Before using the product, thank you for purchasing SV-iS7 DeviceNet option board.

SAFETY PRECAUTIONS

● Always follow safety instructions to prevent accidents and potential hazards from occurring.
● Safety precautions are classified into "WARNING" and "CAUTION" and their meanings are as follows:

⚠ **WARNING**	Improper operation may result in serious personal injury or death.
⚠ **CAUTION**	Improper operation may result in slight to medium personal injury or property damage.

● The indicated illustrations on the product and in the manual have the following meanings.

⚠　Danger may be present. Read the message and follow the instructions carefully.

⚡　Particular attention should be paid because danger of an electric shock may be present.

● Keep operating instructions handy for quick reference.
● Read the operating instructions carefully to fully understand the functions of the SV-iP5A series and to use it properly.

⚠ CAUTION

● **Be cautious, when handling the CMOS components of the Option Board.**
　Static may lead to malfunctioning of the product.
● **Turn off the inverter power, when changing the communication cable.**
　Otherwise, you may damage the board or a communication error may occur.
● **Make sure to insert the Option Board connector to the inverter precisely.**
　Otherwise, you may damage the board or a communication error may occur.
● **Check the parameter unit before setting up the parameter.**
　Otherwise, a communication error may occur.

1. Introduction

SV-iS7 DeviceNet communication card connect the SV-iS7 inverter with DeviceNet network. DeviceNet communication card enables the control and monitoring of inverter to be controlled by sequence program of PLC or Master module selected optionally.

As one or more inverters are connected and operated with a communication line, it can reduce the installation cost compared with when communication is not used. Furthermore, simple wiring enables to the reduction of installation period and easy maintenance as well.

A variety of peripheral devices such as PLC, etc. can be used to control the inverter, and factory automation is made easy by its advantage of the fact that it can be operated linked with a variety of systems such as PC, etc.

2. DeviceNet communication card specification

Terminology		Description
Power Supply	DeviceNet communication power source	Supplied from inverter
	Exterior power source	Input Voltage : 11 ~25V DC Current consumption: Max. 60mA
Network topology		Free, Bus Topology
Communication Baud rate		125kbps, 250kbps, 500kbps
Max. number of node		64 nodes (including Master), Max. 64 stations per each segment In the event of a Master node is connected to network, max. number of the nodes connected is 63 nodes (64-1).
Device type		AC Drive
Kind of support communication		Explicit Peer to Peer Messaging Faulted Node Recovery(Off-Line) Master/Scanner (Predefined M/S Connection) Polling
Terminating resistor		120 ohm 1/4W Lead Type

3. Communication Cable Specifications
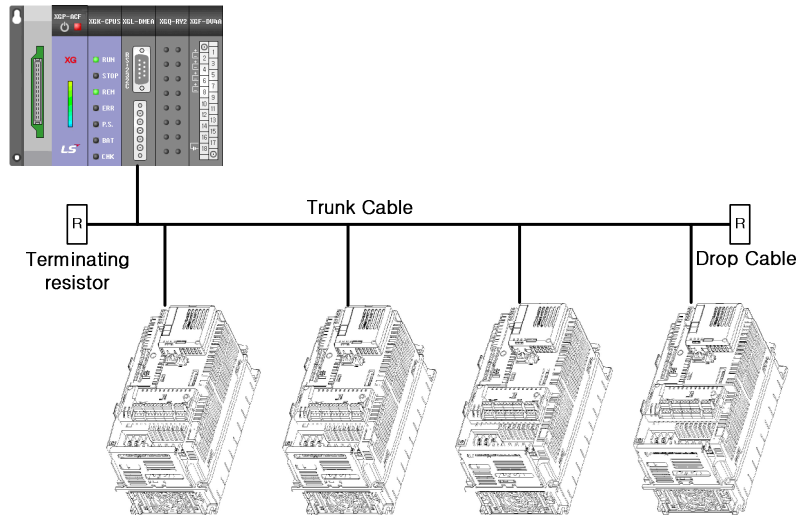
For DeviceNet communication, DeviceNet standard cable specified by ODVA should be used. There are Thick or Thin type cable as DeviceNet standard cable. For DeviceNet standard cable, refer to ODVA homepage (http://www.odva.org).

Either Thick or Thin cable can be used for Trunk cable, but please use Thick cable in general. In case of Drop cable, use Thin cable is strongly recommended.

Maximum length of cable as below is the performance when DeviceNet standard cable was used.

Baud Rate	Trunk Cable length		Drop Length (Thin Cable)	
	Thick Cable	Thin Cable	Max. length	Total sum
125 kbps	500 m (1640 ft.)	100 m (328 ft.)	6 m (20 ft.)	156 m (512 ft.)
250 kbps	250 m (820 ft.)			78 m (256 ft.)
500 kbps	100 m (328 ft.)			39m (128ft.)

4. Installation

When unpacking DeviceNet communication card box, the contents consist of SV-iS7 communication card 1ea, Pluggable 5-pin connector 1ea, Lead type terminal resistor 120 Ω (1/4W) 1ea, bolt that fastens SV-iS7 DeviceNet communication card to SV-iS7 inverter, and this manual for SV-iS7 DeviceNet.

Layout of DeviceNet communication card is as below.

Zoom-in the connector

MS LED

Not using

NS LED

Not using
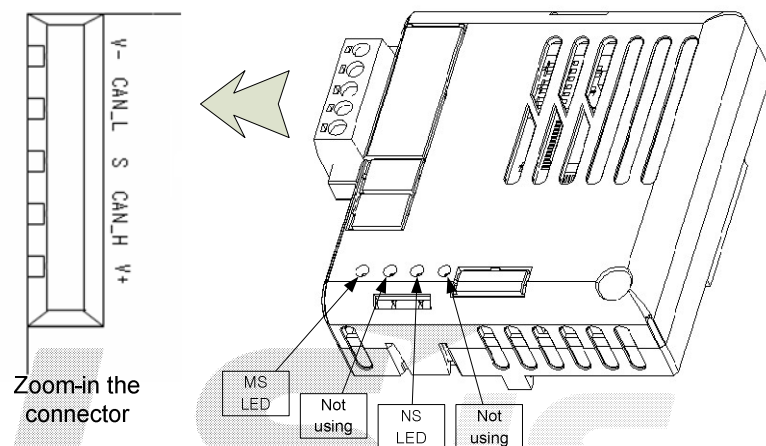
Installation figure is as below.

4
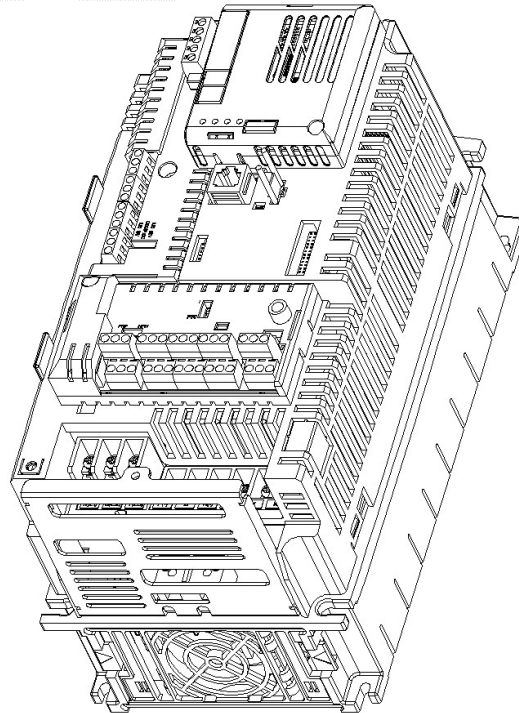
Instruction for installation)

Don't install or remove DeviceNet communication card with the power of inverter on. It may cause damages to both DeviceNet communication card and inverter. Be sure to install or remove communication card after the current of inverter's condenser has been completely discharged.

Don't change the connection of communication signal line with the power of inverter on. Be sure to connect the inverter body and the option board connector exactly corresponded with each other.

In the event of connecting of communication power source (24P, 24G), be sure to check they are V-(24G), V+(24P) silk of DeviceNet communication card before connecting them. When wiring is not connected correctly, it may cause the malfunction of communication.

When configuring the Network, be sure to connect the terminal resistor to the device that is connected with the end part. Terminal resistor should be connected between CAN_L and CAN_H. The value of terminal resistor is 120 Ω 1/4W.

5. LED

DeviceNet communication card enclose 2 LEDs mounted; MS (Module status) LED and NS (Network status) LED. Fundamental function of two LEDs is as below.

MS LED (Module Status)	It is used to check whether the power source state of DeviceNet communication card is stable; whether CPU of DeviceNet communication card is regularly operating; whether the interface communication between DeviceNet communication card and inverter body is made in smooth manner. All the operations as above are normally made, MS LED will be lit in Solid green.
NS LED (Network Status)	It is used to indicate the connection of DeviceNet communication card to communication on the network or the network power source status.

➢ NS LED Status

LED	Status	Cause	Trouble shooting
Off	Off-Line (No Power)	5V power source is not supplied to DeviceNet communication card.	Check whether the inverter power source is supplied or 5V power source is supplied to DeviceNet communication card
		Checking of duplicated Mac ID	Wait for 5 seconds at LED Off status while checking duplicated MAC ID after initializing of Option board at power On.
Flashing Green	On-Line Not Connected	Communication environment is ready after checking duplicated nodes but any node is not connected.	Normal operation prior to connecting.
Solid Green	On-Line, Connected (Link OK)	Connection of one EMC or more is set up	Available to connect I/O communication (Poll)
Flashing Red	Connection Time-Out Critical Link Failure.	Time out occurred during Poll I/O communication	Inverter Reset Request the reset service to Identity Object and then re-connect I/O.

| LED	Status	Cause	Trouble shooting
Solid Red	Abnormal condition	Duplicated MAC ID on Network	Change MAC ID set up.
		Bus Off from Network configuration	Check the connection with signal cable and then do Comm Update.
		Network power source is not supplied from DeviceNet connector.	Check network cable and power supply.
Green → Flashing Red	Self-diagnosis	Device under self-diagnosis	Wait for a moment
Red → Flashing Green	Communication Fault	In the event of Identity Communication Request Message is received at communication Fault status cased by failure of Network Access Passing.	Normal response

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➢ MS LED status

LED	Status	Cause	Trouble shooting
Off	No Power	DeviceNet communication card has no 5V power source.	Checking whether inverter power On or not. Checking the power source of DeviceNet communication card (5V).
Solid Green	Operational	Normal operation	-
Solid Red	Unrecoverable Fault	Interface communication between DeviceNet communication card and inverter is not made up.	Checking connection status between communication card and inverter.
Green → Flashing Red	Self Test	DeviceNet communication doing self-testing.	-

➢ LED Tip

▲ In the event that Reset occurs;

✓ MS (Module Status) LED flashes in Green – Red at every 0.5 second at the beginning and the interface communication between DeviceNet communication card and inverter comes to normal state, it becomes solid Green.

✓ Then, NS (Network Status) LED flashes in Green – Red at every 0.5 second.

✓ In the event there is no abnormality as a result of checking the redundant MAC ID, Network Status LED flashes in Green. It means this Device communication card is connected to the network in normal way, but communication is not made with any device.

✓ If it fails to run as above, please check any of following three cases. If it runs in normal way, you may disregard the following cases.

✓ If the interface communication between DeviceNet communication card and inverter doesn't in normal way, MS (Module Status) LED becomes solid Red. Be sure to check the connection between inverter and DeviceNet communication card first, and then turn on the inverter.

✓ In the event there is abnormality as a result of checking the redundant MAC ID, Network Status LED becomes solid Red. In this case, please configure MAC ID at the other value using keypad.

✓ In the event that the option board is in communication with the other Device, NS (Network Status) LED becomes solid Green.

▲ In the event of EMC (Explicit Message Connection) by EMC Scanner (Master)

✓ Network Status LED becomes solid Green. If EMC setting is released here, it flashed in Green again after 10 seconds. Once EMC is achieved, I/O connection is available. In this case Network Status LED is still continued.

✓ In the event that no communication is made within the time I/O connection is set, Time Out occurs, Network Status LED flashed in Red. (This Status can be changed into flashing Green again depending on the time setting of EMC)

✓ In the event that EMC is connected but I/O connection is not connected, if wire came out, Green LED is still continued On status.
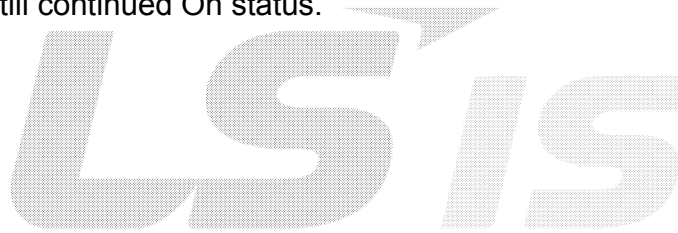
6. EDS (Electronic Data Sheets)

This file includes the information on the parameter of inverter. It is used when the user intends to control the parameters of SV-iS7 through the DeviceNet Manager program. In this case, it is necessary to install on PC the SV-iS7-use EDS file that we provide. EDS file can be downloaded from LSIS website (http://eng.lsis.biz).

The name of EDS file: Lsis_iS7_AcDrive.EDS
Revision: 2.01
The name of ICON: LSISInvDnet.ico

Paste the file of Lsis_iS7_AcDrive.EDS on EDS file folder by Master Configuration program and ICON files save at ICON folder.

Example) In case of SyCon program for XGT PLC series
Paste the file of Lsis_iS7_AcDrive.EDS in DevNet folder and ICON files save in BMP folder.
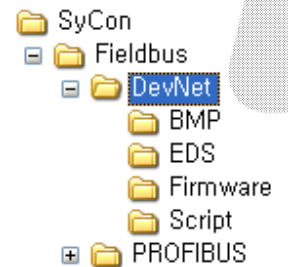
7. Keypad Parameter associated with DeviceNet

Code	Name of Parameter	Initial Value	Range	Description
CNF-30	Option-1 Type	-	-	When SV-iS7 DeviceNet communication card is installed, it indicates 'DeviceNet'.
DRV-6	Cmd Source	1. Fx/Rx-1	0. Keypad 1. Fx/Rx-1 2. Fx/Rx-2 3. Int 485 4. FieldBus 5. PLC	To command inverter run with DeviceNet, it requires setting as 4. FieldBus.
DRV-7	Freq Ref Src	0. Keypad-1	0. Keypad-1 1. Keypad-2 2. V1 3. I1 4. V2 5. I2 6. Int 485 7. Encoder 8. FieldBus 9. PLC	To command Inverter frequency with DeviceNet, it requires setting as 8. FieldBus.
COM-6	FBus S/W Ver	-	-	Indicates the version of DeviceNet communication card
COM-7	FBus ID	1	0~63	-
COM-8	FBus BaudRate	6. 125kbps	6. 125kbps 7 250kbps 8. 500kbps	Requires setting at Baud Rate used in the network with which inverter is connected.
COM-9	FBus Led	-	-	-

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Code	Name of Parameter	Initial Value	Range	Description
COM-29	In Instance	0. 70	0. 70 1. 71 2. 110 3. 111 4. 141 5. 142 6. 143 7. 144	Set the value of input instance to be used in class 0x04 (Assembly Object). At this parameter value is set, the Data Type to be received (Master based) at the time of Poll I/O communication is decided. At the time of changing in Instance, DeviceNet communication card is automatically reset. It cannot be modified while the inverter runs.
COM-30	ParaStatus Num	-	-	When COM-29 In Instance is set at 141~144, the value of COM-30 ParaStauts Num is displayed automatically. This parameter value is changed depending on the value of COM-29.
COM-31	Para Status-1	-	0~0xFFFF	It can be set/display in case of In Instance value between 141 ~ 144.
COM-32	Para Status-2	-	0~0xFFFF	
COM-33	Para Status-3	-	0~0xFFFF	
COM-34	Para Status-4	-	0~0xFFFF	
COM-49	Out Instance	0. 20	0. 20 1. 21 2. 100 3. 101 4. 121 5. 122 6. 123 7. 124	It set the value of Output Instance using at Class 0x04(Assembly Object). By setting of parameter value, Data type to transmit (Master-based) is decided in Poll I/O communication. In the event of changing Out Instance, DeviceNet communication card re-set automatically. The parameter cannot be modified during run status.
COM-50	Para Ctrl Num	-	-	When COM-49 Out Instance is set at 121~124, the value of COM-50 ParaStauts Ctrl Num is displayed automatically. This parameter value is changed depending on the value of COM-49.
COM-51	Para Control-1	-	0~0xFFFF	In event of the value of Out Instance between 121~124, it is displayed on Keypad and it can be set.
COM-52	Para Control-2	-	0~0xFFFF	
COM-53	Para Control-3	-	0~0xFFFF	
COM-54	Para Control-4	-	0~0xFFFF	
COM-94	Comm Update	0. No	0. No 1. Yes	It is used when DeviceNet communication card is initialized. If COM-94 is set with Yes, it is initialized and then it indicates No automatically.

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Code	Name of Parameter	Initial Value	Range	Description
PRT-12	Lost Cmd Mode	0. None	0. None	In case of DeviceNet communication, it executes Lost Command of Communication when Command of Polling Communication Data is lost.
			1. Free-Run	
			2. Dec	
			3. Hold Input	
			4. Hold Output	
			5. Lost Preset	
PRT-13	Lost Cmd Time	1.0 sec	0.1~120.0 sec	After I/O connection is disconnected, Lost Command will be occurred after setting time.
PRT-14	Lost Preset F	0.00 Hz	Start Freq~ Max Freq	If run method (PRT-12 Lost Cmd Mode) is set with No.5 Lost Preset when Speed Command is lost, protective function is operated and it is set the frequency to run continuously.

※ If you want to command for Run, Inverter Frequency by DeviceNet, DRV-06 Cmd Source, DRV-07 Freq Ref Src are set to FieldBus.

(1) FBus ID (COM-7)

✓ FBus ID falls under MAC ID (Media Access Control Identifier) that is called in DeviceNet.

✓ As this value is an indigenous value by which each Device is discriminated in DeviceNet network, it is not allowed for different Devices to have same values.

✓ This value is preset as 1 at the factory. In that event that interface communication is in trouble between DeviceNet communication card and inverter, change the MAC ID.

✓ In the event of modifying MAC ID during operation, DeviceNet communication card will be automatically reset. This is because it is essential to check if Device Using MAC ID value newly set is on the network.

✓ In the event the preset MAC ID value is the one that has already been used by other Device, NS (Network Status) LED will be changed to solid Red. Here, MAC ID can be changed into the other value using keypad again. After that, NS is flashing in green, it means its normal operation.

(2) FBus BaudRate (COM-8)

✓ In the event that the communication speed setting is not same as that used in the network, NS LED maintains Off state.

✓ In the event changing the Baud rate using keypad, in order for the changed Baud rate to influence the actual communication speed, it is necessary to send Reset service to the Identity Object of inverter through communication or reset the inverter.

✓ You may reset the inverter using COM-94 Comm Update.

※ In the event that Network's Baud rate corresponds with Option card's Baud rate and MAC ID is only one, NS LED flashes in green.

(3) FBus Led (COM-9)

✓ DeviceNet communication card has MS LED and NS LED only, but four LEDs are shown from COM-9 FBus LED using keypad. It displays the information of MS LED Red, MS LED Green, NS LED Red, NS LED Greed in the order of COM-09 LEDs (Left → Right).

✓ If COM-9 is displayed as below, it indicates that currently MS LED RED and NS LED RED.

Example of COM-09 Fbus LED status)
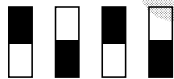
MS LED Red	MS LED Green	NS LED Red	NS LED Green
ON	OFF	ON	OFF

(4) In Instance, Out Instance (COM-29, COM-49)

✓ In Instance, Out Instance is used in the Poll I/O data communication. Poll I/O connection is the Connection to communicate specific data between Scanner (Master) and Inverter.

✓ Type of data sent through Poll I/O is decided by the Assembly Instances (COM-29, COM-49).

✓ In case of instance 20, 21, 100, 101, 70, 71, 110 and 111, the amount of data sent to by Poll I/O communication is 4 bytes in both directions, and the communication cycle default value is 0 (zero).

✓ In case of the other instances, the amount of data sent by Poll I/O communication is 8 bytes in both directions.

✓ Assembly Instance can be broadly divided into Output and Input based on Scanner. That is, Input Data means the amount of data stored in Scanner. It means the value for inverter to feed back to scanner. On the contrary, Output Data means the amount of data supplied from scanner, which is a new command value for inverter.

✓ In the event of changing the value of In Instance or Out Instance, DeviceNet communication card is automatically reset.
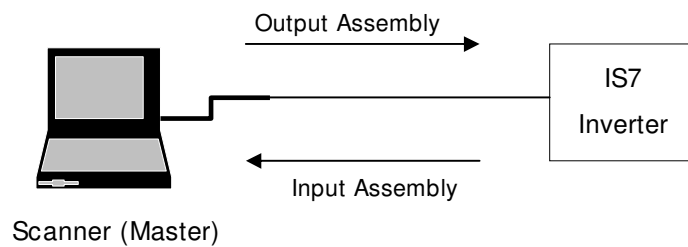
	From the viewpoint of scanner	From the viewpoint of scanner
Input Assembly Data	Receiving data	Transmitting data
Output Assembly Data	Receiving data	Transmitting data

✓ In the event of setting COM-29 (In Instance) at 141 ~ 144, COM-30 ~ 38 are displayed. The using parameters are COM-30 ~ 34 from COM-30 ~ 38. In the event of setting the values other than 141 ~ 144, COM-30 ~ 38 are not displayed.

✓ Followings are the value of COM-30 Para Status Num automatically set and valid Parameter Status with Poll I/O communication depending on the value of In Instance set.

In	COM-	COM-	COM-	COM-	COM-	COM-	COM-	COM-	COM-
141	1	○	×	×	×	×	×	×	×
142	2	○	○	×	×	×	×	×	×
143	3	○	○	○	×	×	×	×	×
144	4	○	○	○	○	×	×	×	×

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✓ Out Instance can be applied in the same way as explained for In Instance.

✓ In the event of setting COM-49 Out Instance at 121 ~ 124, COM-50 ~ 58 are displayed. The using parameters are COM-50 ~ 54 from COM50 ~ 58. In the event of setting the value other than 121 ~ 124 to Out Instance, COM-50 ~ 58 are not displayed

✓ Followings are the value of COM-50 Para Ctrl Num automatically set and valid Parameter Control with communication depending on the value of Out Instance set.

Out	COM-	COM-	COM-	COM-	COM-	COM-	COM-	COM-	COM-
121	1	○	×	×	×	×	×	×	×
122	2	○	○	×	×	×	×	×	×
123	3	○	○	○	×	×	×	×	×
124	4	○	○	○	○	×	×	×	×

8. Definition of Object Map

DeviceNet communication consists of the assemblies of Objects.

Following terminologies are used to explain the Objet of DeviceNet.

Terminology	Definition
Class	Assembly of Objects having similar function
Instance	Concrete expression of Object
Attribute	Property of Object
Service	Function supported by Object or Class

Followings are the definition of Object used in SV-iS7 DeviceNet.

Class Code	Object Class Name
0x01	Identity Object
0x03	DeviceNet
0x04	Assembly
0x05	Connection
0x28	Motor Data
0x29	Control Supervisor
0x2A	AC/DC Drive
0x64	Inverter

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8. 1 Class 0x01 (Identity Object) Instance 1 (Entire device, host and adapter)

(1) Attribute

Attribute ID	Access	Attribute Name	Data Length	Attribute Value
1	Get	Vendor ID (LS Industrial System)	Word	259
2	Get	Device Type (AC Drive)	Word	2
3	Get	Product Code	Word	11 (note 1)
4	Get	Revision Low Byte - Major Revision High Byte - Minor Revision	Word	(note 2)
5	Get	Status	Word	(note 3)
6	Get	Serial Number	Double Word	
7	Get	Product Name	13 Byte	IS7 DeviceNet

(note1) Production Code 11 means SV-iS7 inverter.

(note2) Revision corresponds with the version DeviceNet communication card. High Byte means Major Revision and Low Byte means Minor Revision. For example, 0x0102 means 2.01. DeviceNet communication card version is displayed in Keypad COM-6 FBUS S/W Version.

(note 3)

Bit	0 (Owned)	8 (Recoverable Minor Fault)	Other Bits
Meaning	0: Device is not connected to Master. 1: Device is connected to Master.	0: Normal state of Inverter Interface communication 1: Abnormal state of Inverter Interface communication	Not support

(2) Service

Service Code	Definition	Support for Class	Support for Instance
0x0E	Get Attribute Single	No	Yes
0x05	Reset	No	Yes

8. 2 Class 0x03 (DeviceNet Object) Instance 1

(1) Attribute

Attribute ID	Access	Attribute Name		Data Length	Initial Value	Range	Description
1	Get/ Set	MAC ID [(note4)]		Byte	1	0~63	Address value of DeviceNet communication card
2	Get	Baud Rate [(note 5)]		Byte	0	0	125kbps
						1	250kbps
						2	500kbps
5	Get	Allocation Information [(note6)]	Allocation Choice Byte	Word	-	Bit 0	Explicit Message
						Bit1	Polled
			Master's MAC ID		-	0~63 255	Changed with Allocate only

(note4) MAC ID get/set its value in COM-07 FBus ID.

(note5) Bud Rate get/set the value of FBus Baudrate of COM-08.

(note6) It consists of 1 Word, Upper byte indicates MASTER ID connected and Lower byte indicates the type of communication between Master and Slave. Here, Master means not configuration, it means the device can communicate I/O communication, PLC etc. For reference, in the event of Master is not connected, it indicates 0xFF00 of Default Master ID. There is 2 type of communication type. In case of Explicit communication of non-periodic communication is possible, first bit is 1 and Polled communication of periodic communication is possible, second bit is 1. For example, PLC MASTER is 0 and if communication Explicit and Polled are possible, Allocation Information becomes 0x0003. If Master is not connected, it indicates 0xFF00.

(2) Service

Service Code	Definition	Support for Class	Support for Instance
0x0E	Get Attribute Single	Yes	Yes
0x10	Set Attribute Single	No	Yes
0x4B	Allocate Master/Slave Connection Set	No	Yes
0x4C	Release Group2 Identifier Set	No	Yes

8. 3 Class 0x04 (Assembly Object)

In Instance 70/110

Instance	Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
70/110	0	-	-	-	-	-	Running Fwd	-	Faulted
	1	0x00							
	2	Speed actual (Low byte) Instance 70 - RPM unit Instance 110 - Hz unit							
	3	Speed actual (High byte) Instance 70 - RPM unit Instance 110 - Hz unit							

Detailed description of Instance 70/110

Byte 0	Bit0	Faulted	Signal on the occurrence of inverter Trip 0: Inverter in normal condition 1: Occurrence of inverter Trip
	Bit2	Running Fwd	Indicates the information if inverter runs in forward direction 0: Not in forward direction. 1: In forward direction
Byte 2 Byte 3	Speed reference		Instance 70: Indicates the current information on inverter running speed in [rpm]. Instance 110: Indicates the current information on inverter running speed in [Hz].

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In Instance 71/111

Instance	Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
71/111	0	At Ref.	Ref From Net	Ctrl From Net	Ready	Running Rev	Running Fwd	-	Faulted
	1	0x00							
	2	Speed actual (Low byte) Instance 71 - RPM unit Instance 111 - Hz unit							
	3	Speed actual (High byte) Instance 71 - RPM unit Instance 111 - Hz unit							

Detailed description of Instance 70/110

Byte 0	Bit0	Faulted	Signal on the occurrence of inverter Trip 0 : Inverter in normal condition 1 : Occurrence of Inverter Trip
	Bit2	Running Fwd	Indicates the information if Inverter runs in forward direction. 0 : Not in forward direction. 1 : In forward direction
	Bit3	Running Rev	Indicates the information if Inverter runs in reverse direction. 0 : Not in reverse direction. 1 : In reverse direction
	Bit4	Ready	Indicates the status information if Inverter is ready to run 0 : Inverter is not ready to run 1 : Inverter is ready to run When the power of inverter is ON, this value always becomes 1.
	Bit5	Ctrl From Net	Indicates if the current run command source is communication. 0: In case inverter run is commanded from the other source than communication 1: In the event inverter run command is from communication, this value becomes 1 if the set value of DRV-06 Cmd Source is FieldBus.

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Bit6	Ref From Net	Indicates if the current frequency command source is communication. 0: In case inverter frequency command is from the other source than communication 1: In the event inverter frequency command is from communication, this value becomes 1 if the set value of DRV-07 Freq Ref Source is FieldBus.	
Bit7	At Ref	Indicates the current frequency reached the Reference frequency. 0 : Current frequency fails to reach Reference frequency. 1 : Current frequency reached Reference frequency	
Byte 2 Byte 3	Speed reference	Instance 71 : Indicates the current information on inverter running speed in [rpm]. Instance 111 : Indicates the current information on inverter running speed in [Hz]	

Table of other Attribute associated with In Instance (70, 71, 110, 111)

Name	Description	Related Attribute		
		Class	Instance	Attribute
Faulted	Inverter error occurs in interface communication or inverter Trip.	0x29	1	10
Running Fwd	Motor is running in forward direction.	0x29	1	7
Running Rev	Motor is running in reverse direction.	0x29	1	8
Ready	Motor is ready to run.	0x29	1	9
Ctrl From Net	Run/Stop control Signal 1 : DeviceNet is the inverter run command source.	0x29	1	15
Ref From Net	Speed control command signal 1 : DeviceNet is the inverter run command source.	0x2A	1	29
At Reference	Checks if the current frequency corresponds with the object frequency 1 : Command frequency is same as the current frequency	0x2A	1	3
Drive State	Current Motor State	0x29	1	6
Speed Actual	Indication the current run frequency	0x2A	1	7

In

Instance 141/142/143/144

When In Instance is set at 141, 142, 143 and 144, Receive (Master-based) Poll I/O data information is not fixed, and the address of the data that the user intends to use in COM-31~34 is configured, allowing the user flexibility.

When In Instance 141, 142, 143 and 144, DeviceNet communication card sends Master each data in 2 Bytes, 4 Bytes, 6 Bytes, 8 Bytes. The Byte of the data to be sent is fixed depending on the set value of In Instance. For example, If In Instance is set at 141, it transmits the data in 2 Bytes. But In Instance is set at 143, it transmits the data in 6 Bytes.

Instance			Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
		141	0	Low Byte of the Address set at COM-31 Para State-1							
			1	High Byte of the Address set at COM-31 Para State-1							
		142	2	Low Byte of the Address set at COM-32 Para State-2							
			3	High Byte of the Address set at COM-32 Para State-2							
		143	4	Low Byte of the Address set at COM-33 Para State-3							
			5	High Byte of the Address set at COM-33 Para State-3							
		144	6	Low Byte of the Address set at COM-34 Para State-4							
			7	High Byte of the Address set at COM-34 Para State-4							

Output Instance 20/100

Instance	Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
20/100	0	-	-	-	-	-	Fault Reset	-	Run Fwd
	1	-							
	2	Speed reference (Low byte) Instance 20 - RPM unit Instance 100 - Hz unit							
	3	Speed reference (High byte) Instance 20 - RPM unit Instance 100 - Hz unit							

Detailed description of Instance 20/100

Byte 0	Bit0	Run Fwd	Commands Forward Direction Run. 0 : Stop forward direction run 1 : Forward direction run command
	Bit2	Fault Reset	Resets when error occurs. It happens only when inverter trip occurs. 0: It doesn't adversely affect the inverter. (You may not be concerned about it) 1: performs Trip Reset.
Byte 2 Byte 3	Speed reference		Instance 20: Commands the inverter speed in [rpm] Instance 100: Commands the inverter speed in [Hz].

Output Instance 21/101

Instance	Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
21/101	0	-	-	-	-	-	Fault Reset	Run Rev	Run Fwd
	1	-							
	2	Speed reference (Low byte) Instance 21 - RPM unit Instance 101 - Hz unit							
	3	Speed reference (High byte) Instance 21 - RPM unit Instance 101 - Hz unit							

Detailed description of Instance 21/101

Byte 0	Bit0	Run Fwd	Command forward direction run. 0 : Stop forward direction run 1 : Forward direction run command
	Bit1	Run Rev	Commands reverse direction run. 0 : Stop reverse direction run 1 : Reverse direction run command
	Bit2	Fault Reset	Reset when error occurs. It happens only when inverter Trip occurs. 0 : It doesn't affect the inverter. (You may not be concerned about it. 1 : Performs Trip reset
Byte 2 Byte 3	Speed reference		Instance 21 : Commands the inverter speed in [rpm]. Instance 101 : Commands the inverter speed in [Hz].

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Table of other Attribute associated with In Instance (20, 21, 100, 101)

Name	Description	Related Attribute		
		Class	Instance	Attribute ID
Run Fwd [note6]	Forward Run Command	0x29	1	3
Run Rev [note6]	Reverse Run Command	0x29	1	4
Fault reset [note6]	Fault Reset Command	0x29	1	12
Speed reference	Speed Command	0x2A	1	8

note6) Refer to Drive Run and Fault of 6.6 Class 0x29 (Control Supervisor Object).

Out Instance 121/122/123/124

When Out Instance is set at 121, 122, 123 and 124, Send (Master-based) Poll I/O Data Information is not fixed, but the address of the data that the user intends to for COM-51~54 is set, giving the user flexibility.

At the time of using Out Instance 121, 122, 123 and 124, DeviceNet communication card receives from Master the data of 2Bytes, 4Bytes, 6Bytes and 8Bytes. However, the number of information received is decided depending on the set value of Out Instance. For example, if Out Instance is set at 122, the DeviceNet communication card receives the data value of 4Bytes.

Instance		Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
121		0	Low Byte of the Address set at COM-51 Para State-1							
		1	High Byte of the Address set at COM-51 Para Control1							
122		2	Low Byte of the Address set at COM-52 Para Control-2							
		3	High Byte of the Address set at COM-52 Para Control-2							
123		4	Low Byte of the Address set at COM-53 Para Control-3							
		5	High Byte of the Address set at COM-53 Para Control-3							
124		6	Low Byte of the Address set at COM-54 Para Control-4							
		7	High Byte of the Address set at COM-54 Para Control-4							

8.4 Class 0x05 (DeviceNet Connection Object)

(1) Instance

Instance	Instance Name
1	Predefined EMC
2	Poll I/O
6, 7, 8, 9, 10	Dynamic EMC

(2) Attribute

Attribute ID	Access Established/ Timed Out	Access Established/ Deffered delete	Attribute Name
1	Get	Get	State
2	Get	Get	Instance type
3	Get	Get	Transport Trigger Class
4	Get/Set	Get	Produced Connection ID
5	Get/Set	Get	Consumed Connection ID
6	Get	Get	Initial Comm Characteristics
7	Get	Get	Produced Connection Size
8	Get	Get	Consumed Connection Size
9	Get/Set	Get/Set	Expected Packet Rate
12	Get/Set	Get/Set	Watchdog Timeout Action
13	Get	Get	Produced Connection Path Length
14	Get	Get	Produced Connection Path
15	Get	Get	Consumed Connection Path Length
16	Get	Get	Consumed Connection Path
17	Get/Set	Get	Production Inhibit Time

(3) Service

Service Code	Definition	Support for Class	Support for Instance
0x0E	Get Attribute Single	No	Yes
0x05	Reset	No	Yes
0x10	Set Attribute Single	No	Yes

8.5 Class 0x28 (Motor Data Object) Instance 1

(1) Attribute

Attribute ID	Access	Attribute Name	Range	Definition
3	Get	Motor Type	7	Squirrel-cage induction motor (Fixed Value)
6	Get/Set	Motor Rated Curr	0~0xFFFF	[Get] Reads the value of BAS-13 Rated Curr [Set] Set value is reflected to BAS-13 Rated Curr Scale 0.1
7	Get/Set	Motor Rated Volt	0~0xFFFF	[Get] Reads the value of BAS-15 Rated Volt. [Set] Set value is reflected to BAS-15 Rated Volt. Scale 1

(2) Service

Service Code	Definition	Support for Class	Support for Instance
0x0E	Get Attribute Single	No	Yes
0x10	Set Attribute Single	No	Yes

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8.**6 Class 0x29 (Control Supervisor Object) Instance 1**

(1) Attribute

Attribute ID	Access	Attribute Name	Initial value	Range	Definition
3	Get / Set	Forward Run Cmd.	0	0	Stop
				1	Forward Direction Run
4	Get / Set	Reverse Run Cmd.	0	0	Stop
				1	Reverse Direction Run
5	Get	Net Control	0	0	Run Command with the Source other than DeviceNet communication
				1	Run Command with DeviceNet communication Source
6	Get	Drive State	3	0	Vendor Specific
				1	Startup
				2	Not Ready (State of resetting)
				3	Ready (State of Stopping)
				4	Enabled (Acceleration, Constant Speed)
				5	Stopping (State of Stopping)
				6	Fault Stop
				7	Faulted (Trip Occurred)
7	Get	Running Forward	0	0	State of Stopping
				1	State of running in forward direction
8	Get	Running Reverse	0	0	State of Stopping
				1	State of running in reverse direction
9	Get	Drive Ready	1	0	State of resetting or Trip occurred.
				1	Normal condition where inverter can run
10	Get	Drive Fault	0	0	State that Trip doesn't occur at present
				1	State that Trip occurred at present. Falls under the case of Latch Trip
12	Get / Set	Drive Fault Reset	0	0	-
				1	Trip Reset to release trip after the occurrence of Trip
13	Get	Drive Fault Code	0		Refer to the Table of Drive Fault Code as below
14	Get	Control From Net. (DRV-06 Cmd Source)	0	0	Run Command with the Source other than DeviceNet communication
				1	Run Command with DeviceNet communication Source

Inverter Operation with Forward Run Cmd. and Reverse Run Cmd.

Run1	Run2	Trigger Event	Run Type
0	0	Stop	NA
0 -> 1	0	Run	Run 1
0	0->1	Run	Run 2
0 -> 1	0->1	No Action	NA
1	1	No Action	NA
1->0	1	Run	Run2
1	1->0	Run	Run1

In the above table, Run1 indicates Forward Run Cmd. And Run 2 indicates Reverse Run Cmd. That is, Option board will be command to inverter at the moment that the status is changed from 0 (FALSE) to 1 (TRUE). The value of Forward Run Cmd. indicates the value of option board Run Command not current status of inverter run.

Drive Fault
Drive Fault becomes TRUE when Inverter has a Trip. Drive Fault Codes are as follows.

Drive Fault Reset
Inverter commands TRIP RESET when Drive Fault Reset is becomes 0 -> 1; that is FALSE -> TRUE. In the event of 1 (TRUE) command is repeated at 1 (TRUE) status, TRIP RESET command is not valid to inverter Trip. TRIP RESET command can be valid to command 0 (FAULT) at 1 (TRUE) status and then command 1 (TRUE).

Drive Fault Code

Fault Code Number	Description		
0x0000	None		
0x1000	Ethermal	Out Phase Open	InverterOLT
	InPhaseOpen	ThermalTrip	UnderLoad
	ParaWriteTrip	IOBoardTrip	PrePIDFail
	OptionTrip1	OptionTrip2	OptionTrip3
	LostCommand	UNDEFINED	LostKeypad
0x2200	OverLoad		
0x2310	OverCurrent1		
0x2330	GFT		
0x2340	OverCurrent2		
0x3210	OverVoltage		
0x3220	LowVoltage		
0x2330	GroundTrip		
0x4000	NTCOpen		
0x4200	OverHeat		
0x5000	FuseOpen	HWDiag	
0x7000	FanTrip		
0x7120	No Motor Trip		
0x7300	EncorderTrip		
0x8401	SpeedDevTrip		
0x8402	OverSpeed		
0x9000	ExternalTrip	BX	

(2) Service

Service Code	Definition	Support for Class	Support for Instance
0x0E	Get Attribute Single	No	Yes
0x10	Set Attribute Single	No	Yes

8.7 Class 0x2A (AC Drive Object) Instance 1

(1) Attribute

Attribute ID	Access	Attribute Name	Range	Definition
3	Get	At Reference	0	Frequency command is not set by Keypad.
			1	Frequency command is set by Keypad.
4	Get	Net Reference	0	Frequency command is not set by Fieldbus.
			1	Frequency command is set by Fieldbus.
6	Get	Drive Mode (note7)	0	Vendor Specific Mode
			1	Open Loop Speed (Frequency)
			2	Closed Loop Speed Control
			3	Torque Control
			4	Process Control (e.g.PI)
7	Get	SpeedActual	0~24000	Indicates current output frequency in [rpm] unit.
8	Get / Set	SpeedRef	0~24000	Commands the target frequency in [rpm] unit. It can be applied with the setting 8.FieldBus of DRV-07 Freq Ref Src. Range Error will be occurred when speed command is set larger than MAX. Frequency of inverter.
9	Get	Actual Current	0~111.0 A	Monitor the present current by 0.1 A unit.
29	Get	Ref.From Network	0	Frequency command source is not DeviceNet communication.
			1	Frequency command source is DeviceNet communication.
100	Get	Actual Hz	0~400.00 Hz	Monitor the current frequency (Hz unit).
101	Get / Set	Reference Hz	0~400.00 Hz	Command frequency can be set by communication when DRV-07 Freq Ref Src is set 8.FieldBus. Range Error will be occurred when speed command is set larger than MAX. Frequency of inverter.
102	Get / Set	Acceleration Time (note8)	0~6000.0 sec	Set/Monitor the inverter acceleration time.
103	Get /Set	Deceleration Time (note9)	0~6000.0 sec	Set/Monitor the inverter deceleration time.

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(note7) It related with DRV-10 Torque Control, APP-01 App Mode. If DRV-10 Torque Control is set to Yes, Drive Mode becomes "Torque Control". If APP-01 App Mode is set to Proc PID, MMC, Drive Mode becomes "Process Control (e.g.PI)".
(note8) It is related with DRV-03 Acc Time.
(note9) It is related with DRV-04 Dec Time.

(2) Service

Service Code	Definition	Support for Class	Support for Instance
0x0E	Get Attribute Single	Yes	Yes
0x10	Set Attribute Single	No	Yes

8.8 Class 0x64 (Inverter Object) – Manufacture Profile
(1) Attribute

Instance	Access	Attribute Number	Attribute Name	Attribute Value
2 (DRV Group)				
3 (BAS Group)				
4 (ADV Group)				
5 (CON Group)				
6 (IN Group)				
7 (OUT Group)	Get/Set	Identical with iS7 Manual Code	iS7 Keypad Title (Refer to iS7 Manual)	Setting range of iS7 Parameter (Refer to iS7 Manual)
8 (COM Group)				
9 (APP Group)				
10 (AUT Group)				
11 (APO Group)				
12 (PRT Group)				
13 (M2 Group)				

(2) Service

Service Code	Definition	Support for Class	Support for Instance
0x0E	Get Attribute Single	Yes	Yes
0x10	Set Attribute Single	No	Yes

※ Read Only which is the parameter attribute of inverter is not support the Set Service.

Warranty

Product Name	LSIS Communication Option Card	Installation Date	
Model Name	SV-iS7 DeviceNet Communication Card	Warranty Period	
Customer	Name		
	Address		
	Tel.		
Sales Office	Name		
	Address		
	Tel.		

Note
This product has been manufactured through the strict QC control and inspection of LS Industrial Systems. Warranty period is 12 months after installation or 18 months after manufactured when the installation date is unidentified. However, the guarantee term may vary on the sales term.

● In-warranty service information

  ▸ If the defective part has been identified under normal and proper use within the guarantee term, contact your local authorized LS distributor or LS Service center.

● Out-of-warranty service information

  ▸ The guarantee will not apply in the following cases.
  ▸ Troubles are attributable to a user's intentional negligence or carelessness.
  ▸ Damage was caused by abnormal voltage and peripheral devices' malfunction (failure).
  ▸ Damage was caused by natural disasters (earthquake, fire, flooding, lightning and etc).
  ▸ When LS nameplate is not attached.