042 17 INDEX :=16442 18 MLEN :=2 19 VALID :="Tag_6" 19 VALID :="Tag_6" 20 BUSY :="Tag_6" 21 ERROR :="Tag_10" 22 SITATUS :="Tag_10" 23 LEN :="Tag_11" 24 RECORD :=P4DB3.DBX2.0 BYTE 2 100% Indue:xny Text list: 100% Indue:xny	External source files		13	CALL RDREC , "DB52"		\$DB2		
15 RED := "Tag_6" % M31.7 16 ID := 2042 2042 17 INDEX := 16#4d2 16#4d2 18 MLEN := 2 2 19 VALID := "Tag_7" % M31.1 19 VALID := "Tag_7" % M31.1 10 BUSY := "Tag_7" % M31.1 10 BUSY := "Tag_7" % M31.1 10 BUSY := "Tag_7" % M31.2 19 VALID := "Tag_7" % M31.2 10 BUSY := "Tag_1" % M31.3 10 BUSY := "Tag_1" % M31.2 11 ERROR := "Tag_1" % M31.3 11 ERROR := "Tag_1" % M31.3 12 ERROR := "Tag_1" % M31.3 12 ERROR := "Tag_1" % M31.3 12 ERROR := "Tag_1" % M33.4 > 12 STATUS := "Tag_1" % M33.4 > 13 LEN := "Tag_1" % M33.4 > 14 RECORD := P+DB3.DEX2.0 BYTE 2 > > 100% Info @ Diagnostics<	PIC tags		14	Any				
1 10	PIC data types		15	REQ :="Tag_6"		\$M31.7		
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22 STATUS := "Tag_10" 100% 100% 100% 100% 100% 100% 100% 100%	Online backups		21	ERROR :="Tag_9"		%M31.3		
23 LEN :="Tag_11" NM34 Ph03s.nbx2.0 P4DS.nbx2.0 SYTE 2 Text lists Inout: Any Inout: Any Inout: Any Inout: Any Inout: Any	Device providata		22	STATUS :="Tag_10"		%MD 36		
24 RECORD :=P#DB3.DEX2.0 BYTE 2 P4DB3.DEX2.0 BYTE 2 100% Inout: Any Inout: Inout: Any Inout: Inout: Any Inout: Inout: Any Inout: Inout: Inout:	Program info		23	LEN :="Tag_11"		\$MW 34		
Techninis Techninis	PI Calarmo		24	RECORD :=P#DB3.DBX2.0 B	TE 2	P#DB3.DBX2.0 BYTE 2	~	
Constructed to the second	En Tast liste		() In(Dut: Any X				
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3. Follow the three steps as shown in the figure below to add DB for RDREC and DB for WRREC.

Devices Image: CACCPNO1_Cyclic.Read_Wite Devices & networks	oject tree		CM F	Add new block				× _ = = =	X T	esting 🗖 🛙
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Add new device Device setworks PRC_1 [GPU3152 PNUDP] Device configuration Online & diagnostics Program blocks Program blocks Program resources Program resources Program resources Program info Progra	CMC-PN01_Cyclic_Read_White	^			1	BRDREC_SFB [SF852]	^ 2		>	Call environment
Implexes a frections	Add new device	-		OB	Language:	WRREC_SFB [SFB53]	2		>	Breakpoints
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After you finish adding DB, a screen displays as shown in the figure below.

Siemens - D:\Renesas\Siemens\CMC-PN01_	Сус	lic_Read_Write	CMC-PN01_Cyclic_R	ead_Write						-	∎ X
Project Edit View Insert Online Options	1	ools Window	Help						Tot	ally Integrated Automation	
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2		Main								> CPU operator panel	- In
CMC-PN01_Cyclic_Read_Write	^	Name		Data type	Offset De	fault value Comm	ient			> Call environment	-15
🗧 📑 Add new device						-			<u> </u>	A Description	- 5
Devices & networks		CALL								> Breakpoints	
PLC_1 [CPU 315-2 PN/DP]			77	4.0				0040		> PLC register	<u>v</u>
Device configuration		4	ID :=20	44				2042	^	✓ Call hierarchy	_ 7
V. Online & diagnostics		6	INDEA :=10	9 402				109402			- 1 음.
Program blocks	=	7	DONE :="T	ag 2"				= €M41.1			-B
Add new block		8	BUSY :="T	ag 3"				\$M41.2			
Main [OB1]		9	ERROR :="T	ag 4"				%M41.3			
 System blocks 		10	STATUS :="T	ag_5"				\$MD 46			1
Program resources		11	RECORD :=P#	DB4.DBX2.0 BY	TE 4			P#DB4.DBX2.0 BYTE 4			sks
Data block 2 [DB3]		12									
Data block 3 [DB4]		13	CALL RDREC ,	"DB52"				%DB2			
B52 [D82]		14	Any DEO					a. V.01 - T			
DB53 [DB1]		16	REQ := 1	ag_e~				\$M31.7	_		bra
Technology objects		17	ID .=20	4442				16#4d2			Tie
External source files		18	MLEN :=2	1102				2		No call path available	ŝ
PIC tags		19	VALID :="T	ag 7"				\$M31.1		No can patri avanable	
PIC data tunes		20	BUSY :="T	ag 8"				\$M31.2			
Watch and force tables		21	ERROR :="T	ag_9"				%M31.3			
Add new watch table		22	STATUS :="T	ag_10"				\$MD 3 6			
Fill Force table		23	LEN :="T	ag_11"				%MW 3.4			
Watch table 1		24	RECORD :=P#	DB3.DBX2.0 BY	TE 2		100%	P#DB3.DBX2.0 BYTE 2	~		
Colina hashuas							100%			-	
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- 4. Recompile the programs and download them to the PLC program.
- 5. Test if the programming is workable by using the Watch Table. Refer to the settings in the figure below.

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Device configuration		5		%DB4.DBB4	Hex	16#01	16#01	🗹 🚹				
Online & diagnostics		6		%DB4.DBB5	Hex	16#0A	16#0A	🛛 🗹		SIOP	STOP	
🔻 🛃 Program blocks	•	7		%DB3.DBB2	Hex	 16#E9 				FORCE	MRES	
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Hain [OB1]		9		<add new=""></add>						Mode selector:	RUN_P	
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> Details view		<							>			

X As shown in the example above, before reading the parameters, you must call WRREC functional block to write FF 03 YY YY to change the mode of communication card, and then call RDREC functional block to read the drive parameters (YY YY indicates the parameter group and parameter number. For example, 01-00 means parameter group 01 and parameter number 00.).

※ You can choose to read the parameters or not by setting REQ.

X Note: The ID values in the above-mentioned STL commands can be changed. Refer to the figure below to find the ID setting values.

M Siemens - D:\Renesas\Siemens\S7-Projekt\Acyclic_Wr	te_Test\Acyclic_Write_Test						_ # X
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Note: For the PLC program in Siemens 1200 or 1500 Series, refer to the figure below to find the ID setting values in the above-mentioned STL commands. Siemens - Cit/Sersimarcus.lu/Documents/Automation/SFB33_15163_Test/Series______

	E 4	ast > PLC_1 [CPU 1516-3	PN/DP] > Distributed I/O	PROFINET IO-System	(100): PN/IE_1 >	delta 💶 🖬 🖬 🗙	Hardware catalo	9 8 I
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 Program blocks 					1			
Add new block	1		and a		-			
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Data_block_2 [D83]		100	Concernant of the second se					
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PLC alarms		Bet interconnection	hardware identif	Het.				
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