# MV800 Series Platform Drive

# **Communication Options User Manual**

Document Version: V1.0 Archive Date: BOM Code:

**Shenzhen Megmeet Electrical Co., Ltd.** provides comprehensive technical support for our valued customers. Please contact your nearest Megmeet office or service center, or connect directly with Megmeet headquarters if any assistance is needed.

### Shenzhen Megmeet Electrical Co., Ltd.

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# Foreword

Thank you for choosing Megmeet MV800 Platform Drive Communication Options.

The personnel responsible for installing and operating the options must undergo professional electrical training and safety training, be qualified through examinations, be adequately familiarized with the installation, commissioning, operation, and maintenance procedures and requirements of the product, and be able to prevent various emergency situations.

Before installing, removing, and operating the options, please carefully and thoroughly read the safety precaution sections of this manual and the drive user manual to ensure safe operation.

Any injuries or equipment damage caused by the user's failure to comply with the safety precautions stated in this manual and the drive user manual will not be the responsibility of our company.

Megmeet has conducted strict inspections during the manufacturing and packaging of the product. If any parts are found missing or damaged when unpacking the product, please contact our company or your supplier for further assistance. Due to our commitment to continuous improvement of our products, changes may occur to the provided information without prior notice.

## Unpacking inspection

When unboxing the product, please make sure to verify the following:

- Check whether any damage occurred to this communication option
- Check whether the product is the right one via the bar code label on the PCB;
- Check whether the package contents are correct;
- Check whether the communication option and its user manual are included in the package;
- Contact the supplier immediately if any product damage or wrong models are found, or any of the package contents is found missing;
- Please request the option description document from our company;
- Refer to the environmental specifications for usage.

Item	Specifications
Operational temperature	-10 to 50°C
Storage temperature	-20 to 60°C
Humidity	5% to 95%
Other environmental requirements	Solar irradiation below 700 W/m <sup>2</sup> ; non-condensing, non-freezing, no direct exposure to rain, snow, or hail.
Air pressure	70 to 106 kPa

ltem	Specifications
Vibration/Shock	5.9 m/s $^2$ (0.6g) for sine vibration of 9 to 200 Hz

## Safety precautions

<b>WARNING</b>
• It is required to remove the drive enclosure/cover when installing/removing the option. Make sure the drive is completely powered off and the internal voltage is safe before installing/removing the option. Refer to the drive user manual for installing/removing procedures. Failure to comply with this requirement may result in serious injuries or death.

- When storing the option, make sure to safely place it in a location that is dust-proof, moisture-proof, free from electric shock, and without mechanical pressure.
- The expansion option is sensitive to static electricity. Adequate anti-static measures must be taken during operations to prevent damage to the components.

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# Chapter 1 EtherCAT Communication Option

## 1.1 Overview

Thank you for choosing Megmeet MV810-ECAT02 communication option. This manual provides information of the product functions, specifications, installation guidelines, basic operations, and settings, as well as an introduction to the EtherCAT network protocol. To ensure correct installation and operation of this product, please carefully read this manual and the communication protocol section of the drive user manual before using this communication option.

This manual serves as a guide for operating the MV810-ECAT02 communication option, and includes relevant instructions. Detailed information about the EtherCAT protocol is not included herein. If users would like to learn more about the EtherCAT protocol, please refer to the professional articles or reference materials.

This communication option is defined as a EtherCAT slave communication option that can be used with drives supporting EtherCAT communication.

This communication option supports two methods of reading and writing the process variables from the drive: one through PDO, and the other through SDO for reading and writing the object dictionary defined by the manufacturer.

## 1.2 EtherCAT communication option features

### (1) Functions

- EtherCAT COE protocol supported
- Auto-configuration of the network address

### (2) Services

- PDO and SDO
- Access to the drive parameters via SDO
- 100 Mbps full duplex
- Speed mode and torque mode
- SM mode, and DC mode with min. 1 ms cycle
- 4 groups of configurable PDO

### (3) EtherCAT synchronous cycle

ltem	Value
Superropous quelo	8 ms
Synchronous cycle	4 ms

2 ms
1 ms

#### (4) Communication interface

EtherCAT adopts the standard RJ45 connector. This option offers two RJ45 interfaces that differ in transmission directions. The interface is shown in Figure 1-1. The IN terminal represents the EtherCAT input interface and the OUT terminal represents the output interface. The pin definitions of the interface are shown in Table 1-1.

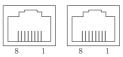


Figure 1-1 RJ45 interface

Table 1-1 F	RJ45 interface	pin	definitions
-------------	----------------	-----	-------------

Pin	Name	Description
1	TX+	Transmit Data+
2	TX-	Transmit Data-
3	RX+	Receive Data+
4	N/C	Not connected
5	N/C	Not connected
6	RX-	Receive Data-
7	N/C	Not connected
8	N/C	Not connected

#### (5) Status indicator

This MV810-ECAT02 option has five LED indicators located on the PCBA of the expansion box and in the communication interface. LED indicators on the PCBA of the expansion box indicate the function status and the power supply status. The LED indicator of the communication interface indicates the communication connection status of MV810-ECAT02.

Description of the LED indicators on the PCBA of the expansion box:

LED1 (red) status	Description	Action
Steady on	Normal power supply for ECAT option	No need for actions
Off	No power supply for ECAT option	Check whether the ECAT option is properly connected to the drive

LED2 (green) status	Description	Action
Off	State machine in Init state	Check whether the ECAT option is properly connected to the host controller
Quickly flashing	State machine in Pre-OP state	Check whether the ECAT option is properly connected to the host controller
Slowly flashing	State machine in Safe-OP state	Check whether the ECAT option is properly connected to the host controller
Steady on	State machine in OP state	No need for actions

LED3 (green) status	Description	Action
Steady on	Normal reading/writing of function code by the master	No need for actions
0.5 s flashing	Function code reading/writing error by the master	Identify the cause by referring to the section 1.4.6 <i>Function code reading/writing fault</i>

LED4 (red) status	Description	Action
Off	Normal	No need for actions
Steady on	Communication timeout between the master and the option	Check whether the ECAT option is properly connected to the drive
0.5 s flashing	Abnormal ESC operation	Contact the manufacturer

Description of the LED indicator of the communication interface:

LED status	Description	Action
Yellow LED flashing	Normal connection, with data exchange	No need for actions
Green LED steady on	Normal connection	No need for actions
Yellow LED steady on	Normal connection, with no data exchange	Check whether the communication between the EtherCAT master and slave is normal
Green LED off	Failure in connection	Check whether the network cable is properly connected

## 1.3 Electrical connection

EtherCAT network generally comprises one master station and multiple slave stations. The network can be structured into a bus type, star type, tree type, or a combination of several types, enabling flexible device connection and wiring. The bus-type network topology is shown in Figure 1-2.

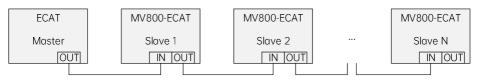


Figure 1-2 Bus-type network topology

## 1.4 EtherCAT communication

## 1.4.1 EtherCAT slave device description file

EtherCAT slave device description file (XML file) is used to configure the master and slave through reading by the master. The file contains the information necessary for the EtherCAT communication setting. Megmeet provides an "MV800\_ECAT2\_CoE\_V1.00.xml" file for the EtherCAT communication option.

## 1.4.2 Function code setting

When using the MV810-ECAT02 to operate the MV800 drive, users need to set the operation command channel and the frequency source of the MV800 drive to the bus communication card, as shown in the following table.

Drive parameter	Value	Function description
P02.02	2	Set the operation command channel to communication control
P02.03	3	Set the communication command channel to EtherCAT
P02.05	8	Set the main frequency source to EtherCAT

## 1.4.3 PDO data mapping

MV810-ECAT02 communication option adopts the following PDO mapping by default (the maximal number of configurable data for 0x1600 and 0x1A00 is 10):

RxPDO (0x1600)	Control word (0x6040)	Target Position (0x210B)	Target Velocity (0x210D)	Target Torque (0x210C)			
TxPDO (0x1A00)	Status word (0x6041)	Error code (0x603F)	Output frequency (0x2202)	Output current (0x2200)	Output torque (0x2203)	Bus voltage (0x2204)	Position actual value (0x220A)

## 1.4.4 PDO data description

PDO enables real-time reading and modification of the drive data by the master, as well as the cyclic data exchange between the master and the drive. The PDO data description of the MV810-ECAT02 option is shown in the following table. For more detailed information, please refer to the XML file of the device.

RxPDO (sent by the master, and received by the slave):

Index/ Sub-index	Indication	Description	Value range	Access rights
		Bit0: Forward running	0: Disabled; 1: Enabled	
		Bit1: Reverse running	0: Disabled; 1: Enabled	
		Bit2: Forward JOG	0: Disabled; 1: Enabled	
6040h/0	Control word	Bit3: Reverse JOG	0: Disabled; 1: Enabled	Dood/Write
60401/0	Control word	Bit4: Stop	0: Disabled; 1: Enabled	Read/Write
		Bit5: Coast to stop	0: Disabled; 1: Enabled	
		Bit6: Fault reset	0: Disabled; 1: Enabled	
		Bit7: Emergency stop	0: Disabled; 1: Enabled	
2100h/0	Drive torque upper limit	Unit: 0.1%	0.0 to 300.0% (corresponding to 0 to 3000)	Read/Write
2101h/0	Braking torque upper limit	Unit: 0.1%	0.0 to 300.0%	Read/Write
2102h/0	FWD frequency upper limit	Unit: 0.01 Hz	0.00 to 599.00 Hz (corresponding to 0 to 59900)	Read/Write

Index/ Sub-index	Indication	Description	Value range	Access rights
2103h/0	REV frequency upper limit	Unit: 0.01 Hz	0.00 to 599.00 Hz	Read/Write
2104h/0	Voltage reference (V/F separation)	Unit: 1 V	0 to 1000 V	Read/Write
2105h/0	DO	Bit0: D01 terminal Bit1: D02 terminal Bit2: D03 terminal Bit3: R0 terminal	0: Disabled; 1: Enabled 0: Disabled; 1: Enabled 0: Disabled; 1: Enabled 0: Disabled; 1: Enabled	Read/Write
2106h/0	AO1	Unit: 0.01%	0.00 to 100.00% (corresponding to 0 to 10000)	Read/Write
2107h/0	HDO1	Unit: 0.001 kHz	0.000 to 50.000 kHz (corresponding to 0 to 50000)	Read/Write
2108h/0	HDO2	Unit: 0.001 kHz	0.000 to 50.000 kHz	Read/Write
2109h/0	PID reference value	Unit: 0.1%	-100.0 to 100.0% (corresponding to -1000 to 1000)	Read/Write
210Ah/0	PID feedback value	Unit: 0.1%	-100.0 to 100.0%	Read/Write
210Bh/0	Position reference	Null	Null	Read/Write
210Ch/0	Torque reference	Unit: 0.1%	-300.0 to 300.0%	Read/Write
210Dh/0	Frequency reference	Unit: 0.01 Hz	0.00 to 599.00 Hz	Read/Write

TxPDO (sent by the slave, and received by the master):

Index/ Sub-index	Indication	Description	Value range	Access rights
	6041h/0 Status word	Bit0: Forward running Bit1: Reverse running	0: Disabled; 1: Enabled 0: Disabled; 1: Enabled	
6041h/0		Bit2: Stop	0: Disabled; 1: Enabled	Read
00411/0		Bit3: Fault	0: Disabled; 1: Enabled	only
	Bit4: Power failure	0: Disabled; 1: Enabled		
		Bit5: Ready status	0: Not ready; 1: Ready	

Index/ Sub-index	Indication	Description	Value range	Access rights
		Bit6: Motor number	0: Motor 1; 1: Motor 2	
		Bit7: Motor type	0: Asynchronous motor;	
			1: Synchronous motor	
		Bit8: Overload pre-alarm	0: Disabled; 1: Enabled	
		Bit9 to Bit10: Control mode	0: Keypad; 1: Terminal;	
			2: Communication	
2200h/0	Output current	Unit: 0.1 A	0.0 to 6553.5 A (corresponding to 0 to 65535)	Read only
2201h/0	Output voltage	Unit: 1 V	0 to 65535 V	Read only
2202h/0	Output frequency	Unit: 0.01 Hz	0.00 to 599.00 Hz (corresponding to 0 to 59900)	Read only
2203h/0	Output torque	Unit: 0.1%	-300.0 to 300.0% (corresponding to -3000 to 3000)	Read only
2204h/0	Bus voltage	Unit: 0.1 V	0.0 to 6553.5 V	Read only
		Bit0: DI1 terminal	0: Disabled; 1: Enabled	
22051-10	DL state 1	Bit1: DI2 terminal	0: Disabled; 1: Enabled	Read
2205h/0	DI state 1	Bit2: DI3 terminal	0: Disabled; 1: Enabled	only
		Bit3: DI4 terminal	0: Disabled; 1: Enabled	
		Bit0: DI5 terminal	0: Disabled; 1: Enabled	
	51.1.1.0	Bit1: DI6 terminal	0: Disabled; 1: Enabled	Read
2206h/0	DI state 2	Bit2: DI7 terminal	0: Disabled; 1: Enabled	only
		Bit3: DI8 terminal	0: Disabled; 1: Enabled	
		Bit0: DO1 terminal	0: Disabled; 1: Enabled	
		Bit1: DO2 terminal	0: Disabled; 1: Enabled	Read
2207h/0	DO state	Bit2: DO3 terminal	0: Disabled; 1: Enabled	only
		Bit3: RO terminal	0: Disabled; 1: Enabled	
2208h/0	Motor power	Unit: 0.1%	-300.0 to 300.0% (corresponding to -3000 to 3000)	Read only

Index/ Sub-index	Indication	Description	Value range	Access rights
2209h/0	Power output	Unit: 0.1 kW	0.0 to 6553.5 kW (corresponding to 0 to 65535)	Read only
220Ah/0	Position actual value	Null	Null	Read only
603Fh/0	Error code	For detailed information, please refer to <i>MV810</i> <i>High-Performance Vector</i> <i>Control Drive User Manual</i>	<ul> <li>0: No error generated</li> <li>1: Overcurrent during acceleration (OC1)</li> <li>2: Overcurrent during deceleration (OC2)</li> <li>3: Overcurrent during operation at constant speed (OC3)</li> <li>4: Overvoltage during acceleration (OV1)</li> <li>5: Overvoltage during deceleration (OV2)</li> <li>6: Overvoltage during operation at constant speed (OV3)</li> <li>7: Undervoltage fault (Uv)</li> <li>8: Input phase loss (SPI)</li> <li>9: Output phase loss (SPO)</li> <li>10: Power module protection (drv)</li> <li>11: Inverter overheat (OH1)</li> <li>12: Rectifier bridge overheat (OH2)</li> <li>13: AC drive overload (OL2)</li> <li>15: External fault (EF)</li> <li>16: EEPROM read/write fault (EEP)</li> <li>17: 485 communication error (CE)</li> <li>18: EtherCAT communication</li> </ul>	Read only

Index/ Sub-index	Indication	Description	Value range	Access rights
			timeout (E-CAt)	
			19: Current detection error (ItE)	
			20: CANopen communication timeout (E-CAN)	
			21: PID feedback loss (FbL)	
			22: Reserved	
			23: Braking resistor overcurrent (brOC)	
			24: Auto-tuning fault (tUN)	
			25: Reserved	
			26: Profinet communication timeout (E-Pn)	
			27: I/O card communication timeout (E-Io)	
			28: Modbus TCP communication timeout (E-TCP)	
			29 to 32: Reserved	
			33: Short-to-ground fault (GdF)	
			34: Speed deviation fault (dEv)	
			35 to 38: Reserved	
			39: Motor overheat (OH3)	
			40: Reserved	
			41: 24 V power supply overload (240L)	
			42 to 45: Reserved	
			46: Board-level communication error (bCE)	
			47: Reserved	
			48: BootLoader failure (bLt)	
			49: Power board software version mismatching (vEr)	

Index/ Sub-index	Indication	Description	Value range	Access rights
			50: Parameter upload and download timeout (UPdnE)	
			51: Al1 current input overcurrent (AIOC)	
			52: Reserved	
			53: Fan locked-rotor (FAn)	
			54: Pre-overload (POL1)	
			55: I/O card 24 V overload (IO-OL)	

## 1.4.5 SDO data description

EtherCAT mailbox data SDO is used to transmit non-cyclic data, including those of communication parameter settings, drive function code parameter settings, etc. This option enables function code reading/writing via SDO communication. The drive function code group (P00 to P98) is mapped to the section (0x2000 to 0x2062) in the EtherCAT object dictionary, with an addition of 1 to the number on the last digit of each function code to form its sub-index in the dictionary. For example:

Drive function code P02.05 is mapped to the main index 0x2002 in the object dictionary, with the sub-index 0x06;

Drive function code P03.07 is mapped to the main index 0x2003 in the object dictionary, with the sub-index 0x08.

## 1.4.6 Function code reading/writing fault

The object dictionary of the index 0x2064 indicates the fault of drive function code reading/writing by EtherCAT master station: the data corresponding to the sub-index 1 indicate the fault code, with high 8 bits indicating a writing error and low 8 bits indicating a reading error. The data corresponding to the sub-index 2 indicate the index of the function code with reading/writing errors. For example, 0x0200 indicates that there is an error of reading/writing the function code P02.00. Types of fault codes are shown below:

Fault	Fault code
Wrong password	0xF1
Index for operation does not exist	0xF4

Invalid parameter	0xF5
Parameter read only	0xF6
System lock	0xF7
EEPROM performing storage	0xF8

## 1.5 Communication example of Beckhoff PLC controlling MV800

The following is the demonstration of MV800 configuration process, taking Beckhoff CX2030 master as an example.

## 1.5.1 Create new project

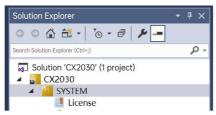
Open TwinCAT software, click "New" and "Project", choose "TwinCAT XAE Project (XML format)", edit "Name" and "Location", and click "OK".

Sto	art Page - <mark>T</mark>	cXaeShell							
File	Edit	View	Project	Debug	Tv	vinC/	AT TwinSAFE	PLC	Team
N	ew				•	訋	Project	Ctrl+Shif	t+N
Op	ben				•	*1	File	Ctrl+N	

New Project						? ×
▹ Recent		Sort by: Default	- # IE		Search (Ctrl+E)	ρ-
<ul> <li>Installed</li> </ul>		TwinCAT XAE Pro	oject (XML format)	TwinCAT Projects	Type: TwinCAT Projects	
I winCAT Project TwinCAT PLC TwinCAT Measur TcXaeShell Solut	rement ion				TwinCAT XAE System Manaç Configuration	ger
	you are looking for?					
	CX2030					
Name: Location:	D:\MV800\PLC tes	+		•	Browse	
Solution name:	CX2030				Create directory for solution	
solution nume.	CALUJU		1000 h		Add to Source Control	
					ОК	Cancel

## 1.5.2 Scan Beckhoff PLC

(1) Double click "SYSTEM" on the left project bar.



(2) Click "Choose Target..." in the pop-up window.

neral Se	ttings Additional	Files		
G	TwinCAT Syste v3.1 (Build 43	5		Choose Target
	Version			
	Engineering	v3.1 (Build 4023.119)		
	Target	v3.1 (Build 4024)	Local	v3.1 (Build 4024)
	Project	v3.1 (Build 4023.119)	Pin Version	

(3) Choose "Search (Ethernet)...", and click "Broadcast Search" to scan the PLC master.

Choose Target System	×
⊞- <mark>ख</mark> <local> (10.2.94.183.1.1)</local>	ОК
	Cancel
~03099 <sup>1</sup>	Search (Ethernet)
Add Route Dialog	William X
Enter Host Name / IP:	Refresh Status Broadcast Search
Host Name Connected Address AMS NetId TwinCAT	OS Version Fingerprint Comment

(4) When the scanning finishes (as shown in the following image), choose "IP Address" and click "Add Route".

	30 🔻		<b>•</b> 100	-		
Add Route Dialog						$\times$
Enter Host Name / IP:			Refresh :	Status	Broadcast Searc	h
	Address AMS Ne 169 254.153.63 5.88.102			~ 1	27A053B64A9F4AE3A	34738
8678-18-100003						
Route Name (Target):	CX-5866F2		Route Name (	Remote):	B10FA012305035	>
AmsNetId:	5.88.102.242.1.1		Target Route		Remote Route	
Transport Type:	TCP_IP	~	<ul> <li>Project</li> <li>Static</li> </ul>		<ul> <li>None / Server</li> <li>Static</li> </ul>	
Address Info:	169.254.153.63		<ul> <li>Tempora</li> </ul>	ry	Temporary	
O Host Name IP	Address	<b></b>	Advanced S	Settings	Unidirectional	
Max Fragment Size (kByte):	0	A6602	Add Ro	oute	Close	

(5) Enter the password (password set as 1 by default for Beckhoff PLC), and click "OK".

Add Remot	e Route	×
- Remote User Ci		
User:	Administrator	Password:  TwinCAT 2 x Password Format
ph.Th.D		OK Cancel

(6) The "x" symbol as shown in the following image indicates a successful connection with the PLC. Then choose "Close".

Add Route Dialog						×
Enter Host Name / IP:				Refresh :	Status	Broadcast Search
		AMS NetId 5.88.102.242.1.1	TwinCAT 3.1.4024	OS Version Windows 7	Fingerprint B1CF6B8E	27A053B64A9F4AE3A34738
< Withthe Woods						>
<	CX-5866F2			Route Name (	Remote):	> B10FA012305035
Route Name (Target):		.1			Remote):	ethe Po
Route Name (Target): AmsNetId:	CX-5866F2			Target Route	Remote):	B10FA012305035 Remote Route
Coute Name (Target): AmsNetId: Transport Type:	CX-5866F2 5.88.102.242.1	~		Target Route Project Static		B10FA012305035 Remote Route None / Server Static
Coute Name (Target): AmsNetid: Fransport Type: Address Info:	CX-5866F2 5.88.102.242.1 TCP_IP	~		Target Route		B10FA012305035 Remote Route
Coute Name (Target): AmsNetId: Transport Type: Address Info:	CX-5866F2 5.88.102.242.1 TCP_IP 169.254.153.6	~		Target Route Project Static	Ŋ	B10FA012305035 Remote Route None / Server Static

(7) Choose the connected PLC device, and click "OK".

□ <local> (10.2.94.183.1.1) □ □ CX-5866F2 (5.88.102.242.1.1)</local>	ОК
-19 <sup>1</sup>	Cancel Search (Ethernet)
4000 <sup>30994</sup>	Search (Fieldbus)
	Set as Default
Connection Timeout (s):	÷

(8) Click "Yes" in the pop-up window.



(9) When the PLC model shows on the status bar, it indicates that the communication between the PC and the PLC has been successfully established.



### 1.5.3 Add a PLC project

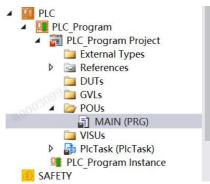
(1) Right-click "PLC" as shown in the following image, and choose "Add new project...".

Solution 'CX2030' (1 pr	oject)		
CX2030			
SYSTEM			
📑 License			
👂 🥚 Real-Tir	ne		
tasks			
Ha Routes			
🚛 Type Sy	stem		
TcCOM	Obje	cts	
MOTION			
🛄 PLC	*-	Add new project	Ins
SAFETY		Add new project	
96. C++		Add existing project	Shift+Alt+A

(2) Choose "Standard PLC Project", edit "Name" and "Location", and click "Add".

Installed     Sort by: Default     Pic Templates     Standard PIC Project     Pic Templates     Fmpty PIC Project     Fmpty PIC Project     Pic Templates     Fmpty PIC Project     Fmpty PIC	New Project - CX2030		2			?	×
Summe     PLC_Program	<ul> <li>Installed</li> </ul>	Sort by: Default	• II' 🗉	145000	Search (Ctrl+E)		p.
Image: Name:     PLC_Program	Plc Templates	Standard PLC Pro	ject	Plc Templates	and the second sec	PLC projec	t
Name: PLC_Program		Empty PLC Project	t	Plc Templates	containing a task and a	program.	
Name: PLC_Program							
Name: PLC_Program							¢
Location: D:/MV800\PLC test\CX2030\CX2030\ Browse	Name: PLC_	Program					
	Location: D:\M	IV800\PLC_test\CX2030\CX2030\	1000	•	Browse	_	

(3) Compile user's PLC program in "MAIN (PRG)".



(4) Click "Build" as shown in the following image to start PLC programming.

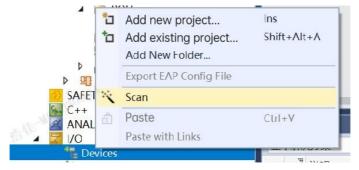
File Edit V	-2	Login		٩F
0 · 0   🔁 • 🖞	*	Build		F
Build 4024.0 (Loade		Rebuild		
Solution Explorer		Check all objects Clean		ŀ
○ ○ ☆ 🛱 ▾   ་@		Add	۲	·C.
Search Solution Explorer	17	Add Solution to Source Control		1
Solution 'CX2030'		Export to ZIP Import from ZIP		1
SYSTEM		Export PLCopenXML		ŀ
▷ 🧼 Real-Tin ⊿ 🛅 Tasks		Import PLCopenXML		
	×	Delete	Del 1000	F
Routes		Save as library		F
TcCOM		Save as library and install		F
	9	Open Folder in File Explorer		TI
<ul> <li>PLC</li> <li>PLC Prov</li> </ul>	×	Properties	Alt+Enter	1
🔺 🛱 PLC I	Progr	am Project	//SpeedCmd	::

## 1.5.4 Scan the drive slave and configure PDO parameters

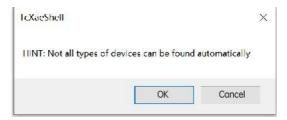
Before scanning the slave, it is required to copy the MV800 EtherCAT XML file into the TwinCAT installation directory.

- TwinCAT2 directory: TwinCAT\IO\EtherCAT
- TwinCAT3 directory: TwinCAT\3.1\config\IO\EtherCAT

Right-click "Devices", and choose "Scan".



```
Click "OK".
```



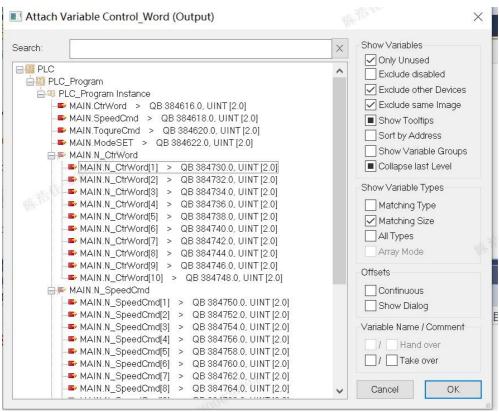
Click "Yes".

[cXaeShell	>	Ç.
? Scan for b	ooxes	

When the scanning finishes, double click the parameter in "TxPDO Mapping 1" and "RxPDO Mapping 1", taking "Control\_Word" as an example, as shown in the following image.

Model Box 1 (MV800\_ECAT\_CoE\_2.0)
 TxPDO Mapping1
 Status\_Word
 Error Code
 OutputFrequency
 OutputCurrent
 Output Torque
 BusVoltage
 Position Actual Value
 RxPDO Mapping 1
 Control\_Word
 FrequencySet
 TorqueSet

Establish the link between the MV800 drive PDO parameters and the PLC variables in the pop-up window.

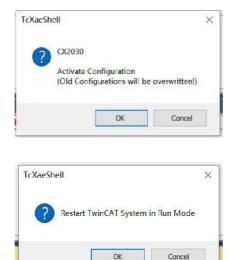


### 1.5.5 Download PLC program

Click "Activate Configuration".



Click "OK".



Click the Login button as shown in the following image to finish the download of the PLC program.

PL	C_Pr	ogra	m		•		
1	•	->	►		₫	ψ 0	0
<b>^</b>	١	0	1.000 A	1	**	5	5

# Chapter 2 PROFINET Communication Option

## 2.1 Overview

Thank you for choosing Megmeet Profinet02 communication option. This manual provides information of the product functions, specifications, installation guidelines, basic operations, and settings, as well as an introduction to the network protocol. To ensure correct installation and operation of this product, please carefully read this manual and the communication protocol section of the drive user manual before using this communication option.

This manual serves as a guide for operating the PROFINET communication option and includes relevant instructions. Detailed information about the PROFINET protocol is not included herein. If users would like to learn more about the PROFINET protocol, please refer to the professional articles or reference materials.

This communication option is defined as a PROFINET slave communication option that can be used with drives supporting PROFINET communication.

This communication option supports linear bus topology and star-type topology.

This communication option supports 32 I/O, facilitating the operations of reading/writing drive process variables, reading drive state variables, and reading/writing drive function codes.

## 2.2 PROFINET communication option features

### (1) Functions

- Supporting Profinet protocol and Profinet I/O device
- Two PROFINET I/O terminals supporting 100 M full duplex operation
- Linear bus topology and star-type topology

#### (2) Communication type

- Standard Ethernet channel: this channel is a non-real-time communication channel using TCP/IP protocol, applied mainly for the device parameterization, configuration, and diagnosis data reading.
- Real-time communication channel (RT): RT channel performs real-time communication via optimized communication channels, the priority of which is higher than that of TCP (UDP) / IP. It ensures data transmission between the stations in the same network within a defined time interval, which is strict in time requirement. The bus cycle reaches the millisecond level. This channel is used for transmitting process data, alarm data, etc.

#### (3) Communication interface

Profinet adopts the standard RJ45 connector. This option offers two RJ45 interfaces that do not differ in transmission directions and can be used interchangeably. The interface is shown in Figure 2-1, and the description is shown in Table 2-1.

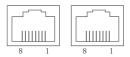


Figure 2-1 Two standard RJ45 interfaces

Table 2-1 RJ45 interface pin definitions

Pin	Name	Description
1	TX+	Transmit Data+
2	TX-	Transmit Data
3	RX+	Receive Data+
4	N/C	Not connected
5	N/C	Not connected
6	RX-	Receive Data-
7	N/C	Not connected
8	N/C	Not connected

#### (4) Status indicator

This MV810-PNET02 option has LED indicators arranged at 3 locations: LED4 and LED5 on the light guide columns of the expansion box; LED1, LED2, and LED3 on the PCB; communication port LEDs. The LED description is shown below.

Protocol stack LED description:

Protocol stack LED	Color	Status	Function description
LED2	Red	Steady on	PROFINET diagnostic alarm with maintenance required or demanded.
		Off	No PROFINET diagnostic alarm with maintenance required or demanded pending.
	Green	Off	PROFINET chip has not started correctly.
LED3		Flashing	PROFINET chip is waiting for the synchronization of the host CPU (hardware start is complete).
		Steady on	PROFINET chip has started correctly.
I FD4	Ded	Steady on	PROFINET diagnosis exists.
	Red	Off	No PROFINET diagnosis
LED5	Red	Steady on	No valid connection

Protocol stack LED	Color	Status	Function description
		Flashing	Ready for connection; no communication with the PROFINET I/O controller.
		Off	The PROFINET I/O controller has an active communication link to this PROFINET I/O device.

Communication port LED description:

LED status	Description	Action
Green light on	Normal connection	No need for actions
Green light off	No connection	Check cable connection
Yellow light flashing	Normal data communication	No need for actions
Yellow light steady on or off	No data communication	Check if there is communication between the master and the slave.

## 2.3 PROFINET network connection

PROFINET adopts the standard RJ45 connector. The network can be structured in linear or star type topology. The electrical wiring is shown in Figure 2-2 and Figure 2-3.

The applicable network cable types for electrical wiring include CAT5, CAT5e, and CAT6. It is required to use high-quality national-standard cables when the communication distance is over 50 m.

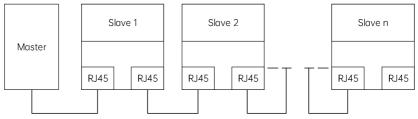
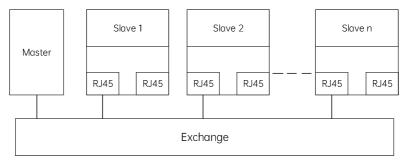


Figure 2-2 Electrical wiring in linear type topology

#### Note:

A PROFINET exchange should be provided by the user for star type network topology.





## 2.4 Communication

### 2.4.1 Message format

Structure of RT frame (non-synchronous) is shown in Table 2-2.

Table 2-2 RT frame structure

Data head	Ethernet type	VLAN	Ethernet type	Frame identifier	RT user data	Cycle counter	Data status	Transmission status	FCS
	2-byte	2-byte	2-byte	2-byte	36 to 1440 bytes	2-byte	1-byte	1-byte	4-byte
	0x8100		0x8892						
	VLAN ide	entifier					APDU st	atus	
	Data head								
7-byte preamble 1-byte synchronization		6-byte sou	Irce MAC o	address	6-byte destind addre				

## 2.4.2 PROFINET I/O communication

This PROFINET communication option enables 16-word input/output. The message format for data transmission with the drive is shown in Fig. 2-4.

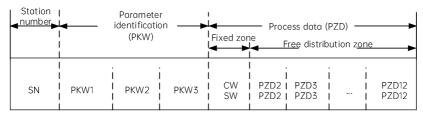


Figure 2-4 Message structure

The 32 I/O explained above facilitate the reference parameter setting and the status value detection of the drive, as well as sending the control command, inspecting the operational status, and reading/writing the function code parameters of the drive. Detailed information of these operations are provided below.

SN: Dedicated to the PN-485 conversion. For details, refer to Section 2.5.

Parameter area:

PKW1: Parameter identification

PKW2: Array index

PKW3: Parameter value

Process data:

CW: Control word (from the master to the slave, refer to Table 2-4)

SW: Status word (from the slave to the master, refer to Table 2-6)

PZD: Process data (designated by the user)

(The reference value is the output from the master to the slave, and the actual value is the input from the slave to the master)

PZD area (process data area): This area is designed to control and inspect the drive. The PZD received from the master and the slave is processed with the highest priority. The priority for processing PZD is higher than that for processing PKW. Only the latest valid data on the interface would be transmitted.

Control word (CW) and status word (SW):

Control word provides the basic method for the fieldbus system to control the drive device, which is sent by the fieldbus master station to the drive device, with the adaptor module functioning as the gateway. The drive device reacts on the basis of the bit code information in the control word, and sends the feedback information of status to the master via the status word.

Reference value: the drive device can receive control information via multiple channels, including analog input, digital input, drive control panel, and communication modules (for example, RS485, CH-PA01 adaptor module, etc.). To control the drive device via PROFINET, it is necessary to set the communication module as the controller of the drive device.

Actual value: actual value is a 16-bit word including the operational information of the drive device. The monitoring function is defined by the drive parameters. The conversion ratio of the integer of the actual value sent to the master differs among the functions. Refer to the drive user manual for more information.

#### Note:

The drive device always checks the bytes of the control word and the reference value.

#### SN station number (master to drive)

The SN station number area is defined by one word. The low byte (Byte0): Target station number (the drive station number visited by the PN master). The high byte (Byte1): Source station number (the drive station number with a PN option).

#### SN station number (drive to master)

The SN station number area is defined by one word. The low byte (Byte0): Target station number (the drive station number with a PN option). The high byte (Byte1): Source station number (the drive station number visited by the PN master).

#### PKW area

PKW area (parameter identification mark PKW1 - data area): PKW area describes the processing method of the parameter identification interface. PKW interface is defined as a mechanism instead of a physical interface. It determines the parameter transmission method between two communication partners, including parameter reading/writing.

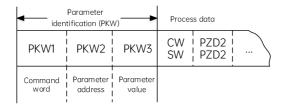


Figure 2-5 Parameter identification area

In cyclic communication, PKW area is composed of four 16-bit words. Definition of each word is shown in the table below:

First word PKW1 (16-bit)				
Bit 15 to 00         Command word or response         0 to 7				
Second word PKW2 (16-bit)				
Bit 15 to 00 Basic parameter address 0 to 247				
Third word PKW3 (16-bit)				
Bit 15 to 00	Error code of the parameter value or returned value	00		

#### Note:

If the master requests a parameter value, the values in the message PKW3/PKW4 sent by the master to the drive will be invalidated.

Task request and response: when transmitting data to the slave, the master uses the request number,

and the slave uses the response number as the positive or negative confirmation.

#### Table 2-3 Definition of task identification mark PKW1

	Request (master to slave)					
Request	Function					
0	No task					
3	Read a parameter					
6	Modify a parameter value (single word) [Modification of both RAM and EEPROM]					
7	Modify a parameter value (single word) [Modification of RAM only]					

Table 2-4 Definition of response identification mark PKW1

	Response number (slave to master)				
Confirmation number	Function				
0	No response				
3	Read a parameter				
6	Modify a parameter value (single word) [Modification of both RAM and EEPROM]				
7	Modify a parameter value (single word) [Modification of RAM only]				
0x83					
0x86	Response error				
0x87					

### Table 2-5 Definition of task identification mark PKW3

Request (master to slave)					
Request	Function				
Read	Number of parameters to be read (1 by default)				
Write	Modify a parameter value				

### Table 2-6 Definition of response identification mark PKW3

Response number (slave to master)		
Command	Function	
Read	Response of a parameter value, or response error	

Response number (slave to master)			
Command	Function		
Write	Response of 0, or response error		
	1: Password error		
	2: Read/Write command error		
	3: CRC check error		
Description of response error	4: Invalid parameter address		
Description of response error	5: Invalid parameter value		
	6: Read-only parameter		
	7: System locked		
	8: Saving parameter		

#### PZD area (master to drive)

Control word (CW): The first word in a PZD task message is a drive CW. Table 2-7 describes the CW of the MV800 series (Byte8: high-byte command word. Byte9: low-byte command word)

Bit	Name	Value	Description
	Forward run	0/1	0: Disable; 1: Enable
	Reverse run	0/1	0: Disable; 1: Enable
0 to 7	Forward jog	0/1	0: Disable. 1: Enable
	Reverse jog	0/1	0: Disable; 1: Enable
	Decelerate to stop	0/1	0: Disable; 1: Enable
	Coast to stop	0/1	0: Disable; 1: Enable
	Fault reset	0/1	0: Disable; 1: Enable
	Emergency stop	0/1	0: Disable; 1: Enable

Table 2-7 MV800 series CW

Reference value (REF): The second to twelfth words in a PZD task message are the main reference values (REF). These 11 words (PZD2 to PZD12) serve to write the internal parameters of the drive. The parameters can be set via the function codes (P43.02 to P43.12). Table 2-5 provides the available settings of the MV800 series.

Table 2-8 A	vailable settings for the MV800 series	S
-------------	--	---

Function code	Word	Range	Default
P43.02	PZD2	0: Disable	0

Function code	Word	Range	Default
	received	1: Frequency reference (0.00 to P02.10)	
P43.03	PZD3 received	2: Drive torque upper limit reference (0.0 to 300.0% of the motor rated current)	0
P43.04	PZD4 received	<ul> <li>3: Brake torque upper limit reference (0.0 to 300.0% of the motor rated current)</li> <li>4. Torque up (200.0 to 200.0% of the motor state of the sector state of the sec</li></ul>	0
P43.05	PZD5 received	<ul> <li>4: Torque reference (-300.0 to 300.0% of the motor rated current)</li> <li>5: FWD run frequency reference upper limit (0.00 to P02.10)</li> <li>6: REV run frequency reference upper limit (0.00 to P02.10)</li> </ul>	0
P43.06	PZD6 received	7: Voltage reference (V/F separation) (0 to 1000) 8: Virtual input terminal command (the range of 0 to 0xFF	0
P43.07	PZD7 received	corresponding to the range of DI8 to DI1) 9: Output terminal bus command (output terminal function set to	0
P43.08	PZD8 received	39; the range of 0 to 0xF corresponding to RO, DO3, DO2, and DO1)	0
P43.09	PZD9 received	10: AO1 output reference (0 to 100.0%) 11: HDO1 output reference (0 to 100.0%)	0
P43.10	PZD10 received	12: HDO2 output reference (0 to 100.0%) 13: PID reference (0.0 to 100.0%)	0
P43.11	PZD11 received	14: PID feedback (0.0 to 100.0%) 15 to 30: Reserved	0
P43.12	PZD12 received		0

### PZD area (drive to master)

Status word (SW): The first word in a PZD response message is a drive SW. The definition of the drive SW is explained below: (Byte8: high-byte SW. Byte9: low-byte SW)

Bit	Name	Value	Description
0 to 7	Forward running	0/1	0: Disable. 1: Enable
	Reverse running	0/1	0: Disable. 1: Enable
	Stop	0/1	0: Disable. 1: Enable
	Fault	0/1	0: Disable. 1: Enable
	Power failure	0/1	0: Disable. 1: Enable

Table 2-9 MV800 series SW

Bit	Name	Value	Description
	Ready state	0/1	0: Disable. 1: Enable
	Motor number	0/1	0: Motor 1. 1: Motor 2
	Motor type		0: Asynchronous. 1: Synchronous
8	Overload pre-alarm	1	0: Disable. 1: Enable
	0	Keypad	
9 to 10	Control mode	1	Terminal
		2	Communication

Actual value (ACT): The second to twelfth words in a PZD task message are the main actual words ACT. These 11 words (PZD13 to PZD23) serve to read the drive internal parameters. The parameters can be set by the function codes (P43.02 to P43.12).

Function code	Word	Range	Default
P43.13	PZD2 Transmitted	0: Disable	0
P43.14	PZD3 Transmitted	1: Frequency reference (0.01 Hz)	0
P43.15	PZD4 Transmitted	2: Ramp frequency reference (0.01 Hz)	0
P43.16	PZD5 Transmitted	3: Frequency output (0.01 Hz) 4: Voltage output (1 V)	0
P43.17	PZD6 Transmitted	5: Current output (0.1 A)	0
P43.18	PZD7 Transmitted	6: Bus voltage (0.1 V)	0
P43.19	PZD8 Transmitted	7: Motor power (0.1%)	0
P43.20	PZD9 Transmitted	8: Reserved 9: Excitation current (0.1 A)	0
P43.21	PZD10 Transmitted	10: Torque current (0.1 A)	0
P43.22	PZD11 Transmitted	11: Status word (0 to 0xFFFF)	0
		12: Fault code (0 to 46)	
		13: DI1 to DI4 status (0 to 0xFFFF)	
		14: DI5 to DI8 status	
P43.23	PZD12 Transmitted	15: DO status (0 to 0xF)	0
		16: Al1 input voltage (0 to 10.00 V)	
		17: Al2 input voltage (-10.00 V to 10.00 V)	
		18: HDI input frequency (0 to 50.000 kHz)	

Table 2-10 MV800 series status value available for reading

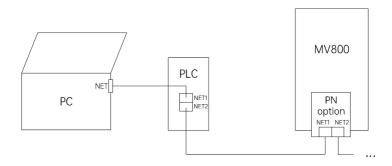
Function code	Word	Range	Default
		19: AO output value (0 to 100.0%)	
		20: HDO1 output value (0 to 50.000 kHz)	
		21: HDO2 output value (0 to 50.000 kHz)	
		22: PID reference (-100.0% to 100.0%)	
		23: PID feedback (-100.0% to 100.0%)	
		24: PID deviation (-100.0% to 100.0%)	
		25: PID output (-100.0% to 100.0%)	

# 2.5 Communication example of Siemens PLC controlling MV800

The following example is based upon a Siemens S7-1500 PLC as the master to demonstrate the configuration and usage of the MV800 PN communication.

### 2.5.1 Hardware connection

The Siemens S7-1500 PLC adopts two network interfaces, one of which serves to connect the computer for downloading the TIA PORTAL, with the other one for connecting the PN bus communication card of the drive. After the connection with the network is established, power on the PLC and the drive. The connection is illustrated below:



### 2.5.2 Establish the connection

For application with a PROFINET master, it is required to configure the GSDML file for the slave first. Add the corresponding slave device into the master system. Consult the agent or the manufacturer for

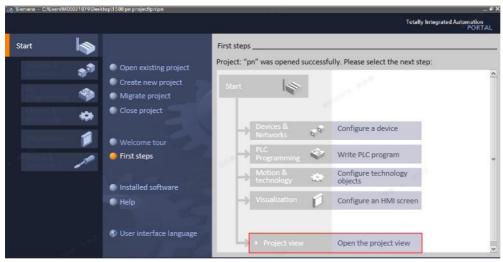
acquisition of the GSDML file.

### 2.5.2.1 Start a new program

Open the TIA Portal software, start a new program, enter a program name, select a save path, and click the "Create" button.

VA Siemens			1 <sup>-00</sup>		_ # ×
				Totally I	Integrated Automation PORTAL
Start			Create new project		
Devices 8		Open existing project	Project name:		
Networks	100		Path: Version:		
I PEC		Create new project	Author:		101
Presumotio		<ul> <li>Migrate project</li> </ul>	Comment:		8
Motion 8. technology	*			- 19 -	×
Visualizatio		Welcome tour			Create
Disposition	1		ante -		
		Installed software			
		🔵 Help			
		🚯 User interface language			

#### Click "Open the project view."



### 2.5.2.2 Install the GSD file

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Sun Advandate General Manager         Image: Sun Advandate General Manag		Manage general station description files (050)		Ontions	1
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In the second set of the		🛃 Show reference			1
	• 11 00	Global Ibraries		Y Find and replace	1
Details view      Details view      Details view      Details view	Devices & networks Ungrouped devices Ungrouped d			What works any     Wat works any	
Name	♥ Details view	_		White document     Prove content post	
	Name				

Select the save path for "GSDML-V2.32-MEGMEET-MV800-20230830.xml."

Manage general station description files			×
GSD installed GSD in project			
Source path: C:\Users\M00031079\Desktop\PN	4)		
Content of imported path			-031079
File	Version	Language	Status
GSDML-V2.32-MEGMEET-MV800-20230830.xml	V2.32	English	Not yet installed
			_
<			>
	De	alete Inst	call Cancel

Select the file, and click the "Install" button.

Manage general station description files				×
GSD installed GSD in project				
Source path: C:\Users\M00031079\Deskto	p\PN			
Content of imported path				n31079
File		Version	Language	Status
GSDML-V2.32-MEGMEET-MV800-20230830.3	xml	V2.32	English	Not yet installed
K0003-				
			Xon	
		De	lete Insta	II Cancel

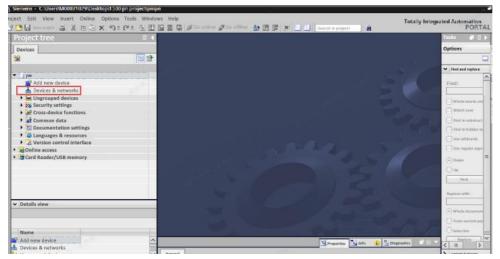
age general station description files	
nstallation result	
Mecsage Installation was completed successfully.	Madagia,
Save Install other files	Close

After a few seconds, the system prompts "Installation was completed successfully." Click the "Close"

button.

### 2.5.2.3 Configuration

Click the "Devices & networks" button.



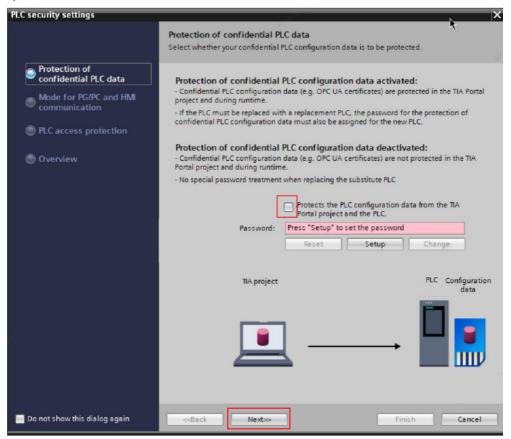
In the "Hardware catalog" on the right sidebar, select the PLC model in actual use. For this example, "1511-1-PN" is used in configuration. Double click the "6ES7 511-1AK02-0AB0" icon.

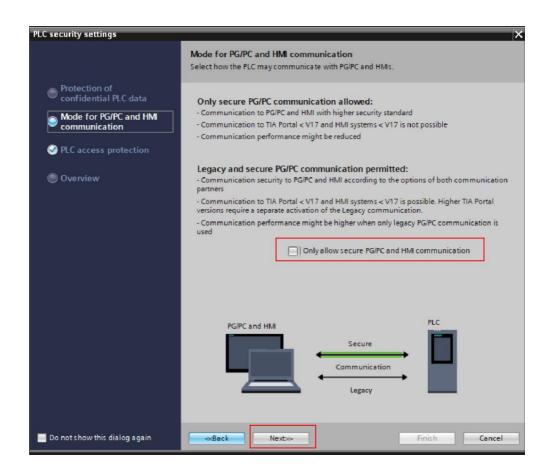
#### Note:

The number combination of the icon shall be identical with that on the back of the PLC unit. Otherwise, it will report an error when downloading the program to the PLC in the following process.

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- Contractory			^	✓ Catalog		
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Add new device				Filter Corports To.		- 10
Devices & networks     Ungrouped devices				• Controllers		CO INTERNA
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Version control interface			11		511-LAR01-0A00	
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			- 11	+ _ CPU 151		
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Name		< III > 100%	- 41	CPU 151		
		💐 Properties 🔨 info 👔 💆 Diagnostics		CPU 151		~
		Greenal		> Information		

Set the data privacy rights as needed. The following steps of the example are based upon full access open for all users.





PLC security settings	X
	PLC access protection Select how the PLC is to be accessed without password protection.
<ul> <li>Protection of confidential PLC data</li> <li>Mode for PG/PC and HMI communication</li> </ul>	Full access (no protection): All users have full access to operations that modify standard project data. No password is required.
PLC access protection Overview	Read access: Users have read-only access to PLC configuration data (e.g. hardware configuration, blocks). Users can also change the PLC operating state (RUN/STOP) and system time.
	HMI access: Only HMI access and access to diagnostics data is possible. This includes read and write access to tags.
	No access (complete protection): TIA Portal users and HMI applications will not have access to any functions.
	Access level without password: Full access (no protection)
🔤 Do not show this dialog again	<back next="">&gt; Finish Cancel</back>

PLC is now successfully added to the network, as shown below:

🕒 🖬 Save project 斗 🐰 🗐 💽	X り t (** 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	💋 Go online 🖉 Go offline  🎄 🖪 📑 🕺	😑 🛄 🛛 earch in project-				PORTA
Project tree 🛛 🖬 🖣	pn + Devices & networks				_ # = ×	Hardware catalog	10
Devices Plant objects			Topology view	h Network view	Device view	Options	
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				^	V Device	✓ Catalog	
• ]pn				-	* 57-1200 statio	Searcho	894 8
Add new device				-	▶ PLC_1	Filter Profile: All>	
Devices & networks	PLC_1					Controllers	121
• _ P.C_1 [OPU 1511-1 PN]	CPU 1511-1 PN					<ul> <li>Controllers</li> <li>SIMATIC 57-1200</li> </ul>	
Generation of the second						<ul> <li>SIMATC 57-1200</li> <li>SIMATC 57-1500</li> </ul>	
Security settings     Gross-device functions						- C C	
Common data						- CPU 1511-1 PN	
Documentation settings	L					6ES7 511-1AK00-0A80	
Languages & resources				1		GES7 511-1AK01-0A80	
Version control interface				1		CPU 1511C-1 PI	-
Online access						CPU 1512C-1 PN	
Card Reader/US8 memory						• Cm CPU 1513-1 PN	
Cald Readenosa memory						CPU 1515-2 PN	
						CPU 1516-3 PMDP	
						CPU 1517-3 MIDP	
						<ul> <li>CPU 1518-4 PNOP</li> <li>CPU 1518-4 PNOP OOK</li> </ul>	
						CPU 1518-4 PNDP MPP	
						CPU 15117-1 PN	
						CPU 1513F-1 PN	
						CPU 1515F-2 PN	
				~		CPU 1516F-3 PNIDP	
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Details view			S Properties	🚹 Info 🚺 强 Dia	ignostics		
	General () Cross-reference	Compile					
	🕄 ႔ 🚺 Show all messages					1	
Name							
	I Path	Description	Go to ? Error	s Warnings Time			
						> Information	

Double click "MV800PN" to add the slave to the network.

Devices     Part objects     Topology view     Network view     Device view     Options       MA der device     Image: Construction in the convection in	roject tree	( pn → Devices & networks	online 🖋 Go offline 🛔 🖪 🖪 🖉 🗶 🚍 🛄 [	Searching Projector 1 1		_ # # X		PORT
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Denier is exervite RC_10Puister 1NN						<ul> <li>\$7-1200 statio</li> </ul>	Searcho	894
Construction     C						+ PLC_1	Filter Profile: <al></al>	100
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Considered Rendom Common data							Network components	
Common data <ul> <li>Constructions antiging:</li> <li>Constructions antingerel antingerel a</li></ul>							Detecting & Monitoring	
Decumentation setting:     Version control interface     Version control interface     Origine access     Origine     Or					- 112		Distributed I/O	
Can directerizza Consulta view Central & Cross-references Comple					- 12		Power supply and distribution	on
Q Version control interface         Image: Control interface         Image: Control interface           Q Cont Resder(U28 memory         Image: Control interface         Image: Control interface           Q cont Resder(U28 memory         Image: Control interface         Image: Control interface           Q cont Resder(U28 memory         Image: Control interface         Image: Control interface           Q cont Resder(U28 memory         Image: Control interface         Image: Control interface           Q cont Resder(U28 memory         Image: Control interface         Image: Control interface           Q cont Resder(U28 memory         Image: Control interface         Image: Control interface           Q control interface         Image: Control interface         Image: Control interface           Q control interface         Control interface         Image: Control interface           Q control interface         Control interface         Image: Control interface							Field devices	
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I Path Description Go to 7 Errors Warnings Time		I Path Descri	ption	Go to ? Errors Warnin	gs Time			
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	pn > Devices & networks				_ # = X	Hardware catalog 🖉 🖡
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	¢ =		> 100%		< 11 >	MV800PN     Semissas Electronics     SEMENS AG
				🗓 Info 👔 😒 Di.		Sensors
Details view	General () Cross-references	Compile	S rioperues		agnostics production	PROFIBUS DP
	Cross-references					
Name	Carline (Carline and messages					
	I Path De	cription	Go to 2 Errors	Warnings Time		

Double click the slave icon to enter the interface as shown below. Configure the slave in the interface.

	pn > Unassigned devices	<ul> <li>MV800PN [MV800PN]</li> </ul>					_ # = X	Hardware catalog 🛛 🖉 🗉
evices Plant objects				2	Topology view	Network view	Device view	Options
		åt '		Device overview			Network overvie 4	
			-	W Module	Feck	Slot Address	V Device	✓ Catalog
]pn	1			▼ M/SOOPN	0	0	<ul> <li>\$7-1200 statio</li> </ul>	dearcho M4
Add new device			- 10	* PN40	0	0 X1	<ul> <li>PLC_1</li> </ul>	
Devices & networks				Port 1 - R/45	0	0 X1 P1		Filter Profile: <al></al>
TRUC_1 [CPU 1511-1 PN]				Port 2 - R/45	0	0 X1 P2		- 📷 Module
Ungrouped devices					0	1		- THE INFOUT
Security settings				1000				Custom telegram, 12 Byte IN/OUT
Cross-device functions								Custom telegram, 16 Byte INICUT
Unassigned devices								Custom telegtam,2 Byte INOUT
Common data				2		7		Custom telegram.32 Byte INIOUT
Languages & resources				-		2		Custom telegram,4 Byte IN/OUT
Version control interface				•				Custom telegram,8 Byte 800UT
Online access								Standard telegram 1,4 Byte INIO
Card Reader/USB memory								
			1.00					
	< 11			4 1		>	< II >	1
		- dated	- Andrew		Ch. Deservation	强 Info 🚯 🖳 Di		1
Details view					g roperties	The month of the Di	agnosues Latente	1
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	🕄 🛔 🚺 Show all me	ssages 💌						
lame								
Sector Contraction of	I Path	Description		Go	to ? Error	s Warnings Tim		

Custom telegram refers to the message customized by the user, and its length is available for configuration. The default selection is "Custom telegram 32Byte IN/OUT."

Standard telegram refers to the standard message 1.

This example is based upon the selection of "Custom telegram 32Byte IN/OUT." Double click the icon to add it into the slot.

The display of the content in the red frame indicates that the "Custom telegram 32Byte IN/OUT" has been added to the slot.

oject tree 🛛 🕄 🖣	pn > Unassigned devices > MV8	DOPN [MV800PN]					_ # = ×	Hardware catalog 📰 🗉
Devices Plant objects				🛃 To	oology view	Metwork view	Device view	Options
i 📰 🛣		d# '	<b>E</b>	Device overview			Network overvie 4 >	
			^	W Module	_ Reck	Slot Address	Price	✓ Catalog
]pn				<ul> <li>MV800PN</li> </ul>	0	0	· \$7-1200 statio	Search>
Add new device	1			▼ P140	0	0 X1	+ PLC_1	Filter Profile: <all></all>
Devices & networks			112	Fort 1 - RJ45	0	0 X1 P1		• Module
Ungrouped devices				Port 2 - Ri45	0	0 X1 P2		
Security settings				Custom telegram 32Byte IN	/0UT 0	1		Custom telegram,12 Byte INIOUT
Cross-device functions								Custom telegram, 16 Byte INICUT
Unassigned devices			100					Custom telegram,2 Byte #VIOUT
Common data	1		1			2		Custom telegram,24 Byte IN/OUT
Documentation settings	1		8					Custom telegram,4 Byte IN/OUT
Languages & resources	1		÷.					Custom telegram,8 Byte INOUT
Version control interface	1		1	201				Standard telegram 1.4 Byte INOL
Card Reader/USB memory	1							
	1		- 88					
			1					
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			116					
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					roperties	🗓 Info 🚯 🗓 Di		1
Details view				3	Toperues	Trainio T Traini	agnostics	1
	General (1) Cross-referen							
	Show all messages							
lame								
	1 Path	Description		Go to		rs Warnings Tim		

Click "Devices & networks", "Unassigned", and "PLC\_1\_PROFINET interface\_1" in sequence to enter the following interface.

	pn + Devices & networks				_ # = X	Hardware catalog	130
evices Plant objects			Topology view	A Network view		Options	hadding
	Network TT Connections	HM connection 🔹 😰 📲 🖽 🛄		1	1.01	options	_
	Connections		Q. I	<b>3</b>	Network overvie 4 >		_
]pn				^	Pevice Device	✓ Catalog	
Add new device		-		=	▼ 57-1200 statio	<search></search>	894
Devices & networks	PLC_1	MV800PN			▶ PLC_1	Filter Profile: <all></all>	-
PLC_1 [CPU 1511-1 PN]	CPU 1511-1 PN	MV800PN MV800PN DP.NORM				C systems	
H Ungrouped devices		Unassigned				Drives & starters	
Security settings		Select I/O controller				Image: Interview of the second s	
Cross-device functions		PLC_1_PROFINET interface_1				Detecting & Monitoring	
Unassigned devices						Distributed #0	
Gil Common data				1		Power supply and distribution	£.,
Documentation settings				2		Field devices	
Conguages & resources				1		Other field devices     Other Ethernet devices	
Version control interface	1					Other Ethernet devices     PROFINET IO	
Online access	1					Drives	
Card Reader/USB memory	1						
	1					Encoders	
						🕨 词 Gateways	
						🗸 📷 Gateways	
						- 🛅 MEGMEET	
						• 🛄 MV800	
						MV800PN	
				~		Renesas Electronics	
	< II		> 100%		< = >	SIEMENS AG	
Details view	-		C Properties	强 Info 👔 🔀 Dia	ionostics	Sensors	
Details view	General 🚯 Cross-refer	ences Compile				PROFIBUS DP	
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### Configuration is completed.

3 Siemens - C:\Users\48726\Desktop\Pro	ect7Project7	_ @>
Project Edit View Insert Online Op		Totally Integrated Automation
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Devices Plant objects		
		Options
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	💕 Network 🖞 Connections Hill connection 💌 🗷 📲 🏭 🔍 ±	
÷	A V Device	✓ Catalog
Add new device	= <b>*</b> 571200 statio	-Search>
Division E nessons     Division E nessons     Di la PC (1000351-04)     Di la PC (1000351-0		Options         Image: Control of the second se
	K Ⅲ	
Details view	S Properties 🚺 Info 🔒 🖞 Diagnostics 👘 🖃	SIEMENS AG     Garage Sensors     Garage PROFIBUS DP
Details view		PROFIBUS DP
	General (1) Cross-references Compile	-
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Name		
	i Path Description Go to ? Errors Warnings Time	
		> Information

### 2.5.2.4 Set IP address

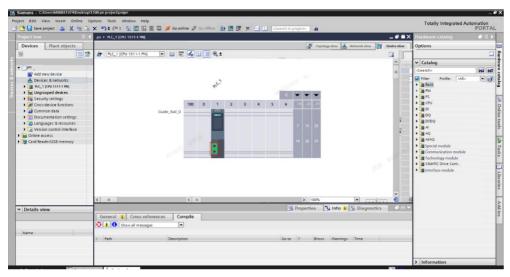
Set the IP address to ensure that the PLC address, slave address, and the PC address are in the same network segment.

Set the IP address of the PC to 192.168.1.12.

Obtain an IP address automat	tically
Use the following IP address:	
IP address:	192.168.1.12
Subnet mask:	255.255.255.0
Default gaeteway:	· · ·
Obtain DNS server address au	itomatically
Use the following DNS server	address:
-	
Preferred DNS server:	-10003 IV
Preferred DNS server:	·

Click "Devices & networks", and double click the PLC icon and the network interface. Set the IP address of PLC to 192.168.1.5.

	X ); (*** 🖑 🕅 🗐 🖷 🖄 🦉 🖉	line 🖉 Go offline  🏭 🖪 🖉 🗶 🚍 🛄 🛛 (Search in project) 🗛		Totally Integrated Automation PORTAL
	pn + PLC_1 [CPU 1511-1 PN]		_ # =>	K Hardware catalog 🛛 🗃 🗉 🕨
Devices Plant objects		🛃 Top	pology view 🚠 Network view 🛐 Device view	Options
B 📃 📑	🏕 (PLC_1 (CPU 1511-1 PN) 💌 🗮			1 😐
			^	✓ Catalog
<ul> <li>pn</li> <li>Add new device</li> </ul>		< <b>- - - -</b>	-	dearcho Mil Mil
Devices & networks		100 0 1 2 3 4 5 6 11 2	i 🗆 🗆	Filter Profile: All>
	Guide_R			+ Back
Generation of the second				→ Cim PM → Cim PS
Security settings		2 15 22		CPU
Cross-device functions     Common data				• 📑 DI
Documentation settings	PROFINET interface_1	1 Properties	Info 🚺 🔀 Diagnostics 🔲 🗆 📼	• 📴 DQ
Languages & resources	General 10 tags Syst	constants Texts		• Car Dibo
Version control interface				▶ (m) Al
Gnline access     Gard Reader/US8 memory		Ethernet addresses	_	+ Can AliAQ
Cald Reductions memory	Ethernet addresses			• 🔄 Special module
	Operating mode	Interface networked with		Communication module
	Advanced options			Technology module      SIMATIC Drive Cont
	Port options	Subnet: PN/IE_1	• 5000	Interface module
	Media redundancy	Add news	100	
	▼ Real time settings			
	IO communication			
	Time synchronizatoin	Internet protocol version 4 (IPv4)		
✓ Details view	Real time options			
	Port [X1 P1 R]	<ul> <li>Set IP address in</li> </ul>	n the project	
	General	IP addr	ress: 192.168.1.5	
Name	Port interconnection	Subnet m	ask: 255 . 255 . 255 . 0	
	Port options	Use IP router		
	▼ Port [X1 P2 R]			



Double click "Devices & networks", click the slave icon, and double click the network interface. Set the slave address to 192.168.1.6, and uncheck "Generate PROFINET device name automatically." Enter the name "mv800pn."

oject Edit View Insert Online Op	tions Tools Window Help X 🏷 ± (= ± 🔂 🔃 🗓 🔛 🔛 💋 Go online 🖉	Go offline 🛔 🖪 🖪 💌 🗲 💷 🤇 Gearch i	n project>	Totally Integrated Automation PORTA
Project tree 🛛 🕅 ┥	pn + PLC_1 [CPU 1511-1 PN]			- 🖬 🖬 🗙 Hardware catalog 🛛 🗐 🗊 🕄 🕽
Devices Plant objects			🖉 Topology view 📥 Network view 🛐 Dev	ice view Options
B 🔤 🚔	🏕 [PLC_1 [CPU 1511-1 PN] 💌 🔤 🖾		6	1
				▲ Catalog
Add new device				a dearch> M4 M
Devices & networks	100	0 1 2 3 4 5 6	6 14 22 B1	Filter Profile: All>
• RUC_1 [OPU 1511-1 PN]	Guide_Rail_0			INIOUT     Custom telegram,12 Byte INIOUT
Getain the second				Custom telegram, 12 Byte IN/OU Custom telegram, 16 Byte IN/OU
Gross-device functions			7 15 23	Custom telegram.2 Byte IN/OUT
Common data	PROFINET interface 1 [X1]	G	Properties 🚺 Info 👔 😲 Diagnostics	Custom telegram,24 Byte IN/OUT
Documentation settings     Languages & resources				Custom telegram,32 Byte IN/OUT
Version control interface	General IO tags System constants	Texts		Custom telegram,4 syte INCOT
Online access	General		Set IP address in the project	Standard telegram 1,4 Byte IN/O
Card Reader/US8 memory	Ethernet addresses		IP address: 192 . 168 . 1	3
	Operating mode		Subnet mask: 255 . 255 . 255 .	
	Advanced options		And a second sec	
	Port options		Synchronize router settings with IO controll	er
	Media redundancy		Use router	810 H
	▼ Real time settings		Router address: 0 0 0	0
	IO communication	•	O IP address is set directly at the device	
	Time synchronizatoin	1	On address is set an early at the device	
Details view	Real time options	PROFINET		
	▼ Port [X1 P1 R]	THUT INC.		
	General		Generate PROFINET device name automatic	ally
Name	Port interconnection			
	Port options	PROFINET device name:	mv800pn	
	▼ Port [X1 P2 R]	Converted name:	mv800pn	
	General		4	>> Information

### 2.5.2.5 Compile and download

Click "Save project." Right click PLC\_1, left click "Compile", "Hardware and software (only changes)" to compile the project.

	Pn Devices &	networks				_ # = ×	Hardware catalog 🛛 🖉
evices Plant obje	ts			a Topology view	h Network view	Device view	Options
	🔤 🛣 📢 Network 💾 C	onnections HMI connection	- 2 5 1 1 1 0;	1		Network overvie 4 +	
					^	V Device	✓ Catalog
]pn					-	▼ 57-1200 statio	dearch>
Card Reader/USB mem	Pic_1 Durange device Open in eve editor Open in eve editor Open skot/Pic data F7 Cope Christ Cope Christ Parate Conv X Delere Del Remanne Del Remanne Del	AV800PN Av800PH #3582				• RC1	Alter mole: Alter of the second
Details view	Go to network view     Comple     Download to device     Backup from online device     Go online     Ctri-ki     Go online     Ctri-ki     Go online     Ctri-ki     Concine & diagnositics Ctri-b     Receice alarms     Supphot of the actual values     Load snaphota a actual.	Hardware and software (only changes Hardware (only changes) Hardware (rebuild all) Software (rebuild all) Software (rebuild all) Software (reset memory reserve)			V Info 🕯 😟 Dia	i∢ m >	Gateways     MicKomet
	Show	all messages					
ame	1 Path	Description		Go to ? Errors	Warnings Time		

If the compilation error is 0, there is no wrong setting in the previous configuration. Download to compile.

	pn > Devices & networks					_ # = X	Hardware catalog
Devices Plant objects		d	Topology view	📥 Network view	De	ice view	Options
	Network Connections Hill connection	- 2 5 1 1 1 0.1		E4 []	Network	overvie < +	
				^	Y Device		✓ Catalog
]pn				-		-1200 statio	dearch>
Add new device	PLC_1				•	PLC_1	Filter Profile: -All>
PLC_1 (CPU 1511-1 PN)	CPU 1511-1 PN						PC systems
H Ungrouped devices	PLC 1						Drives & starters
Security settings							Metwork components
Cross-device functions							Detecting & Monitoring
Unassigned devices	PLC 1. PROFIL	ETIO-Syste		- 11			Distributed I/O     Distributed I/O     Distribution
Common data	March 200 March 200					_	Field devices
Documentation settings		q	Properties 1 Info	👔 况 Diaj	phostics		Other field devices
Languages & resources				- Los			Other Ethernet devices
Version control interface	General 🚺 Cross-references Co	ompile					- PROFINET IO
Card Reader/USB memory	840						Drives
Carlo Maderio Jo meniory							Encoders
	Compiling completed (errors: o; warnings: 1)						Gateways
	rath	Description		Go to	7	Errors	- 🕞 Gateways
	1 - PLC 1					0	- MEGMEET
				<u>_</u>		-	- 🗿 MV800
	Hardware configuration			~	100	0	MV800PN
	0	No hardware was compiled. All configurations are up	-to-date.		?		Renesas Electronics
	Program blocks					0	SIEMENS AG
		No block was compiled. All blocks are up-to-date.					Sensors
Dataile view						_	PROFIBUS DP
Details view	0						
Details view	8	Compiling completed (errors: o; warnings: 1)					
Details view		Compiling completed (errors: o; warnings: 1)					
Details view		Compiling completed (errors: o; warnings: 1)					

#### Click "Download."

	↓ pn → Devices & networks					Hardware catalog
Devices Plant objects			P Topology view	A Network view	Device view	Options
8	Network Tr Connections	connection 💌 📰 🐨 🐨 🔍	1	- a D	Network overvie 4	
				0	Pevice	✓ Catalog
]pn					<ul> <li>S7-1200 statio</li> </ul>	dearcho M
Add new device				-	<ul> <li>PLC_1</li> </ul>	
📥 Devices & networks	PLC_1	MV800PN				Filter Profile: <all></all>
THE PLC_1 [CPU 1511-1 PN]	CPU 1511-1 PN	MV800PN DP.HORM				Drives & starters
H Ungrouped devices		PLC_1				Network components
Security settings						Detecting & Monitoring
Cross-device functions						Distributed I/O
Common data	PL	C_1.PROFINETIO-Syste				Power supply and distribution
Documentation settings			1993	- EW)	bank a strange	Field devices
Languages & resources			🧟 Properties 🚺 In	fo 🔒 😼 Diag	phostics	Other field devices
Version control interface	General 3 Cross-reference	a Compile				🕨 📑 Other Ethernet devices
Online access	General 1 Cross-reference	s compile				PROFINET IO
						• 🗿 Drives
		1005				
	Compiling completed (errors: o; war	1005				Car Drives     Car Encoders     Car Gateways
		1005		Go to	? Errors	<ul> <li>Im Drives</li> <li>Im Encoders</li> <li>Im Gateways</li> <li>Im Gateways</li> </ul>
	Compiling completed (errors: o; war s Path	mings: 1)		Go to		Car Drives     Car Encoders     Car Gateways
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g Card Reader/USB memory Details view	Compiling completed (errors: o; war Path Compiling completed (errors: o; war Path Compiling completed (errors: o; war Network (errors: o; war	nings: 1) Description on No hardware was compiled. All co No block was compiled. All blocks	are up-to-date.	7	° ?	Gar Drives     Gar Drives     Gar Drives     Garteways     Garteway

	Device	ess nodes of "PLC_1" Device type	Slot	Туре	Address	Subnet
	PLC_1	CPU 1511-1 PN	1 X1	PN/IE	192.168.1.5	PN/IE_1
<b></b>		autoritin				
		Type of the PG/PC inte	erface:	PN/IE		
20.2		PG/PC inte	erface:	Realtek	PCIe GbE Family Controll	er 💌 🖲
	(	Connection to interface/su	ubnet:	PN/IE_1		<b>.</b>
		1st gat	and a large			- 6
	Compatible dev	vices in target subnet:			Show all compati	ble devices
		-			onon an compact	bic devices
	Device	Device type	Туре		Address	Target device
-	Device —		Type PN/IE			
	Device				Address	
1	Device —				Address	
Flash LED	Device —				Address	
Flash LED	Device 				Address	Target device
	-				Address	Target device
Flash LED	-				Address Access address	Target device
	-				Address Access address	Target device
	-				Address Access address	Target device

Select the option in the red frame as shown below, and click "Start search."

	Configured access no Device		Slot	T	Address	Subnet	
	PLC_1	Device type CPU 1511-1 PN	1 X1	Type PN/IE	Address 192.168.1.5	PN/IE_1	
	ruc_1	CPU ISTI-I PN	TAI	PINIE	192.108.1.5	PN/IC_1	
	autorion <sup>1</sup>	pe of the PG/PC inter	face	PN/IE		-	1
100		PG/PC inter			PCIe GbE Family Controller		
	Conno	ction to interface/sul		PN/IE_1	roe operanning controller		
	Conne			FINIE_1		1.0	
		1st gate	way.	()			
	Compatible devices in Device	n target subnet: Device type	Туре		Show all compatible Address	e devices Target dev	rice
<b>a</b>	PLC_1	CPU 1511-1 PN	PN/IE		192.168.1.1	PLC_1	
a.	-	10 - 10 M	PN/IE		Access address		
Flash LED							
Flash LED	10000					Start	search
	tion:				🔲 Display only prol		search
Flash LED	tion:				Display only prol		search
	tion:				Display only prol		search
	tion:				Display only prol		search

Select PLC in the search result table, and click "Load."

Follow the steps below.

	Device	s nodes of "PLC_1" Device type	Slot	Туре	Address	Subnet
	PLC_1	CPU 1511-1 PN	1 X1	PN/IE	192.168.1.5	PN/IE_1
$\square$						
		Type of the PG/PC inte		PN/IE		•
Esta	ablish connection to	device	1		×	
	//192 168	1.1 might not be a trust	worthy de	vice	362-2	
	192.100.	tra migni not be a trust	worthy de	where a	-	
	The device	e uses an unknown, self-	signed cer	tificate.	le	e devices
						Target device
-	12125	10		a a		PLC_1
		ce is the one you want, ot the one you want, yo				PLC_1 -
1			u should a		ection.	PLC_1 _
	device is n		u should a	bort the conn	ection.	PLC_1 —
	device is n		u should a	bort the conn	ection.	PIC_1 -
	device is n		u should a	bort the conn	ection.	PLC_1 - Start search
Flash LED	device is n		u should a	bort the conn	ection.	Start search
Flash LED	device is n		u should a	bort the conn	Abort connection	Start search
Flash LED	device is n		u should a	bort the conn	Abort connection	Start search
Flash LED	device is n		u should a	bort the conn	Abort connection	Start search
Flash LED	device is n		u should a	bort the conn	Abort connection	Start search

Softwa	are synchronization before loading to a device			×
4	The CPU contains changes that cannot be automatic	cally synchro	onized.	
1	Software synchronization	Status	Action	
	▼ PLC_1			
<b>A</b>	<ul> <li>'Program blocks'</li> </ul>			
- A	Main [OB1]	0	Manual synchronization required	
- A	<ul> <li>'PLC tags'</li> </ul>			
	Tags	0	Manual synchronization required	
	- <sup>2</sup> 000			
<			Ш	>
	Offline/online comparision	Synchro	onize Continue without synchronization	Cancel
-				

tatus	1	Target	Message	Action	
+II	9	- PLC_1	Ready for loading.	Load 'PLC_1'	1
		▼ Protection	Protection from unauthorized access		
	4		Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation. For more information about industrial security, please visit htp://www.siemens.com/industrialsecurity		
	0	Stop modules	The modules are stopped for downloading to device.	Stop all	10
	0	Device configuration	Delete and replace system data in target	Download to device	1
	0	Software	Download software to device	Consistent download	1
	0	Certificate configu	Password for confidential PLC configuration data protection is cha		
٢			ш	>	

Click "Finish" to complete the downloading.

tatus	1	Target	Message	Action	
1	0	▼ PLC_1	Downloading to device completed without error.	Load 'PLC_1'	
	-			219	
	0	<ul> <li>Start modules</li> </ul>	Start modules after downloading to device.	Start module	
1					

### 2.5.2.6 Watch

Click "Go online."

Conception and a second s	Catalog satch>   M Filter Profile:   All>   @ PC systems @ Drives & starters @ Network components	Network overvie 4 +		Topology view		Devices Revelation
Porter Status     Porter	Farch>	W Device				
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Display of green icons indicates normal PN communication.

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# 2.6 Integrated PN communication application

A single communication option is capable of controlling up to 5 drives, applicable for extruders, printing, and packaging machines, as shown below.



PN communication self-defined message can be divided into two types:

#### **General PN communication**

This is the traditional communication mode for controllers and PN devices. Each of the drives shall be equipped with a PN option. The address of the first two bytes in the self-defined message can be empty. The function code can be set as follows:

P02.02 = 2 (communication control)

- P02.03 = 3 (PN communication control)
- P02.05 = 8 (frequency reference channel set to PN)
- P15.00 ones place = 0 (non PN-to-485 function)
- P40.01 = 3.0 s (defined as the expansion card identification timeout; modifiable)

P43.01 = 1 (0 is the standard message 1, and 1 is the self-defined message)

Function codes (P43.02 to P43.12) are used to set the parameters modifiable by the controller.

Function codes (P43.13 to P43.23) are used to set the parameters available for reading by the controller.

#### PN to 485 (one PN option controlling up to 5 drives)

In this mode, only one drive is installed with the PN option, which can transmit the PLC messages to other drives through 485. The frame header and tail will be eliminated during transmission, making the length of the message to 33 bytes. Only self-defined messages are allowed in this mode. PLC uses the first two bytes (485 station number) of the message to visit the corresponding drive. The function code setting can be further divided into two types:

(1) 485 master

P02.02 = 2 (communication control)

P02.03 = 3 (PN communication control)

P02.05 = 8 (frequency reference channel set to PN)

P15.00 ones place = 1 (PN-to-485 function enabled)

P15.02 is used to set the local 485 station number.

P40.01 = 3.0s (defined as the expansion card identification timeout; modifiable)

P43.01 = 1 (use self-defined messages only)

Function codes (P43.02 to P43.12) are used to set the parameters modifiable by the controller.

Function codes (P43.13 to P43.23) are used to set the parameters available for reading by the controller.

(2) 485 slave

P02.02 = 2 (communication control)

P02.03 = 3 (PN communication control)

P02.05 = 8 (frequency reference channel set to PN)

P15.00 个位 = 1 (PN-to-485 function enabled)

P15.02 is used to set the local 485 station number.

P40.01 = 3.0s (defined as the expansion card identification timeout; modifiable)

P43.01 = 1 (use self-defined messages only)

Function codes (P43.02 to P43.12) are used to set the parameters modifiable by the controller.

Function codes (P43.13 to P43.23) are used to set the parameters available for reading by the controller.

#### Note:

The current baud rate of PN-485 is set to 200k. The time interval between sending the message and receiving the slave response by the master is less than 5 ms. The master transmits a PN message every 50 ms (this cycle time shall be larger than the total time needed for one time of sending and one time of response). Due to high frequency of message sending by the controller, it may take several rounds of

reading and writing before the controller receives the corresponding data and response, which makes the device applicable only for application with low requirement in real-time performance.

# Chapter 3 CANopen Communication Option

# 3.1 Overview

Thank you for choosing Megmeet CANopen communication option. This manual provides information of the product functions, specifications, installation guidelines, basic operations, and settings, as well as an introduction to the network protocol. To ensure correct installation and operation of this product, please carefully read this manual and the communication protocol section of the drive user manual before using this communication option.

This manual serves as a guide for operating the CANopen communication option and includes relevant instructions. Detailed information about the CANopen protocol is not included herein. If users would like to learn more about the CANopen protocol, please refer to the professional articles or reference materials.

The communication card is defined as a CANopen slave communication option that can be used with drives supporting CANopen communication.

This communication option supports two methods of reading and writing the process variables from the drive: one through PDO, and the other through SDO for reading and writing the object dictionary defined by the manufacturer.

# 3.2 Features

MV800 CANopen provides services including:

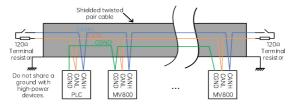
(1) NMT

- (2) Node guard message
- (3) Heartbeat message
- (4) 4 TxPDOs, 4 RxPDOs
- (5) Quick SDO reading/writing of the drive function codes
- (6) Emergency message
- (7) Synchronous mode

# 3.3 Electrical wiring and transmission distance

The network topology of CAN bus is shown in the figure below. It is recommended to employ the shielded twisted pair cable for CAN bus connection. Each end of the bus shall be connected to a 120 Ohms terminal resistor to prevent signal reflection. As a general rule, the 120 Ohms terminal resistor

would be added to the master station and the last slave station on the sequence. For the MV800-Canopen option, turn the terminal resistor switch 1 and switch 2 to ON position.



The transmission distance of CAN bus is directly correlated with the baud rate and the communication cable properties. The relation between the maximum bus length and the baud rate is shown in the table below:

Baud rate (bps)	Length (m)
1M	25
500k	100
250k	250
125k	500
100k	500
50k	1000
20k	1000

# 3.4 Parameter settings for CANopen network connection

To operate the MV800 drive using MV810-CANopen, users need to set the operation command channel and the frequency source of the MV800 drive to the bus communication card, as shown in the following table.

Drive parameter	Value	Function description
P02.02	2	Set the operation command channel to communication control
P02.03	3	Set the communication command channel to CANopen
P02.05	8	Set the main frequency source to CANopen

Settings of CANopen node address and baud rate are shown in the table below:

Drive parameter	Value	Function description
P40.01	0 to 10.0	CAN communication
P40.01	0 to 10.0	disconnection detection time

Drive parameter	Val	ue	Function description
			(measured in second)
P40.20	1 to 127		CANopen station number
	0: 1 Mbps/s	1: 800 Kbps/s	
	2: 500 Kbps/s	3: 250 Kbps/s	
P40.21	4: 125 Kbps/s	5: 100 Kbps/s	CAN communication baud rate
	6: 50 Kbps/s	7: 20 Kbps/s	
	8: 10 Kbps/s		

# 3.5 Communication

## 3.5.1 Communication object COB-ID

CANopen provides multiple communication objects, each of which possesses different features (refer to the standard CANopen protocol for detailed information) and suits different applications. This expansion card adopts predefined COB-ID. The rules are shown below:

1) NMT object: 0x000

2) SYNC object: 0x080

- 3) SDO object
- Send SDO—0x600+Node-Id
- ◆ Receive SDO—0x580+Node-Id

4) PDO object:

- RPDO1—0x200+Node-Id
- RPDO2—0x300+Node-Id
- ◆ RPDO3—0x400+Node-Id

- ◆ RPDO4—0x500+Node-Id
- ◆ TPDO1—0x180+Node-Id
- TPDO2—0x280+Node-Id
- ◆ TPDO3—0x380+Node-Id
- ◆ TPDO4—0x480+Node-Id
- 5) EMCY object: 0x80+Node-Id
- 6) Heartbeat/Node guard object: 0x700+Node-Id
- Node-ID: device ID (station address), function code P40.20 setting;
- Communication object COB-ID is distributed in fixed form, and unchangeable.

### 3.5.2 NMT network management command

NMT message is used by the master to control the slave NMT status, the structure of which is shown in the table below. COB-ID is fixed to 0x00. Data0 refers to the one-byte command word. Data1 serves as the Node-ID of the CANopen slave node, and occupies one byte; when it turns to 0, it serves as a broadcast message, valid for all slave devices in the network.

COB-ID	RTR	Data0	Data1
0x000	0	Command word	Node-ID

Command word types are shown below:

Command word	Description
0x01	Start remote node
0x02	Stop remote node
0x80	Enter pre-operational state
0x81	Reset node
0x82	Reset communication

### 3.5.3 SYNC message

The SYNC message is sent by the NMT master station with the purpose of facilitating the synchronization of PDO transmission in the entire network when the PDO transmission type is set to SYNC (1 to 240). The structure of the message is shown below:

COB-ID	RTR
0x80	0

## 3.5.4 Process data object (PDO)

### 3.5.4.1 PDO trigger mode

The communication parameter of each PDO (the communication parameter for RxPDO sits in the index 1400h to 15FFh in the object dictionary, and the communication parameter for TxPDO sits in the index 1800h to 19FFh) has defined the transmission type, the inhibit time, and the event timer. The transmission type sub-index is 02, the inhibit time sub-index is 0x03, and the event timer sub-index is 0x05. The unit for the inhibit time and the event timer is ms.

Synchronous trigger: PDO transmission is synchronous when the transmission type is set to 1 to 240. For example, when the TxPD01 transmission type is set to n ( $1 \le n \le 240$ ), the slave would send a TxPD01 command once the number of the SYNC messages it receives reaches n, and the same rule applies to other PDO operations.

Asynchronous trigger (254): when the event timer is set to non-0 status, the slave would send TxPDO messages in a periodical fashion. For example, when the TxPDO1 event timer is set to 200, the slave

would send a TxPD01 message every 200 ms. When the event timer is set to 0, every time the corresponding TxPD0 data changes, the slave would send a TxPD0 message; however, the time interval is restricted by the inhibit time, which means the same PD0 message would be sent once only in the range of the inhibit time, so the burden of the bus would be minimized.

Asynchronous trigger (255): when the event timer is set to non-0 status, the slave would send TxPDO messages in a periodical fashion. For example, when the TxPD01 event timer is set to 200, the slave would send a TxPD01 message every 200 ms. When the event timer is set to 0, the slave would send a TxPD0 message once it receives a RxPD0 message. For example, the slave would send a TxPD01 message once it receives a RxPD01 message.

For this option, the PDO transmission type is set to asynchronous trigger (255), the event timer is set to 0, and the inhibit time is set to 0 by default.

### 3.5.4.2 PDO mapping

This communication card supports 4 TxPDOs and 4 RxPDOs. Each PDO supports mapping of up to four 16-bit data.

Default RxPDO mapping is shown below:

RxPDO	Mapping
	Control word
	Frequency reference
RxPDO1	
RxPDO2	
RXPDU2	
RxPDO3	
RXPD05	
RxPDO4	

Default TxPDO mapping is shown below:

TxPDO	Mapping
	Status word
TxPDO1	Output frequency
TXPDOT	
TxPDO2	
TXFDOZ	
TxPDO3	
171 003	
TxPDO4	
IXED04	

Users can configure the PDO mapping to access the following data. For detailed information, refer to the "MV800\_Canopen.eds" file.

RxPDO (sent by the master, and received by the slave):

Index/ Sub-index	Indication	Description	Value range	Access rights
		Bit0: Forward running	0: Disabled; 1: Enabled	
6040h/0 Control word	Bit1: Reverse running		0: Disabled; 1: Enabled	
	Bit2: Forward JOG	0: Disabled; 1: Enabled	Read/ Write	
8040170	6040h/0 Control word	Bit3: Reverse JOG	0: Disabled; 1: Enabled	Redu/ Wille
		Bit4: Stop	0: Disabled; 1: Enabled	
		Bit5: Coast to stop	0: Disabled; 1: Enabled	

		Bit6: Fault reset Bit7: Emergency stop	0: Disabled; 1: Enabled 0: Disabled; 1: Enabled	
2100h/0	2100h/0 Unit: 0.1%		0.0 to 300.0% (corresponding to 0 to 3000)	Read/ Write
2101h/0	Braking torque upper limit	Unit: 0.1%	0.0 to 300.0%	Read/ Write
2102h/0	FWD frequency upper limit	Unit: 0.01 Hz	0.00 to 599.00 Hz (corresponding to 0 to 59900)	Read/ Write
2103h/0	REV frequency upper limit	Unit: 0.01 Hz	0.00 to 599.00 Hz	Read/ Write
2104h/0	Voltage reference (V/F separation)	Unit: 1 V	0 to 1000 V	Read/ Write
2105h/0 DO Bit1: DO2 t Bit2: DO3		Bit0: DO1 terminal Bit1: DO2 terminal Bit2: DO3 terminal Bit3: RO terminal	0: Disabled; 1: Enabled 0: Disabled; 1: Enabled 0: Disabled; 1: Enabled 0: Disabled; 1: Enabled	Read/ Write
2106h/0	2106h/0 AO1 Unit: 0.01%	Unit: 0.01%	0.00 to 100.00% (corresponding to 0 to 10000)	Read/ Write
2107h/0	HD01	Unit: 0.001 kHz	0.000 to 50.000 kHz (corresponding to 0 to 50000)	Read/ Write
2108h/0	HDO2	Unit: 0.001 kHz	0.000 to 50.000 kHz	Read/ Write
2109h/0	PID reference value	Unit: 0.1%	-100.0 to 100.0% (corresponding to -1000 to 1000)	Read/ Write
210Ah/0	PID feedback value	Unit: 0.1%	-100.0 to 100.0%	Read/ Write
210Bh/0	Position reference	Null	Null	Read/ Write
210Ch/0	Torque reference	Unit: 0.1%	-300.0 to 300.0%	Read/ Write
210Dh/0	Frequency reference	Unit: 0.01 Hz	0.00 to 599.00 Hz	Read/ Write

Index/ Access Indication Description Value ranae Sub-index riahts Bit0: Forward running 0: Disabled; 1: Enabled 0: Disabled; 1: Enabled Bit1: Reverse running 0: Disabled; 1: Enabled Bit2: Stop Bit3: Fault 0: Disabled; 1: Enabled Bit4: Power failure 0: Disabled; 1: Enabled Bit5: Ready status 0: Not ready; 1: Ready 6041h/0 Status word Read only Bit6: Motor number 0: Motor 1; 1: Motor 2 0: Asynchronous motor; Bit7: Motor type 1: Synchronous motor Bit8: Overload pre-alarm 0: Disabled; 1: Enabled Bit9 to Bit10: Control 0: Keypad; 1: Terminal; mode 2: Communication 0.0 to 6553.5 A 2200h/0 Output current Unit: 0.1 A Read only (corresponding to 0 to 65535) 2201h/0 Output voltage Unit: 1 V 0 to 65535 V Read only 0.00 to 599.00 Hz Output 2202h/0 Unit: 0.01 Hz Read only frequency (corresponding to 0 to 59900) -300.0 to 300.0% (corresponding to -3000 to 2203h/0 Output torque Unit: 0.1% Read only 3000) Unit: 0.1 V 0.0 to 6553.5 V 2204h/0 Bus voltage Read only Bit0: DI1 terminal 0: Disabled; 1: Enabled Bit1: DI2 terminal 0: Disabled; 1: Enabled 2205h/0 DI state 1 Read only Bit2: DI3 terminal 0: Disabled; 1: Enabled 0: Disabled; 1: Enabled Bit3: DI4 terminal Bit0: DI5 terminal 0: Disabled; 1: Enabled Bit1: DI6 terminal 0: Disabled; 1: Enabled 2206h/0 DI state 2 Read only Bit2: DI7 terminal 0: Disabled; 1: Enabled Bit3: DI8 terminal 0: Disabled; 1: Enabled Bit0: DO1 terminal 0: Disabled: 1: Enabled Bit1: DO2 terminal 0: Disabled: 1: Enabled 2207h/0 DO state Read only Bit<sup>2</sup>· DO3 terminal 0: Disabled; 1: Enabled Bit3: RO terminal 0: Disabled; 1: Enabled -300 0 to 300 0% 2208h/0 Motor power Unit·01% (corresponding to -3000 to Read only

TxPDO (sent by the slave, and received by the master):

2209h/0

Power output

Unit: 0.1 kW

3000)

0.0 to 6553.5 kW

(corresponding to 0 to 65535)

Read only

220Ah/0	Position actual value	Null	Null	Read only
603Fh/0	Error code	Refer to the <i>Drive fault</i> <i>information</i> in section 3.5.6 <i>Emergency</i> <i>message</i>		Read only

## 3.5.5 SDO reading/writing operation

### 3.5.5.1 Drive function code mapping

This CANopen option enables access to the drive function codes via the quick SDO message. The drive function code group (P00 to P98) is mapped to the section (0x2000 to 0x2062) in the CANopen object dictionary, with an addition of 1 to the number on the last digit of each function code to form its sub-index in the dictionary. For example:

Drive function code P02.05 is mapped to the main index 0x2002 in the object dictionary, with the sub-index 0x06;

Drive function code P03.07 is mapped to the main index 0x2003 in the object dictionary, with the sub-index 0x08.

### 3.5.5.2 SDO reading/writing message

Quick SDO request message is shown below (from the master to the slave):

CAN	Description
11-bit ID	0x600+Node-ID
RTR	0
DATAO	Command specifier (CS)
DATA1	Low-byte index
DATA2	High-byte index
DATA3	Sub-index
DATA4	Request data bit0 to 7
DATA5	Request data bit8 to 15
DATA6	Request data bit16 to 23
DATA7	Request data bit24 to 31

Quick SDO response message is shown below (from the slave to the master):

CAN	Description
11-bit ID	0x580+Node-ID
RTR	0
DATAO	Command specifier (CS)
DATA1	Low-byte index
DATA2	High-byte index
DATA3	Sub-index
DATA4	Response data bit0 to 7
DATA5	Response data bit8 to 15
DATA6	Response data bit16 to 23
DATA7	Response data bit24 to 31

Types of the command specifier in the request/response message is shown below:

Command specifier	Description	Command specifier	Description
0x2F	Write 1 byte	0x40	Read
0x2B	Write 2 bytes	0x4F	Read 1-byte response
0x27	Write 3 bytes	0x4B	Read 2-byte response
0x23	Write 4 bytes	0x47	Read 3-byte response
0x60	Write success response	0x43	Read 4-byte response
0x80	Abnormal response		

Examples:

When the address of the drive CANopen is set to 0x03, the SDO request for reading the drive function code P02.05 is shown below:

COB-ID	RTR	Data (Hex)
0x603	0	40 02 20 06 00 00 00 00

The value of the drive P02.05 is 8, and the response is shown below:

COB-ID	RTR	Data (Hex)
0x583	0	4B 02 20 06 08 00 00 00

### 3.5.5.3 SDO exception code

When error occurs during SDO reading/writing, the command specifier in the SDO response message would be 0x80, and the response data would be the exception code shown in the table below:

Exception code	Description	Exception code	Description
0x05040000	SDO visit timeout	0x06070010	Data type mismatching; serve parameter length mismatching
0x06010000	The object does not allow visit.	0x06090011	The sub-index does not exist.
0x06010001	The object for reading is write only.	0x06090030	Reading visit out of parameter value range
0x06010002	The object for writing is read only.	0x08000022	Data can not be transmitted or saved to the application due to the current device status.
0x06020000	The object dictionary does not exist.	0x08000000	General fault

### 3.5.6 Emergency message

The following message would be sent when internal error occurs inside the communication card or the drive, or when the error is cleared.

COB-ID	RTR	Data0 to 1	Data2	Data3 to 7
0x80+Node-ID	0	Emergency error code	Error register	Error code designated by the manufacturer

- \* Emergency error code: refer to the related chapters in the DS301 document; "0x8100" for communication error; "0xFF00" for error designated by the manufacturer.
- Error register: refer to the 1001H data in the object dictionary in the related DS301 document chapters; bit0 for generated error flag; bit4 for communication error flag; bit7 for error designated by the manufacturer.
- ※ Error code designated by the manufacturer: refer to the drive fault information in the following table. For detailed information, refer to the *MV810 High-Performance Vector Control Drive User Manual*.

Drive fault information	Drive fault information	Drive fault information
0: No error generated	15: External fault (EF)	34: Speed deviation fault (dEv)
1: Overcurrent during	16: EEPROM read/write fault	35 to 38: Reserved

acceleration (OC1)	(EEP)	39: Motor overheat (OH3)
2: Overcurrent during	17: 485 communication error (CE)	40: Reserved
deceleration (OC2)	18: EtherCAT communication	41: 24 V power supply overload
3: Overcurrent during operation	timeout (E-CAt)	(24OL)
at constant speed (OC3)	19: Current detection error (ItE)	42 to 45: Reserved
4: Overvoltage during acceleration (OV1)	20: CANopen communication timeout (E-CAN)	46: Board-level communication error (bCE)
5: Overvoltage during	21: PID feedback loss (FbL)	47: Reserved
deceleration (OV2)	22: Reserved	48: BootLoader failure (bLt)
6: Overvoltage during operation at constant speed (OV3)	23: Braking resistor overcurrent (brOC)	49: Power board software version mismatching (vEr)
7: Undervoltage fault (Uv)	24: Auto-tuning fault (tUN)	50: Parameter upload and
8: Input phase loss (SPI)	25: Reserved	download timeout (UPdnE)
9: Output phase loss (SPO)	26: Profinet communication	51: Al1 current input overcurrent
10: Power module protection	timeout (E-Pn)	(AIOC)
(drv)	27: I/O card communication	52: Reserved
11: Inverter overheat (OH1)	timeout (E-lo)	53: Fan locked-rotor (FAn)
12: Rectifier bridge overheat	28: Modbus TCP communication	54: Pre-overload (POL1)
(OH2)	timeout (E-TCP)	55: I/O card 24 V overload
13: AC drive overload (OL1)	29 to 32: Reserved	(IO-OL)
14: Motor overload (OL2)	33: Short-to-ground fault (GdF)	

## 3.5.7 Node guard message

Node guard service enables the present status inspection of each node by the NMT main node. The NMT main node sends a remote frame to request the slave status using the message below:

COB-ID	RTR
0x700+Node-ID	1

The slave response message is shown below:

COB-ID	RTR	Data0
0x700+Node-ID	0	Status word

The status word of Data0 is described below:

Status word	Description
bit7	It is required to alternate between 0 and 1 in the setting each time.
bit6 to bit0	Status: 0: Initialized 4: Stop 5: Run 127: Pre-run

## 3.5.8 Heartbeat message

The master station may occasionally require the slave station to initiate a heartbeat message at intervals so it can learn the real-time slave status. The time interval parameter is defined in the object dictionary 0x1017 (16-bit data length, with the unit set to ms). When the time is set to 0, the slave would not send heartbeat messages. The producer heartbeat time of this CANopen communication card is set to 0 by default.

COB-ID	RTR	Data0
0x700+Node-ID	0	Status word

Bit7 of the heartbeat message status word is set to 0 and does not allow changes. The definitions of bit0 to bit6 are the same with the definitions of bit0 to bit6 in the status word of the node guard response frame.

# 3.6 Fault diagnosis

## 3.6.1 LED indicator description and fault removal

MV810-CANopen has three LED indicators. Their descriptions are shown below:

LED	Status	Description	Action
	Off	No power supply for CANopen	Check whether the CANopen option is
LED1	LED1		properly connected to the drive
(Red)	Steady on	Normal power supply for	No need for actions
Steduy on	CANopen	No need for detions	
LED2 Off (Green)	State machine in Stopped	Check whether the CANopen option is	
	OII	state	properly connected to the host controller
(Green)	Flashing	State machine in Pre-OP state	Check whether the CANopen option is

LED	Status	Description	Action
			properly connected to the host controller
Steady on		State machine in OP state	No need for actions
	Off	Normal	No need for actions
LED3 (Red)	Flashing	CANopen station number collision	Reset P40.20, power off and restart
(Red)	Steady on	CANopen emergency message fault	Solve the problem indicated in the fault information of the emergency message

### 3.6.2 Function code diagnosis information

Function codes of CANopen commissioning (read only):

Drive parameters	Value	Function
	0: Boot-up;	
P50.07	4: Stopped;	CANanan communication status
	5: Operational;	CANopen communication status
	127: Pre-operational	
P50.08	0 to 65535	Accumulated number of CAN sending/receiving errors

#### Diagnosis:

If the value of P50.08 is greater than 0 and continues to increase, it indicates a case of existing interference with or improper configuration of the network, and that an action is needed for troubleshooting.

#### Methods for troubleshooting:

Check whether all the nodes have the same baud rate, and whether the addresses have the same setting. Check whether the DIP switch is correctly set in place, and whether the main controller baud rate and address are properly configured.

Check whether the terminal resistors are connected to the two ends of the bus only. Power off the whole unit, and measure the resistance between CANH and CANL in the bus using a multimeter. If the value sits in the range of 50 to 60 Ohms, it indicates a normal state of resistance.

Check whether the node CANH and node CANL are reversely connected, and whether the bus port CGND end is connected (in normal state, it is required to connect the CGND ends of all devices only, and grounding is not required).

### 3.6.3 Function code reading/writing fault

The object dictionary of the index 0x2064 indicates the drive function code reading/writing fault by the CANopen master station: the data corresponding to the sub-index 1 indicate the fault code, with high 8 bits indicating a writing error and low 8 bits indicating a reading error. The data corresponding to the

sub-index 2 indicate the index of the function code with reading/writing errors. For example, 0x0200 indicates that there is an error of reading/writing the function code P02.00. Types of fault codes are shown below:

Fault	Fault code
Wrong password	0xF1
Index for operation does not exist	0xF4
Invalid parameter	0xF5
Parameter read only	0xF6
System lock	0xF7
EEPROM performing storage	0xF8

# 3.7 Communication example of Inovance H5U PLC controlling

### MV800

The following example is based upon an Inovance H5U PLC as the master to demonstrate the configuration and usage of the MV800 CANopen communication.

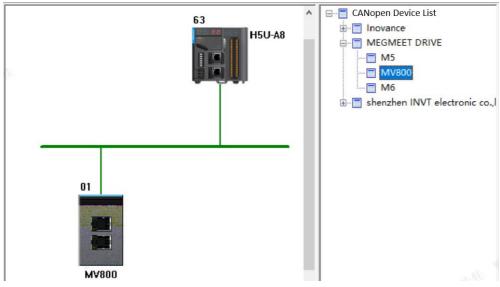
- (1) Start AutoShop software, select "New Project", select "H5U Series" in "Series and models", and click the "OK" button to start programming.
- (2) Select and click 🖶 CAN(CANopen) in the left column to enter "CAN Config", set up the program as the following, and click the "OK" button.

"Protocol": CANopen

"Station No." in "Communicate Param": Upper computer setting (the CANopen station number of PLC shall be different with that of the AC drive)

"Baud Rate" in "Communicate Param": Upper computer setting (the baud rate shall be in consistency with that of the AC drive)

(3) Configure the master and the slave: right click the pop-up window to display CAN(CANOPEN) and select "Add CAN Config" in configuration view, right click "CANOpen device list" in the right column, select "Import EDS" to import the "MV800\_Canopen.eds" file; double click the MV800 slave station to add it to the network.



(4) Double click the slave station, and configure the "Receive PDO" and "Send PDO." MV800

Slave Node		Debug	Debug I\O Mapping		Module information	
	Service Data Objects		Receive PDO		Send PDO	
Num <b>V</b> 1	Name Receive PDO 1 Parameter	Index 16#1400	Subindex	Bit Length		
	Control word	16#6040	16#00	16		
	FrequencySet	16#210D	16#00	16		
2	Receive PDO 2 Parameter	16#1401				
V 3	Receive PDO 3 Parameter	16#1402				
<b>V</b> 4	Receive PDO 4 Parameter	16#1403				

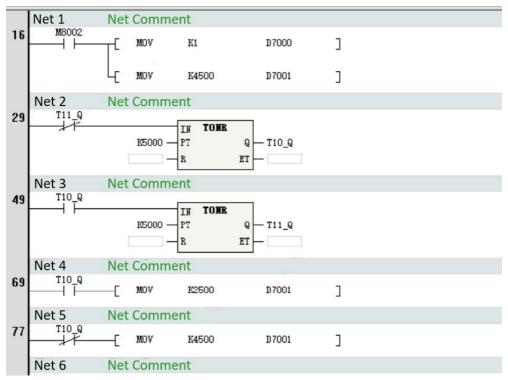
X

(5) Check I\O mapping

When PDO is configured, H5U PLC will automatically map all the PDO data to the D element. During PLC programming, PDO data are read/written via the D element..

Slave Node E Service Data Objects		Debug	Receive PD	O Module	Module information Send PDO	
		Objects	I\O Mapping	Send		
	Variable	Mapping	Index: Subindex	Bit Length		
	D7000D7001	Receive PDO 1 Mapping	16#1600	32		
	D7000	Control word	16#6040:0	16		
	D7001	FrequencySet	16#210D:0	16		
	D7400D7401	Transmit PDO 1 Mapping	16#1A00	32		
	D7400	Status word	16#6041:0	16		
	D7401	OutputFrequency	16#2202:0	16		

(6) Conduct the PLC programming, and download the program to PLC for multi-speed running control of the AC drive, as shown in the following image.



# Chapter 4 Modbus TCP Communication Option

## 4.1 Overview

Thank you for choosing Megmeet Modbus TCP communication option. This manual provides information of the product functions, specifications, installation guidelines, basic operations, and settings, as well as an introduction to the network protocol. To ensure correct installation and operation of this product, please carefully read this manual and the communication protocol section of the drive user manual before using this communication option.

This manual serves as a guide for operating the Modbus TCP communication option, and includes relevant instructions. Detailed information about the Modbus TCP protocol is not included herein. If users would like to learn more about the Modbus TCP protocol, please refer to the professional articles or reference materials.

This communication option is defined as a slave communication option that can be used with drives supporting Modbus TCP communication.

## 4.2 Features

This MV800 Modbus TCP option offers services including the followings:

- (1) Read slave parameters (0x03)
- (2) Modify single slave parameter (0x06)
- (3) Modify multiple slave parameters (0x10)
- (4) Mutable mapping of address (setting via P30 function code group)

### 4.3 Electrical connection

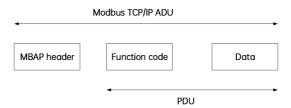
Modbus TCP network is generally composed of a master station and multiple slave stations. The network can be structured into a bus type, star type, tree type, or a combination of several types, enabling flexible device connection and wiring. The bus-type network topology is shown in the figure below.



## 4.4 Modbus TCP communication

### 4.4.1 Modbus TCP data frame structure

During Modbus TCP communication, only parameters in a word format can be read/written by the drive. The corresponding read command is 0x03; the write command is 0x06; the multi-data write command is 0x10; the read/write command of parameters in a byte/bit format is not supported. The data format is shown below:



The MBAP header contains the following fields:

Fields	Length	Description	Client	Server
Transaction Identifier	2 Bytes	ldentification of a Modbus request/response transaction	Initialized by the client	Recopied by the server from the received request
Protocol Identifier	2 Bytes	0 = Modbus protocol	Initialized by the client	Recopied by the server from the received request
Length	2 Bytes	Number of following bytes	Initialized by the client (request)	Initialized by the server (response)
Unit Identifier	2 Bytes	ldentification of a remote slave connected on a serial line or on other buses	Initialized by the client	Recopied by the server from the received request

	7-byte	1-byte	2-byte	2-byte
Read command frame of master station	MBAP header	Read command 0x03	Function code address HL	Number of function codes (n)

Theoretically, the host controller supporting reading of multiple sequential parameters (n up to 12) at a time. However, those sequential parameters shall not pass over the last parameter in the group; otherwise, response error may occur.

	7-by	te 1-byt	е	1	-byte	(2n)	-byte
Read response fram of master station	e MBAP heade	Icommo	and <sup>r</sup>		code address (2n)		f function des
	7-byt	e 1-byt	e	2	-byte	2-	byte
Write command frame of master station	MBAP heade	Icommo	and <sup>1</sup>		code address IL	The A Description Decision of	f function des
	7-byt	e 1-byt	e	2	-byte	2.	byte
Read command frame of slave station	frame of slave   MBAP   con			Function code address HL		Number of function codes	
Multi-data write	7-byte	1-byte	2	2-byte	2-byte	1-byte	(2n)-byte
command frame of master station	MBAP header	Write command 0x10	a	ction code ddress HL	Number of function codes (n)	Number of data bytes (2n)	Function code parameter
Multi-data ~	7-byte	1-byte	2	2-byte	2-byte	1-byte	2-byte
write response frame of slave station	MBAP header	Write command 0x10	a	ction code ddress HL	Number of function codes (n)	Number of data bytes (2n)	Function code address HL
-				07.11			

The read response error code of slave station is 0x83; the write response error code is 0x86; the multi-write response error code is 0x90.

	7-byte	1-byte	1-byte
Read response error frame of slave station	MBAP header	Write command 0x83	Error type

	7-byte	1-byte	1-byte
Write response error frame of slave station	MBAP header	Write command 0x86	Error type
	7-byte	1-byte	1-byte
Multi-data write response error frame of slave station	MBAP header	Write command 0x90	Error type

Data frame field description:

Command code	0x03 refers to the reading of slave parameters; 0x06 refers to the writing of slave parameters; 0x10 refers to the multi-writing of slave parameters.
Function code address	It refers to the address of the drive internal parameter, indicated in a hexadecimal format. It includes the parameter type and the non-parameter type (e.g. running status parameters, or running commands, etc.). During transmission, the high bytes run ahead and the low bytes follow.
Number of function codes	It refers to the number of parameters read in this frame. When it is set to 1, it indicates that only 1 parameter is read. During transmission, the high bytes run ahead and the low bytes follow. This protocol supports modification of only 1 parameter at a time, and this field is not available.
Number of data bytes	It refers to the data length, which is twice the number of parameters.
Function code parameter	It refers to the response data or data to be written. During transmission, the high bytes run ahead and the low bytes follow.

### 4.4.2 Parameter setting for Modbus TCP network connection

To operate the MV800 platform AC drive using this MV810-TCP01 option, it is to required to set the command channel and frequency source of the MV800 Platform drive to bus communication card, as shown below.

Parameter	Value	Function description
P02.02	2	It serves to set the operation command channel to communication control.
P02.03	0	It serves to set communication operation channel to Modbus TCP.

Parameter	Value	Function description
P02.05	7	It serves to set the main frequency source to Modbus TCP.

IP address setting (IP, subnet mask, and gateway) is shown below.

Drive parameter	Value	Function description
P40.02	0 to 255	IP address 1
P40.03	0 to 255	IP address 2
P40.04	0 to 255	IP address 3
P40.05	0 to 255	IP address 4
P40.06	0 to 255	Subnet mask 1
P40.07	0 to 255	Subnet mask 2
P40.08	0 to 255	Subnet mask 3
P40.09	0 to 255	Subnet mask 4
P40.10	0 to 255	Gateway 1
P40.11	0 to 255	Gateway 2
P40.12	0 to 255	Gateway 3
P40.13	0 to 255	Gateway 4

### 4.4.3 Mutable mapping application of address

To use the mutable mapping function, it is required to set the communication action to the tenth place 1 of P15.05 first.

The mutable mapping of the drive parameters is shown in the following table.

Drive parameter	Value	Function name	Description
P30.00	0 to 0xFFFF	Mapped address 1 of the 485 parameter	The mapped address refers to the actual internal address of the
P30.01	0 to 0xFFFF	Used address 1 of the	parameter; the used address refers

Drive parameter	Value	Function name	Description
		485 parameter	to the parameter address used in
P30.02	0 to 0xFFFF	Mapped address 2 of the 485 parameter	the message. (For example, the actual operating address of PLC.)
P30.03	0 to 0xFFFF	Used address 2 of the 485 parameter	
P30.04	0 to 0xFFFF	Mapped address 3 of the 485 parameter	
P30.05	0 to 0xFFFF	Used address 3 of the 485 parameter	
P30.06	0 to 0xFFFF	Mapped address 4 of the 485 parameter	
P30.07	0 to 0xFFFF	Used address 4 of the 485 parameter	
P30.08	0 to 0xFFFF	Mapped address 5 of the 485 parameter	
P30.09	0 to 0xFFFF	Used address 5 of the 485 parameter	

Example:

The address of P02.00 is 0x0200, and the address of P03.00 is 0x0300. Due to the discontinuity of the function code address, it is required to conduct the following address mapping for PLC to operate the above function codes in sequence via the 0x1000 address.

P30.00 = 0x0200, P30.01 = 0x1000

P30.02 = 0x0300, P30.03 = 0x1001

## 4.5 Fault diagnosis

### 4.5.1 LED indicator description and fault diagnosis

MV810-TCP01 has LED indicators on five locations, including the LED indicators on the PCBA of the expansion box for indicating the function status and the power status, and the LED indicators of the communication ports for indicating whether the communication connection status of MV810-TCP01 is normal.

Description of LED on the PCBA of the expansion box:

LED4 (Red) status	Description	Action
Off	Normal	No need for actions
Steady on		Check whether the TCP01 option is properly connected to the drive

Description of LED on the communication port:

LED status	Description	Action
Yellow light flashing	Normal connection with data transmission available	No need for actions
Green light steady on	Normal connection	No need for actions
Yellow light steady on	Normal connection without data transmission	Check whether there is communication between the master and the slave.
Green light off	Connection failed	Check whether the cable is properly connected.

# 4.6 Communication example of Inovance AM600 PLC

# controlling MV800

The following example is based upon an Inovance AM600 PLC as the master to demonstrate the configuration and usage of the MV800 Modbus TCP communication.

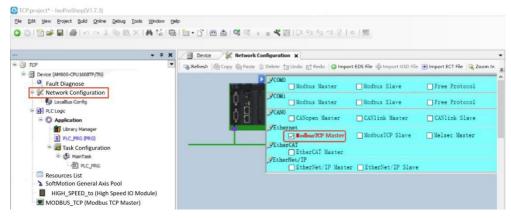
STEP 1: create a new project

Open the "New Project" window in the InoProShop software interface, and select "AM600-CPU1608TP/TN" in the "Device" list, as shown in the following image.

StandardPr	AC702	Structured Text (ST)
Lbraries	AC33     AC33     AC31     AC31	Device Device
lame: TCP		
ocation: C: V	Isers MI00031079 (Desktop MV810-TCP	v

#### STEP 2: configure the network

Double click "Network Configuration" in the left column, and select "Modbus TCP Master" to add it to the network, as shown in the following image.

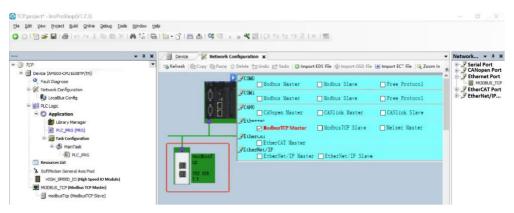


STEP 3: Add a slave

Doube click "MODBUS\_TCP" in the right column, as shown in the following image.

	Window Help					
30126618181871	M 25 1001	100 · C. 100 🐨 🔞 👌	= <ul> <li></li></ul>	◇   完		
	* # X	Device X Network	Configuration x			Network
10°			fi Delete fo Undo (c) Redo O Impo	t EDS File 🌵 Import GSD File	+ Import ECT File Q Zoom In	Serial Port
= 1 Device (AM600-CPU1508TP/TN)	ľ		D JCOND			Ethernet Por
Fault Diagnose     Ketwork Configuration			Modbus Master	Modbus Slave	Free Protocol	MODEU
LocaBus Config		Ó	COW1 Modbus Master	Modbus Slave	Free Protocol	EtherNet/IP.
F DI PLC Logic		0 B	JCAND			
= O Application		Υā	CANopen Master	CANlink Master	CANlink Slave	
Library Manager			JEthernet	ModbusTCP Slave	Melsec Master	
PLC_PRG (PRG)			SetherCAI	ModbusitP Slave	Meisec Master	
Task Configuration			EtherCAI Master			
AlinTask			JEtherNet/IP			
Resources List			EtherNet/IP Maste	r EtherNet/IP Slave		
SoftMotion General Axis Pool						
HIGH_SPEED_10 (High Speed IO Module	;)					
MODBUS_TCP (Modbus TCP Master)						

When the slave is successfully added to the network, the interface will display the view as follows.



#### STEP 4: configure slave information

Double click "modbusTCP (ModbusTCP Slave)" in the left column to configure the slave IP address in the displayed interface.

Gle Edit Yew Project Build Online Debug 이 이 한 같은 또한 태양 이야 것 같은 18		<b>4</b> 🕅   (3 43 43 43 5	(   o   )	
TOP     Fault Diagnose     Fault Diagnose	Modbus TCP Slave Configuration Modbus TCP Slave Configuration Device diagnose Status Information	Madua TCP Slave IP Address Port: Unit ID [0255]: Timeout (ms): Slave Enable Variable: SM	192 , 168 , 1 , 1 502 <b>Q</b>	

STEP 5: configure read/write command

Click "Modbus TCP Slave Communication Configuration", and click the "Add" button to display the "Modbus Channel Set" dialog box. Then, configure "Function Code", "Cycle Time", "Offset", "Length", etc. as shown in the following images.

TCP.project* - InoProShop(V1.7.3)     Ele Edit View Project Build Online Debug Tools Window									
Bie Edit View Broject Build Online Debug Tools Window O O I O B B B I A ○ ○ X I I I X X M C I		- 4 10	Va 64 +2	2.1.4.1應					
		• • •							
tees 👻 🖣 🗄	K Device 🔣 Network Confi	pration	modbusTcp	×					
= 37 TCP = 1 Device (AM600-CPU 1608TP/TN)	<ul> <li>Modbus TCP Slave Configuration</li> </ul>		Lanse e T		NAME: COLOR	[	Read		
- Seult Diagnose	Modbus TCP Slave Communication Configuration	Name	No. 🔺	Access Type	Trigger	Variable	Offset	Length	Error Han
🕼 LocaBus Config	Device diagnose								
D) PLC Logic     O Application	Status								
Library Manager	Information								
Task Configuration									
D PLC_PRG									
Resources List     SoftHoton General Axis Pool									
HIGH_SPEED_JO (High Speed IO Module)									
MODBUS_TCP (Modbus TCP Master)									
		4							
		Use decir	nal offset	Add	Delete	1	Edit		

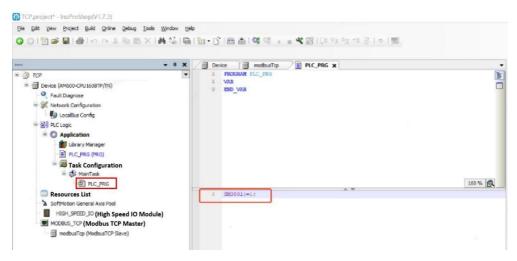
Name	Channel 01		
Access Type	Read Holding Register (Function Code	03)	~
Trigger	Cyclic 🗸 Cycle Time	e (ms) 5	\$
Repeated	1		÷
Comment			
ad Register Offset	0x0000		
	0x0000		¢.
			•
Offset Length (WORD)	1		
Offset Length (WORD) Error Handling	1		

When the setting is successfully completed, the following view will be displayed.

- 8 1		uration 🖉 🗐	modbusTc	×					
(70)     (70)	<ul> <li>Modbus TCP Slave Configuration</li> <li>Modbus TCP Slave</li> </ul>	Name	No. a	Access Type	Trigger	Variable	Read Offset	Length	Error Han
Network Configuration	Communication Configuration	Channel 01	1	Read Holding Reg	Cyclic , t#5ms		0x0000	1	Keep L
Software General Kas Pool Kashing Configuration  Software General Kas Pool  Resources List  Software General Kas Pool  MCC_MC  MCCUS_TCP (ModbusTCP Save)	Internal I/O Mapping Status Information	¢							

STEP 6: enable Modbus TCP communication

Enable "Slave Enable Variable" in "PLC\_PRG" as shown in the image below.



Save the project, build and download it to PLC, and confirm the success of Modbus TCP communication connection between PLC and MV800 drive by checking whether there are green marks before the master and slave items in the left project tree, as shown in the image below.

		MODBUS_TCP	PLC_PRG	modbusTcp x		
P Device [connected] (AM600-CPU1608TP/TN)	Modbus TCP	Slave Configuration	Modbus TCP			
Fault Diagnose     Four Configuration     LocalBus Config	Modbus TCP Communicat Device Diagn	Slave ion Configuration iose	Slave IP Address:	192 . 168 . 1	. 10	
PLC Logic	Internal I/O I	Mapping	Port:	502	0	
<ul> <li>Application [run]</li> <li>Ibrary Manager</li> </ul>	Status		Unit ID [0255]:	255	0	
PLC_PRG (PRG)	Information		Timeout (ms):	1000	٢	
<ul> <li>Itask Configuration</li> <li>ItainTask</li> <li>PLC_PRG</li> </ul>			Slave Enable Variable: SM	3001	0	

Check the read/write variables in the "Internal I/O Mapping" interface, as shown in the image below.

() TCP.project\* - InoProShop(V1.7.3)

• • ×	Modbus TCP Slave Confi	ODBUS_TO	Find	A.C_PRG	modbusTc	Filter Show a	i		Add FB for IO Ch Go
Device [connected] (AM600-CPU1608TP/TN)	Modbus TCP Slave Communication Configuration Device Diagnose		Variable		Mapping	Channel	Address	Туре	Default Current
S Fault Diagnose			÷ *			Channel 01	%IW1	ARRAY (00) OF WORD	
Wetwork Configuration			÷ *		Channel 01[0]	%JW1	WORD	7225	
🜗 LocalBus Config	Internal I/O Mapping	-	*		Bit0	%DX2.0	BOOL	TRUE	
PLC Logic			-	*		Bit1	%D(2.1	BOOL	FALSE
🗟 🔘 Application (run)	Status Information			**		Bit2	%D(2.2	BOOL	FALSE
- 💼 Library Manager				*		Bit3	%DX2.3	BOOL.	TRUE
PLC_PRG (PRG)				*		Bit4	%DX2.4	BOOL	TRUE
Task Configuration				*		Bit5	%DX2.5	BOOL	TRUE
🖷 🧶 MainTask				*		Bit6	%DX2.6	BOOL	FALSE FALSE FALSE
D PLC_PRG				*		Bit7	%DX2.7	BOOL	FALSE
-			<	*9		BitB	%DX3.0	BOOL	FALSE
Resources List									
😔 🍃 SoftMotion General Axis Pool									
HIGH_SPEED_to (High Speed IO Module)									

# Chapter 5 Ethernet/IP Communication Option

## 5.1 Overview

Thank you for choosing Megmeet Ethernet/IP communication option. This manual provides information of the product functions, specifications, installation guidelines, basic operations, and settings, as well as an introduction to the application of this option. To ensure correct installation and operation of this product, please carefully read this manual and the communication protocol section of the drive user manual before using this communication option.

This manual serves as a guide for operating the Ethernet/IP communication option and includes relevant instructions. Detailed information about the Ethernet/IP protocol is not included herein. If users would like to learn more about the Ethernet/IP protocol, please refer to the professional articles or reference materials.

This communication card is defined as a slave communication option that can be used with drives supporting Ethernet/IP communication.

This communication option provides the "MEGMEET\_MV800\_EthernetIP\_V1.01.EDS" file, which can be obtained from the manufacturer or by downloading from our official website.

## 5.2 Features

MV800 Ethernet/IP option provides services including:

- (1) PZD control of data exchange
- (2) PKW access to drive parameters
- (3) 100 Mbps full duplex
- (4) Linear bus topology and star-type topology

# 5.3 Electrical connection

Ethernet/IP network is generally composed of a master station and multiple slave stations. The network can be structured into a bus type, star type, tree type, or a combination of several types, enabling flexible device connection and wiring. The bus-type network topology is shown in the figure below.

Ethernet/IP	Ethernet/IP	Ethernet/IP	Ethernet/IP
Master station	Slave station 1	Slave station 2	 Slave station N

# 5.4 Ethernet/IP communication application

The PLC can read/write the drive PKW/PZD via the EIP protocol.

The data format is explained as the table below.

Parameter	Byte	Description
	Byte0	This is the EIP slave station (where the EIP communication option is
PKWO	Byte1	installed). Byte0: Target station number Byte1: Source station number (local station number) Slave response: Byte0: Target station number Byte1: Source station number (local station number)
	Byte2	Function code read/write command (read/write one function code at a time)
PKW1	Byte3	0x03: Read one function code 0x06: Write one function code, and save to EEPROM 0x07: Write one function code; not save to EEPROM Byte2: Command word high byte; Byte3: Command word low byte Slave response: Byte2: 0 Byte3: 0x03, response to read operation 0x06 + 0x07, response to write operation 0x80 + command code, response error
	Byte4	Address of the function code to be read/written
PKW2	Byte5	Byte4: Address high byte; Byte5: Address low byte Slave response: Byte4: Address high byte; Byte5: Address low byte
	Byte6	For write operation, PKW3 refers to the written value; for read operation, PKW3 refers to the number of function codes to be read (fixed value: 1)
PKW3	Byte7	Byte6: Parameter high byte; Byte7: Parameter low byte Slave response: Byte6: Function code value high byte (response to read operation), 0 (response to write operation), error code high byte (response error) Byte7: Function code value low byte (response to read operation), 0 (response to write operation), error code low byte (response error)

Parameter	Byte	Description			
		The mast	er sends control (	command word:	
		Bit0: FWD	) run;	0: Disable; 1: Enable	
		Bit1: REV	run;	0: Disable; 1: Enable	
	Byte8	Bit2: FWD	) jog;	0: Disable; 1: Enable	
	Dytoo	Bit3: REV	jog;	0: Disable; 1: Enable	
		Bit4: Dece	elerate to stop;	0: Disable; 1: Enable	
		Bit5: Coas	st to stop;	0: Disable; 1: Enable	
		Bit6: Faul	t reset;	0: Disable; 1: Enable	
		Bit7: Eme	rgency stop;	0: Disable; 1: Enable	
		Byte8: Co	mmand word hig	Jh byte	
		Byte9: Co	mmand word lov	v byte	
PZD1		Status wo	ord of slave respo	onse:	
FZDI	Byte9	Bit0: FWD running		0: Disable; 1: Enable	
		Bit1: REV running		0: Disable; 1: Enable	
		Bit2: Stop		0: Disable; 1: Enable	
		Bit3: Fault		0: Disable; 1: Enable	
	Byte?	Bit4: Power failure		0: Disable; 1: Enable	
		Bit5: Ready state		0: Disable; 1: Enable	
		Bit6: Moto	or number	0: Motor 1; 1: Motor 2	
		Bit7: Moto	or type	0: Asynchronous; 1: Synchronous	
		Bit8: Over	rload pre-alarm	0: Disable; 1: Enable	
		Bit9 to Bit	t10: Control mode	e 0: Keypad; 1: Terminal; 2: Communication	
		Byte8: Ste	atus word high b	yte	
		Byte9: Sto	atus word low by	te	
0700	Byte10			o PZD12) are used to read/write the drive internal	
PZD2 -	Byte11			P43.02 to P43.23 (parameters P43.02 to P43.12 on; P43.13 to P43.23 are used for read operation).	
PZD3 -	Byte12	P43.02	PZD2 received	0: Disable	
1203	Byte13	P43.03	PZD3 received	1: Frequency reference (0.00 to P02.10)	
PZD4	Byte14	P43.04	PZD4 received	2: Drive torque upper limit reference (0.0 to	
	Byte15	P43.05	PZD5 received	300.0% motor rated current)	
PZD5	Byte16	140.00		3: Brake torque upper limit reference (0.0 to	

Parameter	Byte			Description
	Byte17	P43.06	PZD6 received	300.0% motor rated current)
PZD6	Byte18	P43.07	PZD7 received	4: Torque reference (-300.0 to 300.0% motor rated current)
PZDO	Byte19	P43.08	PZD8 received	5: FWD run frequency reference upper limit
	Byte20	P43.09	PZD9 received	(0.00 toP02.10)
PZD7	Byte21	P43.10	PZD10 received	6: REV run frequency reference upper limit (0.00 to P02.10)
PZD8	Byte22	P43.11	PZD11 received	7: Voltage reference (V/F separation) (0 to
1200	Byte23			
PZD9	Byte24			8: Virtual input terminal command (0 to 0xFF are corresponding to DI8 to DI1)
FZD7	Byte25			9: Output terminal bus command (the output
PZD10	Byte26			terminal function is set to 39; 0 to 0xF are corresponding to RO, DO3, DO2, and DO1)
12010	Byte27	P43.12	PZD12 received	10: AO1 output reference (0 to 100.0%)
	Byte28			11: HDO1 output reference (0 to 100.0%)
PZD11	Byte29			12: HDO2 output reference (0 to 100.0%)
	Byte30			13: PID reference (0.0 to 100.0%)
				14: PID feedback (0.0 to 100.0%)
				15 to 30: Reserved
		P43.13	PZD2 feedback	0: Disable
		P43.14	PZD3 feedback	1: Frequency reference (0.01 Hz)
				2: Ramp frequency reference (0.01 Hz)
		P43.15	PZD4 feedback	3: Frequency output (0.01 Hz) 4: Voltage output (1 V)
PZD12		P43.16	PZD5 feedback	5: Current output (0.1 A)
	Byte31	P43.17	PZD6 feedback	6: Bus voltage (0.1 V)
		D47 10	DZDZ foodback	7: Motor power (0.1%)
		P43.18	PZD7 feedback	8: Torque output (0.1%)
		P43.19	PZD8 feedback	9: Excitation current (0.1 A)
		P43.20	PZD9 feedback	10: Torque current (0.1 A) 11: Status word (0 to 0xFFFF)
				12: Fault code (0 to 46)
		P43.21	PZD10 feedback	13: DI1 to DI4 status (0 to 0xFFFF)
		F4J.ZI	feedback	13: DI1 to DI4 status (0 to 0xFFFF)

Parameter	Byte			Description
		P43.22	PZD11 feedback	14: DI5 to DI8 status 15: DO status (0 to 0xF)
				16: Al1 input voltage (0 to 10.00 V) 17: Al2 input voltage (-10.00V to 10.00 V)
				18: HDI input frequency (0 to 50.000 kHz)
			PZD12	19: AO output value (0 to 100.0%)
				20: HDO1 output value (0 to 50.000 kHz)
		P43.23		21: HDO2 output value (0 to 50.000 kHz)
			feedback	22: PID reference (-100.0% to 100.0%)
				23: PID feedback (-100.0% to 100.0%)
				24: PID deviation (-100.0% to 100.0%)
				25: PID output (-100.0% to 100.0%)
				26 to 30: Reserved
		Byte10: Po	arameter high b	yte; Byte11: Parameter low byte
		(Similar w	vith other bytes)	· · ·

### 5.4.1 Parameter setting for Ethernet/IP connection

To operate the MV800 drive using MV810-EIP, users need to set the operation command channel and the frequency source of the MV800 drive to the bus communication card, as shown in the following table.

Drive parameter	Value	Function description
P02.02	2	Set the operation command channel to communication control
P02.03	3	Set the communication command channel to EtherNet/IP
P02.05	8	Set the main frequency source to EtherCAT, Profinet, CANopen, and EtherNet/IP

Settings of IP address (IP, subnet mask, and gateway) are shown in the table below.

Drive parameter	Value	Function
P40.02	0 to 255	IP address 1
P40.03	0 to 255	IP address 2

Drive parameter	Value	Function
P40.04	0 to 255	IP address 3
P40.05	0 to 255	IP address 4
P40.06	0 to 255	Subnet mask 1
P40.07	0 to 255	Subnet mask 2
P40.08	0 to 255	Subnet mask 3
P40.09	0 to 255	Subnet mask 4
P40.10	0 to 255	Gateway 1
P40.11	0 to 255	Gateway 2
P40.12	0 to 255	Gateway 3
P40.13	0 to 255	Gateway 4

### 5.5 Fault diagnosis

### 5.5.1 LED indicator description and fault removal

MV810-EIP has LED indicators on five locations, including the LED indicators on the PCBA of the expansion box for indicating the function status and the power status, and the LED indicators of the communication ports for indicating whether the communication connection status of MV810-EIP is normal.

Description of LED on the PCBA of the expansion box:

LED4 (Red) status	Description	Action
Off	Normal	No need for actions
Steady on	Communication timeout between the master and the communication card	Check whether the EIP option is properly connected to the drive.

Description of LED on the communication port:

I	LED status	Description	Action
Yello	w light flashing	Normal connection with data transmission available	No need for actions

LED status	Description	Action	
Green light steady on Normal connection		No need for actions	
Yellow light steady on	Normal connection without data transmission	Check whether there is communication between the master and the slave.	
Green light off	Connection failed	Check whether the cable is properly connected.	

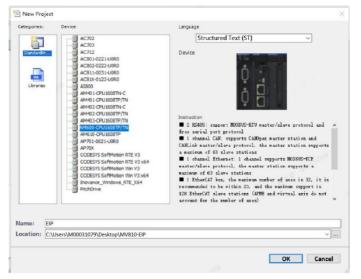
# 5.6 Communication example of Inovance AM600 PLC

# controlling MV800

The following example is based upon an Inovance AM600 PLC as the master to demonstrate the configuration and usage of the MV800 Ethernet/IP communication.

STEP 1: create a new project

Open the "New Project" window in the InoProShop software interface, and select "AM600-CPU1608TP/TN" in the "Device" list, as shown in the following image.



STEP 2: import the "MEGMEET\_MV800\_EthernetIP\_V1.01.EDS" file as shown in the following image.

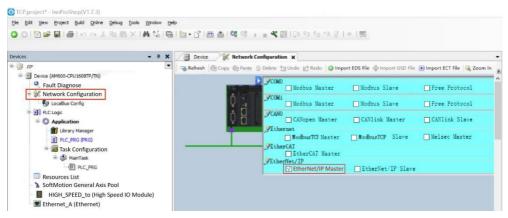
cation:	System Repository			~	Edit Locat
	(C:\Inovance Control\InoPr	oShop\CODESYS	\Repository\Devices)		
stalled d	levice descriptions:				
string fo	r a fulltext search	Vendor:	<all vendors=""></all>	~	Install
Name	Vendor	Version Des	cription		Uninstall
-	iscellaneous				Export
🗉 🕤 PL	.C oftMotion drives				
	eldbusses				
<u> </u>					
		2.5			Details

When the file is successfully imported, the following view will be displayed.

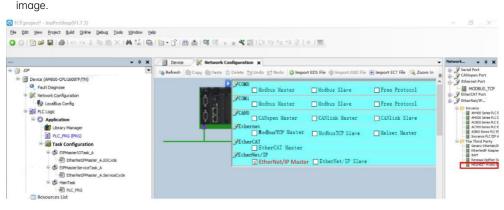
ocation:	System Repository			$\sim$	Edit Locat
	(C:\Inovance Control\InoProShop\CODESYS\Repository\Devices)				
nstalled o	levice descriptions:				
String fo	r a fulltext search	Vendor:	<all vendors=""></all>	$\sim$	Install
Name			Vendor	^	Uninstall
	- m INVT		shenzhen INVT electronic co.,ltd	_	Export
	MEGMEET MV800 EIP		shenzhen MEGMEET electronic co.	,lt	
	Renesas OpENer Device	e	Renesas Electronics		
< 1	Ethernet Adapter			× 1	
				-	
			9-45b0-86df-9518efacbb96\GD35	0	
	Device "MEGMEET MV800 EIP" in	nstalled to de	vice repository.		
					Details

#### STEP 3: configure the network

Open the "Network Configuration" interface, and select "EtherNet/IP Master" as the current PLC communication protocol, as shown in the following image.



Double click "MEGMEET MV800 EIP" in the right column to add the slave, as shown in the following



When the slave is added successfully, the following view will be displayed.



STEP 4: configure the slave parameters

Set the slave IP address, as shown in the following image.

TCP.project* - InoProShop(V1.7,3)					- Ø X
Ele Edit Vew Project Build Online Debug Tools Window H	elp				
00100000000000000000000000000000000000	<u>ៅឯ•បិគ្រាស់(%</u> ា	= 4 🖾   (3 73 53 +3 )	3   4   1		
Devices • • ×	Network Configuration	Hardware Configuration	Device	MEGHEET_MV800_EIP X	-
GP     Device (AM600 CPU1608TP/TN)	General	Address Setting			
<ul> <li>Fault Diagnose</li> <li>         Metwork Configuration     </li> </ul>	Connection	IPAddress 192 . 1	68 . 1 . 2	EtherNet/IP	
🚽 LocalBusConfig	UserParameters	20			
= 100 PLCLogic = 100 Application	EtherNet/IPI/OMapping	Electronic Keying Keying Option	4		
- 🏙 Library Manager - 🔝 PLC_PRG (PRG)	EtherNet/IPIECObject	<ul> <li>Compatibilitycheck</li> <li>Strict identitycheck</li> </ul>			
🖻 🗃 TaskConfiguration	Status	Device type check	0		
EIPMasteriOTask_A	Information	Vendor ID check	35		
BPMasterServiceTask_A		Product code check	5		
EtherNetIPMaster_AServiceCycle     ServiceCycle     MainTask	0	Majorrevision check	1		
PIC_PRG		Minor revision check	0		
- Resources List		Restore to Default_			
SoftMation General Avis Pool     High_SPEED_IO(High Speed IO Madule)					
<ul> <li>Ethemet_A(Ethemet)</li> </ul>					
EtherNetIPMaster_A(EtherNet/IPScanner)					
MEGMEET_MV800_EIP (MEGMEET MV800EIP)					

#### STEP 5: configure master IP

Select the Internet interface for the master, as shown in the following image.

TCP.project* - InoProShop(V1.7.3)			— Ø X
Be Lat yew Broject Bald Quine Bebug Tools Wordow Be ◯ ◯ I ◯ D D Be Bell And I >>> X No No X And X I No X	1 🛍 • 🕤 1 🕅 💩 1 💜 😋		
	Vetwork Configuration	Hardware Configuration	hernet_A x 🔂 EtherNetIPMaster_A 🔹
BP     Boke/MK00CPUB0BIP/IN)     Calbigroe     Mexect/CPUB0BIP/IN)     Calbigroe     Mexect/CPUB0BIP/IN)     Calbigroe     Mexect/CPUB0BIP/IN)     Calbigroe     Mexect/CPUB0BIP/IN     Calbigroe     Minitak     Dehet/Master/ADOpte     Minitak     Dehet/Master/ADOpte     Minitak     Dehet/Master/ADOpte     SetMattRater/ADOpte     SetMattRater/ADOpte/SectMattRater/ADOpte     SetMattRater/ADDehet/Mexer/ABBend     MattRater/ABBend	General Sonus Ethenhet/PV(OMupping Ethenhet/PECCejict Information	Petrine P Petrine 225 255 255 0 Defa Gasway 0 0 0 0 0 Adstopentinguyamenting:	

Double click "eth0", and the information, including the IP address, subnet mask, etc., will be automatically filled. The value of the IP address will be in consistency with that of "eth0", as shown in the following image.

Interfac	e		
Name	Descr	IP Address	
10		127. 0. 0. 1	
eth0		192.168.1.88	
eth1		0.0.0.0	
	000		
IP Addre		192 . 168 . 1 . 68	
IP Addre Subnet	Mask	192 . 168 . 1 . 68 255 . 255 . 255 . 0	
IP Addre Subnet		192 . 168 . 1 . 68	

STEP 6: when the project is saved, build and download it to PLC.

Save the project, build and download it to PLC, and confirm the success of EIP communication connection between PLC and MV800 drive by checking whether there are green marks before the master and slave items in the left project tree, as shown in the image below.

Devices • • ×	Network Configuration	Hardware Configuration	Device	MEGHEET_MV800_EIP X	
	General Connection UserParameters	Address Setting IPAddress 192 . :	168 . 1 . 2	EtherNet/IP	
ICORESCITE     I	Derrächnetes Elhenke//PiCOMapping Elhenke//PECObject Satus Information	ExtonicKajing KajingQotion Compatibilitychock Compatibilitychock Montacitichenkychock Montaciticheck Montaciticheck Mignerekischock FestoretoDefault	0  35  5  1  0		

Check the read/write variables in the "EtherNet/IP I/O Mapping" interface, as shown in the image below.

TCP.project\* - InoProShop(V1.7.3)

o x

Bie Edit view Broject Build Online Debug Iools Window Help

Device [connected](AM600-CPU1608TP/TN)	General	Find		Filter Show all			- Ac	d FB for IO	Ch Go t
Fault Diagnose     Statution	Connection	Variable	Map	Channel	Address	Туре	Default	Current	Prepare.
🚯 LocalBusConfig	UserParameters	8.79	_	Input Data_Param0	%182	BYTE		192	
= 🗐 PLCLogic		8.9		Input Data_Param1	%183	BYTE		1	
= 🧿 Application [run]	EtherNet/IPI/OMapping	a. 14		Input Data_Param2	%284	BYTE		0	
💼 LibraryManager	EtherNet/PIECObject			Input Data_Param3	%385	BYTE		128	
PLC_PRG (PRG)	La kitely a be object	a 19		Input Data_Param4	%196	BYTE		0	
🖮 🌌 TaskConfiguration	Status	8.9		Input Data_Param5	%287	BYTE		0	
= 🕼 EPMasteriOTask_A	10.0	8.5		Input Data_Param6	%288	BYTE		0	
B EtherNetIPMaster_AIOCycle	Information	* *		Input Data_Param7	%189	BYTE		2	
EPMasterServiceTask_A		* *		Input Data_Param8	%IB10	BYTE		4	
EtherNetIPMaster_AServiceCycle		# <b>*</b>		Input Data_Param9	%IB11	BYTE		36	
		11							

= 🧐 🗊 Ethernet\_A(Ethernet)

= 😳 🚮 EtherNet/PMaster\_A(EtherNet/IPScanner)

S S MEGMEET\_MV800\_EP (MEGMEET MV800E

# Appendix I EtherCAT Object Dictionary

Index	Sub-index	Description	Access rights	Data type	Default value
1000h	0	Device type	RO	UINT32	0x00000402
1001h	0	Error register	RO	UINT8	0
1008h	0	Manufacturer device name	RO	String	MV800_ECAT_CoE
1009h	0	Manufacturer hardware version	RO	String	Determined by the hardware version
100Ah	0	Manufacturer software version	RO	String	Determined by the software version
			ID object		
	0	The biggest sub-index included	RO	UINT8	4
1018h	1	Supplier ID	RO	UINT32	0x000006AE
	2	Product code	RO	UINT32	0x00000902
	3	Revision number	RO	UINT32	0x00000200
	4	Serial number	RO	UINT32	0x0000000
		RX PDO1 r	mapping parame	eter	
	0	Number of supported mapping objects	RW	UINT8	4
	1	The first mapping object	RW	UINT32	0x60400010
	2	The second mapping object	RW	UINT32	0x210B0010
	3	The third mapping object	RW	UINT32	0x210D0010
1600h	4	The fourth mapping object	RW	UINT32	0x210C0010
	5	The fifth mapping object	RW	UINT32	0x0000000
	6	The sixth mapping object	RW	UINT32	0x0000000
	7	The seventh mapping object	RW	UINT32	0x0000000
	8	The eighth mapping object	RW	UINT32	0x0000000
	9	The ninth mapping object	RW	UINT32	0×00000000

	10	The tenth mapping object	RW	UINT32	0x00000000			
		RX PDO2 n	napping param	eter				
1601h	0	Number of supported mapping objects	RW	UINT8	2			
	1	The first mapping object	RW	UINT32	0x60400010			
	2	The second mapping object	RW	UINT32	0x210B0010			
		RX PDO3 n	napping param	eter				
1602h	0	Number of supported mapping objects	RW	UINT8	2			
	1	The first mapping object	RW	UINT32	0x60400010			
	2	The second mapping object	RW	UINT32	0x210D0010			
		RX PDO4 n	napping param	eter				
1603h	0	Number of supported mapping objects	RW	UINT8	2			
	1	The first mapping object	RW	UINT32	0x60400010			
	2	The second mapping object	RW	UINT32	0x210C0010			
	TX PDO1 mapping parameter							
	0	Number of supported mapping objects	RW	UINT8	7			
	1	The first mapping object	RW	UINT32	0x60410010			
	2	The second mapping object	RW	UINT32	0x603F0010			
	3	The third mapping object	RW	UINT32	0x22020010			
	4	The fourth mapping object	RW	UINT32	0x22000010			
	5	The fifth mapping object	RW	UINT32	0x22030010			
1A00h	6	The sixth mapping object	RW	UINT32	0x22040010			
Ī	7	The seventh mapping object	RW	UINT32	0x220A0010			
	8	The eighth mapping object	RW	UINT32	0x00000000			
	9	The ninth mapping object	RW	UINT32	0x00000000			
	10	The tenth mapping object	RW	UINT32	0x00000000			

		TX PDO2 r	napping param	eter				
1A01h	0	Number of supported mapping objects	RW	UINT8	2			
	1	The first mapping object	RW	UINT32	0x60410010			
	2	The second mapping object	RW	UINT32	0x220A0010			
	TX PDO3 mapping parameter							
1A02h	0	Number of supported mapping objects	RW	UINT8	2			
	1	The first mapping object	RW	UINT32	0x60410010			
	2	The second mapping object	RW	UINT32	0x22020010			
		TX PDO4 r	napping param	eter				
1A03h	0	Number of supported mapping objects	RW	UINT8	2			
	1	The first mapping object	RW	UINT32	0x60410010			
	2	The second mapping object	RW	UINT32	0x22030010			
	Synchronized management of communication types							
	0	The biggest sub-index	RO	UINT8	4			
1C00h	1	SM0 communication type	RO	UINT8	0x01			
	2	SM1 communication type	RO	UINT8	0x02			
	3	SM2 communication type	RO	UINT8	0x03			
	4	SM3 communication type	RO	UINT8	0x04			
		RxPD	0 distribution					
1C12h	0	The biggest sub-index	RW	UINT8	1			
	1	Object index distributed by RxPDO	RW	UINT16	0x1600			
		TxPD	O distribution					
1C13h	0	The biggest sub-index	RW	UINT8	1			
	1	TxPDO distribution	RW	UINT16	0x1A00			
1C32h	Synchronized management of synchronously output parameters							

	0x00	The biggest sub-index	RO	UINT8	0x20
	0x01	Sync mode	RW	UINT16	0x02
	0x02	Cycle time	RO	UINT32	0
	0x03	Switching time	RO	UINT32	0
-	0x04	Synchronization type supported	RO	UINT16	0x4006
	0x05	The shortest cycle time	RO	UINT32	0x0003D090
	0x06	Calculate/Copy time	RO	UINT32	0
	0x07	Reserve	RW	UINT32	0
	0x08	Learn cycle time	RW	UINT16	0
	0x09	Delay time	RO	UINT32	0
	0x0A	Sync0 time	RW	UINT32	-
	0x0B	SM event loss counter	RO	UINT32	0
	0x0C	Loop timeout counter	RO	UINT32	0
	0x0D	Switching time too short counter	RO	UINT32	0
	0x20	Sync error	RO	UINT8	0
		Synchronized managemen	t of synchronou	isly input para	meters
	0x00	The biggest sub-index	RO	UINT8	0x20
	0x01	Sync mode	RW	UINT16	0x02
	0x02	Cycle time	RO	UINT32	0
	0x03	Switching time	RO	UINT32	0
1C33h	0x04	Synchronization type supported	RO	UINT16	0x4006
	0x05	The shortest cycle time	RO	UINT32	0x0003D090
	0x06	Calculate/Copy time	RO	UINT32	0
	0x07	Reserve	RW	UINT32	0
	0x08	Learn cycle time	RW	UINT16	0
	0x09	Delay time	RO	UINT32	0

	0x0A	Sync0 time	RW	UINT32	-
	0x0B	SM event loss counter	RO	UINT32	0
	0x0C	Loop timeout counter	RO	UINT32	0
	0x0D	Switching time too short counter	RO	UINT32	0
	0x20	Sync error	RO	UINT8	0
2000h		P00 function code group			
2001h		P01 function code group			
2002h		P02 function code group			
2003h		P03 function code group			
2004h		P04 function code group			
2005h		P05 function code group			
2006h		P06 function code group			
2007h		P07 function code group			
2008h		P08 function code group			
2009h		P09 function code group			
200Ah		P10 function code group			
200Bh		P11 function code group			
200Ch		P12 function code group			
200Dh		P13 function code group			
200Eh		P14 function code group			
200Fh		P15 function code group			
2010h		P16 function code group			
2012h		P18 function code group			
2014h		P20 function code group			
2015h		P21 function code group			
2016h		P22 function code group			
2017h		P23 function code group			

					]
2018h		P24 function code group			
201Ah		P26 function code group			
2028h		P40 function code group			
2029h		P41 function code group			
202Bh		P43 function code group			
2032h		P50 function code group			
2061h		P97 function code group			
2062h		P98 function code group			
		Function code rea	ding/writing err	or indication	
	0	Number of sub-indexes	RO	UINT8	2
2064h	1	Error code	RO	UINT32	0
	2	Index of the function code with error	RO	UINT32	0
2100h	0	Drive torque upper limit	RW	UINT16	0
2101h	0	Braking torque upper limit	RW	UINT16	0
2102h	0	FWD frequency upper limit	RW	UINT16	0
2103h	0	REV frequency upper limit	RW	UINT16	0
2104h	0	Voltage reference (V/F separation)	RW	UINT16	0
2105h	0	DO	RW	UINT16	0
2106h	0	AO1	RW	UINT16	0
2107h	0	HD01	RW	UINT16	0
2108h	0	HDO2	RW	UINT16	0
2109h	0	PID reference value	RW	INT16	0
210Ah	0	PID feedback value	RW	INT16	0
210Bh	0	Position reference	RW	UINT16	0
210Ch	0	Torque reference	RW	INT16	0
210Dh	0	Frequency reference	RW	UINT16	0

2200h	0	Output current	RO	UINT16	0
2201h	0	Output voltage	RO	UINT16	0
2202h	0	Output frequency	RO	UINT16	0
2203h	0	Output torque	RO	INT16	0
2204h	0	Bus voltage	RO	UINT16	0
2205h	0	DI state 1	RO	UINT16	0
2206h	0	DI state 2	RO	UINT16	0
2207h	0	DO state	RO	UINT16	0
2208h	0	Motor power	RO	INT16	0
2209h	0	Power output	RO	UINT16	0
220Ah	0	Position actual value	RO	UINT16	0
603Fh	0	Error code	RO	UINT16	0
6040h	0	Control word	RW	UINT16	0
6041h	0	Status word	RO	UINT16	0

# Appendix II CANopen Object Dictionary

Index	Sub-index	Description	Access rights	Data type	Default value
1000h	0	Device type	RO	UINT32	0x00000320
1001h	0	Error register	RO	UINT8	0
		Erro	r code register		
	0	Number of errors	RW	UINT8	0
	1	Error code	RO	UINT32	0
	2	Error code	RO	UINT32	0
1007h	3	Error code	RO	UINT32	0
1003h	4	Error code	RO	UINT32	0
	5	Error code	RO	UINT32	0
	6	Error code	RO	UINT32	0
	7	Error code	RO	UINT32	0
	8	Error code	RO	UINT32	0
1005h	0	SYNC COB ID	RW	UINT32	0x80
100Ch	0	Protection time	RW	UINT16	0
100Dh	0	Life cycle factor	RW	UINT8	0
1014h	0	Emergency COB ID	RW	UINT32	0x80+Node-ID
1017h	0	Producer heartbeat time	RW	UINT16	0
	0	Number of sub-indexes	RO	UINT8	4
	1	Manufacturer ID	RO	UINT32	0x264
1018h	2	Product code	RO	UINT32	0x320
	3	Revision number	RO	UINT32	0x01
	4	Serial number	RO	UINT32	0
			ID object	ľ	
1018h	0	Number of sub-indexes	RO	UINT8	4
	1	Supplier ID	RO	UINT32	0x000006AE

	2	Product code	RO	UINT32	0x00000902
	3	Revision number	RO	UINT32	0x00000200
	4	Serial number	RO	UINT32	0x0000000
		5	Server SDO		
1200h	0	Number of sub-indexes	RO	UINT8	2
120011	1	COB ID client to server	RO	UINT32	0x600+Node-ID
	2	COB ID server to client	RO	UINT32	0x580+Node-ID
		RxPDO1 com	nmunication pa	rameter	
	0	Number of sub-indexes	RO	UINT8	6
	1	COB-ID used by PDO	RW	UINT32	0x200+Node-ID
1400h	2	Transmission type	RW	UINT8	0xFF
140011	3	Inhibit time	RW	UINT16	0
	4	1	1	UINT8	1
	5	Event timer	RW	UINT16	0
	6	1	1	UINT8	1
		RxPDO2 com	nmunication pa	rameter	
	0	Number of sub-indexes	RO	UINT8	6
	1	COB-ID used by PDO	RW	UINT32	0x80000300+Node-ID
1401h	2	Transmission type	RW	UINT8	0xFF
140111	3	Inhibit time	RW	UINT16	0
	4	1	1	UINT8	1
	5	Event timer	RW	UINT16	0
	6	1	1	UINT8	1
		RxPDO3 com	nmunication pa	rameter	
	0	Number of sub-indexes	RO	UINT8	6
1402h	1	COB-ID used by PDO	RW	UINT32	0x80000400+Node-ID
	2	Transmission type	RW	UINT8	0xFF
	3	Inhibit time	RW	UINT16	0

Image: constraint of the second mapping objectRWUINT1605Event timerRWUINT1606//UINT8/6//UINT8/7RVPD04 communication pursues0x80000500+Node-ID0x8000500+Node-ID1400COB-ID used by PDORWUINT320x8000500+Node-ID2Transmission typeRWUINT340xFF3Inhibit timeRWUINT604//UINT8/5Event timerRWUINT8/6//UINT8/7Number of sub-indexesRWUINT841400Number of sub-indexesRWUINT320x604000102The first mapping objectRWUINT320x210D00102The fourth mapping objectRWUINT320x210D00103The third mapping objectRWUINT3204The fourth mapping objectRWUINT3201401The first mapping objectRWUINT		4		1	UINT8	/
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IntermediateIntermediateIntermediateIntermediateIntermediateIntermediate10Number of sub-indexesRWUINT320x8000500+Node-ID2Transmission typeRWUINT320x8000500+Node-ID2Transmission typeRWUINT30xFF3Inhibit timeRWUINT604//UINT605Event timerRWUINT606//UINT8/7Number of sub-indexesRWUINT8411The first mapping objectRWUINT320x604000102The second mapping objectRWUINT320x210D00103The third mapping objectRWUINT3204The fourth mapping objectRWUINT320140thThe first mapping objectRWUINT3203The third mapping objectRWUINT320140thThe first mapping objectRW <td< td=""><td></td><td>6</td><td> </td><td>1</td><td></td><td>/</td></td<>		6		1		/
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1403h2Transmission typeRWUINT8OxFF3Inhibit timeRWUINT1604//UINT8/5Event timerRWUINT1606//UINT8/7KxPD0VUINT8/100Number of sub-indexesRWUINT8411The first mapping objectRWUINT320x604000102The second mapping objectRWUINT320x20D00103The third mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The first mapping objectRWUINT3201401The first mapping objectRWUINT3201402The second mapping objectRWUINT3201403The third mapping objectRWUINT3201404The fourth mapping objectRWUINT3201404The first mapping objectRWUINT3201405AThe first mapping objectRWUINT3201404The first mapping object <td></td> <td>0</td> <td></td> <td>•</td> <td></td> <td>6</td>		0		•		6
1403h2Transmission typeRWUINT8OxFF3Inhibit timeRWUINT1604//UINT8/5Event timerRWUINT1606//UINT8/7KxPD0VUINT8/100Number of sub-indexesRWUINT8411The first mapping objectRWUINT320x604000102The second mapping objectRWUINT320x20D00103The third mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The first mapping objectRWUINT3201401The first mapping objectRWUINT3201402The second mapping objectRWUINT3201403The third mapping objectRWUINT3201404The fourth mapping objectRWUINT3201404The first mapping objectRWUINT3201405AThe first mapping objectRWUINT3201404The first mapping object <td></td> <td>1</td> <td>COB-ID used by PDO</td> <td>RW</td> <td>UINT32</td> <td>0x80000500+Node-ID</td>		1	COB-ID used by PDO	RW	UINT32	0x80000500+Node-ID
1403h3Inhibit timeRWUINT1604//UINT3/5Event timerRWUINT3606//UINT8/6//UINT8/7RVPDIUINT8/1400hNumber of sub-indexesRWUINT320x604000102The first mapping objectRWUINT320x210D00103The third mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The first mapping objectRWUINT3201401hThe first mapping objectRWUINT3201402hThe first mapping objectRWUIN		2		RW	UINT8	0xFF
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6//UINT8/6//IUINT8/RxPDO1 ====================================		4		1	UINT8	1
RXPDO1100Number of sub-indexesRWUINT8411The first mapping objectRWUINT320x6040001020The second mapping objectRWUINT320x210D00103The third mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT320140hThe first mapping objectRWUINT320140hThe first mapping objectRWUINT3202The second mapping objectRWUINT3203The third mapping objectRWUINT3204The fourth mapping objectRWUINT3203The third mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3201402hMumber of sub-indexesRWUINT841402hThe first mapping objectRWUINT3201402hThe first mapping objectRWUINT3201402hThe first mapping objectRWUINT3201402hThe first mapping objectRWUINT320150Mumber o		5	Event timer	RW	UINT16	0
1400hNumber of sub-indexesRWUINT841The first mapping objectRWUINT320x604000102The second mapping objectRWUINT320x210D00103The third mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3201401hThe first mapping objectRWUINT3202The second mapping objectRWUINT3203The third mapping objectRWUINT3204The fourth mapping objectRWUINT3203The third mapping objectRWUINT3204The fourth mapping objectRWU		6		1	UINT8	1
1400h1The first mapping objectRWUINT320x6040001012The second mapping objectRWUINT320x210D00103The third mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3201401hThe first mapping objectRWUINT32012The second mapping objectRWUINT32012The second mapping objectRWUINT3203The third mapping objectRWUINT3204The fourth mapping objectRWUINT3203The third mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The first mapping objectRWUINT3201402hThe first mapping objectRWUINT3201402hThe first mapping objectRWUINT3201402hThe first mapping objectRWUINT3201402hThe first mapping objectRWUINT3201502The second map			RxPDO1 n	napping param	neter	1
1400h2The second mapping objectRWUINT320x210D00103The third mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3201401hMumber of sub-indexesRWUINT841The first mapping objectRWUINT3202The second mapping objectRWUINT3203The third mapping objectRWUINT3203The third mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3201402h1The first mapping objectRWUINT3201402h1The first mapping objectRWUINT3201402h1The first mapping objectRWUINT3202The second mapping objectRWUINT320		0	Number of sub-indexes	RW	UINT8	4
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RxPDO2 mapping parameter0Number of sub-indexesRWUINT841The first mapping objectRWUINT3202The second mapping objectRWUINT3203The third mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3204The fourth mapping objectRWUINT3201402h1The first mapping objectRWUINT841402h1The first mapping objectRWUINT320		3	The third mapping object	RW	UINT32	0
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4The fourth mapping objectRWUINT320RxPDO3 mapping parameter0Number of sub-indexesRWUINT841402h1The first mapping objectRWUINT3202The second mapping objectRWUINT320	1401h	2	The second mapping object	RW	UINT32	0
RxPDO3 mapping parameter           0         Number of sub-indexes         RW         UINT8         4           1402h         1         The first mapping object         RW         UINT32         0           2         The second mapping object         RW         UINT32         0		3	The third mapping object	RW	UINT32	0
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1402h     1     The first mapping object     RW     UINT32     0       2     The second mapping object     RW     UINT32     0			RxPDO3 r	napping paran	neter	
2 The second mapping object RW UINT32 0		0	Number of sub-indexes	RW	UINT8	4
	1402h	1	The first mapping object	RW	UINT32	0
3 The third mapping object RW UINT32 0		2	The second mapping object	RW	UINT32	0
		3	The third mapping object	RW	UINT32	0

	4	The fourth mapping object	RW	UINT32	0		
	RxPDO4 mapping parameter						
	0	Number of sub-indexes	RW	UINT8	4		
14076	1	The first mapping object	RW	UINT32	0		
1403h	2	The second mapping object	RW	UINT32	0		
	3	The third mapping object	RW	UINT32	0		
	4	The fourth mapping object	RW	UINT32	0		
		TxPDO1 com	munication pa	rameter	-		
	0	Number of sub-indexes	RO	UINT8	6		
	1	COB-ID used by PDO	RW	UINT32	0x180+Node-ID		
1800h	2	Transmission type	RW	UINT8	0xFF		
18000	3	Inhibit time	RW	UINT16	0		
	4	1	/	UINT8	1		
	5	Event timer	RW	UINT16	0		
	6	1	/	UINT8	1		
	TxPDO2 communication parameter						
	0	Number of sub-indexes	RO	UINT8	6		
	1	COB-ID used by PDO	RW	UINT32	0x80000280+Node-ID		
10016	2	Transmission type	RW	UINT8	0xFF		
1801h	3	Inhibit time	RW	UINT16	0		
	4	1	/	UINT8	1		
	5	Event timer	RW	UINT16	0		
	6	1	/	UINT8	1		
		TxPDO3 com	munication pa	rameter			
	0	Number of sub-indexes	RO	UINT8	6		
1802h	1	COB-ID used by PDO	RW	UINT32	0x80000380+Node-ID		
	2	Transmission type	RW	UINT8	0xFF		
	3	Inhibit time	RW	UINT16	0		

	4	1	1	UINT8	/
	5	Event timer	RW	UINT16	0
	6	1	1	UINT8	1
		TxPDO4 com	munication pa	rameter	
	0	Number of sub-indexes	RO	UINT8	6
	1	COB-ID used by PDO	RW	UINT32	0x80000480+Node-ID
1803h	2	Transmission type	RW	UINT8	0xFF
1803h	3	Inhibit time	RW	UINT16	0
	4	1	1	UINT8	/
	5	Event timer	RW	UINT16	0
	6	1	1	UINT8	/
	TxPDO1 mapping parameter				
	0	Number of sub-indexes	RW	UINT8	4
1A00h	1	The first mapping object	RW	UINT32	0x60410010
IAUUII	2	The second mapping object	RW	UINT32	0x22020010
	3	The third mapping object	RW	UINT32	0
	4	The fourth mapping object	RW	UINT32	0
	TxPDO2 mapping parameter				
	0	Number of sub-indexes	RW	UINT8	4
1A01h	1	The first mapping object	RW	UINT32	0
AUIII	2	The second mapping object	RW	UINT32	0
	3	The third mapping object	RW	UINT32	0
	4	The fourth mapping object	RW	UINT32	0
		TxPDO3 r	napping param	neter	
	0	Number of sub-indexes	RW	UINT8	4
1A02h	1	The first mapping object	RW	UINT32	0
	2	The second mapping object	RW	UINT32	0
	3	The third mapping object	RW	UINT32	0

	4	The fourth mapping object	RW	UINT32	0	
	TxPDO4 mapping parameter					
	0	Number of sub-indexes	RW	UINT8	4	
1A03h	1	The first mapping object	RW	UINT32	0	
IAUSH -	2	The second mapping object	RW	UINT32	0	
	3	The third mapping object	RW	UINT32	0	
	4	The fourth mapping object	RW	UINT32	0	
2000h		P00 function code group				
2001h		P01 function code group				
2002h		P02 function code group				
2003h		P03 function code group				
2004h		P04 function code group				
2005h		P05 function code group				
2006h		P06 function code group				
2007h		P07 function code group				
2008h		P08 function code group				
2009h		P09 function code group				
200Ah		P10 function code group				
200Bh		P11 function code group				
200Ch		P12 function code group				
200Dh		P13 function code group				
200Eh		P14 function code group				
200Fh		P15 function code group				
2010h		P16 function code group				
2012h		P18 function code group				
2014h		P20 function code group				
2015h		P21 function code group				
2016h		P22 function code group				

				1	
2017h		P23 function code group			
2018h		P24 function code group			
201Ah		P26 function code group			
2028h		P40 function code group			
2029h		P41 function code group			
202Bh		P43 function code group			
2032h		P50 function code group			
2061h		P97 function code group			
2062h		P98 function code group			
		Function code rea	ding/writing er	ror indication	
	0	Number of sub-indexes	RO	UINT8	2
2064h	1	Error code	RO	UINT32	0
	2	Index of the function code with error	RO	UINT32	0
2100h	0	Drive torque upper limit	RW	UINT16	0
2101h	0	Braking torque upper limit	RW	UINT16	0
2102h	0	FWD frequency upper limit	RW	UINT16	0
2103h	0	REV frequency upper limit	RW	UINT16	0
2104h	0	Voltage reference (V/F separation)	RW	UINT16	0
2105h	0	DO	RW	UINT16	0
2106h	0	AO1	RW	UINT16	0
2107h	0	HD01	RW	UINT16	0
2108h	0	HDO2	RW	UINT16	0
2109h	0	PID reference value	RW	INT16	0
210Ah	0	PID feedback value	RW	INT16	0
210Bh	0	Position reference	RW	UINT16	0
210Ch	0	Torque reference	RW	INT16	0

210Dh	0	Frequency reference	RW	UINT16	0
2200h	0	Output current	RO	UINT16	0
2201h	0	Output voltage	RO	UINT16	0
2202h	0	Output frequency	RO	UINT16	0
2203h	0	Output torque	RO	INT16	0
2204h	0	Bus voltage	RO	UINT16	0
2205h	0	DI state 1	RO	UINT16	0
2206h	0	DI state 2	RO	UINT16	0
2207h	0	DO state	RO	UINT16	0
2208h	0	Motor power	RO	INT16	0
2209h	0	Power output	RO	UINT16	0
220Ah	0	Position actual value	RO	UINT16	0
603Fh	0	Error code	RO	UINT16	0
6040h	0	Control word	RW	UINT16	0
6041h	0	Status word	RO	UINT16	0

# Appendix III Warranty and Service

Megmeet rigorously adheres to the ISO 9001:2008 standard in manufacturing motor drive products. If any irregularities occur with our products, please contact the product supplier or the headquarters directly. Megmeet is committed to delivering comprehensive technical support services to all our clients.

#### 1. Warranty period

The warranty period for the product is 18 months from the date of purchase, but not exceeding 24 months after the manufacturing date recorded on the nameplate.

#### 2. Warranty scope

During the warranty period, any abnormalities arising from the responsibility of our company can be repaired or replaced free of charge by our company. However, a certain amount of repair charges may apply even within the warranty period under the following circumstances:

- (1) Damage caused by fire, flood, severe lightning strikes, or similar reasons;
- (2) Man-made damage caused by users' unauthorized modifications;
- (3) Damage due to dropping or transportation after purchase;
- (4) Damage caused by usage beyond the standard specifications or requirements;
- (5) Damage resulting from operation/use not in accordance with the user manual.

#### 3. After-sales service

- (1) If there are special requirements for the installation and commissioning of the drive product, or if the product's performance or functionality is not satisfactory, please contact the product distributor or Megmeet.
- (2) In case of any abnormalities, please seek assistance by contacting the product supplier or Megmeet.
- (3) During the warranty period, any abnormalities caused by manufacturing and design defects will be repaired free of charge by our company.
- (4) Beyond the warranty period, repairs will be conducted at the customer's request and charged by our company.
- (5) Service fees are calculated based on actual costs. Any agreements in place will take precedence.

#### Shenzhen Megmeet Electrical Co., Ltd.

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# Drive Warranty Bill

Customer company:				
Detailed address:				
Zip code:	Contact:			
Tel:	Fax:			
Machine model:				
Power:	Machine No.:			
Contract No.:	Purchase date:			
Service unit:				
Contact:	Tel:			
Maintenance person:	Tel:			
Maintenance date:				
Comment on service:				
Excellent     God	od 🗆 Fair 🗆 Unsatisfactory			
Other comment:				
User's signature: Date:				
Customer Service Center follow-up record:				
Follow-up phone of	call 🛛 🗆 Follow-up letter			
Other:				
Signature of the technical support	engineer: Date:			

Note: This bill becomes invalid if the user can not be visited.

Shenzhen Megmeet Electrical Co., Ltd.

# Drive Warranty Bill

Customer company:	
Detailed address:	
Zip code:	Contact:
Tel:	Fax:
Machine model:	
Power:	Machine No.:
Contract No.:	Purchase date:
Service unit:	
Contact:	Tel:
Maintenance person:	Tel:
Maintenance date:	
Comment on service:	
Excellent     God	od 🗆 Fair 🗆 Unsatisfactory
Other comment:	
User's signature: Date:	
Customer Service Center follow-up record:	
□ Follow-up phone call □ Follow-up letter	
Other:	
Signature of the technical support engineer: Date:	

Note: This bill becomes invalid if the user can not be visited.