CMM-DN01/CMM-DN02 DeviceNet

CMM-DN01/02 DeviceNet Slave Station Communication Module Operation Manual

Applicable Products:
CMM-DN01 / CMM-DN02 (MS300 / MH300 Option Cards)

Application	Drive Firmware Version: MS300 V1.07 / MH300 V1.02 or later CMM-DN02 Communication Card Firmware Version: V1.01 or later

http://www.deltaww.com/

DELTA_IA-MDS_VFD-M300 Series_CMM-DN02_OM_EN_20230616

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Caution

- This operation manual provides information on specifications, installation instructions, basic operations/configurations, and details on network communication protocols.

- This model uses the OPEN TYPE case. So, you must install it in a dustproof, moisture-proof, and shockproof enclosure when using this motor drive. This enclosure must be protected by special tools or keys to prevent non-maintenance personnel from operating or accidental impact on the unit, which may cause danger and damage. Do not touch any terminals while powering up.

- Read this manual carefully and follow the instructions completely to avoid device damage or personal injury.

Table of Contents

Issued Edition: 00
Issued Date: June 2023

1

Chapter 1 Introduction to CMM-DN01/CMM-DN02

1.1 Product Features
1.2 Functions

- Thank you for using Delta CMM-DN01/CMM-DN02 network communication module. In order to make sure that you can install and operate properly this product, read this user manual carefully before starting to use this module.
- CMM-DN01/CMM-DN02 is a DeviceNet network communication module, which can be controlled remotely to set up communication functions via the DeviceNet bus.
- CMM-DN01/CMM-DN02 communication cards are used to connect Delta VFD-MS300/VFD-MH300 series AC motor drives to the DeviceNet networks.
- The CMM-DN01/CMM-DN02 communication card will be described in detail below.

1.1. Product Features

Based on the high-speed communication interface of Delta's HSSP protocol, the AC motor drive can be controlled in real-time.

- Supports Group 2 only connection and polling I/O data exchange.
- For I/O mapping, supports a maximum of 32 words input and 32 words output.
- Supports EDS file configuration in DeviceNet configuration software.
- Supports all baud rates on DeviceNet bus: 125 kbps, 250 kbps, 500 kbps and extendable baud rate mode.
- Node address and baud rate can be set in the AC motor drive.
- Power is supplied from the AC motor drive.

1.2. Specifications

- **DeviceNet Connector**

Item	Specification
Interface	5-PIN open pluggable connector. PIN interval: 5.08mm
Communication Mode	CAN
Transmission cable	Shielded twisted-pair cable (with 2 power cables)
Transmission Speed	125 kbps, 250 kbps, 500 kbps and extendable baud rate mode
Communication Protocol	DeviceNet protocol

- **AC Motor Drive Connection Port**

Item	Specification
Interface	24 PIN communication terminal
Communication Mode	SPI communication
Terminal function	1. Communication module communicates with the AC motor drive through this port. 2. The AC motor drive supplies power to communication module through this port.
Communication Protocol	Delta HSSP protocol

- **Environment Conditions**

Item	Specification
Noise immunity	ESD (IEC 61800-5-1, IEC 6100-4-2) EFT (IEC 61800-5-1,IEC 6100-4-4) Surge Teat (IEC 61800-5-1,IEC 6100-4-5) Conducted Susceptibility Test (IEC 61800-5-1, IEC 6100-4-6)
Operation / storage	Operation: -10–50°C (temperature), 90% (humidity) Storage: -25–70°C (temperature), 95% (humidity)
Shock / vibration resistance	International Standard Specification IEC 61800-5-1, IEC 60068-2-6 / IEC 61800-5-1, IEC 60068-2-27

- **Electrical Specifications**

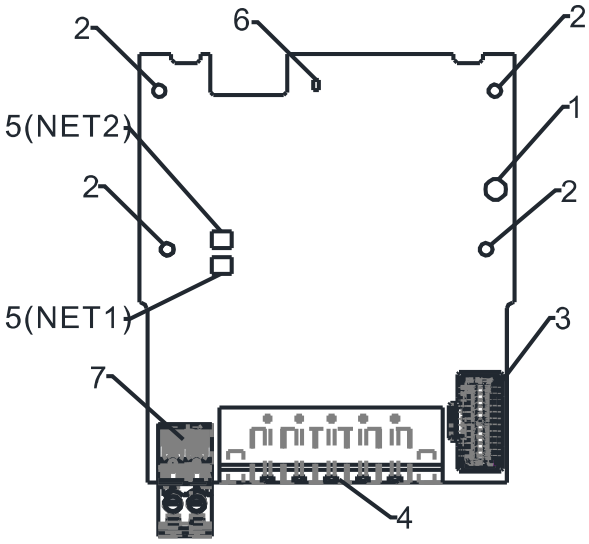
Item	Specification
Power Voltage	$5V_{DC}$ (Supplied by the AC motor drive)
Insulation Voltage	$500V_{AC}$
Communication cable power consumption	0.85W
Power consumption	1W
Weight	23g

2

Chapter 2 Components of CMM-DN01/CMM-DN02

2.1 Components Overview
2.2 DeviceNet Connection Ports

2.1 Components Overview



Fig,2.1.1 Front View

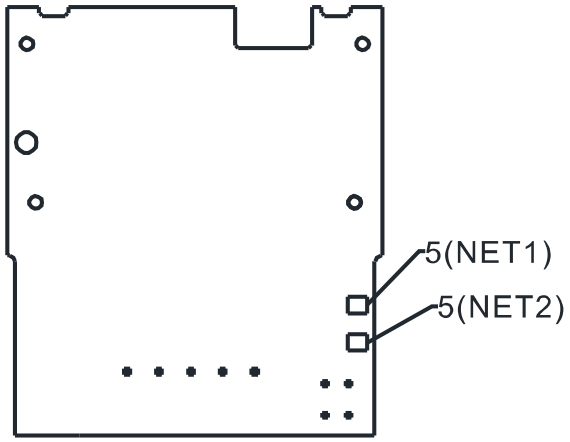


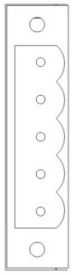
Fig.2.1.2 Rear View

1	Screw fixing hole	2	Positioning hole	3	AC motor drive connection port
4	Communication Port	5	LED Indicator NET1 (MS), NET2 (NS)	6	POWER indicator
7	Ground terminal block				

2.2 DeviceNet Connector

Use this port to connect to the DeviceNet network. The table below show its PIN definitions:

PIN	Signal	Color	Description
1	V+	Red	DC24V
2	H	White	Positive signal
3	S	-	Ground
4	L	Blue	Negative signal
5	V-	Black	0V

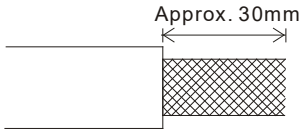
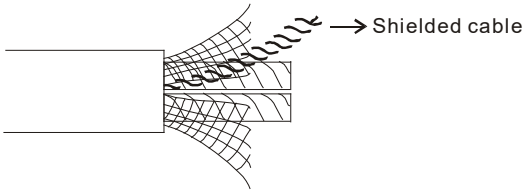
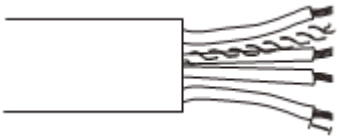
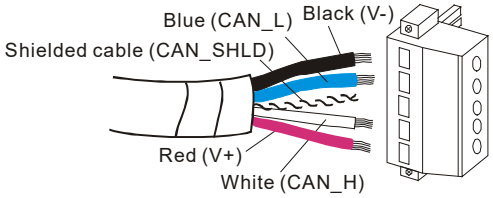
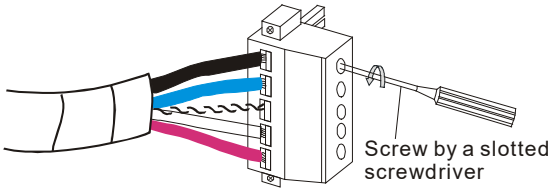


Chapter 3 Basic Operation

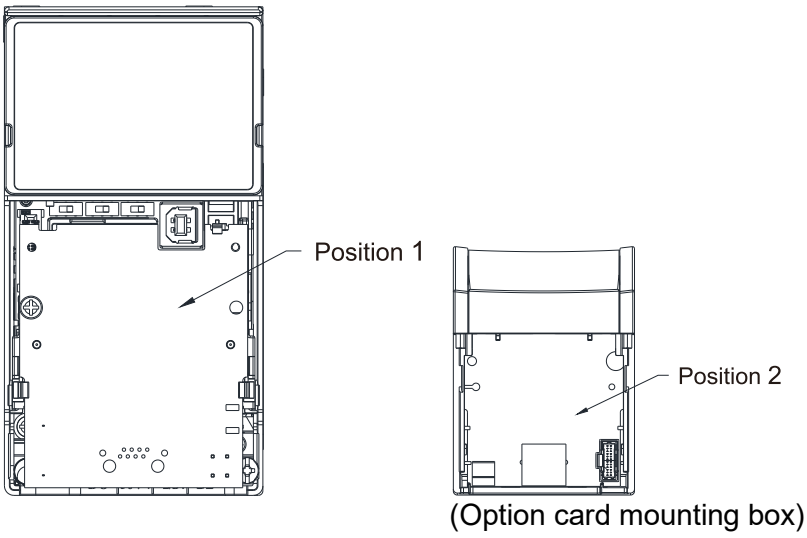
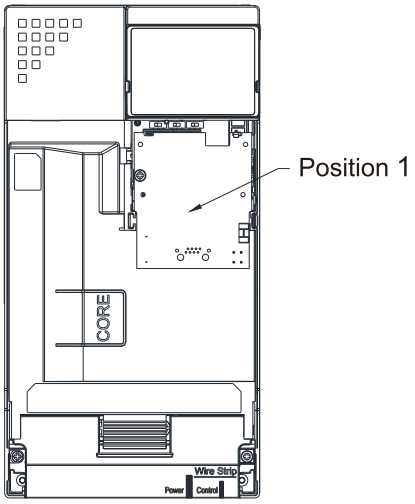
3.1 Installation and Wiring

3.1 Installation and Wiring

Wiring Cables

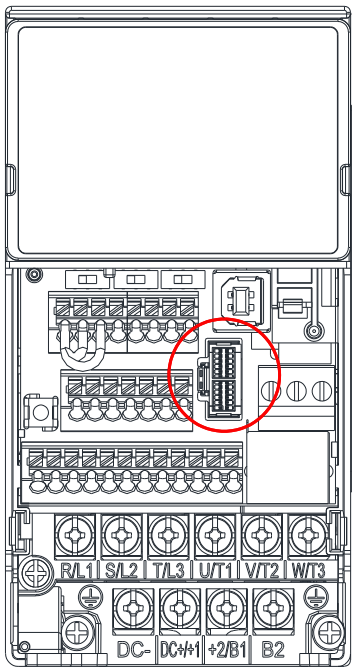
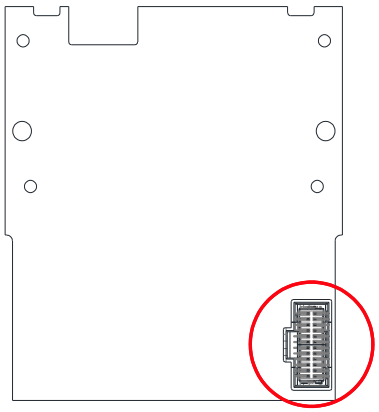
	Description	Figure
①	Use a professional tool to strip the communication cable by about 30mm, and make sure not to damage the shielded wire during the stripping process.	
②	Peel off the outer metal shield mask and aluminum foil and you will see 2 power lines (red and black), 2 signal lines (blue and white), and 1 shielded line	
③	Remove the outer layer of metal shield and aluminum foil, then peel off the plastic skin of the power cable and the signal cable to an appropriate length.	
④	Insert the stripped communication cable in the correct order into the wiring holes of the communication connector as shown in the figure on the right.	
⑤	Use a standard slotted/flat head screwdriver to tighten the communication connector screws and secure the communication cable in the wiring holes of the communication connector.	

Mounting Position of Option Card

Frame A–D Mounting position 1, 2 (Option card mounting box)	Frame E and F Mounting position 1
 Figure 3-1	 Figure 3-2

Note: Frame E and F does not support a second option card installation, so there is no mounting position 2.

The Wiring of Option Cards

MS300 control board connector	Option card connector
 Figure 3-3	 Figure 3-4 Attention: Do NOT misuse the cables for the communication cards and the cables for the power card. You must read the descriptions on the cables before wiring.

- Communication Card Cables

To correctly use the communication cards, you must purchase the communication card along with the connection cables. Check your communication card models first. Then, select your applicable connection cables according to the mounting positions by different frames. Two cable length are available for your choice. See the table below to select your applicable communication card cables.

Applicable for MS300:

Communication Cards	CMM-DN02; CMM-EIP02; CMM-EIP03; CMM-PD02; CMM-COP02		CMM-EC02	
Frame	Mounting Position 1	Mounting Position 2	Mounting Position 1	Mounting Position 2
	Cable Model#	Cable Model#	Cable Model#	Cable Model#
A	CBM-CL01A	CBM-CC01A	CBM-CL01A	CBM-CL01A
B		CBM-CC02A		CBM-CL02A
C	CBM-CL02A		CBM-CL02A	
D				
E		N/A		N/A
F				

Table 3-1

Applicable for MH300

Communication Cards	CMM-DN02; CMM-EIP02; CMM-EIP03 CMM-PD02, CMM-COP02		CMM-EC02	
Frame	Mounting Position 1	Mounting Position 2	Mounting Position 1	Mounting Position 2
	Cable Model#	Cable Model#	Cable Model#	Cable Model#
A	CBM-CL01A	CBM-CC01A	CBM-CL01A	CBM-CL01A
B		CBM-CC02A		CBM-CL02A
C	CBM-CL02A		CBM-CL02A	
D				
E		CBM-CL02A		
F				
G				
H				
I				

Table3-2

An option card mounting box is included upon purchasing the communication card CMM-EC02, you need to purchase it with CBM-CL01A or CBM-CL02A

Model:
CBM-CL01A
CBM-CC01A

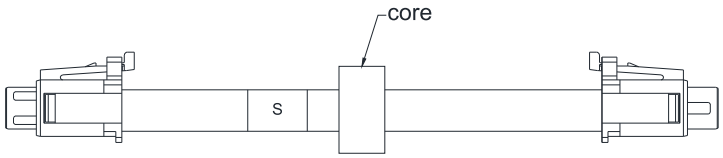


Figure 3-5

Model:
CBM-CL02A
CBM-CC02A

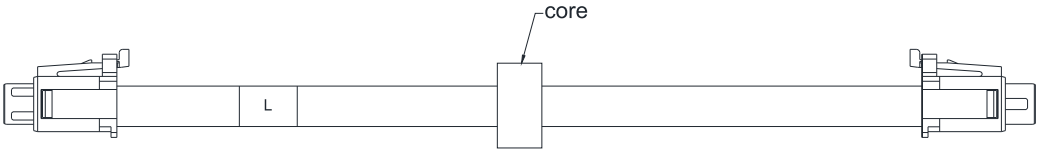


Figure 3-6

● Power Card Cables

An option card mounting box and cables with two different length are included when you purchase the power card EMM-BPS02 (DC 24 V backup power supply card), so you do not need to purchase it with the connection cables. "**BPS use only**" and "# S" or "# L" are marked on the EMM-BPS02 power card cable. See the table below to select your applicable power card cables according to different mounting positions.

Applicable for MS300:

Power Card	EMM-BPS02	
Frame	Mounting Position 1	Mounting Position 2
	Cable Model#	Cable Model#
A	# S	# S
B		# L
C	# L	
D		
E		N/A
F		

Table 3-3

Applicable for MH300:

Power Card	EMM-BPS02	
Frame	Mounting Position 1	Mounting Position 2
	Cable Model#	Cable Model#
A	Expansion Card	# S
B		# L
C		
D		
E		
F		
G		
H		
I		

Table 3-4

S

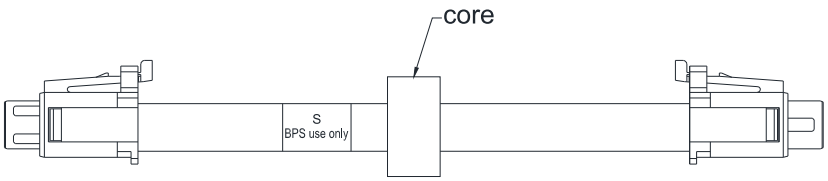


Figure 3-7

L

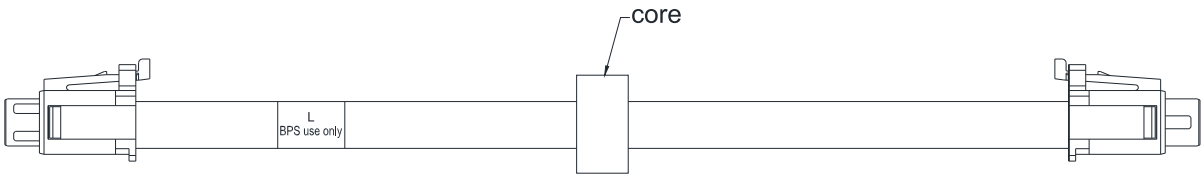


Figure 3-8

Mounting Position of Option Card 1

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

1. Turn off the power of the motor drive, and then remove the front cover, as shown in Figure 3-8.
2. Assemble the connection cable: Connect the connector at one end of the connection cable to the control board connector. Refer to Page 3-3 **The Wiring of Option Cards** for more information on connection methods.
3. Assemble the supported frame of the option card: Aim the two clips at the two slots on the motor drive, and then press downward to have the two clips engage the slots, as shown in Figure 3-9.
4. Assemble the connection cable: Connect the connector at the other end of the connection cable to the connector of the option card.
5. Assemble the option card: Have the terminal block and connector of the option card face downward, aim the two holes of the option card to the position column and press downward so that the three clips engage the option card, as shown in Figure 3-10.
6. Make sure that three clips properly engage the option card and then tighten the screws (suggested torque value: 4–6 kg-cm [3.5–5.2 lb-in.] [0.39–0.59 Nm]), as shown in Figure 3-11.
7. Assembly is completed, as shown in Figure 3-12.

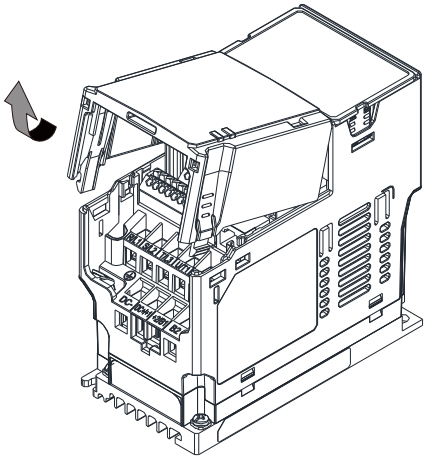


Figure 3-8

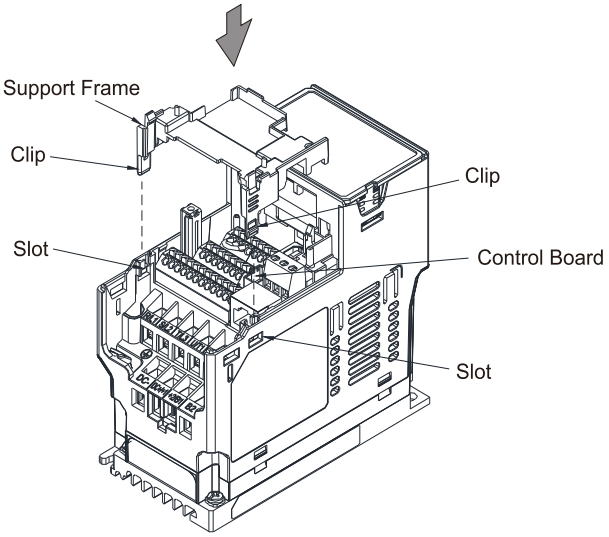


Figure 3-9

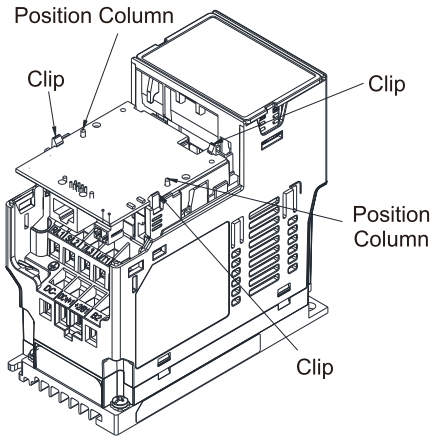


Figure 3-10

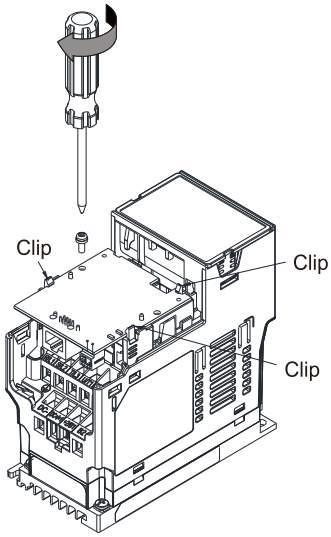


Figure 3-11

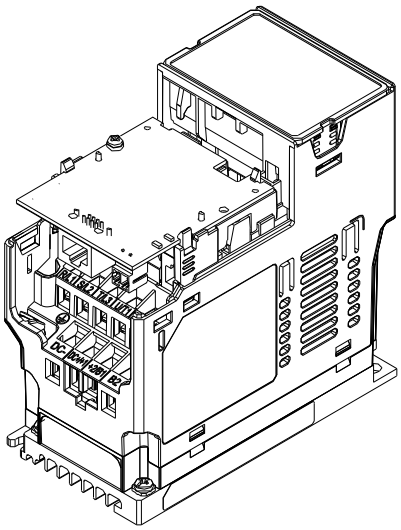


Figure 3-12

Option Card Mounting Position 2 (Frame A–D)

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

1. Turn off the power of the motor drive, and then remove the front cover, as shown in Figure 3-13.
2. Assemble the option card: Detach the upper cover of the mounting box for the option card by slipping and make the terminal block and connector of the option card face upward. Fix the front end of the option card to the slots, and then rotate it, as shown in the Figure 3-14.
3. Make sure that two clips properly engage the option card on the backside, and then tighten the screws (suggested torque value: 4–6 kg-cm [3.5–5.2 lb-in.] [0.39–0.59 Nm]), as shown in Figure 3-15.
4. Assemble the connection cable: Connect the connector at one end of the connection cable to the control board connector. Refer to Page 3-3 **The Wiring of Option Cards** for more information on connection methods.
5. Attach the front cover of the drive.
6. Assemble the connection cable: Connect the connector at the other end of the connection cable to the connector of the option card.
7. Attach the upper cover to the mounting box for the option card, as shown in Figure 3-16.
8. Assemble the mounting box for the option card: Aim the four clips of the mounting box for the option card at the slots on the upper cover of the motor drive, and then press downward to have the four clips engage the slots, as shown in the Figure 3-17.
9. Assembly is completed, as shown in Figure 3-18.

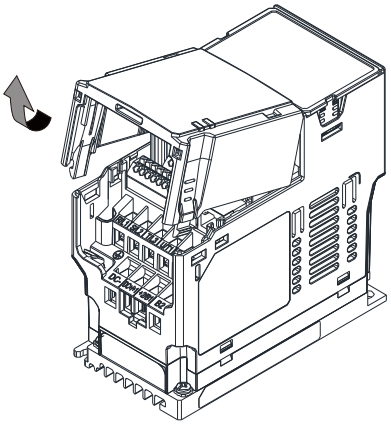


Figure 3-13

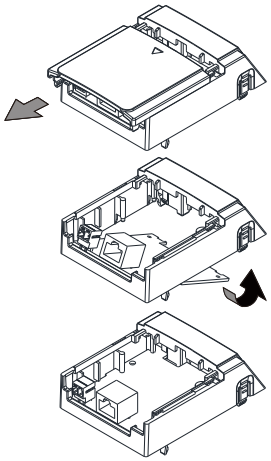


Figure 3-14

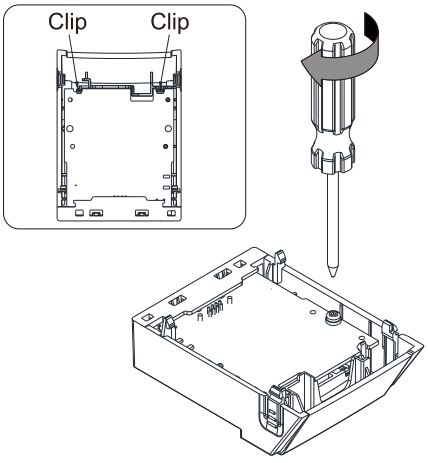


Figure 3-15

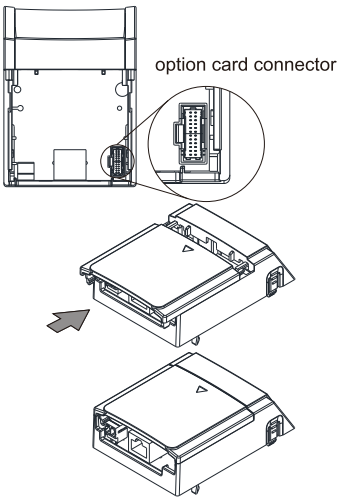


Figure 3-16

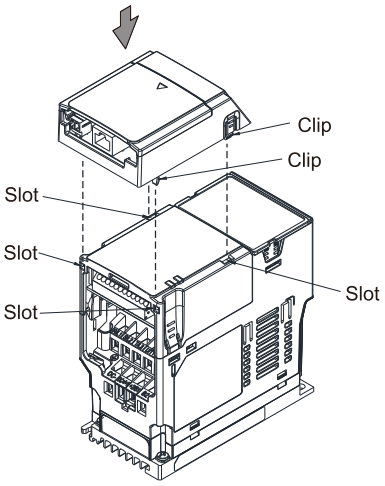


Figure 3-17

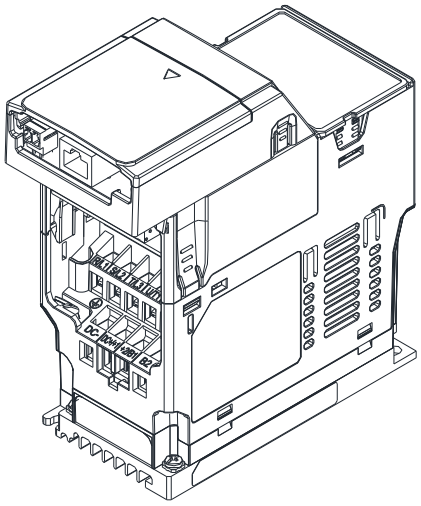


Figure 3-18

Grounding installation

- You must ground the option cards as listed below when wiring. The ground terminal is included in the option card package, as shown in Figure 3-19.

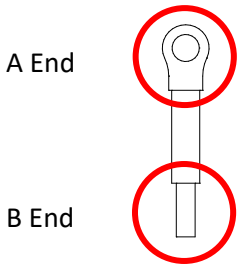


Figure 3-19 Grounding Wire

- Installation
  The B end of the grounding wire connects to the ground terminal block of the option card, as the No.7 shows in Figure 3-20. The A end of the grounding wire connects to the drive's PE, as the circles show in Figure 3-21 and Figure 3-22.

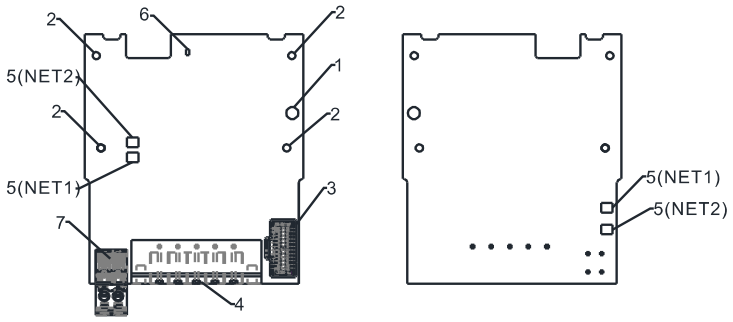


Figure 3-20

Frame A–C

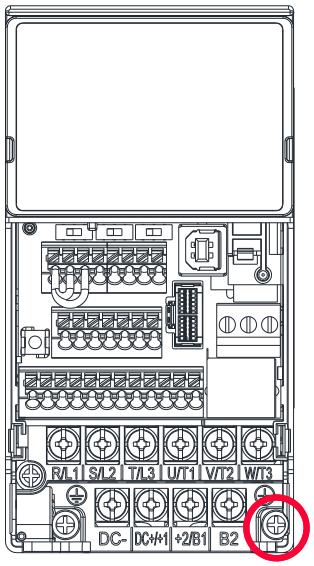


Figure 3-21

Frame D–F

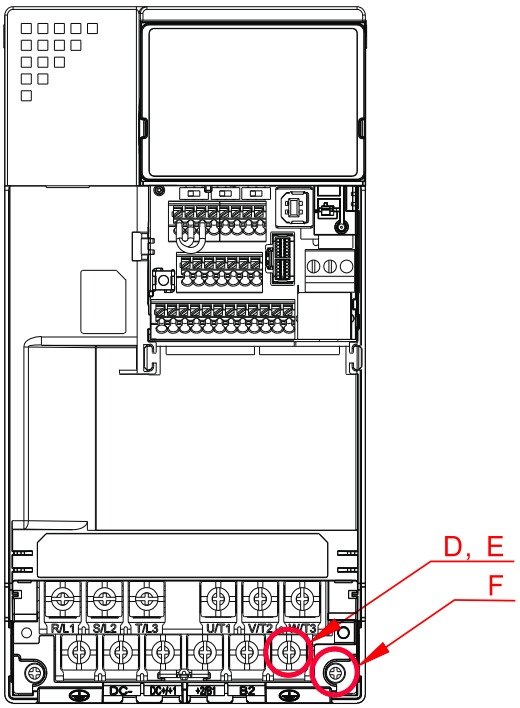


Figure 3-22

Frame	Screw	Torque (±10%)
A	M3.5	9 kg-cm [7.8 lb-in] [0.88 Nm]
B	M4	15kg-cm [13.0lb-in] [1.47Nm]
C	M4	20kg-cm [17.4lb-in] [1.96Nm]

Frame	Screw	Torque (±10%)
D	M4	20kg-cm [17.4lb-in] [1.96Nm]
E	M5	25kg-cm [21.7lb-in] [2.45Nm]
F	M4	20kg-cm [17.4 lb-in] [1.96 Nm]

Build a DeviceNet Network

Set the DVPDNET-SL as the master station of the DeviceNet, Combine CMM-DN01/CMM-DN02 communication card and MS300 series AC motor drive together to form the DeviceNet slave station. Use DeviceNetBuilder software to configure DeviceNet network.

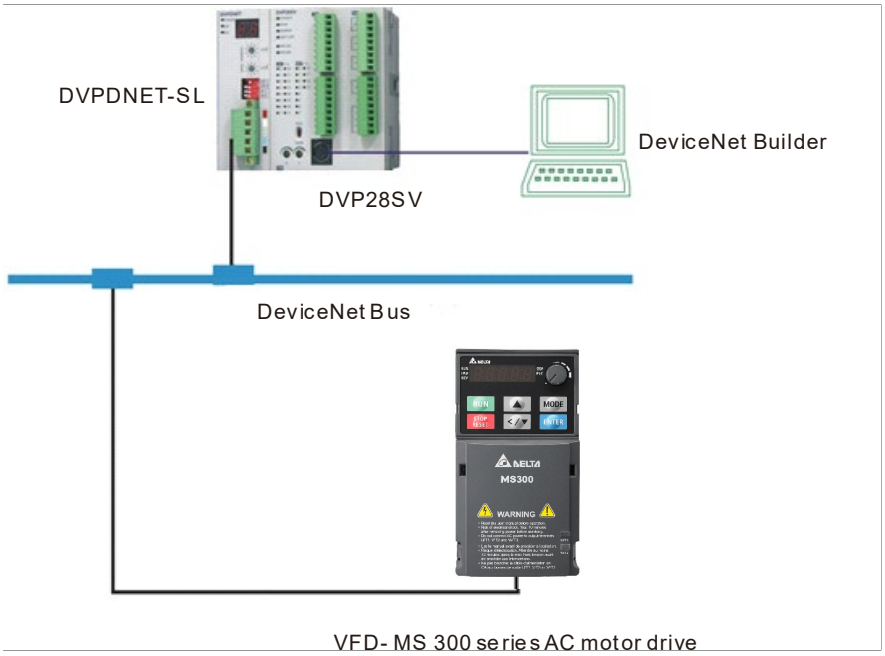


Figure 3-23

4

Chapter 4 Relations between MS300 series Motor Drives and DeviceNet Master Stations

This chapter focuses on the relations between Delta MS300 series AC motor drives and the DVPDNET-SL, and how the data exchange is processed between them. The DVPDNET-SL in Fig. 4.1.1 is the DeviceNet master. The MS300 series AC motor drive which is connected to the DeviceNet network via the CMM-DN01/CMM-DN02 communication card acts as the DeviceNet slave.

4.1 DeviceNet Data Exchange Process

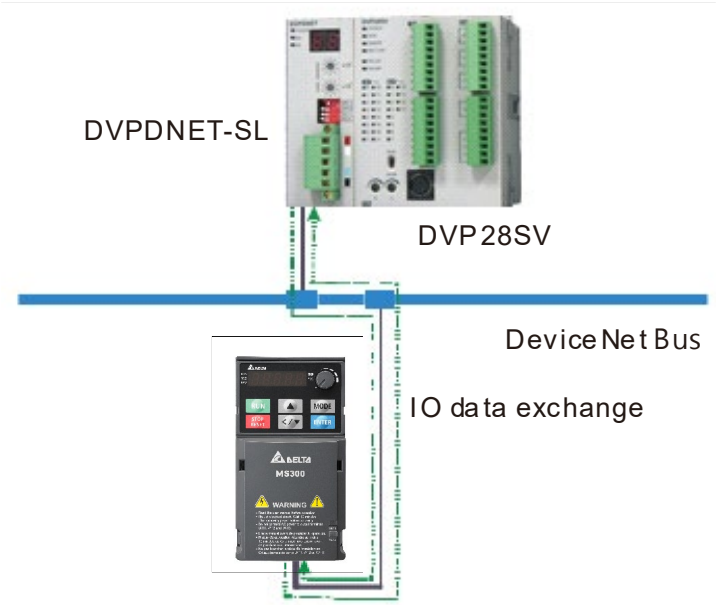


Fig.4.1. DeviceNet Data Exchange Diagram

As shown in the diagram, the DVP28SV and DVPDNET-SL perform real-time data exchange: the data of DVP28SV is sent to DVPDNET-SL, and the data of DVPDNET-SL is also sent to DVP28SV. DVPDNET-SL sends the data sent from DVP28SV to VFD-MS300 motor drive in time according to the established IO connection (see Section 4.3 for IO data connection establishment), and VFD-MS300 motor drive sends its own data back to DVPDNET-SL.
After the VP28SV data is sent to the AC motor drive, the following Section 4.2 describes in detail how the internal parameters are sent to the AC motor drive.

4.2 Mapping of CMM-DN01/CMM-DN02

VFD-MS300 motor drives are connected to the DeviceNet network via CMM-DN01/CMM-DN02 communication cards. The CMM-DN01/CMM-DN02 communication cards receive IO data from the DeviceNet master and send the data to the corresponding parameters of the AC motor drive according to the mapping relationship built within the CMM-DN01/CMM-DN02 communication cards. This mapping relationship is configured by the DeviceNetBuilder software.

By opening the "Parameter Editor" in the DeviceNetBuilder software (see Fig.4.2.1), we can see the parameters "Length of input data", " Length of output data", "Data_in[1]" and "Data_out[1]" parameters (see Table 4.2.1 for their meanings). **The parameter editor only supports decimal values, so we need to convert the required values into decimal values before filling them into the parameter editor.**

Parameter Name	Description
Length of input data	Number of AC motor drive parameters sent to the DeviceNet master
Length of output data	Number of parameters of the AC motor drive controlled by DeviceNet master
Data_in[1]	The first AC motor drive parameter sent back to the DeviceNet master
Data_in[2]	The second AC motor drive parameter sent back to the DeviceNet master
Data_in[3]	The third AC motor drive parameter sent back to the DeviceNet master
…	…
Data_in[32]	The thirty-second AC motor drive parameter sent back to the DeviceNet master
Data_out[1]	Parameter 1 of motor drive controlled by the DecviceNet master\
Data_out[2]	Parameter 2 of motor drive controlled by the DecviceNet master
Data_out[3]	Parameter 3 of motor drive controlled by the DecviceNet master
…	…
Data_out[32]	Parameter 32 of motor drive controlled by the DecviceNet master

Table 4.2.1 Parameter Description

For example, the parameters of the motor drive sent back to the DeviceNet master are H2101 and H2103, and the parameters of the motor drive controlled by the DeviceNet master are H2000 and H2001. Therefore, we set the "Length of input data" to 2 (2 parameters of the motor drive to be sent back to the DeviceNet master), the "Length of output data" to 2 (2 parameters of the motor drive controlled by the DeviceNet master), "Data_in[1]" to 8449 (hexadecimal 2101 is converted to decimal 8449), and the "Data_in[2]" to 8451 (hexadecimal 2103 is converted to decimal 8451), the "Data_out[1]" to 8192 (hexadecimal 2000 is converted to decimal 8192), and the "Data_out[2]" to 8193 (hexadecimal 2001 is converted to decimal 8193). Download the new mapping relationship to the CMM-DN01/CMM-DN02 communication card after setting. The mapping relationship of CMM-DN01/CMM-DN02 communication card is completed.

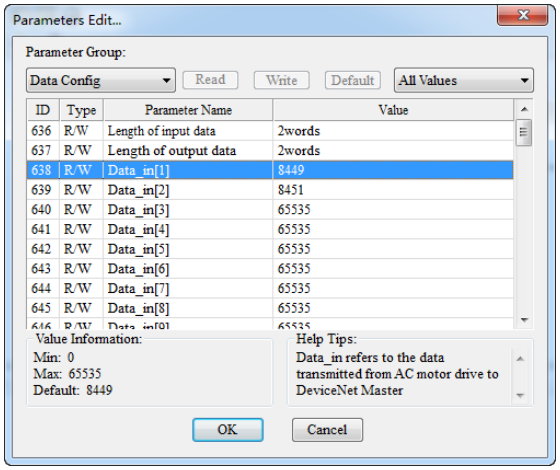


Fig.4.2.1 Input Data Mapping Setting

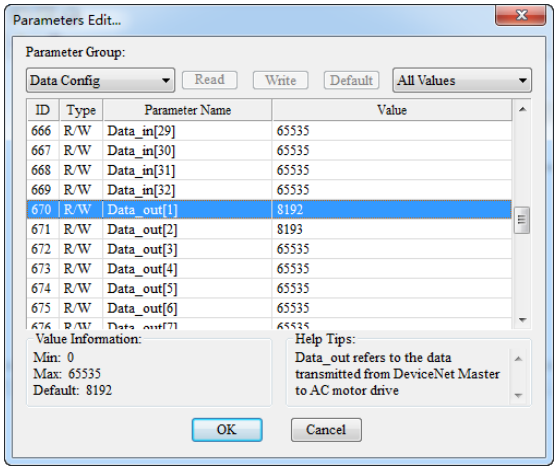


Fig.4.2.2 Output Data Mapping Setting

4.3 Establishing I/O Connection

The MS300 motor drive has been configured into the DeviceNet master by opening the Scan Module Configuration form in the DeviceNetBuilder software (as shown below). The registers in "Output List" and "Input List" are used for data exchange between the motor drive and DeviceNet master, and the DVP28SV and DVPDNET-SL perform real-time data exchange.

The D6287, D6288, D6037 and D6038 in the diagram are the registers of DVP28SV. We can control and monitor the internal parameters of the MS300 motor drive by controlling the registers of DVP28SV.

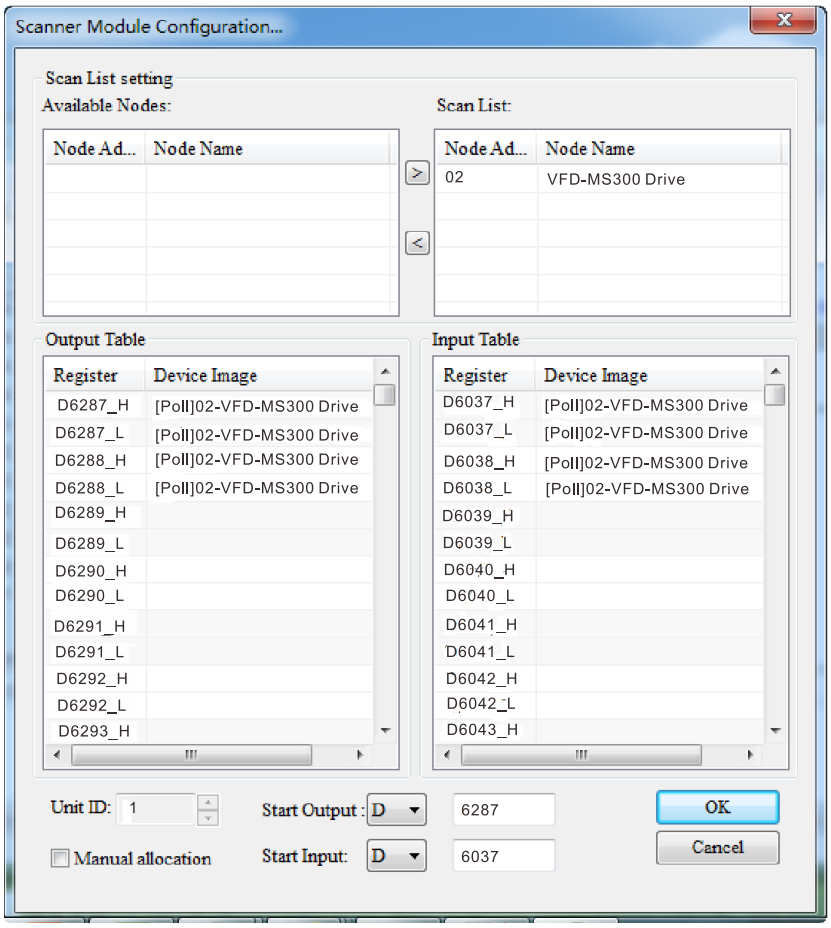


Fig.4.3.1 Establishing I/O Connection

5

Chapter 5 Create a DeviceNet Network

This chapter illustrates how to configure the MS300 motor drive with an application example.

5.1 Build a DeviceNet Network via CMM-DN01/ CMM-DN02

- Build a DeviceNet Network

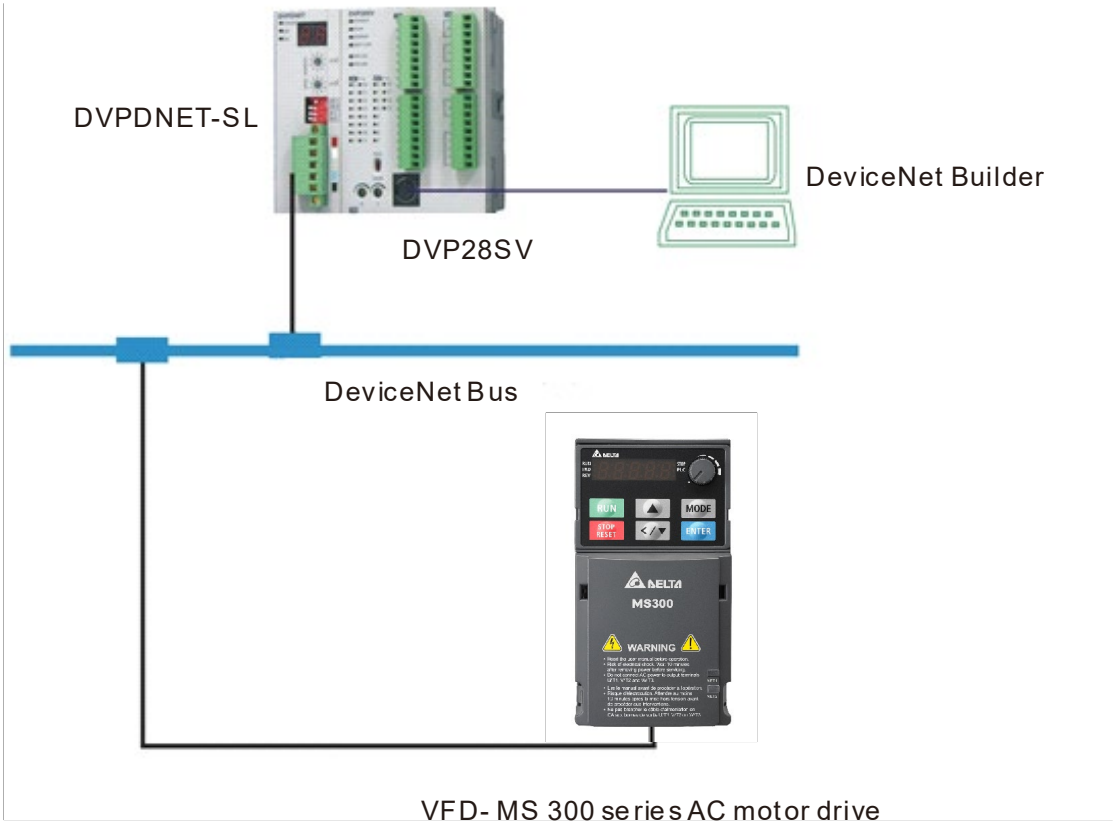


Fig.5.1.1 A DeviceNet Network

- The DVPDNET-SL scanning module and MS300 motor drive are set up separately as follows:

Module Type	Node Address	Baud Rate
DVPDNET-SL scanning module	1	500 Kbps
VFD-MS300 series AC Motor Drive	2	500 Kbps

Note: The node address and baud rate of the MS300 motor drive in the DeviceNet network are set as follows.

Drive Parameter Setting	Function	Setting Range
Pr.00-20	Master frequency command source	8
Pr.00-21	Operation command source	5
Pr.09-30	Communication Decoding Method	0
Pr.9-70	Used to set the node address of the motor drive in DeviceNet	DeviceNet: 0–63

Drive Parameter Setting	Function	Setting Range	
Pr.9-71	Used to set the serial baud rate of the motor drive in DeviceNet	Standard Mode	Extension Mode
		0: 125 Kbps 1: 250 Kbps 2: 500 Kbps	0 0: 10 Kbps 1 0: 20 Kbps 2 0: 50 Kbps 3 0: 125 Kbps 4 0: 250 Kbps 5 0: 500 Kbps 6 0: 800 Kbps 7 8: 1 Mbps
Pr.9-72	To set up two modes of Pr.09-71.	When Pr.09-72 = 0, Pr.09-71 = standard mode. When Pr.09-72 = 1, Pr.09-71 = Extension mode.	

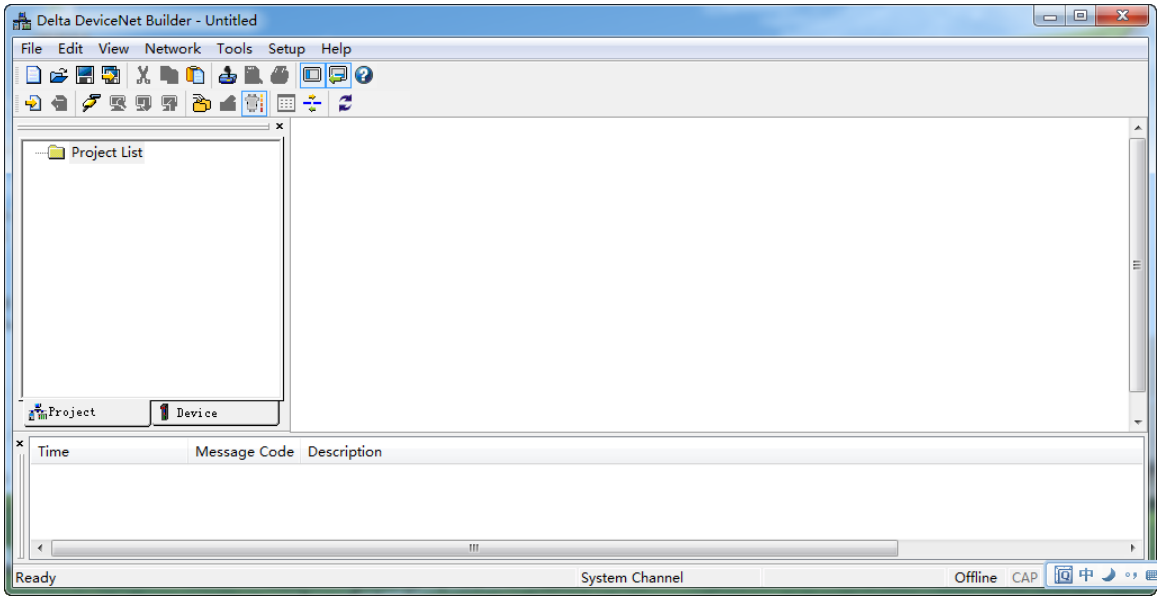
- Verify and make sure the DVPDNET-SL scanning module and motor drive work properly. Verify and make sure also the entire network wiring is correct and the DeviceNet network power supply also works properly. Refer to the LED Indicator & Troubleshooting if your DeviceNey cannot get online.

5.2 Use DeviceNet Builder Software to Configure the Network

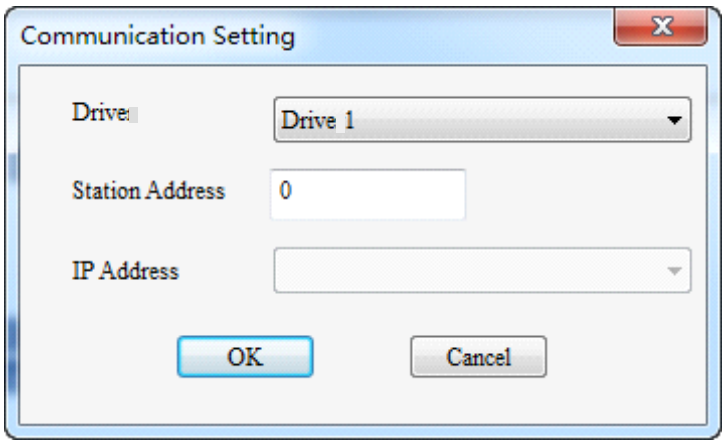
We use DeviceNetBuilder software to configure the DeviceNet network below.

■ Configuration of the MS300 Motor Drive

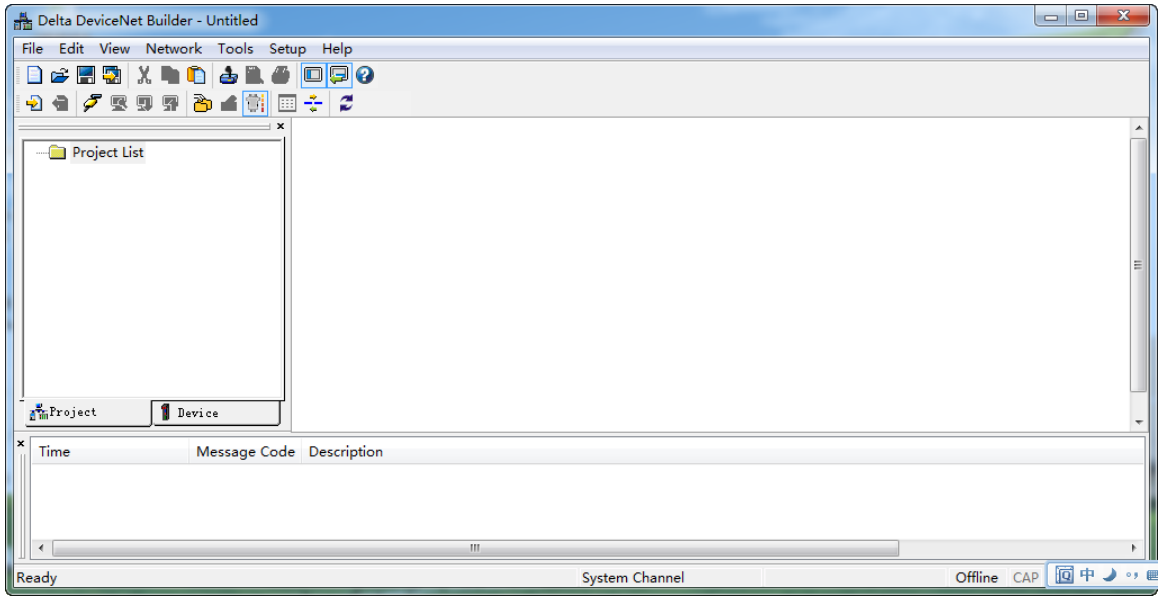
1. Run the DeviceNetBuilder software, the software interface is as shown below:



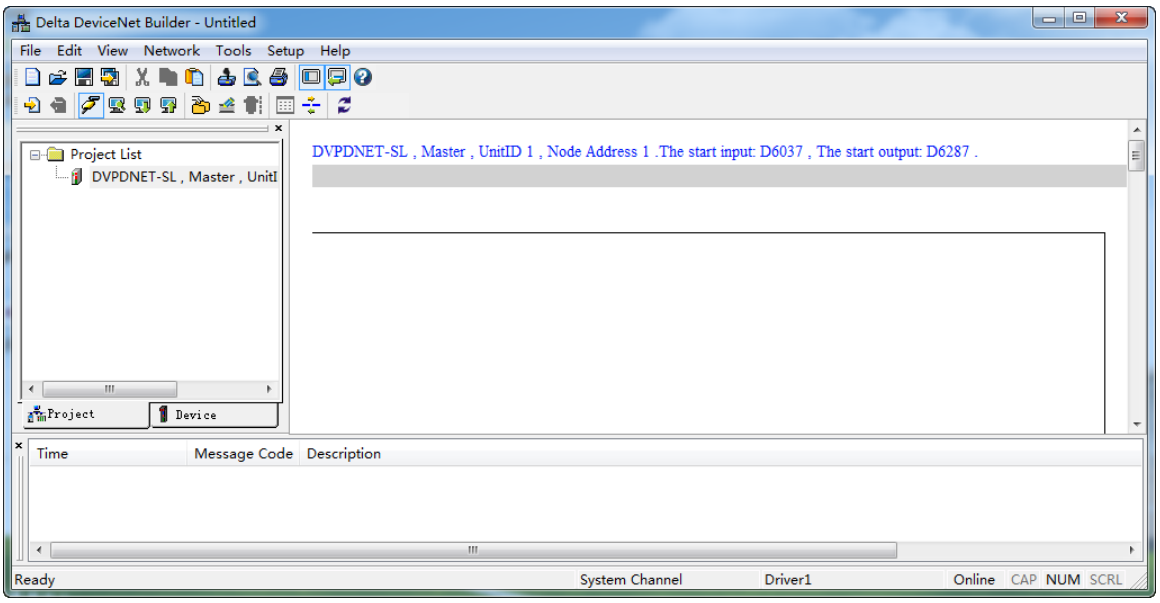
2. Select "Setup" >> "Communication Settings", and the "Communication Settings" dialog box will appear, as shown in the following figure:



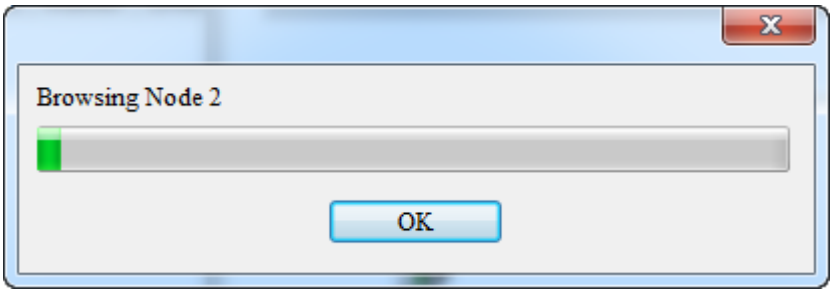
3. Click the "OK" button to return to the main page after the settings are correct.



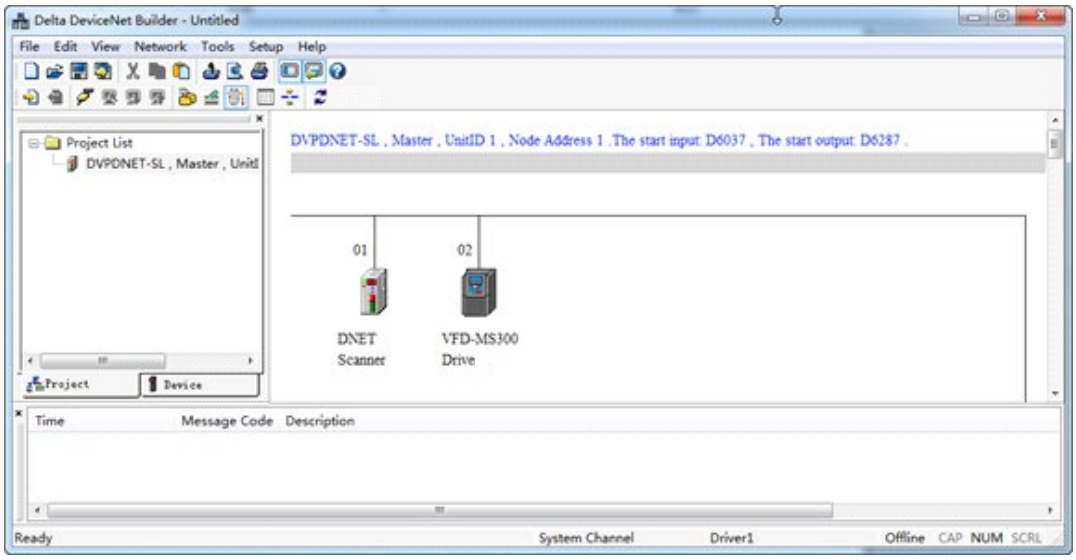
4. Select "Network" >> "Online" to put the DeviceNet Builder software in online mode, as shown below:



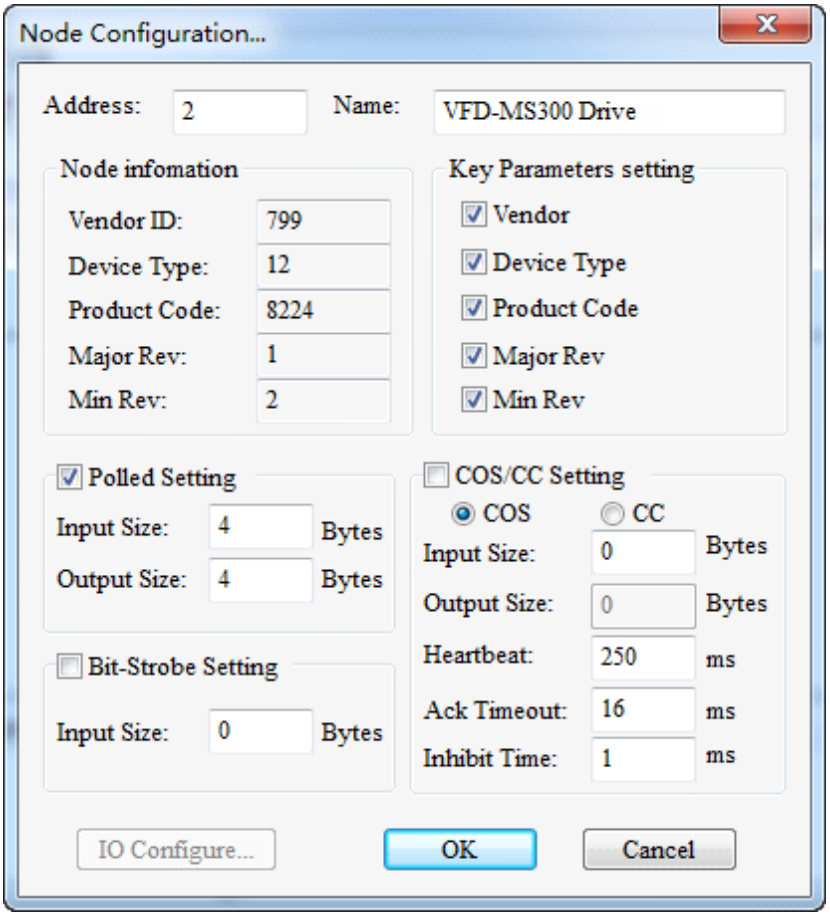
5. Select "Network" >> "Scan DeviceNet Network" to start scanning the entire network, as shown in the following figure:



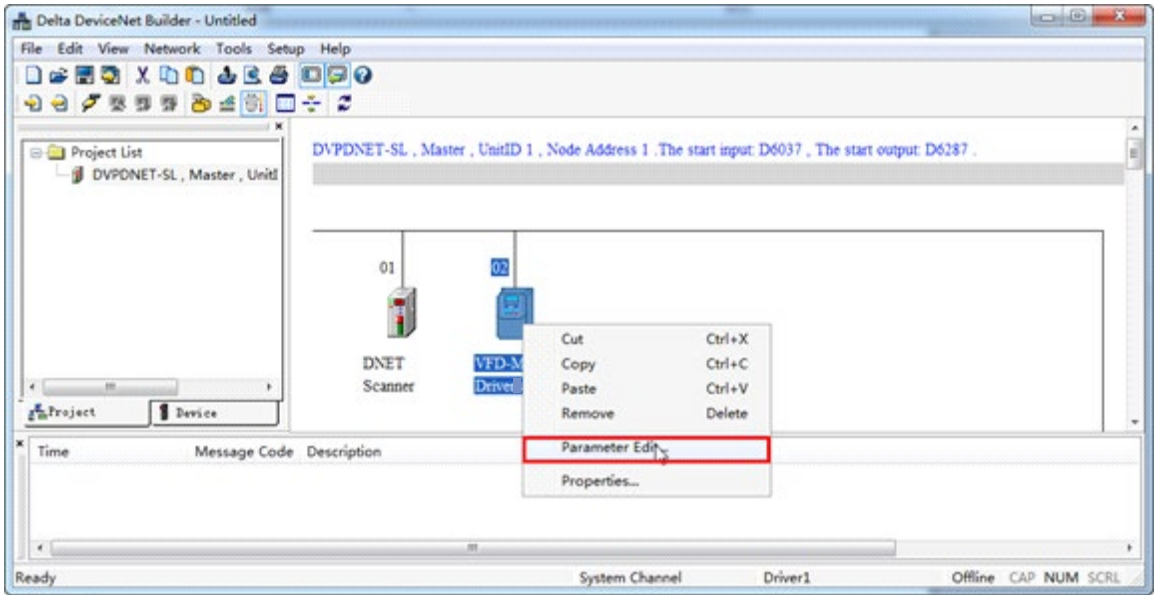
6. If the progress bar of the dialog box above does not move forward, the communication connection between PC and SV PLC does not work properly or there are other programs on the PC using the serial port. When the scan is complete, the "Scan Network Completed" dialog box will appear. The icons and device names of all nodes scanned on the network are displayed in the software interface, as shown below. The node address of DVPDNET-SL in this example is 01.



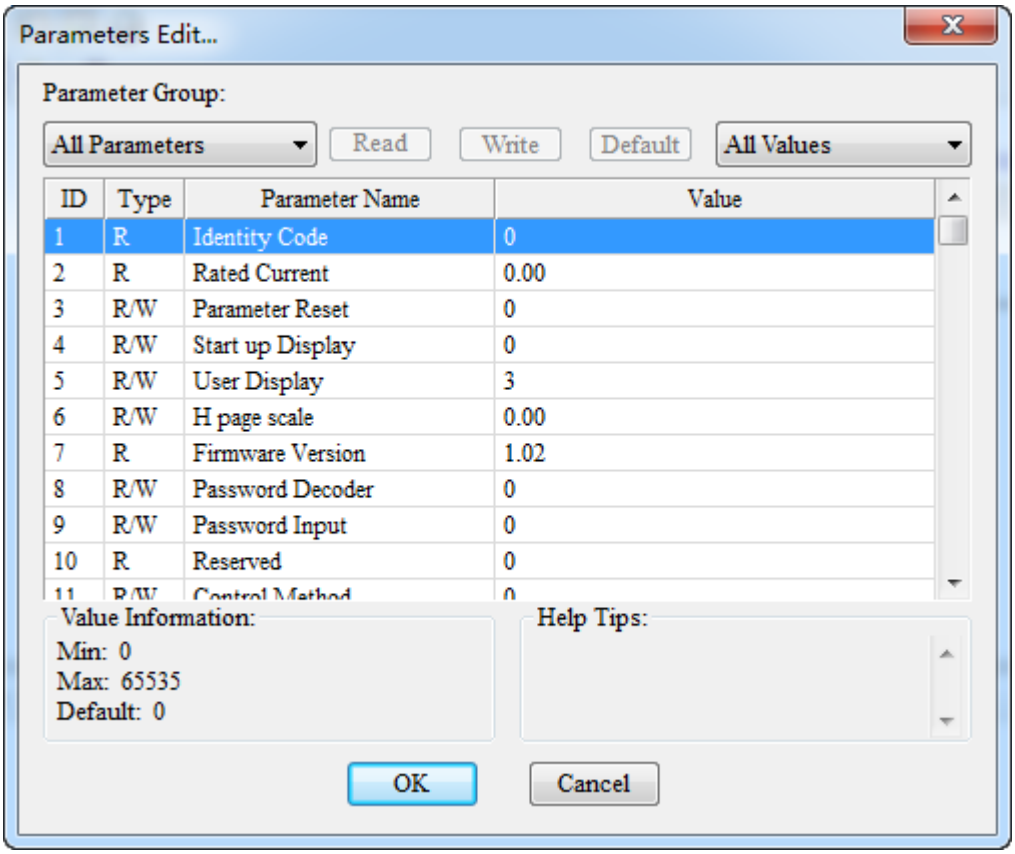
7. Double-click the icon of the VFD-MS300 motor drive (i.e. the AC motor drive connected to the CMM-DN01/CMM-DN02 communication card) and then the "Node Configuration..." dialog box will appear. Set the Polled input length to 4 Bytes and the output length to 4 Bytes.



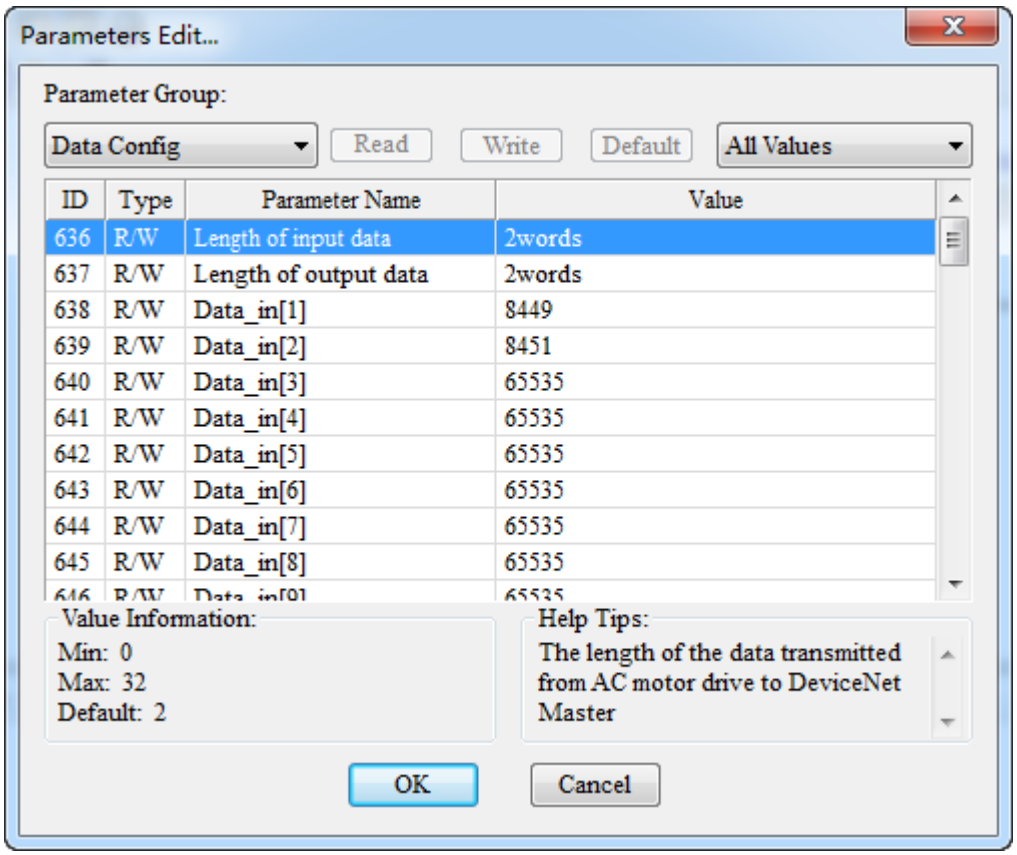
8. Right-click the icon of VFD-MS300 motor drive and select "Parameter Edit".



9. After selecting "Parameter Edit", a dialog box will pop up as shown below.



10. Select "Data Config" in the "Parameter Group", and the data mapping settings area in the parameter editor will appear in the dialog box.



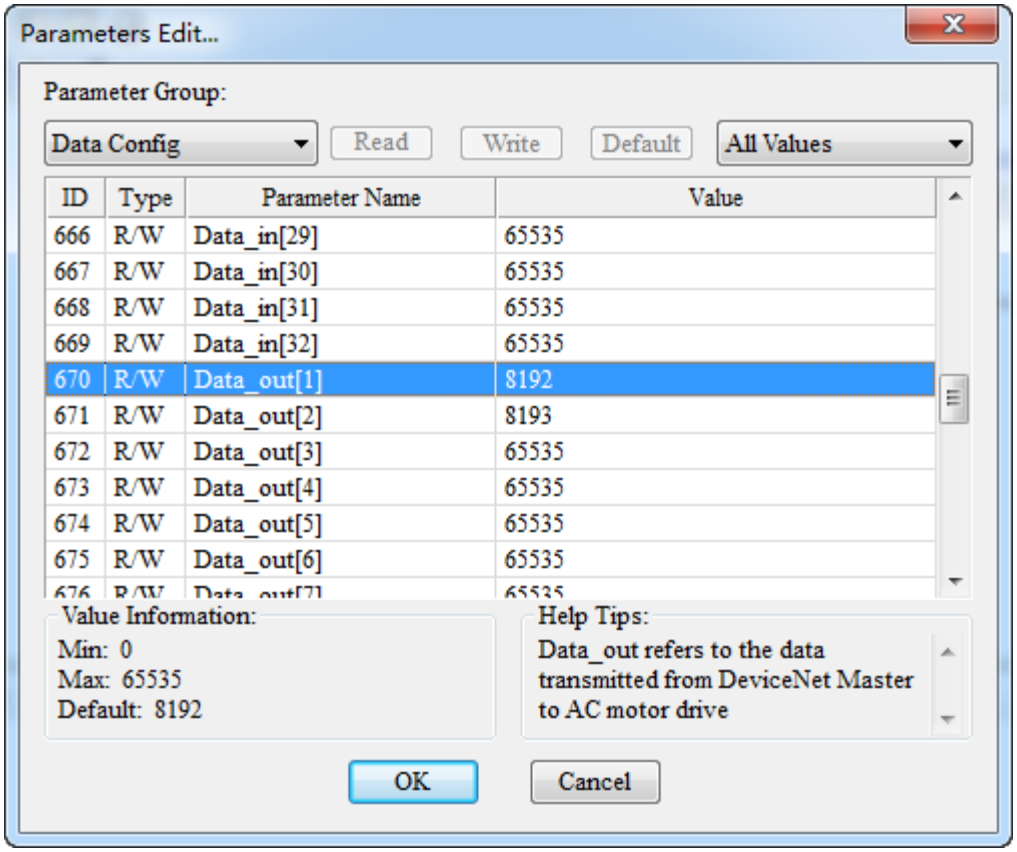
11. Set the Length of input data to 2words and Length of output data to 2words in the dialog box.

    Data_in[1] is set to K8449 (the status word of the AC motor drive H2101),

    Data_in[2] is set to K8451 (the output frequency of the AC motor drive H2103),

    Data_out[1] is set to K8192 (the control word of the AC motor drive H2000).

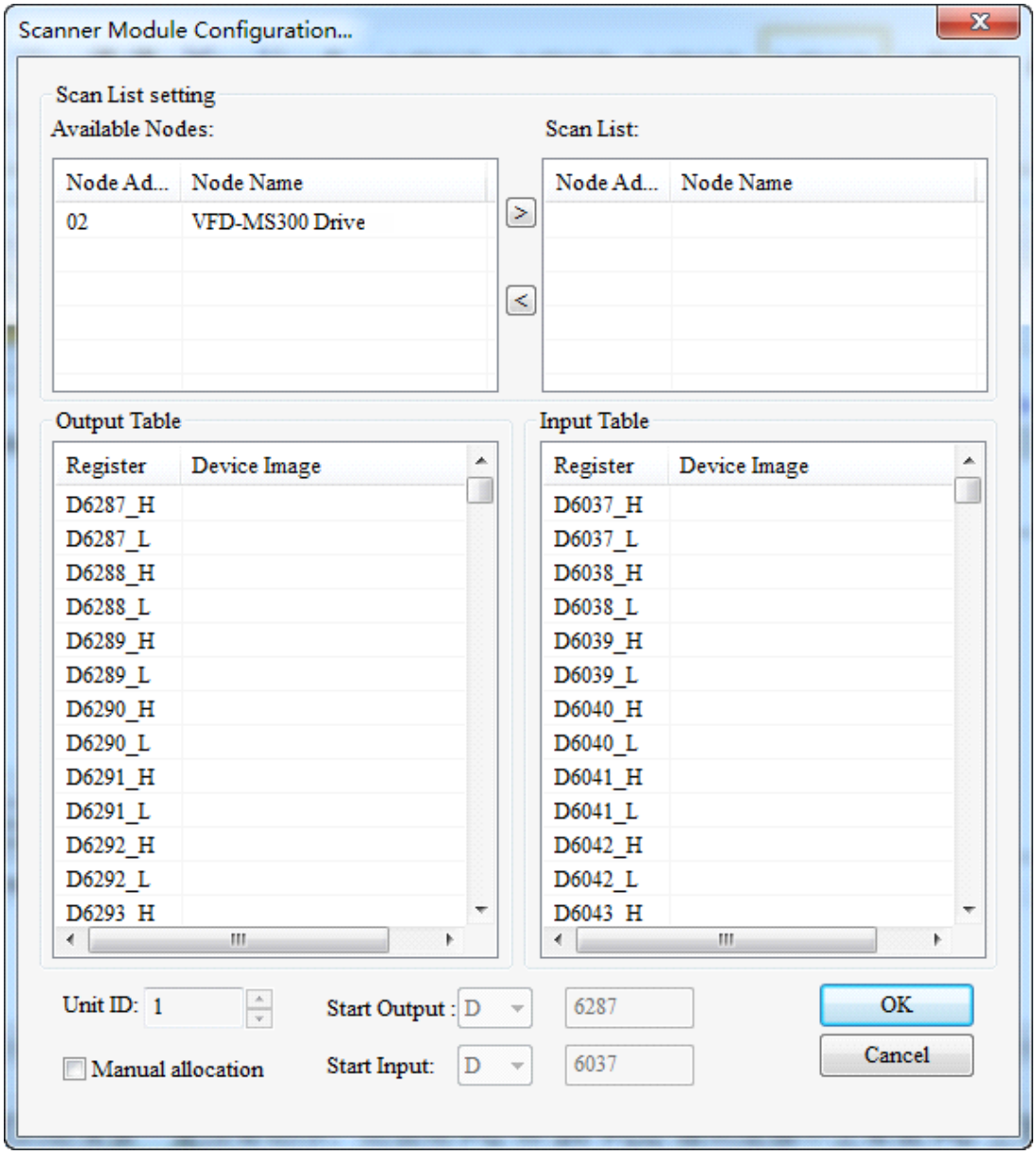
    Data_out[2] is set to K8193 (the given frequency of the AC motor drive H2001). After you finish the setting, select "All Values" and "Write".



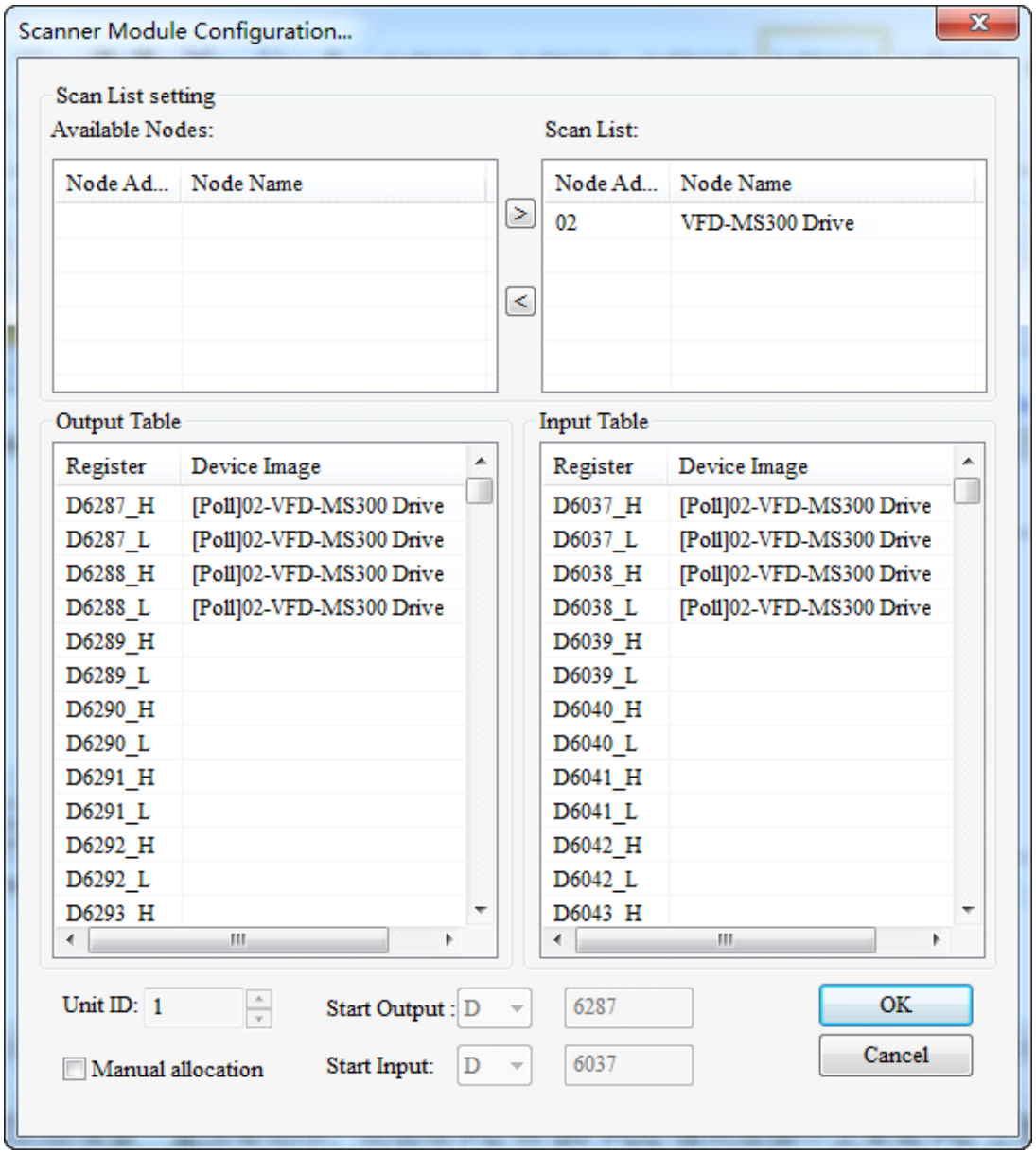
12. After downloading, reapply power to the AC motor drive.

■ Configuration of DVPDNET Scan Module

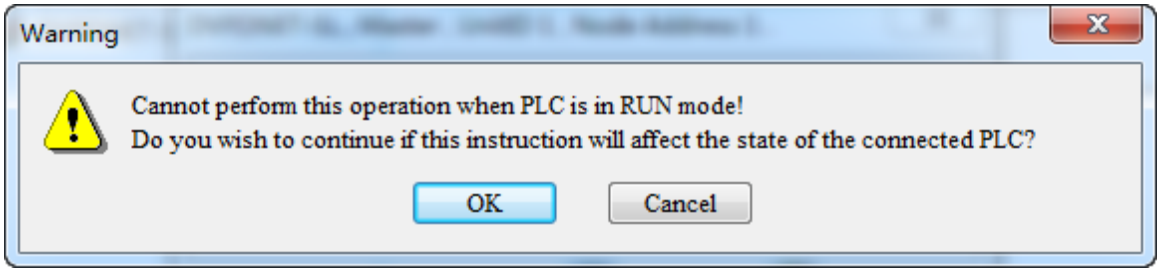
1. Double-click the DNET Scanner (Node 1) icon to bring up the "Scan Module Configuration..." dialog box, then you can see the currently available nodes VFD-MS300 motor drive in the top left list. An empty "Scan List" at the top right corner.



2. Add the DeviceNet slave device in the upper left list in the diagram aboveto the scan list of the scan module. To do so, select the DeviceNet slave node and click "**>**", as shown in the diagram below. Follow this procedure to add a DeviceNet slave node to the scan list of the scan module.



3. Click "OK" to download the configuration to the DVPDNET-SL scan module after verifying that there are no errors. When downloading, if the PLC is in RUN mode, a "Warning" dialog box will pop up, as shown below:



4. Click the "OK" button to download the configuration to the scan module and confirm that the PLC is in RUN mode. Then you can see "MS LED" and "NS LED" of the CMM-DN01/CMM-DN02 communication card are on and in green color.

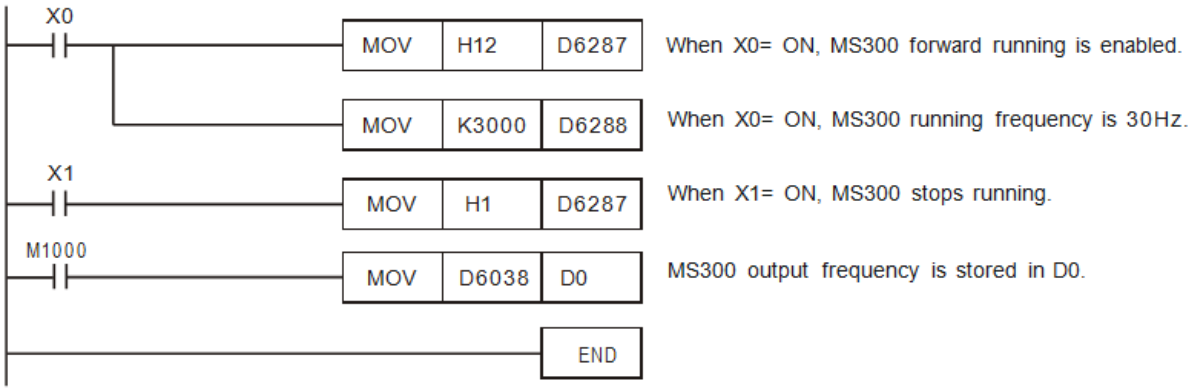
5.3 Corresponding Mapping Relationship

Follow the above steps above to configure the DeviceNet network. The mapping relationship between the DVPDNET-SL scan module and the AC motor drive is as follows:

DVPDNET-SL scan module		VFD-MS300 Series AX Motor Drive
D6287	⇨	H2000
D6288		H2001
D6037	⇦	H2101
D6038		H2103

5.4 Editing the ladder diagram

The IO data contain the control word, status word, given frequency and output frequency of the AC motor drive. This allows us to use ladder diagrams to control the start/stop, forward and reverse running, and operating speed of the AC motor drive. An example of a ladder diagram is as follows



6

Chapter 6 Displaying Fault Codes on the Keypad

6.1 Displaying Fault Codes on the Keypad

6.1 Displaying Fault Codes on the Keypad

When the communication between the CMM-DN01/CMM-DN02 communication card and the VFD-MS300 motor drive fails, the fault codes will be displayed on the digital keypad. The fault codes are shown in the following table:

Fault Codes	Description	Corrective Actions
ECid	Duplicate MAC ID error□ Node address setting error	Verify the setting at Pr.09-70 and then cycle the power of the AC motor drive.
ECLv	The 5V power that the drive provides to the communication card is too low	Verify MPU's power.
ECtt	The communication card is in the test mode	Cycel the power of the AC motor drive.
ECbF	The communication card detects too many errors in the BUS, then enters the BUS-OFF status and stop communicating.	Cycle the power of the AC motor drive.
ECnP	There is no power supply of the DeviceNet	1. Verify the CMM-DN01/CMM-DN02 wiring and network power in DeviceNet; 2. Reset the CMM-DN01/ CMM-DN02 to the factory setting.

7

Chapter 7 LED Indicator & Troubleshooting

7.1 Power LED Description
7.2 NS LED Description
7.3 MS LED Description

The CMM-DN01/CMM-DN02 communication module has three LED indicators. The POWER LED is used to indicate if the power supply of the communication card is normal.
MS LED and NS LED are duo-light LED which are used to indicate the communication connection staus and the error information.

7.1 POWER LED Description

LED status	Indication	Corrective Action
Off	Abnormal power supply	Verify if the power supply of CMM-DN01/ CMM-DN02 is normal.
Green light on	Power supply in normal status.	No action is required.

7.2 NS LED Indicator Description

LED status	Indication	Corrective Action
Off	No power supply or the CMM-DN01/ CMM-DN02 does not pass the MAC ID test.	1.Check the power to the CMM-DN01/ CMM-DN02 and see if the connection is normal. 2.Make sure there is at least one node on the bus. 3.Check if the baud rate of the CMM-DN01/ CMM-DN02 is the same as that of the other nodes.
Green light flashes	The CMM-DN01/ CMM-DN02 is on-line but does not connect to the master.	1. Configure the CMM-DN01/CMM-DN02 to the master scan list. 2.Re-download the configured data to the master.
Green light on	The CMM-DN02 is on-line and normally connects to the master.	No action is required.
Red light flashes	CMM-DN01/ CMM-DN02 are online but I/O connection has timed out.	1. Check if the network connection is normal. 2. Check if the master operates normally.
Red light on	1. Broken communication 2. MAC ID test failure 3. No network power supply. 4. CMM-DN01 / CMM-DN02 are offline.	1. Make sure all MAC IDs on the network are unique. 2. Check if the network installation is normal. 3. Check if the baud rate of the CMM-DN02 is the same as that of the other nodes. 4. Check if the CMM-DN01/ CMM-DN02 has legal station numbers. 5. Check if the network power supply is normal.

7.3 MS LED Indicator Description

LED status	Indication	Corrective Action
Off	No power supply or device is off-line	Check the power supply of the CMM-DN02 and see if the connection is normal.
Green light flashes	Waiting for I/O data	Switch the master PLC to RUN status.
Green light on	I/O data is normal	No action is required.
Red light flashes	Mapping error	Reset CMM-DN01/ CMM-DN02 Cycle the power of the AC motor drive
Red light on	Hardware error	1. See the fault codes displayed on the keypad and find the causes. 2. Return the unit to the factory for repair if necessary.
Orange light flashes	Establishing a connection between the CMM-DN01/ CMM-DN02 and the AC motor drive/	If the orange color flashing lasts for a long period of time, turn off the power to check if the CMM-DN01/ CMM-DN02 and the AC motor drive are installed and connected properly to each other.

Appendix A Supporting DeviceNet Object

A.1 DeviceNet Objects List

Class	Object
0x01	Identity object
0x02	Message router object
0x03	DeviceNet Object
0x05	Connection object
0x0F	Parameter Object
0x95	DataConf object

A.1.1 Class 0x01 – Identity object

- **Class attribute**

Attribute ID	Access rule	Name	Data type
1	Get	Revision	UINT
2	Get	MaxInstance	UINT
3	Get	NumberofInstances	UINT
6	Get	MaxIdClass	UINT
7	Get	MaxIdInstance	UINT

- **Instance**

Attribute ID	Access rule	Name	Data type
1	Get	VendorId	UINT
2	Get	DeviceType	UINT
3	Get	ProductCode	UINT
4	Get	Revision MaxRev MinRev	SINT USINT
5	Get	Status	WORD
6	Get	Sn	UDINT
7	Get	ProdName StrLen ASCIIStr	USINT STRING

- **Common services**

Service code	Implemented for		Service name
	Class	Instance	
0x05	No	Yes	Reset
0x0E	Yes	Yes	Get_Attribute_Single

A.1.2 Class 0x02 – Message router object

- **Class attribute**

Attribute ID	Access rule	Name	Data type
1	Get	Revision	UINT
6	Get	MaxIdClass	UINT
7	Get	MaxIdInstance	UINT

- **Instance**

Attribute ID	Access rule	Name	Data type
2	Get	NumAvailable	UINT
3	Get	NumActive	UINT

- **Common services**

Service code	Implemented for		Service name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single

A.1.3 Class 0x03 – DeviceNet object

- **Class attribute**

Attribute ID	Access rule	Name	Data type
1	Get	Revision	UINT

- **Instance attribute**

Attribute ID	Access rule	Name	Data type
1	Get	MACID	USINT
2	Get	BaudRate	USINT
3	Get/Set	BusofInterrupt	BOOL
4	Get/Set	BusofCounter	USINT
5	Get	AllocationInfo AllocationChoice MasterNodeAddress	BYTE USINT
6	Get	MACIDSwitchChanged	BOOL
7	Get	BaudRateSwitchChanged	BOOL
8	Get	MACIDSwitchValue	USINT
9	Get	BaudRateSwitchValue	USINT

- **Common services**

Service code	Implemented for		Service name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single
0x4B	No	Yes	Allocate_Master/Slave_Connection_Set
0x4C	No	Yes	Release_Master/Slave_Connection_Set

A.1.4 Class 0x05 – Connection object

- **Class attribute**

Attribute ID	Access rule	Name	Data type
1	Get	Revision	UINT

- **Instance 1: Explicit message connection**

Attribute ID	Access rule	Name	Data type
1	Get	State	USINT
2	Get	InstanceType	USINT
3	Get	TransportClassTrigger	USINT
4	Get	ProducedConnectionId	UINT
5	Get	ConsumedConnectionId	UINT
6	Get	InitialCommCharacterisitcs	BYTE
7	Get	ProducedConnectionSize	UINT
8	Get	ConsumedConnectionSize	UINT
9	Get/Set	ExpectedPackedRate	UINT
12	Get/Set	WatcdogTimeoutAction	USINT
13	Get	Produced Connection Path Length	USINT
14	Get	Produced Connection Path	EPATH
15	Get	Consumed Connection Patch Length	USINT
16	Get	Consumed Connection Path	EPATH

- **Instance 2: EPATH**

Attribute ID	Acccess rule	Name	Data type
1	Get	State	USINT
2	Get	InstanceType	USINT
3	Get	TransportClassTrigger	USINT
4	Get	ProducedConnectionId	UINT
5	Get	ConsumedConnectionId	UINT
6	Get	InitialCommCharacteristics	BYTE
7	Get	ProducedConnectionSize	UINT
8	Get	ConsumedConnectionSize	UINT

Attribute ID	Acccess rule	Name	Data type
9	Get/Set	ExpectedPackedRate	UINT
12	Get/Set	WatchdogTimeoutAction	USINT
13	Get	Produced Connection Path Length	USINT
14	Get	Produced Connection Path	EPATH
15	Get	Consumed Connection Path Length	USINT
16	Get	Consumed Connection Path	EPATH

- **Common services**

Service code	Implemented for		Service name
	Class	Instance	
0x05	No	Yes	Reset
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

A.1.5 Class 0x96 Parameter Object

- **Class attributes**

Attribute ID	Access rule	Name	Data type
1	Get	Revision	UINT

- **Instance 1 :Paremeter Instance 1 through N**

Attribute ID	Access rule	Name	Data type
1	Get/Set	Parameter Value	—
2	Get	Link Path Size	USINT
3	Get	Link Path	—
4	Get	Descriptor	WORD
5	Get	Data type	USINT
6	Get	Data Size	USINT

- **Common Services**

Service Code	Implemented for		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

A.1.6 Class 0x95 – DataConf Class attribute

Attribute ID	Access rule	Name	Data type
1	Get	Revision	UINT

- **Instance 1~N:**

Attribute ID	Access rule	Name	Data type
1	Get/Set	Parameter Value	—
2	Get	Link Path Size	USINT
3	Get	Link Path	—
4	Get	Descriptor	WORD
5	Get	Data type	USINT
6	Get	Data Szie	USINT

- **Common Services**

Service Code	Implemented for		Service Name
	Class	Instance	
0X05	Yes	No	Reset
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

- **Instance List:**

Instance ID	Access rule	Name	Data type	Default
1	Get	Software version	UINT	####
2	Get/Set	Reset Configuration	UINT	0
3	Get/Set	Control enable	UINT	1
4	Get/Set	LossDNTreat	UINT	1
5	Get/Set	LossSPTreat	UINT	1
6	Get/Set	Output Length (master->card)	UINT	2 words
7	Get/Set	Input Length (card -> master)	UINT	2 words
10	Get/Set	Output[0] master->card	UINT	2000H
11	Get/Set	Output[1]	UINT	2001H
12	Get/Set	Output[2]	UINT	FFFFH
13	Get/Set	Output[3]	UINT	FFFFH
14	Get/Set	Output [4]	UINT	FFFFH
15	Get/Set	Output [5]	UINT	FFFFH
16	Get/Set	Output [6]	UINT	FFFFH
17	Get/Set	Output[7]	UINT	FFFFH
18	Get/Set	Output[8]	UINT	FFFFH
19	Get/Set	Output[9]	UINT	FFFFH
20	Get/Set	Output[10]	UINT	FFFFH

Instance ID	Access rule	Name	Data type	Default
21	Get/Set	Output[11]	UINT	FFFFH
22	Get/Set	Output[12]	UINT	FFFFH
23	Get/Set	Output[13]	UINT	FFFFH
24	Get/Set	Output[14]	UINT	FFFFH
25	Get/Set	Output[15]	UINT	FFFFH
26	Get/Set	Output[16]	UINT	FFFFH
27	Get/Set	Output[17]	UINT	FFFFH
28	Get/Set	Output[18]	UINT	FFFFH
29	Get/Set	Output[19]	UINT	FFFFH
30	Get/Set	Output[20]	UINT	FFFFH
31	Get/Set	Output[21]	UINT	FFFFH
32	Get/Set	Output[22]	UINT	FFFFH
33	Get/Set	Output[23]	UINT	FFFFH
34	Get/Set	Output[24]	UINT	FFFFH
35	Get/Set	Output[25]	UINT	FFFFH
36	Get/Set	Output[26]	UINT	FFFFH
37	Get/Set	Output[27]	UINT	FFFFH
38	Get/Set	Output[28]	UINT	FFFFH
39	Get/Set	Output[29]	UINT	FFFFH
40	Get/Set	Output[30]	UINT	FFFFH
41	Get/Set	Output[31]	UINT	FFFFH
42	Get/Set	Input[0] card->master	UINT	2101H
43	Get/Set	Input[1]	UINT	2103H
44	Get/Set	Input[2]	UINT	FFFFH
45	Get/Set	Input[3]	UINT	FFFFH
46	Get/Set	Input[4]	UINT	FFFFH
47	Get/Set	Input[5]	UINT	FFFFH
48	Get/Set	Input[6]	UINT	FFFFH
49	Get/Set	Input[7]	UINT	FFFFH
50	Get/Set	Input[8]	UINT	FFFFH
51	Get/Set	Input[9]	UINT	FFFFH
52	Get/Set	Input[10]	UINT	FFFFH
53	Get/Set	Input[11]	UINT	FFFFH
54	Get/Set	Input[12]	UINT	FFFFH
55	Get/Set	Input[13]	UINT	FFFFH
56	Get/Set	Input[14]	UINT	FFFFH
57	Get/Set	Input[15]	UINT	FFFFH

Instance ID	Access rule	Name	Data type	Default
58	Get/Set	Input[16]	UINT	FFFFH
59	Get/Set	Input[17]	UINT	FFFFH
60	Get/Set	Input[18]	UINT	FFFFH
61	Get/Set	Input[19]	UINT	FFFFH
62	Get/Set	Input[20]	UINT	FFFFH
63	Get/Set	Input[21]	UINT	FFFFH
64	Get/Set	Input[22]	UINT	FFFFH
65	Get/Set	Input[23]	UINT	FFFFH
66	Get/Set	Input[24]	UINT	FFFFH
67	Get/Set	Input[25]	UINT	FFFFH
68	Get/Set	Input[26]	UINT	FFFFH
69	Get/Set	Input[27]	UINT	FFFFH
70	Get/Set	Input[28]	UINT	FFFFH
71	Get/Set	Input[29]	UINT	FFFFH
72	Get/Set	Input[30]	UINT	FFFFH
73	Get/Set	Input[31]	UINT	FFFFH