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Preface

Thank you for choosing the EM760-CM-C1 (CANOpen) communication option card developed by Sine Electric.

Document number: 31010264

Release date: 2024.3

Version: 1.0

The EM760-CM-C1 (CANOpen) communication option card independently developed by Sine Electric is an optional accessory for Sine Electric's EM760 series high-performance vector inverter. When users need to perform CANOpen bus communication, they need to select this communication card to Through this option card, the inverter can be connected to the CANOpen bus 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 can be customized by users for transmitting communication process data, that is, real-time Parameters to be set or monitored.
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 CANOpen communication cards with software version V106 and above The supporting EDS file is " EM 760_EM 750_CANOpen.eds "

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 further notice.

For the latest changes and more information, please visit www.sinee.cn or call 400-601-9298 Contact us.

Chapter 1EM 760- CM -C1

Introduction

1.1 Features

1. Support Node Guard Service, the master station can use this function to query the device status.
2. SupportHeartbeatService, the slave station reports the current status to the master station at regular intervals.
3. SupportSDOAccelerate the transfer mode, each transfer 1Function code2Bytes of data.
4. Support4individualRPDO, 4individualTPDO Synchronous and asynchronous transmission modes.
5. Support emergency objects.

1.2 Functional specifications

CANopenCommunication specifications :

content	illustrate
Link layer protocol	CAN bus
Application layer protocols	CANopen protocol
CAN-ID Type	Support 11bit CAN2.0A
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	120Ω
Support Services	NMT Network Management System PDO Process Data Object SDO Service Data Object Heartbeat message SYNC Synchronous message, used for PDO Boot-up message Emergency
SDO transmission method	Fast SDO transmission, can read and write 1, 2, 4 bytes of data

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Support PDO number	4 RPDOs, 4 TPDOs
PDO transmission type	Synchronous trigger, asynchronous event
Support sub-protocols	CiA 301 CANOPEN application layer and communication protocol
Support inverter operation model	1: Speed control mode 2: Torque control mode

CANOpenConnection port:

Signal terminal	definition
CAN_H	Positive signal line
CAN_L	Negative signal line
GND	Signal Ground

Note: Two CANOpenThe signal terminals are completely consistent, making wiring easier for users.

Interface with frequency converter:

project	Specification
Connectors	20PINConnector pin terminal
Transmission method	SCIcommunication
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

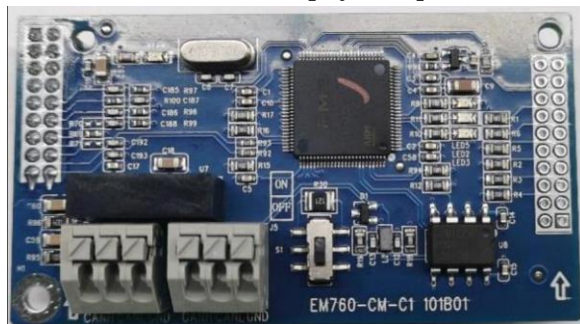
project	Specification
Supply voltage	5VDC (provided by inverter)
Insulation voltage	500VDC
Communication line power consumption	0.8W
Power consumption	1W
weight	25g

Environmental specifications

project	Specification
Anti-interference immunity	ESD(IEC 61800-5-1,IEC 610 0-4-2) EFT(IEC 61800-5-1,IEC 610 0-4-4) Surge Teat(IEC 61800-5-1,IEC 61 00-4-4) Conducted Susceptibility Test(IEC 61800-5-1,IEC 610 0-4-6)
Operating/Storage Environment	Operation: -10°C~40°C, Humidity 90% Storage: -25°C~80°C, humidity95%
Impact/shock resistance	International standards IEC 61800-5-1, IEC 60068-2-6

Chapter 2 Product appearance and installation information

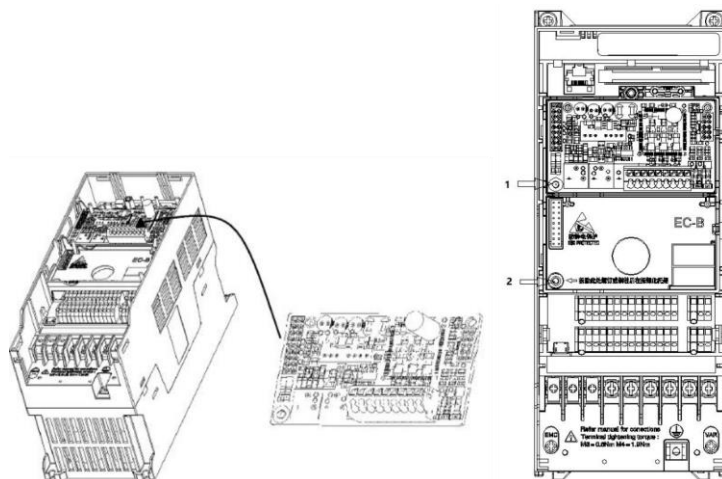
2.1 EM 760- CM -C1 communication card physical picture



picture2.1.1

2.2 EM 760 - CM -C1 communication card and inverter connection

- Close EM 760High performance vector inverter power supply.
- OpenEM760Inverter cover.
- First, remove the screws of the expansion card bracket (positions 1 and 2 in Figure 2.2.1 are both acceptable), use a flat-blade screwdriver to fix the copper pillar included with the card to the original screw hole position, take out the expansion card, align it with the positioning pillar and press it down, then use screws to lock the expansion card and the copper pillar to complete the installation.



picture2.2.1

2.3 EM 760 Series inverter communication parameter setting

Inverter connection CANopen After the communication card is installed, 2.3.1 Set the communication parameters of the inverter. After the number, CANopen Only the master station can start and stop the inverter.

surface 2.3.1

parameter	Parameter name	Parameter Value	meaning
F00.02	Command source selection	2	The operation command is controlled by the communication card
F00.04	Main frequency sourceA choose	7	The frequency command is given directly by the communication card
F00.36	Communication control start and stop channel selection	3	CANopen Communication control start and stop
F00.37	Communication given channel selection	3	CANopen Communication control data given
F10.12	CANopen Expansion card communication address	1~127	
F10.15	Expansion card and bus communication baud rate	0~23	Units: CANopen Card 0: 125K 1: 250K 2: 500K 3: 1M
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 card manual reset	-	0: No operation 1: Communication card reset

Remark:

F10.51 is set to 0, which can be used for the master station that does not need to import EDS files. After the master station and the inverter slave station establish a connection, 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.

2.4 Indicator Lights

Current Status	READY (green) LED5	ERR(red) LED2	RUN (green) LED3
initialization	ON	OFF	OFF
Pre-operation	ON	OFF	Slow flash (500ms)
run	ON	OFF	ON
stop	ON	OFF	Flash (200ms)
CANopenBus failure/ Inverter failure	ON	ON	OFF
MODBUSFault	OFFor flashing		

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 to run, the keyboard stop provides an emergency stop function. Only after the control board software

V112 (F10.24 = 112.00).Stop 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 F00.07 Object dictionary index 0x2000,
sub-index 0x08 . Function code F18.12 Object dictionary
index 0x2012, sub-index 0x0D .

1000hSeries Object Dictionary

Index	Sub- index	Name	Accessability	Can Mapping	Data types	Data category	Factory value
1000h	-	Device Type	RO	NO	Uint32	VAR	0x10192
1001h	-	Error register	RO	NO	Uint8	VAR	0
1003h	-	Predefined error fields	RO	NO	-	ARR	
	1-4h	Error Field	R	NO	Uint32	-	0
1005h	-	Synchronization message COB-ID	RO	NO	Uint32	VAR	0x80
100Ch	-	Guardian Time	R	NO	Uint16	VAR	0
100Dh	-	Life Factor	R	NO	Uint8	VAR	0
1014h	-	Emergency message COB-ID	R	NO	Uint32	VAR	0x80000080+Node_ID
1017h	-	Producer heartbeat time	R	NO	Uint16	VAR	0
1200h	-	SDO Server Parameters	RO	NO	-	REC	
	1h	Client to Server COB-ID	RO	NO	Uint32	-	0x600+Node_ID
	2h	Server to Client server COB-ID	RO	NO	Uint32	-	0x580+Node_ID

1400h	-	RPDO1 Communication parameters	R	NO	-	REC	
	1h	RPDO1 of COB-ID	R	NO	Uint32	-	0x200+Node_ID
	2h	RPDO1 Transmission type	R	NO	Uint8	-	0xFF
1401h	-	RPDO2 Communication parameters	R	NO	-	REC	
	1h	RPDO2 of COB-ID	R	NO	Uint32	-	0x80000300+Node_ID
	2h	RPDO2 Transmission type	R	NO	Uint8	-	0xFF

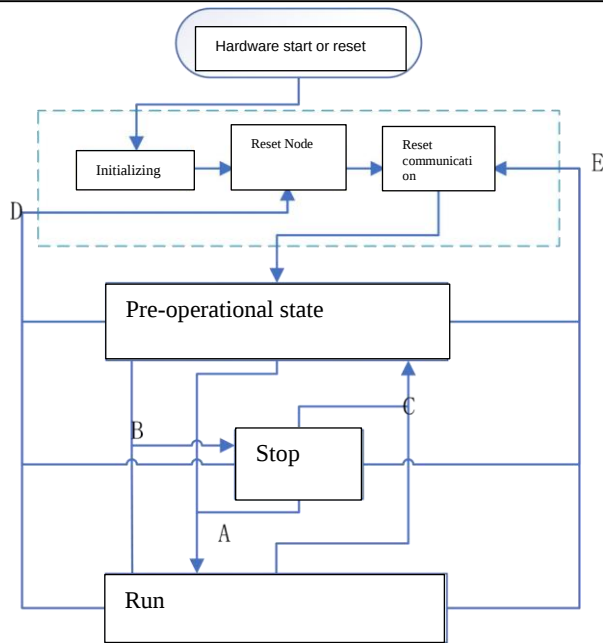
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1402h	-	RPDO3 Communication parameters	R	NO	-	REC	
	1h	RPDO3 of COB-ID	R	NO	Uint32	-	0x80000400+Node_ID
	2h	RPDO3 Transmission type	R	NO	Uint8	-	0xFF
1403h	-	RPDO4 Communication parameters	R	NO	-	REC	
	1h	RPDO4 of COB-ID	R	NO	Uint32	-	0x80000500+Node_ID
	2h	RPDO4 Transmission type	R	NO	Uint8	-	0xFF
1600h	-	RPDO1 Mapping Parameters	R	NO	-	REC	
	1-8h	RPDO1 Mapping Objects	R	NO	Uint32	-	-
1601h	-	RPDO2 Mapping Parameters	R	NO	-	REC	
	1-8h	RPDO2 Mapping Objects	R	NO	Uint32	-	0
1602h	-	RPDO3 Mapping Parameters	R	NO	-	REC	
	1-8h	RPDO3 Mapping Objects	R	NO	Uint32	-	0
1603h	-	RPDO4 Mapping Parameters	R	NO	-	REC	
	1-8h	RPDO4 Mapping Objects	R	NO	Uint32	-	0
1800h	-	TPDO1 Communication parameters	R	NO	-	REC	
	1h	TPDO1 of COB-ID	R	NO	Uint32	-	0x180+Node_ID
	2h	TPDO1 Transmission type	R	NO	Uint8	-	0xFF
	3h	Prohibited time	R	NO	Uint16	-	10
	5h	Event Timer	R	NO	Uint16	-	50
1801h	-	TPDO2 Communication parameters	R	NO	-	REC	
	1h	TPDO2 of COB-ID	R	NO	Uint32	-	0x80000280+Node_ID
	2h	TPDO2 Transmission type	R	NO	Uint8	-	0xFF
	3h	Prohibited time	R	NO	Uint16	-	10

	5h	Event Timer	R	NO	Uint16	-	60
1802h	-	TPDO3 Communication parameters	R	NO	-	REC	
	1h	TPDO3 of COB-ID	R	NO	Uint32	-	0x80000380+Node_ID
	2h	TPDO3 Transmission type	R	NO	Uint8	-	0xFF
	3h	Prohibited time	R	NO	Uint16	-	10
	5h	Event Timer	R	NO	Uint16	-	70
1803h	-	TPDO4 Communication parameters	R	NO	-	REC	
	1h	TPDO4 of COB-ID	R	NO	Uint32	-	0x80000480+Node_ID
	2h	TPDO4 Transmission type	R	NO	Uint8	-	0xFF
	3h	Prohibited time	R	NO	Uint16	-	10
	5h	Event Timer	R	NO	Uint16	-	80
1A00h	-	TPDO1 Mapping Parameters	R	NO	-	REC	
	1-8h	TPDO1 Mapping Objects	R	NO	Uint32	-	-
1A01h	-	TPDO2 Mapping Parameters	R	NO	-	REC	
	1-8h	TPDO2 Mapping Objects	R	NO	Uint32	-	0
1A02h	-	TPDO3 Mapping Parameters	R	NO	-	REC	
	1-8h	TPDO3 Mapping Objects	R	NO	Uint32	-	0
1A03h	-	TPDO4 Mapping Parameters	R	NO	-	REC	
	1-8h	TPDO4 Mapping Objects	R	NO	Uint32	-	0

3.2 NMT State Management

CANopenThe state machine specified in the protocol performs the corresponding work, some of which are automatically converted internally, and some are Must be provided by NMT Host sendsNMTThe message is converted 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.

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

Table 1 NMT message format

The COB-ID of the NMT message is fixed to "0x000". 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 CANopen node address. When it is "0", it is a broadcast message, which is valid for all devices in the network.

Command word	Turn code	illustrate
0x01	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

Table 2 NMT message commands

After the CANopen device starts and completes internal initialization, it will perform parameter initialization configuration of the CAN module, and after completion, it will automatically enter the pre-operation state. 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 CANopen slave station node status. Various NMT Services supported by status

Serve	Pre-operation	run	stop
Process Data Object (PDO)	no	yes	no
Service Data Object (SDO)	yes	yes	no
Synchronization object (SYNC)	yes	yes	no
Emergency message (EMCY)	yes	yes	no
Network Management System (NMT)	yes	yes	yes

Table 3 Services supported in various NMT states

3.3 NMT Error Control

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

Node (lifetime) protection

Node protection is that the NMT host periodically queries the status of the NMT slave through remote frames, while life protection is that the slave indirectly monitors the status of the master through the received remote frame interval. 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 sends a node protection remote frame every 100Ch set time, and the slave must respond, otherwise the slave is considered to be dropped; if the slave does not receive a node protection remote frame within 100Ch*100Dh, the master is considered to be dropped.

The remote frame sent by the NMT master node is shown in the following table.

COB-ID	RTR
0x700+ Node-ID	1

Table 4 Node remote frame message format

COB-ID	RTR	DATA
0x700+ Node-ID	0	BIT7: Must be 0 and 1 Alternate BIT6~BIT0: 4-Stop status 5- Operation status 127-Pre-operation state 74- CANopenFault 75-MODBUS Fault

Table 5 Node protection response message format

Heartbeat

The heartbeat message adopts the producer-consumer model. CANopen devices can send heartbeat messages according to the time period set by the producer heartbeat interval object dictionary 1017h, in ms. The node with consumer heartbeat function in the network monitors the producer according to the consumer time set by 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 time interval 1017h, the node heartbeat function is activated and heartbeat messages begin to be generated. Only one of the node (life) protection and heartbeat message can be enabled.

The slave sends a heartbeat message every 1017h to monitor the slave's host (or other slaves). If the heartbeat message is not received within the consumer time, the slave is considered to have dropped. $1017h \times 1.8 \leq$ the consumer time of the host (or other slaves) that monitors the slave, otherwise it is easy to falsely report the slave's drop.

The heartbeat message format 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.

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

Table 6 Heartbeat message format

3.4 Service Data Object (SDO)

Service Data Objects (SDO) are linked to the object dictionary through indexes and sub-indexes. SDO can read the data contents of the object dictionary, or modify the object data 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 F00.07 Object dictionary index 0x2000, sub-index 0x08. Function code F18.12 Object dictionary index 0x2012, sub-index 0x0D.

To set F00.07 For example, the digital given frequency is given to the object dictionary 0x2000, sub-index 0x08 Write data in 5000. You can set F00.07 for 50.00hz.

When setting the function code F02.32 When selecting analog input curve, if you want to set AI1 Select curve 4, you need to set F02.32 The units digit of the value is set to 3. You cannot directly add the object dictionary at this time 0x2002, sub-index 0x21 Write data in 3. The data should be read out first 3210, then 3213 Write. That is, use SDO When writing data to the inverter, only one The whole two bytes of data are read and written. It is recommended to use EM760 directly The matching LCD keyboard modifies this type of function code.

SDO The transmission is divided into no more than 4 Bytes and above 4 Bytes of object data to be transferred. No more than 4 Bytes Use acceleration SDO Transmission mode, higher than 4 Bytes are transmitted in segments or blocks. Communication expansion card only Support acceleration SDO Transmission. SDO Transmission message by COB - ID The data segment uses the little-endian mode, that is, the low The first bit is in front, and the high bit is in the back. All SDO The message data segment must be 8 Bytes. SDO transmission message format As shown in the following table:

COB-ID	DATA							
580h+Node_ID	0	1	2	3	4	5	6	7
/ 600h+ Node_ID	Comm and	index		Sub- ind	data			

	Gen erati on code		ex	
--	----------------------------	--	----	--

Table 7 SDO transmission message format description

		COB-ID	0	1	2	3	4	5	6	7
Client →		600h+Node_ID	23h	index	Sub-ind ex	data				
			27h			data			-	
			2B			data		-		-
			2F			data	-	-	-	-
← Serv er	normal	580h+Node_ID	60h	index	Sub-ind ex	-	-	-	-	-
	abnorm al		80h			Abort Code				

Table 7 Accelerated SDO write message description

“-” indicates that there is data but it will not be considered. It is recommended to write 0 when writing data, the same below.

		COB-ID	0	1	2	3	4	5	6	7
Client →		600h+Node_ID	40h	index		Sub-index	-	-	-	-
← Server	normal	580h+Node_ID	43h	index	Sub-index	data				
			47h			data			-	
			4B			data		-	-	
			4F			data	-	-	-	
	abnor mal	80h	index	Sub-index	Abort Code					

Table 8 Accelerated SDO Read Message Description

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

	exist	
0x06090032	Data range does not match match	SDOThe data frame command bits do not match the size of the object dictionary being written.
0x06010002	An attempt was made to write a read-only elephant	06H Parameters are read only. PDOConfiguration parameters cannot be modified while the configuration is valid.
0x02030405	No such service	COBIDOnly the highest bit can be modified. SDOThe 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 9 SDO abort codes

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 from the slave (inverter) is not a permitted address ; in particular, The combination of register start address and transfer length is invalid
03H	Illegal data frame	The length of the data received from the slave (inverter) orCRC Checksum is incorrect
04H	Slave device failure	An unrecoverable error occurred when the slave (inverter) attempted to perform the requested operation . The reason may be a logical error or a writeEEPROMFailure, etc.
05H	Data out of range	The data received by the slave (inverter) exceeds the minimum to maximum value of the corresponding register scope
06H	Parameters read only	The current register is read-only and cannot be written.
07H	Parameters are not available during operation change	The inverter is in operation and the current register cannot be written . Please stop the machine.
08H	Parameters are password protected	The current register is password protected

Table 10 SDO exception code description

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 CANopen. 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 COB-ID of PDO [(RPDO: 1400h~1403h, TPDO: 1800h~1803h) sub-index 0x01] is changed to 1.

(2) Clear the original mapping: Write 0 to the sub-index 0x00 of the object mapping relationship (RPDO: 1600h~1603h, TPDO: 1A00h~1A03h).

(3) Write the PDO mapping content: Write the mapping content to the sub-index 0x01~0x04 of the object mapping relationship (RPDO: 1600h~1603h, TPDO: 1A00h~1A03h).

(4) Write the number of PDO mapping objects: Write the number of mapping contents entered in the previous step to the sub-index 0x00.

(5) Enable PDO: Change the highest bit of the PDO 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. CANopen communication card uses 4 RPDO and 4 TPDO to realize PDO transmission.

name		COB-ID	Communicati on 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

Table 11 PDO parameter list

When the transmission type of PDO is located at the sub-index 02 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 RPDO is 0~240, the latest data of the RPDO is updated to the inverter as long as a synchronization frame data is received.

When the communication type value in the transmission type of RPDO is 254 or 255, the received data is 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 TPDO is 255, the TPDO is sent when the event timer arrives.

Operation example

Take our SMC300 motion controller as an example, the host computer software uses CODESYS.

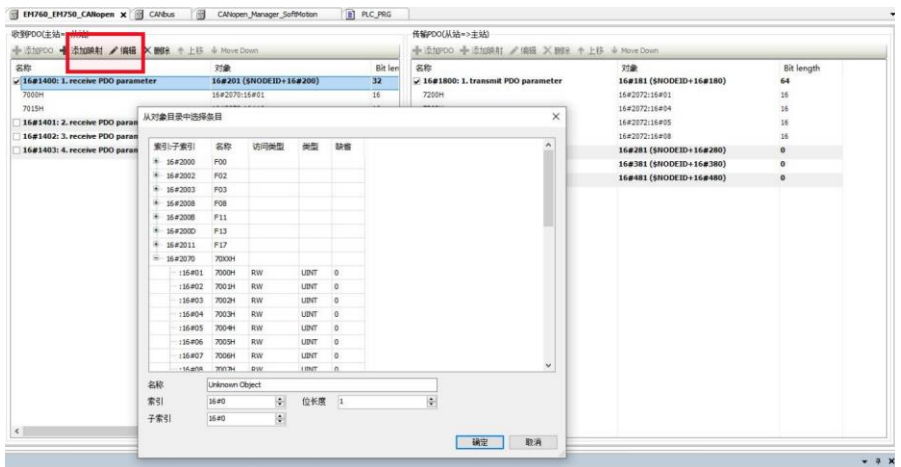
1.Master station configuration

When using a host computer control that can import EDS, the inverter function code F10.51 needs to be set to 1. The figure shows the default value of the PDO mapping relationship of the CANopen communication card EDS file.

Receive PDO (Slave to Master)			
名称	对象	符号名	Bit len
☒ 16#1400: 1. receive PDO parameter	16#201 (\$NODEID+16#200)		32
7020H	16#2070:16#01		16
7020H	16#2070:16#02		16
☐ 16#1401: 2. receive PDO parameter	16#301 (\$NODEID+16#300)		0
☐ 16#1402: 3. receive PDO parameter	16#401 (\$NODEID+16#400)		0
☐ 16#1403: 4. receive PDO parameter	16#501 (\$NODEID+16#500)		0

Transmit PDO (Master to Slave)			
名称	对象	符号名	Bit length
☒ 16#1800: 1. transmit PDO parameter	16#181 (\$NODEID+16#180)		64
7202H	16#2072:16#01		16
7202H	16#2072:16#02		16
7202H	16#2072:16#03		16
☐ 16#1801: 2. transmit PDO parameter	16#281 (\$NODEID+16#280)		0
☐ 16#1802: 3. transmit PDO parameter	16#381 (\$NODEID+16#380)		0
☐ 16#1803: 4. transmit PDO parameter	16#481 (\$NODEID+16#480)		0

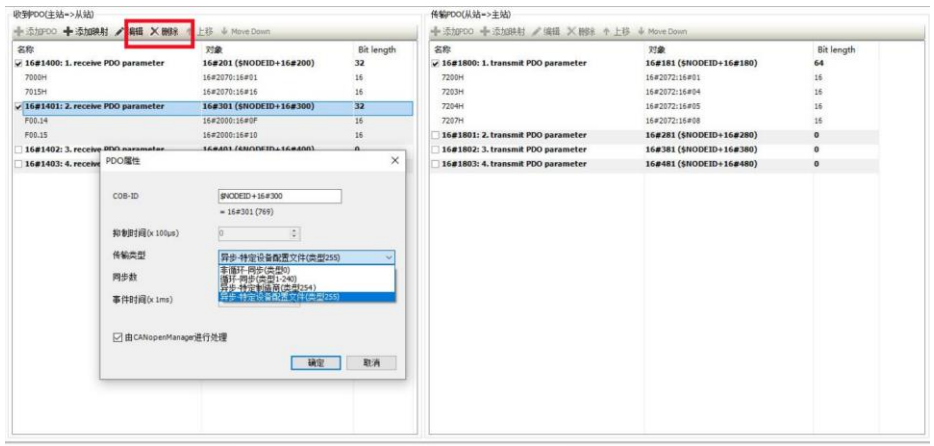
When you need to add PDO mapping, click "Add Mapping" and add or modify the mapping in the pop-up interface according to the time requirement. The function code configured by RPDD should be the modifiable function code at that time. For details, see the function code with the attribute "●" in the EM760 User Manual.



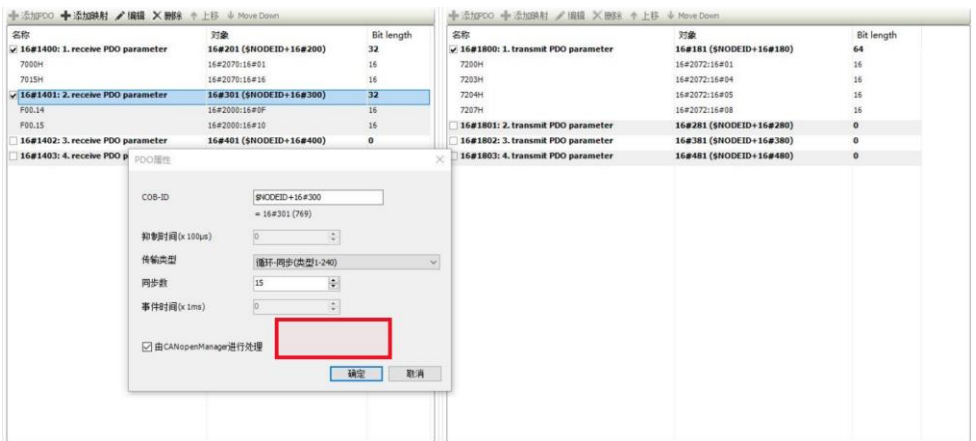
Special note:

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.

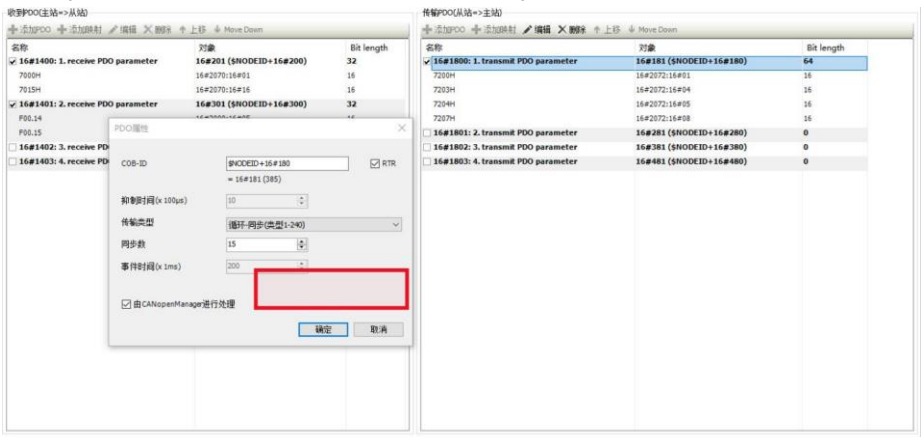
Select the required PDO mapping group and click Edit to configure the PDO properties.



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



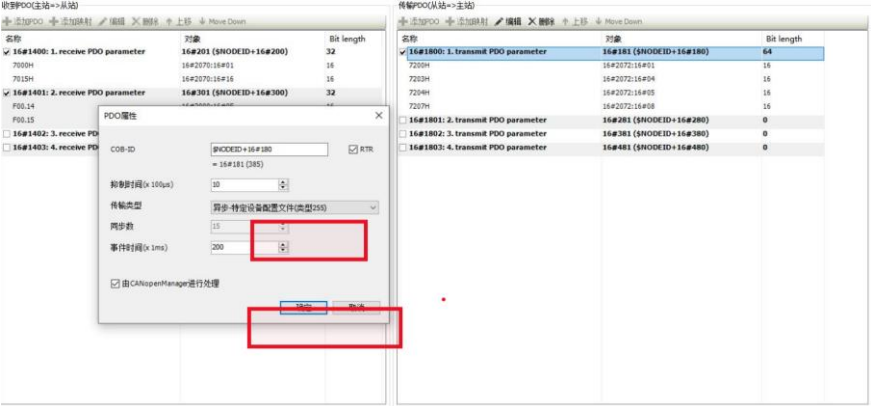
When setting the TPDO transmission type to "Cyclic-Synchronous (Type 1-240)", you also need to set the synchronization number, that is, the slave sends TPDO data once after the master sends synchronization frame data n times, and n is the synchronization number.



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

The inhibition time is the minimum time interval for sending the TPDO data. If it is set to 10, the TPDO data will only be sent once within 1ms.

The event time is the time period for sending the TPDO data. If it is set to 200, the TPDO data will be sent every 200ms.



2. Keyboard configuration

When using a controller that cannot import EDS, you can set the inverter function code F10.51 to 0 to configure the mapping content of PDO by keyboard.

The default value of function code F10.17~F10.46 is 65535, which is an invalid configuration. When using keyboard configuration, write the required function code into F10.17~F10.31, F10.32~F10.46. For example, when configuring 1A00h:02 as the frequency setting of F18.01, write 0x1201 (18D=12H, 01D=01H) or 4609 into F10.32. After the configuration is completed, it needs to be manually reset once. After receiving the command to enter the running state, the CANopen slave station automatically synchronizes the data to the object dictionary and then enters the running state.

Continuous configuration is required during configuration. If F10.17 and F10.18 cannot be configured, F10.19 is reserved as 65535, and then F10.20 is configured.

The corresponding relationship is shown in the following table:

RPDO		TPDO	
Object Dictionary	Function code	Object Dictionary	Function code
1600h:01	Fixed value 7000h, no need set up	1A00h:01	Fixed value 7200h, no need set up
1600h:02	f/10.17	1A00h:02	f/10.32
1600h:03	f/10.18	1A00h:03	f/10.33
1600h:04	f/10.19	1A00h:04	f/10.34
.....			
1603h:01	f/10.28	1A03h:01	f/10.43
1603h:02	f/10.29	1A03h:02	f/10.44
1603h:03	f/10.30	1A03h:03	f/10.45

1603h:04	f/10.31	1A03h:04	f/10.46
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3.6 Synchronization object (SYNC)

CANopenThe communication card is only a consumer of synchronization data and is used to PDO Synchronous transmission of data.

3.7 Emergency Service Objects (EMCY)

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

surface 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	

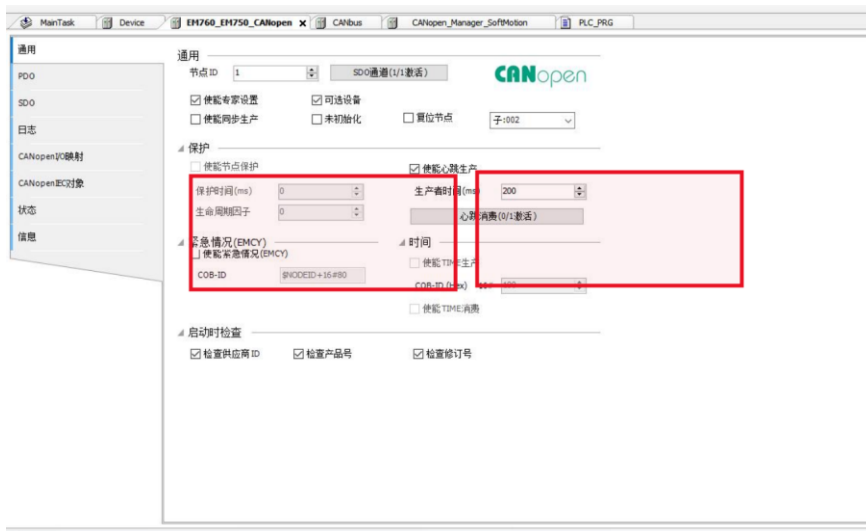
Error code "0x8100" is a communication error, "0xFF00" is a manufacturer-specified error. The error register is 1001hSave The auxiliary byte is the inverter fault code.

When the error code is 0x8100The auxiliary bytes are shown in the table below. The highest bit is fixed at 1 .

Fault name	Code	illustrate
BUSOFFFault	0x01	CAN_H and CAN_L Short circuit, need to check the wiring. Or the network There are high-priority data frames occupying the bus for a long time. The previous node data failed to be sent multiple times.
PDOConfiguration Failure	0x02	PDO There are parameters in the mapping parameters that cannot be modified during operation.
Invalid keyboard configuration	0x04	f/10.51Set the question0Keyboard configuration, but no configuration in the function code Set data
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	PDOUnsupported transport type in property configuration

3.8 Other configuration instructions

1. NMTError 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 , used for PLC Identification CANopenSlave stations and their corresponding EDS file.V105For communication cards of version 1 and below, there are different requirements for connecting inverters of different powers to communication cards.EDSdocument.

▲ 启动时检查

☒ 检查供应商ID

☐ 检查产品号

☐ 检查修订号

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~71F FH	7000H Control Word	0000H	Invalid instruction	
		0001H	Forward operation	
		0002H	Reverse operation	
		0003H	JOGForward	
		0004H	JOGReversal	
		0005H	Slow down and stop	
		0006H	Quick Stop	
		0007H	Free parking	
	7001H	Main channel frequency ACommunication Percentage Than given	-100.00%~100.00% (Maximum frequency base allow)	
	7002H	Auxiliary channel frequencyB Communication Percentage Than given	-100.00%~100.00% (Maximum frequency base allow)	
	7003H	Torque communication setting	-200.00%~200.00% (Digital given base allow)	
	7004H	processPIDGiven communication given	-100.00%~100.00%	
	7005H	processPIDFeedback communication setting	-100.00%~100.00%	

	7006H	VF Separation mode voltage setting		0.00%~100.00%
	700FH	Master-slave communication setting		-100.00%~100.00% (maximum value allow)
	7015H	Main channel frequencyA Communication given		0.00~Fmax
	7016H	Auxiliary channel frequencyB Communication given		0.00~Fmax
	7017H	Upper limit frequency communication setting		0.00~Fmax
	7018H	Upper frequency limit of torque control Communication given		0.00~Fmax
Working status 7200H~73F F	7200H Status word 1	Bit7~0 Running status	00H	Parameter settings
			01H	Slave operation

H			02H	JOGrun
			03H	Self-learning operation
			04H	Slave machine parking
			05H	JOGparking
			06H	Fault Status
			07H	Factory self-inspection
		Bit15~8 Fault Informati on	00H	The inverter is operating normally
			xxH	Inverter fault status, "xx" is the fault code
	7201H Status word2	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 Monitoring frequency +/- Status word 1 (1:~;0:~+)	bit0	Output frequency	
		bit1	Given frequency	
		bit2	Synchronous frequency	
		bit3	PGCard feedback frequency	
		bit4	Estimating feedback frequency	
		bit5	Estimated slip frequency	
		Bit6	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	bit15~bit1 correspondX16~X1	
		1		
	720AH	Switch input 2	bit 15 to bit 8 correspondVX 8~ VX 1; bit 3~ bit 0correspond AI4~AI3	
	720BH	Switching output 1	bit15~bit0 Should Y 14/Y13/ ... /Y3/Y2/Y1/R2/R1	
	720CH	Switching output 2	bit15~bit8 correspondXY8~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/DOWNOffset frequency sign (0/1: +/-)		
	7222H	Bit7~0 Running status	00H	Shutdown status
			01H	Forward operation (upward)
			02H	Reverse run (downward)
			03H	JOGForward
			04H	JOGReversal
			05H~0F FH	reserve
		Bit15~8 Fault Informati	00H	Inverter is normal
			xxH	Inverter fault status, "xx" is a fault Code

		on		
	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.
