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Preface

EM750-CM-C1 (CANopen) communication option developed by Sine Electric .

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The EM750-CM-C1 (CANopen) communication plug-in box independently developed by Sine Electric is an optional accessory for Sine Electric's EM750 series inverters. When users need to perform CANopen bus communication, they need to select this communication plug-in box so that the inverter can be connected to the CANopen bus through this communication plug-in box to achieve bus communication.

Main features of the product:

1. The maximum communication rate of CANopen bus can reach 1Mbps .
2. Support SDO service, which can be used to read and write inverter parameters .
3. Support 4 groups of PDO services, which users can customize for transmission of communication process data, that is, parameters that need to be given or monitored in real time.
4. Support node heartbeat message and node protection to realize the master station's monitoring and protection of the slave station status.

Special note: This user manual is applicable to CAN open communication plug-in boxes with software version V 106 and above

Before using this product, please read this manual carefully and keep it properly.

As we are always committed to improving our products and product information, the information provided by our company is subject to change without prior notice.

For the latest changes and more information, please visit www.sineedrive.com or call 400-601-9298 for inquiries.

Chapter 1 Introduction to EM750-CM-C1

1.1 Product Features

1. Support Node Guard service . The master station can use this function to query the device status .
2. Support Heart beat service, whereby the slave station reports the current status to the master station at regular intervals .
3. Support SDO accelerated transmission mode, transmitting 1 function code and 2 bytes of data each time.
4. Support synchronous and asynchronous transmission modes of 4 RPDOs and 4 TPDOs.
5. Support emergency objects.

1.2 Functional specifications

CAN open communication specifications :

Content	Illustrate
Link layer protocol	CAN bus
Application layer protocols	CANopen protocol
CAN-ID Type	Support 11bit CAN 2.0A
CAN frame length	0-8 bytes transmission
CAN frame type	Supports data frames, but not remote frames yet
Baud rate setting	125 Kbit/s , 250 Kbit/s , 500 Kbit/s , 1 Mbit/s
Maximum number of nodes	Supports 127 nodes
Terminal matching resistor	120 Ω
Support Services	NMT Network Management System PDO process data object SDO Service Data Object Heartbeat message SYNC synchronization message, used for PDO Boot-up message

	Emergency message
SDO transmission mode	Fast SDO transmission, can read and write 1, 2 , 4 bytes of data
Supported PDO number	4 RPDO , 4 TPDO
PDO transmission type	Synchronous trigger, asynchronous event
Support sub-protocols	CiA 301 CANOPEN application layer and communication protocol
Support inverter operation mode	1: Speed control mode 2: Torque control mode

CANopen connector:

Signal Terminal	Definition
CAN_H	Positive signal line
CAN_L	Negative signal line
GND	Signal Ground

Note: The two CAN open signal terminals are completely consistent, which is convenient for users to connect.

Interface with frequency converter:

project	Specification
Connectors	4 PIN connector, RJ45 port
Transmission method	Modbus RTU Protocol
Terminal Function	1. The communication card communicates with the inverter through this interface 2. The communication card obtains working power through this interface
Network Protocol	Modbus Protocol

Electrical specifications

Project	Specification
Supply voltage	24VDC (provided by inverter)
Insulation voltage	500VDC
Communication line power consumption	0.8W
Power consumption	1 W
weight	500 g

Environmental specifications

project	Specification
Anti-interference immunity	ESD(IEC 61800-5-1,IEC 6100-4-2) EFT(IEC 61800-5-1,IEC 6100-4-4) Surge Teat(IEC 61800-5-1,IEC 6100-4-4) Conducted Susceptibility Test(IEC 61800-5-1,IEC 6100-4-6)
Operating/Storage Environment	Operation: -10 ℃ ~40 ℃, humidity 90% Storage: -25 ℃ ~80 ℃, humidity 95%
Impact/shock resistance	International standards IEC 61800-5-1 , IEC 60068-2-6

Chapter 2 Product Appearance and Installation Information

2. 1 EM750-CM-C1 communication plug-in box physical picture

Figure 2.1.1

2.2 EM750-CM-C1 communication card and inverter connection

Connection method 1: **RJ 45 connection,** use a Category 6 network cable to connect the RJ45 port on the communication plug-in box to the RJ 45 port on the inverter control panel .

Connection method 2: **4PIN terminal connection** , connect the port on the external box to the port on the inverter control board according to the silk screen port, and modify the relevant parameters at the same time.

2.3 EM750 series inverter communication parameter setting

The inverter is connected to the CAN open communication card, the inverter communication parameters must be set according to Table 2.3.1 . After the communication parameters are set, the CAN open master station can start and stop the inverter.

Table 2.3.1

Parameter	Parameter name	Parameter Value	Meaning
F00.02	Command source	2	The operation command is

	selection		controlled by the communication card
F00.04	Main frequency source A selection	7	The frequency command is given directly by the communication card
F00.36	Communication control start and stop channel selection	3	CAN open communication control start and stop
F00.37	Communication given channel selection	3	CAN open communication control data setting
F10.12	C A N open expansion card communication address	1 ~127	
F10.15	Expansion card and bus communication baud rate	0~ 23	Units: CA N open card 0 : 125 K 1:250K 2:500K 3 : 1 M
F10.47	Communication card status	-	
F10.48	Communication card software version	-	
F10.51	Process data address setting method	-	0: Keyboard configuration 1: Master station configuration
F10.52	Communication	-	0: No operation

	card manual reset		1: Communication card reset

Remark:

F10.51 is set to 0 and can be used for master stations that do not need to import EDS files. After the master station and the inverter slave station are connected, the process data set by the keyboard cannot be modified (see Chapter 3, Section 3.5 for specific setting methods). Please set F10.51 to 1 when the master station needs to import EDS files .

When using 4-pin terminal connection, you need to modify the following parameters to the set values:

Function code	Default value	Settings
F10.00	1	2
F10.01	1	5
F10.02	0	0

2.4 Indicator Lights

Power indicator

State	Illustrate
Always on	The power supply of the CANopen communication plug-in box is normal.
Destroy	The power supply of the CANopen communication plug-in box is abnormal

Communication indicator

state	illustrate
Always on	The CANopen communication plug-in box communicates normally with the inverter
Destroy	Abnormal communication between CANopen communication plug-in box and inverter

Running indicator light

State	Illustrate
Always on	CANopen node is in operation (op) state
Slow flash (1s each time)	The CANopen node is in the pre-operational (pre-op) state
Flash (500ms each time)	CANopen node is in fault state
Destroy	The CANopen node is in the stop state or initialization state

Fault indicator light

state	illustrate
Always on	C AN open slave is in fault state
Flashing (1s each time)	The CANopen communication plug-in box and the host computer communication connection are accidentally disconnected
Destroy	The CANopen communication plug-in box and the host computer are connected normally.

2.5 Other key issues

After the entire system CAN bus connection is completed, the first CAN device and the last CAN device need to turn on the terminal resistance. Use a multimeter to check the resistance between the bus CAN_H and CAN_L, which is about 60 ohms .

When the CANopen card controls the inverter, the keyboard stop function provides an emergency stop function . After the Stop function stops, F00.02 switches to keyboard control. If communication control needs to be restored, F00.02 can be switched to communication control.

Chapter 3 Communication Configuration

3.1 Function code and object dictionary

Object dictionary index = 0x2000 + the first two digits of the function code

Object dictionary sub-index = the last two digits of the function code + 1

For example:

Function code F 00.07 object dictionary index 0x 2000, sub-index 0x 08.

Function code F18.12 object dictionary index 0x 2012, sub-index 0x 0D.

1000 h Series object dictionary

Index	Sub-index	Name	Accessibility	Can it be mapped?	Data Types	Data Category	Factory value
1000h	-	Device Type	RO	NO	Uint 32	VAR	0x10192
1001h	-	Error register	RO	NO	U int8	VAR	0
1003h	-	Predefined error fields	RO	NO	-	ARR	
	1-4h	Error Field	RW	NO	Uint 32	-	0
1005h	-	Synchronous message COB - ID	RO	NO	Uint 32	VAR	0x80
100Ch	-	Guardian time	RW	NO	Uint 16	VAR	0
100Dh	-	Life Factor	RW	NO	Uint 8	VAR	0
1014h	-	Emergency message COB -ID	R	NO	Uin t32	V A R	0x 80000080+ Node_ID
1017h	-	Producer heartbeat time	R	NO	Uint 16	VAR	0
1200h	-	SDO server parameters	RO	NO	-	REC	
	1 h	Client to Server COB-ID	RO	NO	Uint 32	-	0x 600+Node_I

							D
	2 h	Server to Client Server COB-ID	RO	NO	Uint 32	-	0x 580+Node_ID
1400h	-	RPDO1 communication parameters	RW	NO	-	REC	
	1h	RCOB-ID of PDO1	RW	NO	Uint 32	-	0x 200+Node_ID
	2 h	R Transmission type of PDO1	RW	NO	Uint 8	-	0xFF
1401h	-	RPDO2 communication parameters	RW	NO	-	REC	
	1h	RCOB-ID of PDO2	RW	NO	Uint 32	-	0x 80000300+ Node_ID
	2 h	RPDO2 transmission type	RW	NO	Uint 8	-	0xFF
1402h	-	RPDO3 communication parameters	RW	NO	-	REC	
	1h	RCOB-ID of PDO3	RW	NO	Uint 32	-	0x 80000400+ Node_ID
	2 h	RPDO3 transmission type	RW	NO	Uint 8	-	0xFF

1403h	-	RPDO4 communication parameters	R W	NO	-	REC	
	1h	RCOB-ID of PDO4	R W	NO	Uint 32	-	0x 80000500+ Node_ID
	2 h	RPDO4 transmission type	R W	NO	Uint 8	-	0xFF
1600h	-	RPDO1 mapping parameters	R	NO	-	REC	
	1- 8 hours	RPDO1 mapping object	R W	NO	Uint 32	-	-
1601h	-	RPDO2 mapping parameters	R	NO	-	REC	
	1- 8 hours	RPDO2 Mapping Object	R W	NO	Uint 32	-	0
1602h	-	R PDO3 mapping parameters	R	NO	-	REC	
	1- 8 hours	RPDO3 Mapping Object	RW	NO	Uint 32	-	0
1603h	-	RPDO4 mapping parameters	R	NO	-	REC	

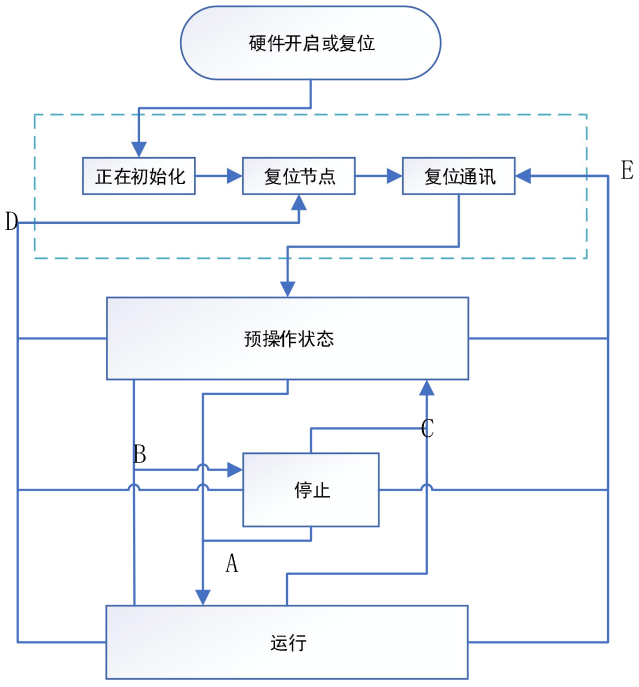
	1- 8 hours	RPDO4 mapping object	RW	NO	Uint 32	-	0
1800h	-	TPDO1 communication parameters	RW	NO	-	RE	
	1 h	TPDO 1 COB - ID	RW	NO	Uint 32	-	0x 180+Node_ID
	2 h	T Transmission type of PDO1	RW	NO	Uint 8	-	0xFF
	3 h	Prohibited time	RW	NO	Uint16	-	10
	5 h	Event Timer	RW	NO	Uint16	-	50
1801h	-	TPDO2 communication parameters	RW	NO	-	RE	
	1 h	TPDO 2 COB - ID	RW	NO	Uint 32	-	0x 80000280+ Node_ID
	2 h	TPDO2 transmission type	RW	NO	Uint 8	-	0xFF
	3 h	Prohibited time	RW	NO	Uint16	-	10
	5 h	Event Timer	RW	NO	Uint16	-	60
1802h	-	TPDO3 communication parameters	RW	NO	-	RE	
	1 h	TPDO 3 COB - ID	RW	NO	Uint 32	-	0x 80000380+ Node_ID

	2 h	TPDO3 transmission type	RW	NO	Uint 8	-	0xFF
	3 h	Prohibited time	RW	NO	Uint16	-	10
	5 h	Event Timer	RW	NO	Uint16	-	70
1803h	-	TPDO4 communication parameters	RW	NO	-	RE	
	1 h	TPDO 4 COB - ID	RW	NO	Uint 32	-	0x 80000480+ Node_ID
	2 h	TPDO4 transmission type	RW	NO	Uint 8	-	0xFF
	3 h	Prohibited time	RW	NO	Uint16	-	10
	5 h	Event Timer	RW	NO	Uint16	-	80
1A00h	-	TPDO1 mapping parameters	R	NO	-	RE	
	1- 8 hours	TPDO1 mapping object	RW	N O	Uint 32	-	-
1A01h	-	TPDO2 mapping parameters	R	NO	-	RE	
	1- 8 hours	TPDO2 mapping object	RW	NO	Uint 32	-	0
1A02h	-	TPDO3 mapping	R	NO	-	RE	

		parameters					
	1- 8 hours	TPDO3 mapping object	RW	NO	Uint 32	-	0
1A03h	-	TPDO4 mapping parameters	R	NO	-	RE	
	1- 8 hours	TPDO4 mapping object	RW	NO	Uint 32	-	0

3.2 NMT status management

CAN open performs corresponding work according to the state machine specified in the protocol, some of which are automatically converted internally, and some must be converted by the NMT host sending NMT messages, as shown in the following figure:



The conversion with letters in the above figure is realized by NMT message, and only NMT host can send NMT control message. The message format is shown in the following table.

Table 1 NMT message format

COB - ID	R	DATA/ byte	
		0	1
0x000	0	Command word	Node - ID (0x00 is the broadcast address)

COB-ID of the NMT message is fixed to "0x 000 ". The data area consists of two bytes: the first byte is the command word, indicating the control function of the frame, as shown in Table 2. The second byte is the CAN open node address. When it is "0", it is a broadcast message and all devices in the network are valid.

Table 2 NMT message commands

Command word	Turn code	illustrate
0x 01	A	Start remote node command (enter running state)
0x02	B	Stop remote node command (enter stop state)
0x80	C	Enter pre-operation state command
0x81	D	Reset Node Command
0x82	E	Reset communication

After the CANopen device starts and completes internal initialization, it will initialize the parameters of the CAN module and automatically enter the pre-operation state after completion. The master station is informed of the slave station's readiness through the boot message (boot up). The master station can send NMT messages to change the CAN open slave station node status.

Table 3 Services supported in various NMT states

Serve	Pre-operation	Run	Stop
Process Data Object (PDO)	no	yes	no
Service Data Object (SDO)	yes	yes	no
Synchronization	yes	yes	no

object (SYNC)			
Emergency message (EMCY)	yes	yes	no
Network Management System (NMT)	yes	yes	yes

3.3 NMT error control

NMT error control is mainly used to detect whether the devices in the CA N open network are online and the status of the devices, including node protection (lifetime) protection and heartbeat. The two methods cannot be used at the same time.

Node (lifetime) protection

periodically queries the status of the NMT slave through remote frames , while life protection is when the slave indirectly monitors the status of the master through the received remote frame intervals. Node protection follows the master-slave model, and each remote frame must be responded to .

The object dictionary related to node (lifetime) protection includes protection time 100Ch and life factor 100Dh. The value of 100Ch is the time interval for the master node to send protection remote frames under normal circumstances , in ms. The product of 100Ch and 100Dh determines the latest time for the host to query. When both 100Ch and 100D of the node are non-zero values and a node protection remote frame is received , the node (lifetime) protection is activated.

The master station sends a node protection remote frame every 100Ch set time , and the slave must respond, otherwise it is considered that the slave station has dropped . If the slave station does not receive the node protection remote frame within 100Ch * 100Dh, it is considered that the master station has dropped.

The NMT master node sends remote frames as shown in the following table.

Table 4 Node remote frame message format

COB-ID	R
0x700 + Node - ID	1

Table 5 Node protection response message format

COB- ID	R	DATA
0x700 + Node - ID	0	BIT 7: must alternate between 0 and 1 BIT6 ~BIT0: 4- Stop status 5- Operation status 127-Pre-operation state 74 - CAN open fault 75- MODBUS fault

Heartbeat

Heartbeat message adopts the producer - consumer model. CANopen devices can send heartbeat messages according to the time period set in the producer heartbeat interval object dictionary 1017h , in ms. Nodes with consumer heartbeat function

In the network monitor the producer according to the consumer time set in object 1016h. Once the producer heartbeat of the corresponding node is not received within the consumer heartbeat time range, the node is considered to be faulty. After configuring the producer heartbeat interval to 1017h, the node heartbeat function is activated and starts to generate heartbeat messages. Only one of the node (lifetime) protection and the heartbeat message can be enabled.

The slave sends a heartbeat message every 1017h to monitor the master (or other slaves) of the slave. If the heartbeat message is not received within the consumer time, the slave is considered to have dropped out. 1017h*1.8 ≤ the consumer time of the master (or other slaves) monitoring the slave, otherwise it is easy to falsely report that the slave has dropped out.

The format of the heartbeat message is shown in the table. The data segment contains only one byte, the highest bit is fixed to "0", and the rest is consistent with the node protection response message status in Table 3.

Table 6 Heartbeat message format

COB-ID	R	DATA
0x700 + Node - ID	0	Status word

3.4 Service Data Object (SDO)

The service data object (SDO) is connected to the object dictionary through indexes and sub-indexes. Through SDO, the data content in the object dictionary can be read or the object data can be modified if allowed.

The correspondence between the object dictionary and the inverter function code is as follows:

Object dictionary index = 0x2000 + the first two digits of the function code

Object dictionary sub-index = the last two digits of the function code + 1

For example:

Function code F 00.07 object dictionary index 0x 2000, sub-index 0x 08.

Function code F18.12 object dictionary index 0x 2012, sub-index 0x 0D.

Taking the setting of F00.07 digital given frequency as an example, write data 5000 to object dictionary 0x2000 , sub-index 0x08 to set F00.07 to 50.00 Hz .

When setting the function code F02.32 analog input curve selection, if you want to set the AI1 curve to select curve 4, you need to set the unit digit of the value of F02.32 to 3. At this time, you cannot directly write data 3 to the object dictionary 0x2002 and sub - index 0x21. You should first read out data 3210 and then write 3213. That is, when using SDO to write data to the inverter, you can only read and write data as a whole two bytes. It is recommended to directly use the LCD keyboard supporting EM760 to modify this type of function code .

SDO transmission is divided into object data transmission of no more than 4 bytes and object data transmission of more than 4 bytes. No more than 4 bytes use accelerated SDO transmission, and more than 4 bytes use segmented transmission or block transmission. CAN open communication expansion card only supports accelerated SDO transmission . SDO transmission message consists of COB-ID and data segment. The data segment adopts little end mode, that is, the low bit is in front and the high bit is in the back. All SDO message data segments must be 8 bytes. The SDO transmission message format is as follows:

Table 7 SDO transmission message format description

COB -ID	DATA							
5 80h +Node_ID / 6 00h+ Node_ID	0	1	2	3	4	5	6	7
	Command Code	index		Sub-index	data			

Table 7 Accelerated SDO write message description

		COB -ID	0	1	2	3	4	5	6	7
Client →		6 00h + Node_ID	23h	index		Sub-index	data			
			27h				data			-
			2B				data		-	-
			2F				data	-	-	-
← Server	normal	5 80h+Node_ID	60h	index		Sub-index	-	-	-	-
	abnormal		80h				Abort Code			

"-" means there is data but it will not be considered. It is recommended to write 0 when writing data. The same applies below.

Table 8 Accelerated SDO read message description

		COB -ID	0	1	2	3	4	5	6	7
Client →		6 00h + Node_ID	4 0h	index		Sub-index	-	-	-	-
← Server	normal	5 80h+Node_ID	4 3h	index		Sub-index	data			
			4 7h				data			-
			4 B				data		-	-
			4 F				data	-	-	-
	abnormal		8 0h	index		Sub-index	Abort Code			

Table 9 SDO abort code

SDO abort code	Name	Remark
0x06020000	Object dictionary does not exist	01H Illegal function
0x06090011	Subindex does not exist	02H Illegal data address

0x06090032	Data range does not match	The SDO data frame command bits do not match the size of the write object dictionary.
0x06010002	Attempt to write to a read-only object	06H Parameters are read only . Configuration parameters cannot be modified when PDO configuration is valid .
0x02030405	No such service	Highest bit of COBID can be modified. The SDO data frame command bit data is invalid.
0x08000021		03H Illegal data frame
0x06060000		04H Slave device failure
0x06090032		05H Data out of range
0x06010016		07H Parameters cannot be modified during operation
0x08080808		08H Parameters are password protected

Table 10 SD O abnormal code description

Exception code	Name	Meaning
01H	Illegal function	The function code received by the slave (inverter) is out of the configured range
02H	Illegal data address	The data address received by the slave (inverter) is not an allowed address; in particular, the combination of register start address and transfer length is invalid
03H	Illegal data frame	The length of the data received by the slave (inverter) or the CRC check is incorrect
04H	Slave device failure	An unrecoverable error occurred when the slave (inverter) attempted to execute the requested

		operation. Possible causes include logic errors or failure to write to EEPROM.
05H	Data out of range	The data received by the slave (inverter) exceeds the minimum to maximum value range of the corresponding register
06H	Parameters read only	The current register is read-only and cannot be written.
07H	Parameters cannot be changed during operation	The inverter is in operation. The current register cannot be written. If operation is required, please stop the inverter.
08H	Parameters are password protected	The current register is password protected

3.5 Process Data Object (PDO)

Functional Description

Process Data Object (PDO) is used to transmit real-time data and is the main transmission method in CAN open . Since PDO transmission does not require a response and the length of PDO can be less than 8 bytes, the transmission speed is fast.

The configuration process of PDO is as follows:

(1) Invalid PDO : The highest bit of the sub-index 0 x 0 1 of the COB -ID of the PDO (RPDO : 1400h~1403h , TPDO : 1800h~1803h) is changed to 1.

(2) Clear the original mapping: write 0 to the sub-index 0x 00 of the object mapping relationship (RPDO : 1600h~ 1603h , TPDO : 1A00h~ 1A03h).

(3) Write PDO mapping content: write the mapping content to the sub-index 0x 01 ~ 0x 04 of the object mapping relationship (RPDO : 1600h~1603h , T PDO : 1A00h~1A03h) .

(4) Write the number of PDO mapping objects: Write the number of mapping contents entered in the previous step to sub-index 0 x 00.

(5) Enable PDO : Change the highest bit of PDO 's COB -ID to 0.

According to the difference between receiving and sending, PDO can be divided into RPDO and TPD. The final transmission mode and content of PDO are determined by communication parameters and mapping parameters. CAN open communication card uses 4 RPDO and 4 TPDO to realize PDO transmission.

Table 11 PDO parameter list

Name		COB-ID	Communication object	Mapping Objects
RPDO	1	200h+ Node_ID	1400h	1600h
	2	300h+ Node_ID	1401h	1601h
	3	400h+Node_ID	1402h	1602h
	4	500h+Node_ID	1403h	1603h
TPDO	1	180h+Node_ID	1800h	1A00h
	2	280h+Node_ID	1801h	1A01h
	3	380h+ Node_ID	1802h	1A02h
	4	480h+ Node_ID	1803h	1A03h

When the transmission type of PDO is located at the sub-index 0 2 of the communication parameters (RPDO : 1400h~ 1403h , TPDO : 1800h~1803h) , it determines the transmission method of the PDO.

When the communication type value in the transmission type of RPD O is 0~ 240 , as long as a synchronization frame data is received, the latest data of the RPD O will be updated to the inverter.

the communication type value in the transmission type of RPD O is 254 or 255 , the received data will be directly updated to the inverter.

When the transmission type of TPDO is 0, a synchronization frame is received and the TPDO is sent.

When the transmission type of TPDO is 1~240, the TPDO is sent when the

corresponding number of synchronization frames are received.

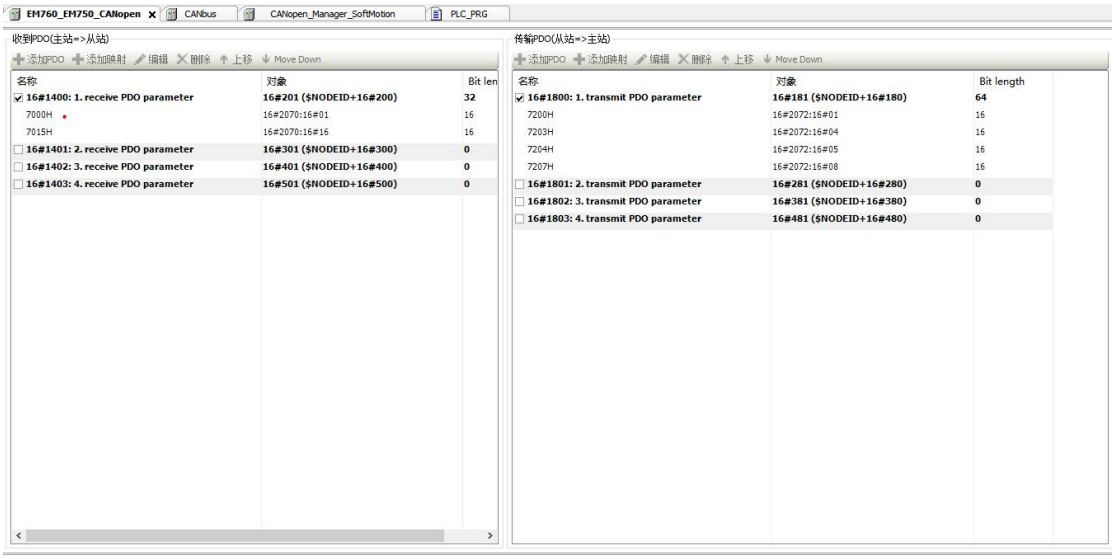
When the transmission type of a TPDO is 255, the TPDO is sent when the event timer arrives.

Operation examples

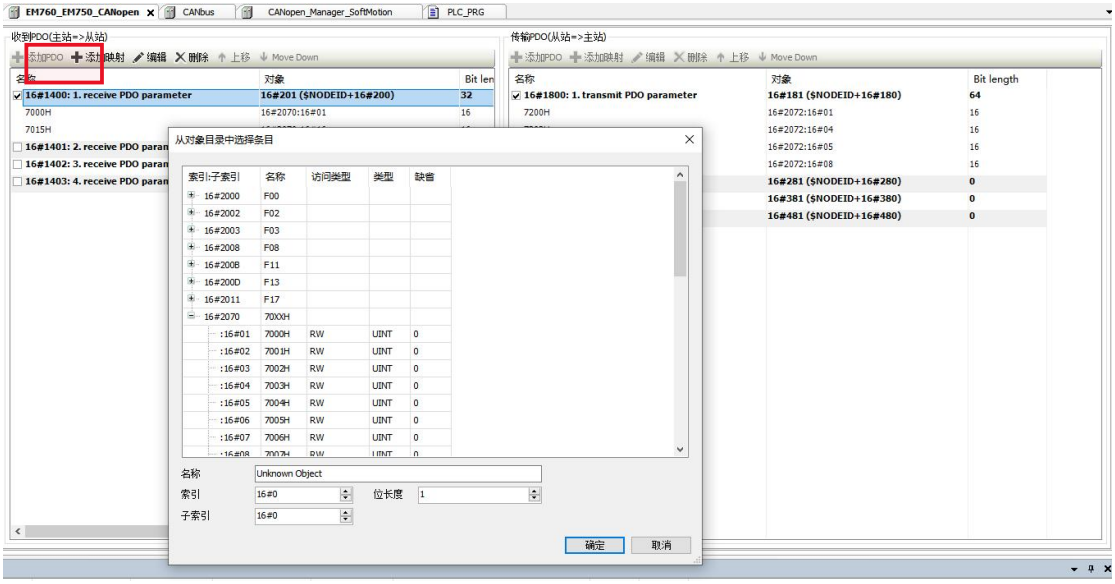
Taking our SMC 300 motion controller as an example, the host computer software uses CODESYS.

1、Master Station Configuration

When using a host computer control that can import EDS, the inverter function code F 10.51 needs to be set to 1. The figure shows the default value of the PDO mapping relationship of the CAN open communication card EDS file

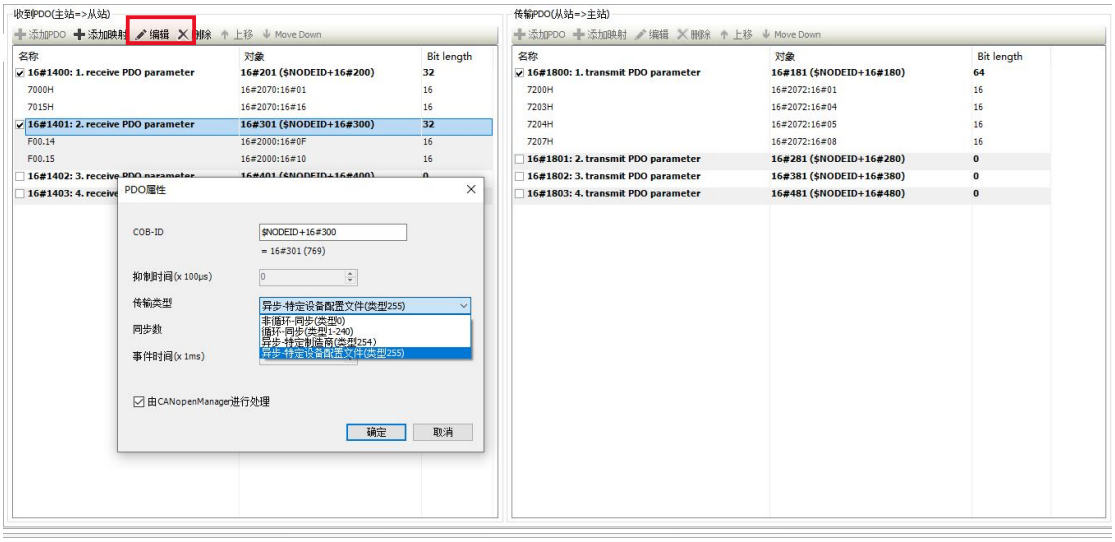


When you need to add PDO mapping, click "Add Mapping" in the pop-up interface to add or modify the mapping according to the time requirements. The function code configured by RPD D should be the modifiable function code at the time. For details, see the function code with the attribute " • " in the EM 760 user manual .

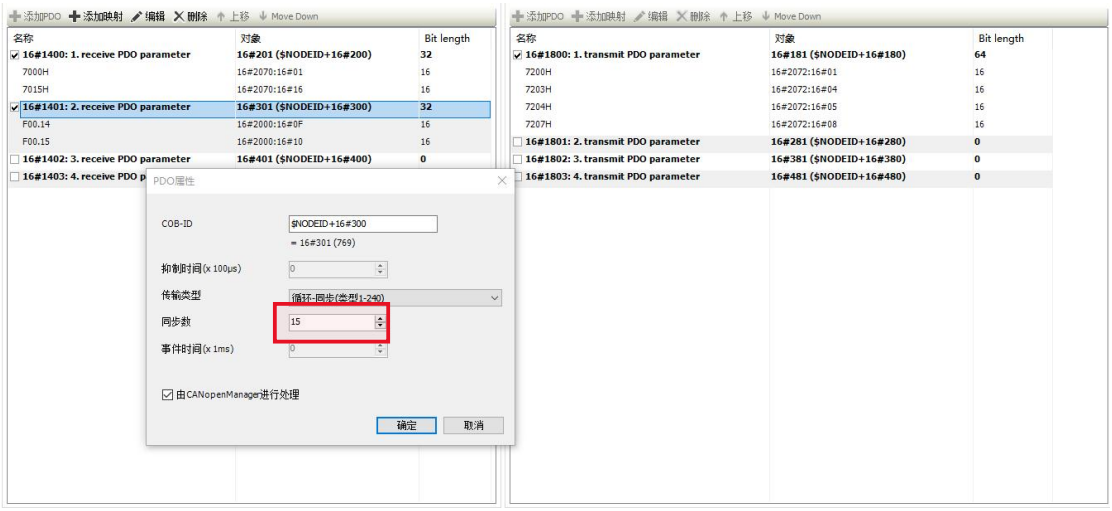


Special note : When using one or more groups of PDO, the first mapping in the first group with valid configuration must be 7000H and 7200H , and modification is prohibited.

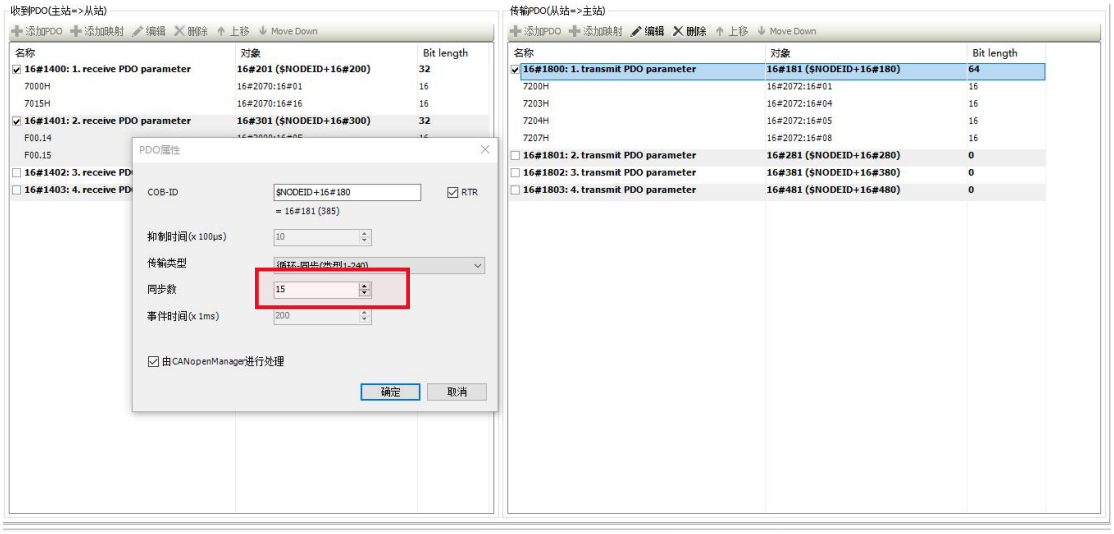
Select the required PDO mapping group and click Edit to configure the PDO properties .



setting the RPDO transmission type to "Cyclic-Synchronous (Type 1-240) ", you need to set the synchronization number, that is, the master station sends RPD O data once after sending n synchronization frame data , and n is the synchronization number.



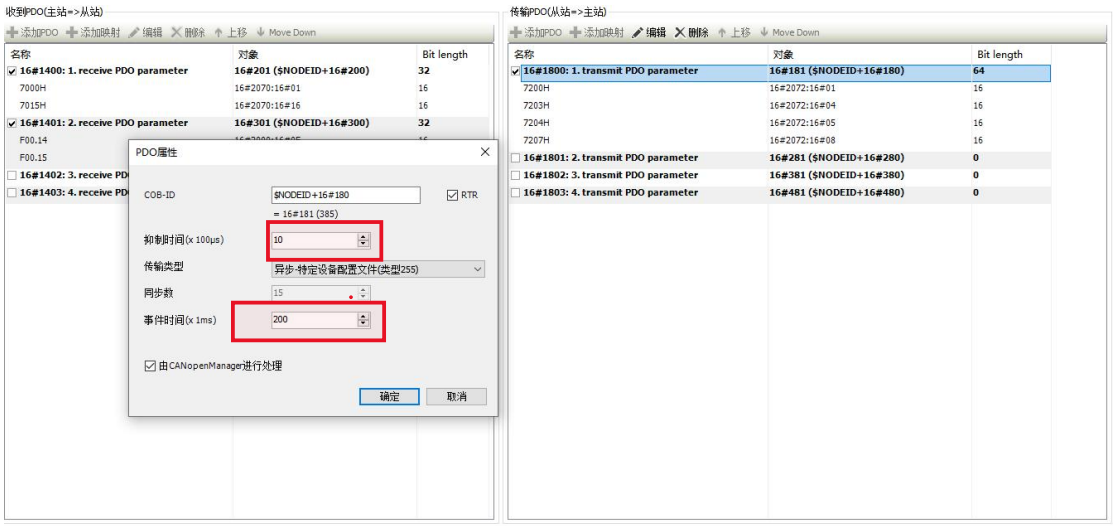
setting the TPDO transmission type to "Cyclic-Synchronous (Type 1-240) ", you also need to set the synchronization number, that is, the slave sends TPDO data once after the master sends the synchronization frame data n times , and n is the synchronization number.



setting the TPDO transmission type to "Asynchronous - Specific Device Profile (Type 255)", you need to set the inhibition time and event time.

the minimum time interval for sending the TPD O data. If it is set to 1 0 , the TPD O data will only be sent once within 1ms.

the time period for sending the TPD O data. If it is set to 2 00 , the TPD O data is sent every 2 00 ms.



2、 Keyboard Configuration

When using a controller that cannot import EDS, you can set the inverter function code F 10.51 to 0 to configure the mapping content of PDO using the keyboard.

function code F 10.17~ F 10.46 is 65535, which is invalid configuration. When using keyboard configuration, write the required function code into F 10.17~F10. 31, F 10.32~F 10.46. For example, when configuring 1A 00h:02 to set the frequency for F 18.0 1, write 0x 1201 (18D = 12H, 01D = 01H) into F 10.32 , which is 460 9. After the configuration is completed, it needs to be manually reset once. After receiving the command to enter the running state, the CAN open slave station automatically synchronizes the data to the object dictionary and then enters the running state.

The configuration needs to be continuous. For example, if you cannot configure to use F 10.17 and F 10.18 , keep F 10.19 as 65535, and then configure to use F 10.20.

The corresponding relationship is shown in the following table:

RPDO		TPD	
Object Dictionary	Function code	Object Dictionary	Function code
1600h:01	Fixed value 7 000 h, no setting required	1A00h:01	Fixed value 72 00 h, no setting required
1600h:02	F10.17	1A00h:02	F10.32
1600h:03	F10.18	1A00h:03	F10.33
1600h:04	F10.19	1A00h:04	F10.34
.....	.....	.....	.....
1603h:01	F10.28	1A03h:01	F10.43
1603h:02	F10.29	1A03h:02	F10.44

1603h:03	F10.30	1A03h:03	F10.45
1603h:04	F10.31	1A03h:04	F10.46

3.6 Synchronization Object (SYNC)

The CAN open communication card is only used as a consumer of synchronous data and is used for synchronous transmission of PDO data.

3.7 Emergency Service Objects (EMCY)

When an error occurs in a CAN open node, the node will send an emergency message according to the standardized mechanism. Other nodes in the CAN network can choose to handle the fault. The CANopen communication card only acts as an emergency message producer and does not process emergency messages from other nodes.

Table 12 Emergency message content specifications

COB -ID	0	1	2	3	4	5	6	7
80h+Node_ID	Error Code		Error register	reserve	Auxiliary Byte			

The error code "0x8100 " is a communication error, and "0xFF00 " is a manufacturer-specified error. The error register is consistent with 1001h , and the auxiliary byte is the inverter fault code.

When the error code is 0x 8100 , the auxiliary byte is shown in the table below, and the highest bit is fixed to 1.

Fault name	Code	illustrate
BUS OF F FAULT	0x01	CAN_H and CAN_L are short-circuited, and the wiring needs to be checked. Or there are high-priority data frames in the network that occupy the bus for a long time, and the current node data fails to be sent multiple times .
PDO configuration failure	0x02	The PDO mapping parameters that cannot be modified during operation .
Invalid keyboard configuration	0x04	F10.51 is set to 0 keyboard configuration, but there is no configuration data in the

		function code
The main station is offline	0x08	When node protection is used, the remote frame data sent by the master station times out
Unsupported PDO transmission type	0x10	The PDO attribute configuration contains an unsupported transport type.

3.8 Other configuration instructions

1. NMT error control: In the general configuration interface, check Enable node protection or Enable heartbeat production. It is recommended to use the heartbeat function.

2. Emergency message: Check Enable emergency message to send a frame of emergency message data when a slave fails.

3. Check at startup: It is recommended to only check the supplier ID , which is used by the PLC to identify the CAModen slave and its corresponding EDS file. In communication cards of version V105 and below, different power inverters connected to the communication card have different EDS files.

appendix Communication command function code

Function code 7000H object dictionary index 0x2070 , sub-index 0x01

Function code 7015H object dictionary index 0x2070 , sub-index 0x16.

Function code 7200H object dictionary index 0x2072 , sub-index 0x01.

Function code 7230H object dictionary index 0x2072 , sub-index 0x31 .

Control Commands (write only) 7000H~71FFH	7000H Control Word	0000H	Invalid instruction
		0001H	Forward operation
		0002H	Reverse operation
		0003H	JOG forward
		0004H	JOG reverse
		0005H	Slow down and stop
		0006H	Quick Stop
		0007H	Free parking
	7001H	Main channel frequency A communication percentage given	-100.00% ~ 100.00% (maximum frequency reference)
	7002H	Auxiliary channel frequency B communication percentage given	-100.00% ~ 100.00% (maximum frequency reference)
	7003H	Torque communication setting	-200.00% ~ 200.00% (digital given basis)
	7004H	Process PID given Communication given	-100.00% ~ 100.00%
	7005H	Process PID feedback communication setting	-100.00% ~ 100.00%
	7006H	VF separation mode voltage setting	0.00% ~ 100.00%
	700FH	Master-slave	-100.00% ~ 100.00% (maximum value

		communication setting		basis)
	7015H	Main channel frequency A communication setting		0.00 ~ Fmax
	7016H	Auxiliary channel frequency B communication setting		0.00 ~ Fmax
	7017H	Upper limit frequency communication setting		0.00 ~ Fmax
	7018H	Torque control upper frequency communication setting		0.00 ~ Fmax
Working status 7200H~73FFH	7200H Status word 1	Bit7~0 Running status	00H	Parameter settings
			01H	Slave operation
			02H	JOG operation
			03H	Self-learning operation
			04H	Slave machine parking
			05H	JOG parking
			06H	Fault Status
			07H	Factory self-inspection
		Bit15~8 Fault Information	00H	The inverter is operating normally
			xxH	Inverter fault status, "xx" is the fault code
	7201H Status word 2	Bit0 Given direction	1	- Given valid
			0	+ Given Valid
		Bit1 Running direction	1	Frequency output inversion
			0	Frequency output forward
		Bit3~2 How it works	00	Speed control method
			01	Torque control method

			10	Servo control method
			11	reserve
	7202H Monitor frequency +/- status word 1 (1: -; 0: +)	bit0		Output frequency
		bit1		Given frequency
		bit2		Synchronous frequency
		bit3		PG card feedback frequency
		bit4		Estimating feedback frequency
		bit5		Estimated slip frequency
		B it6		Load speed
		Bit15 ~6		reserve
	7203H	Output frequency		
	7204H	Output voltage		
	7205H	Output Power		
	7206H	Operating speed		
	7207H	Bus voltage		
	7208H	Output torque		
	7209H	Switch input 1		bit15~bit1 corresponds to X16~X1
	720AH	Switch input 2		bit15~bit8 corresponds to VX8~VX1; bit3~bit0 corresponds to AI4~AI3
	720BH	Switching output 1		bit15~bit0 corresponds to Y14/Y13/ ... /Y3/Y2/Y1/R2/R1
	720CH	Switching output 2		bit15~bit8 corresponds to XY8~VY1
	720DH	The first two failures		
	720EH	The first three failures		
	720FH	The most recent failure		
	7210H	The most recent fault output frequency		
	7211H	The most recent fault output current		
	7212H	The bus voltage at the most recent fault		
	7213H	The most recent fault status		
	7214H	The last fault working time		

	7215H	Set acceleration time		
	7216H	Set deceleration time		
	7217H	Cumulative length		
	7218H	reserve		
	7219H	UP/DOWN offset frequency sign (0/1: +/-)		
	7222H	B it7~0 Running status	00H	Shutdown status
			01H	Forward operation (upward)
			02H	Reverse run (downward)
			03H	JOG forward
			04H	JOG reverse
			05H~0FFH	reserve
		Bit15 ~8 Fault Information	00H	Inverter is normal
			xxH	Inverter fault status, "xx" is the fault code
	7224H	Output Current		
	7225H	Given frequency		
	7226H	Current load capacity	Unit: 0.1t	
	7227H	Current altitude	Unit: 1m	
	7228H	Cumulative power-on time		
	7230H	Warning Signs	0: No warning; Others: Current warning indicator.	