

LS Industrial Systems Co., Ltd.

STARVERT Inverter Series

LSBus Driver

Supported version

TOP Design Studio

V1.0 or higher



CONTENTS

We want to thank our customers who use the Touch Operation Panel.

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Select a TOP model and an external device.
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Describes how to set the TOP communication.
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Describes how to set up communication for external devices.
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Describes the cable specifications required for connection.
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Refer to this section to check the addresses which can communicate with an external device.

1. System configuration

The system configuration of TOP and "STARVERT Inverter" is as follows:

Series	CPU	Link I/F	Communication method	System setting	Cable
STARVERT	SV-IS7	Built-in communication port	RS-485	3. TOP communication setting 4. External device setting	5.1. Cable table 1
	SV-iG5A	Built-in communication port	RS-485		5.1. Cable table 1
		RS485 option baud	RS-485		5.2. Cable table 2
	SV-iP5A	Built-in communication port	RS-485		5.1. Cable table 1
		RS485 option baud	RS-485		5.2. Cable table 2
	SV-iC5	RS485 option baud	RS-485		5.2. Cable table 2
	SV-iV5	RS485 option baud	RS-485		5.2. Cable table 2
	SV-iG5	Built-in communication port	RS-485		5.1. Cable table 1
	SV-IS5	RS485 option baud	RS-485		5.2. Cable table 2
	SV-iH	RS485 option baud	RS-485		5.2. Cable table 2
SV-iV	RS485 option baud	RS-485	5.2. Cable table 2		
SV-IS3	RS485 communication card	RS-485	5.2. Cable table 2		

■ Connectable configuration

- 1:1 (one TOP and one external device) connection – configuration which is possible in RS232C/422/485 communication.

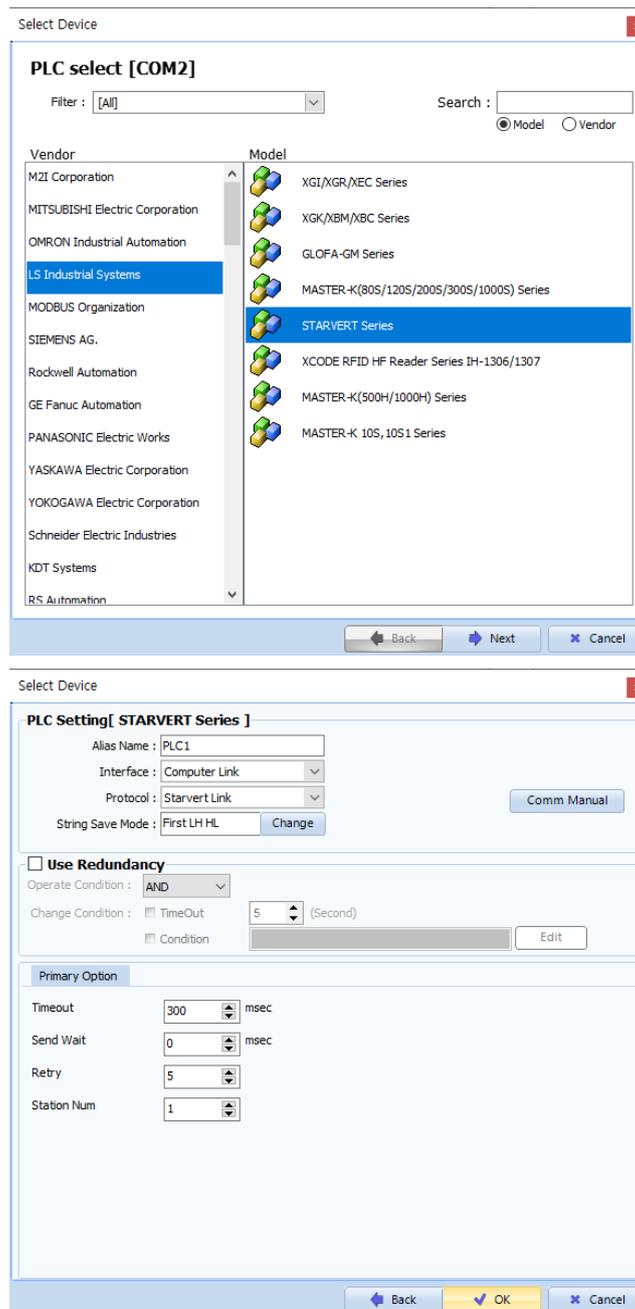


- 1:N (one TOP and multiple external devices) connection – configuration which is possible in RS422/485 communication.



2. External device selection

- Select a TOP model and a port, and then select an external device.



Settings		Contents					
TOP	Model	Check the TOP display and process to select the touch model.					
External device	Vendor	Select the vendor of the external device to be connected to TOP. Select "LS Industrial Systems".					
	PLC	Select an external device to connect to TOP. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Model</th> <th>Interface</th> <th>Protocol</th> </tr> </thead> <tbody> <tr> <td>STARVERT Series</td> <td>Computer Link</td> <td>STARVERT Link</td> </tr> </tbody> </table> <p>Please check the system configuration in Chapter 1 to see if the external device you want to connect is a model whose system can be configured.</p>	Model	Interface	Protocol	STARVERT Series	Computer Link
Model	Interface	Protocol					
STARVERT Series	Computer Link	STARVERT Link					

3. TOP communication setting

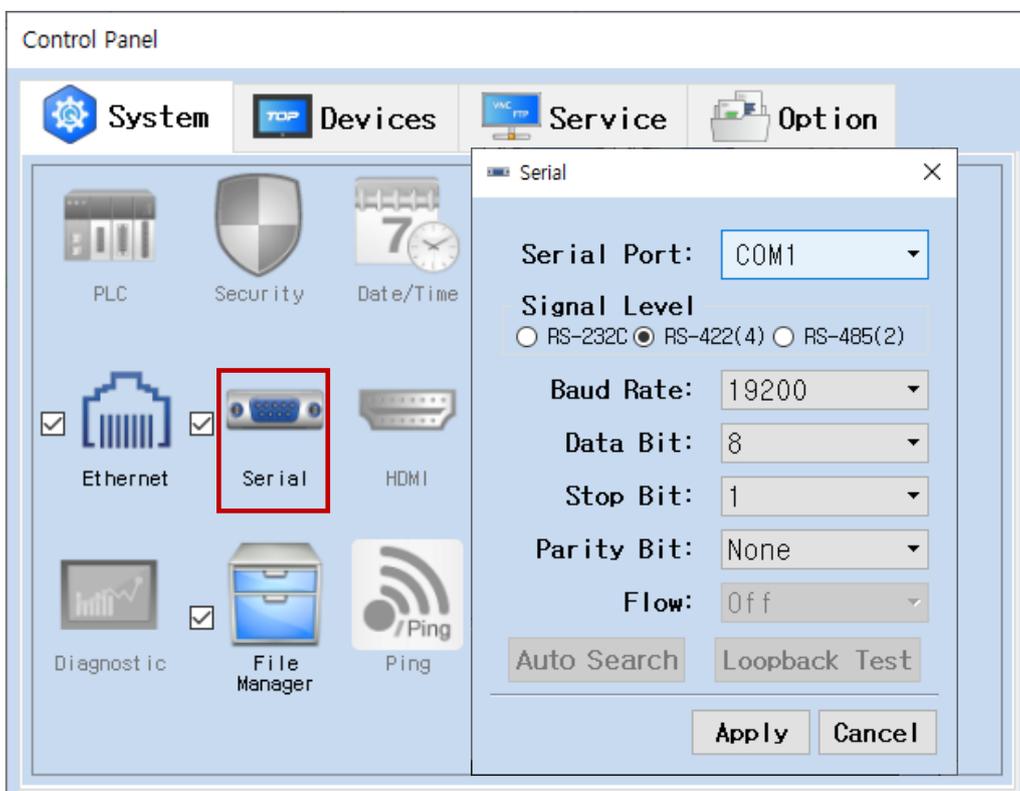
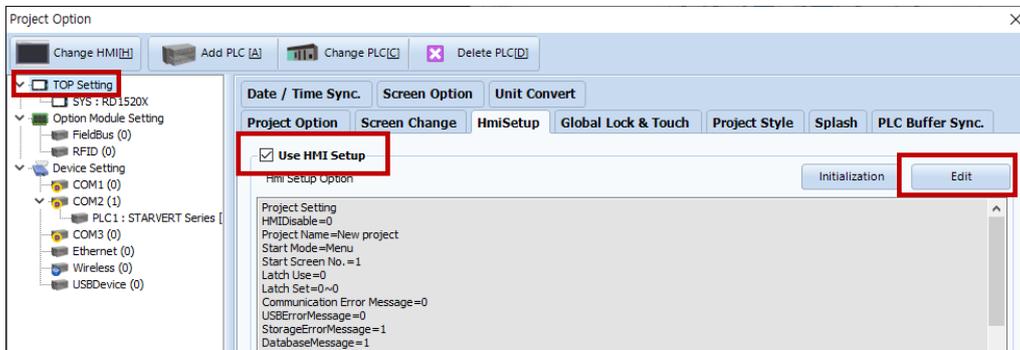
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

■ [Project > Project Property > TOP Setting] → [Project Options > "Use HMI Setup" Check > Edit > Serial]

– Set the TOP communication interface in TOP Design Studio.



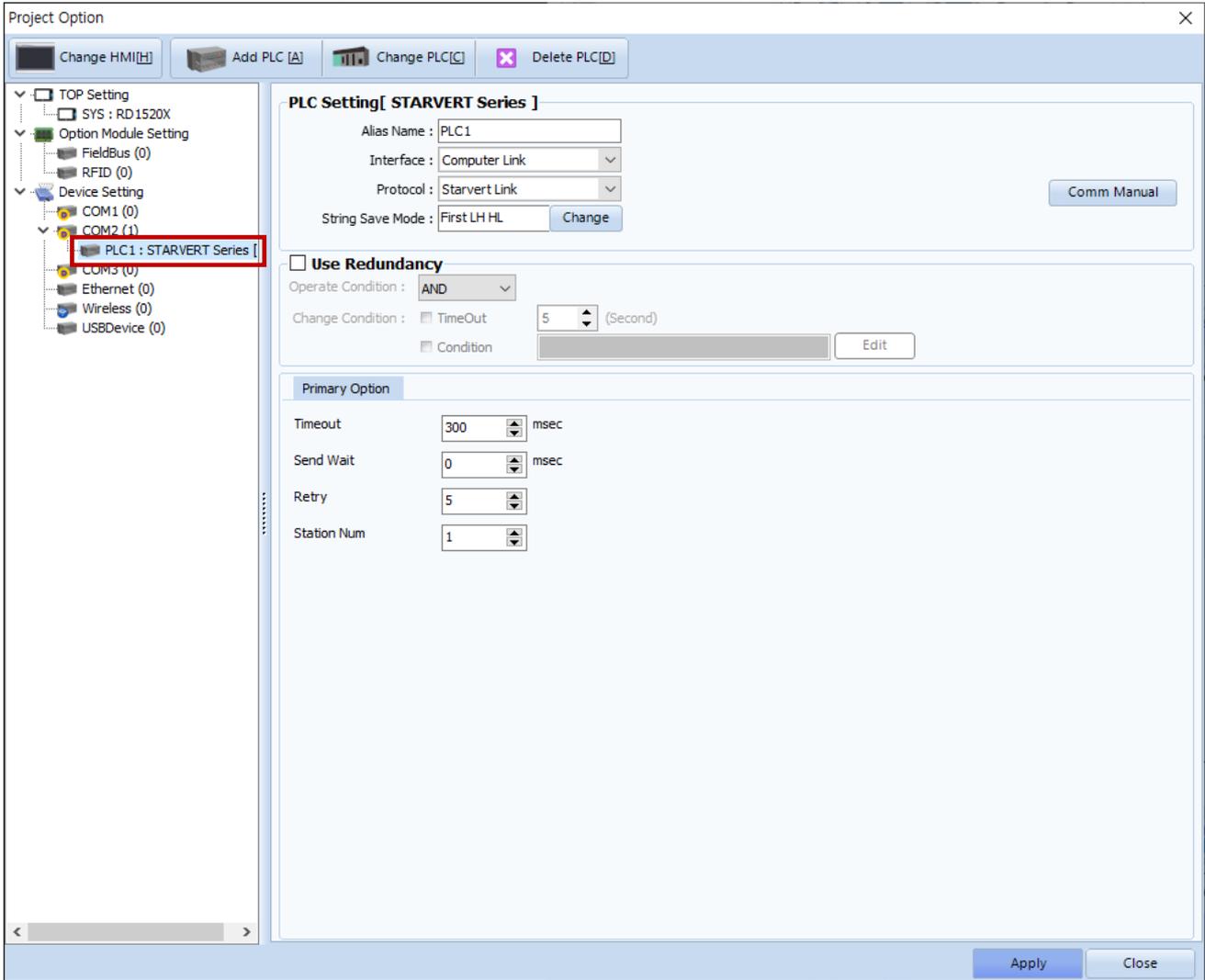
Items	TOP	External device	Remarks
Signal Level (port)	RS-232C RS-422/485	RS-232C RS-422/485	
Baud Rate	19200		
Data Bit	8		
Stop Bit	1		
Parity Bit	None.		

* The above settings are examples recommended by the company.

Items	Description
Signal Level	Select the serial communication method between the TOP and an external device.
Baud Rate	Select the serial communication speed between the TOP and an external device.
Data Bit	Select the serial communication data bit between the TOP and an external device.
Stop Bit	Select the serial communication stop bit between the TOP and an external device.
Parity Bit	Select the serial communication parity bit check method between the TOP and an external device.

(2) Communication option setting

- [Project > Project Property > PLC Settings > CO1 > "STARVERT Series"]
- Set the options of the Computer Link communication driver in TOP Design Studio.

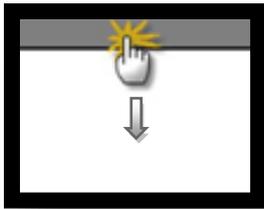


Items	Settings	Remarks
Interface	Configure the communication interface between the TOP and an external device.	Refer to "2. External device selection".
Protocol	Configure the communication protocol between the TOP and an external device.	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	

3.2. Communication setting in TOP

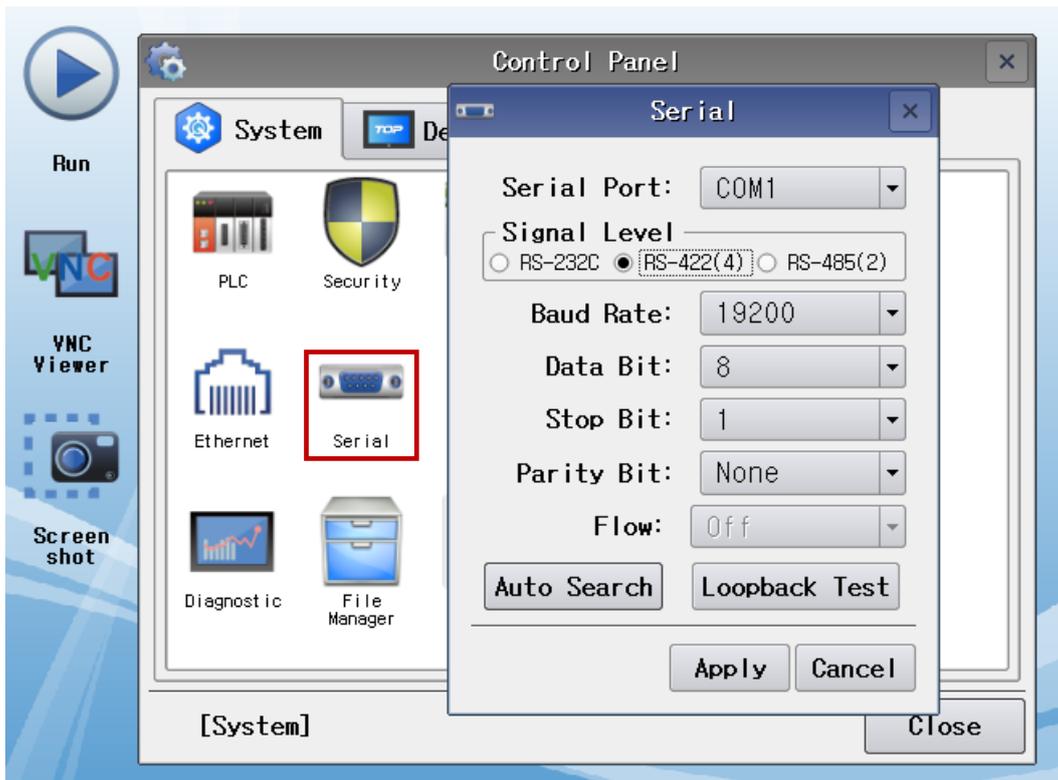
* This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.

- Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.



(1) Communication interface setting

- [Main Screen > Control Panel > Serial]



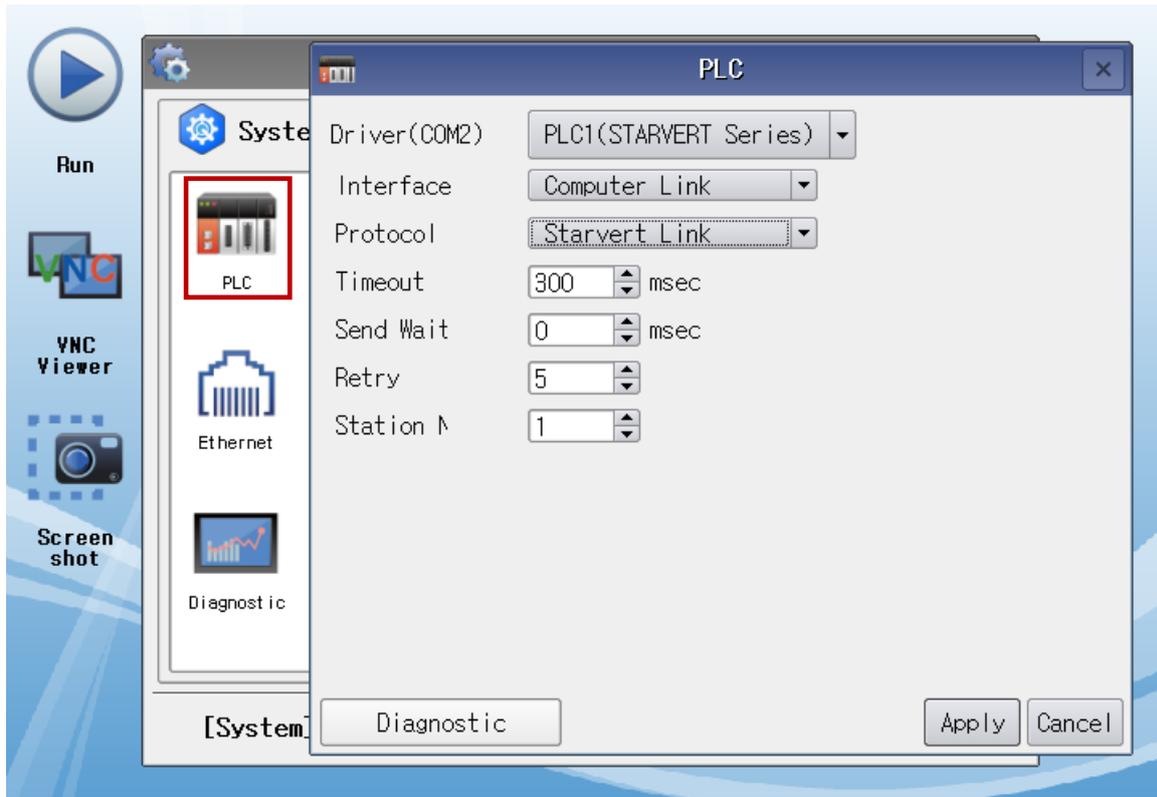
Items	TOP	External device	Remarks
Signal Level (port)	RS-232C RS-422/485	RS-232C RS-422/485	
Baud Rate	19200		
Data Bit	8		
Stop Bit	1		
Parity Bit	None.		

* The above settings are setting examples recommended by the company.

Items	Description
Signal Level	Select the serial communication method between the TOP and an external device.
Baud Rate	Select the serial communication speed between the TOP and an external device.
Data Bit	Select the serial communication data bit between the TOP and an external device.
Stop Bit	Select the serial communication stop bit between the TOP and an external device.
Parity Bit	Select the serial communication parity bit check method between the TOP and an external device.

(2) Communication option setting

■ [Main Screen > Control Panel > PLC]



Items	Settings	Remarks
Interface	Configure the communication interface between the TOP and an external device.	Refer to "2. External device selection".
Protocol	Configure the communication protocol between the TOP and an external device.	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	

3.3 Communication diagnostics

- Check the interface setting status between the TOP and an external device.
 - Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.
 - Check if the COM port settings you want to use in [Control Panel > Serial] are the same as those of the external device.

- Diagnosis of whether the port communication is normal or not
 - Touch "Communication diagnostics" in [Control Panel > PLC].
 - The Diagnostics dialog box pops up on the screen and determines the diagnostic status.

OK	Communication setting normal
Time Out Error	Communication setting abnormal - Check the cable, TOP, and external device setting status. (Reference: Communication diagnostics sheet)

- Communication diagnostics sheet
 - If there is a problem with the communication connection with an external terminal, please check the settings in the sheet below.

Items	Contents	Check		Remarks	
System configuration	How to connect the system	OK	NG	1. System configuration	
	Connection cable name	OK	NG		
TOP	Version information	OK	NG	2. External device selection 3. Communication setting	
	Port in use	OK	NG		
	Driver name	OK	NG		
	Other detailed settings	OK	NG		
	Relative prefix	Project setting	OK		NG
		Communication diagnostics	OK		NG
	Serial Parameter	Transmission Speed	OK		NG
Data Bit		OK	NG		
Stop Bit		OK	NG		
Parity Bit		OK	NG		
External device	CPU name	OK	NG	4. External device setting	
	Communication port name (module name)	OK	NG		
	Protocol (mode)	OK	NG		
	Setup Prefix	OK	NG		
	Other detailed settings	OK	NG		
	Serial Parameter	Transmission Speed	OK		NG
		Data Bit	OK		NG
		Stop Bit	OK		NG
Parity Bit		OK	NG		
Check address range		OK	NG	6. Supported addresses (For details, please refer to the PLC vendor's manual.)	

4. External device setting

Set the communication interface of the external device by operating the keypad on the front of the inverter. For more information, refer to the inverter user manual.

■ SV-iS7

1. Turn the inverter to ON.
2. Operate the keypad to change the COM group as shown below.

Group	Code no.	Function notation	Settings			
			Notation value	Contents		
COM	01	Int485 St ID (Integrated communication inverter ID)	1	Set prefix when using RS-485 communication. 0~250		
	02	Int485 Proto (Integrated communication protocol)	2	Set communication protocol.		
				0	ModBus RTU	
				1	- Reserved -	
	2	LS Inverter-only protocol				
	03	Int485 BaudR (Integrated communication speed)	5	Set communication speed.		
0				1200 bps		
1				2400 bps		
2				4800 bps		
3				9600 bps		
4				19200 bps		
04	Int485 Mode (Set integrated communication frame)	0	Set communication transmission format.			
				Data Bit	Stop Bit	Parity Bit
			0	8 bit	1 bit	NONE
			1	8 bit	2 bit	NONE
			2	8 bit	1 bit	EVEN
3	8 bit	1 bit	ODD			
05	Resp Delay (After receiving, sending delay_	5	0 ~ 1000 [mSec]			
DRV	06	Cmd Source *Note 1) (Operation command method)	3	Int 485 (communication operation)		
	07	Freq Ref Src *Note 1) (Frequency Settings Method)	7	Int 485 (communication operation)		

***Note 1)** DRV-06 and 07 are not required settings, but these must be set in order to change operating commands and frequencies for parameters in the common area of the TOP.

■ SV-iG5A

1. Turn the inverter to ON.
2. Operate the keypad to change the COM group as shown below.

Group	Code no.	Function details	Settings			
			Notation value	Contents		
Input/Output	I59	Communication protocol setting	1	Set communication protocol.		
				0	MODBUS RTU	
		1	LS Inverter-only protocol			
	I60	Inverter Prefix	1	Set prefix when using RS-485 communication.		
				1~32		
	I61	Communication speed	4	Set communication speed.		
				0	1200 bps	
				1	2400 bps	
				2	4800 bps	
				3	9600 bps	
	4	19200 bps				
I65	Set data/parity/stop bit	0	Set communication transmission format.			
				Data Bit	Stop Bit	Parity Bit
			0	8 bit	1 bit	NONE
			1	8 bit	2 bit	NONE
			2	8 bit	1 bit	EVEN
	3	8 bit	1 bit	ODD		
Operation	Drv	Operation command method ^{*Note 1)}	3	RS-485 communication operation		
	Frq	Frequency Settings Method ^{*Note 1)}	7	RS-485 communication settings		

***Note 1)** Operation-drv and frq are not required settings, but these must be set in order to change operating commands and frequencies for parameters in the common area of the TOP.

■ Other “Starvert Series” Device Settings

When purchasing a product, set the following parameters according to the proper situation in the enclosed user manual.

- Communication protocol setting
- Inverter Prefix
- Communication speed
- Set data/parity/stop bit
- Operation command method
- Frequency Settings Method

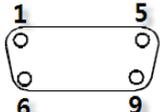
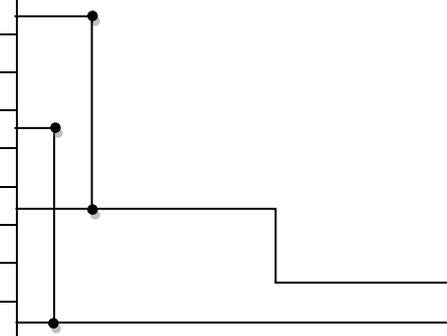
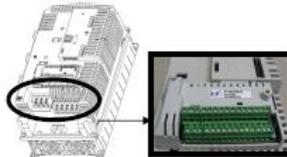
5. Cable table

This chapter introduces a cable diagram for normal communication between the TOP and the corresponding device.
 (The cable diagram described in this section may differ from the recommendations of "LS Industrial Systems")

5.1. Cable table 1

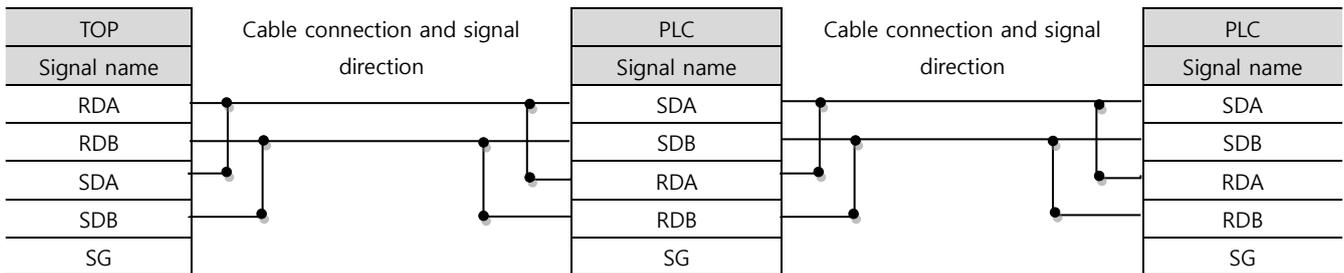
■ 1:1 connection

TOP COM Port (9 pin)

TOP COM			Cable connection	PLC	
Pin arrangement* Note 1)	Signal name	Pin number		Signal name	Pin arrangement
 <p>Based on communication cable connector front, D-SUB 9 Pin male (male, convex)</p>	RDA	1		MO	
		2		CM	
		3		P1	
	RDB	4		(Omit)	
	SDA	6		S+	
		7		S-	
		8			
	SDB	9			

***Note 1)** The pin arrangement is as seen from the connecting side of the cable connection connector.

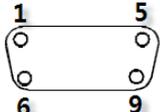
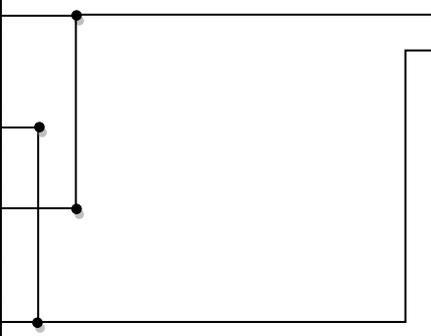
■ 1:N connection – Refer to 1:1 connection to connect in the following way.



5.2. Cable table 2

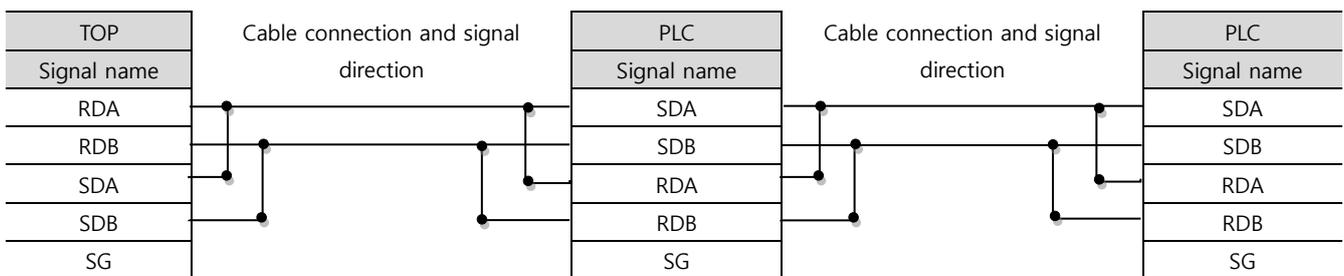
■ 1:1 connection

TOP COM Port (9 pin)

TOP COM			Cable connection	PLC		
Pin arrangement* Note 1)	Signal name	Pin number		Signal name	Pin arrangement	
 <p>Based on communication cable connector front, D-SUB 9 Pin male (male, convex)</p>	RDA	1		P	 <p>6PIN terminal block</p>	
				2		N
				3		G
	RDB	4		S		
				5		T1
	SDA	6		T2		
				7		
				8		
	SDB	9				

***Note 1)** The pin arrangement is as seen from the connecting side of the cable connection connector.

■ 1:N connection – Refer to 1:1 connection to connect in the following way.



6. Supported addresses

The devices available in TOP are as follows:

The device range (address) may differ depending on the CPU module series/type. The TOP series supports the maximum address range used by the external device series. Please refer to each CPU module user manual and be take caution to not deviate from the address range supported by the device you want to use.

Category	Address	Parameter	Remarks
General area	0000 – 04FF	LS inverter pre-model common area	Hexadecimal Address Notation
	0500 – 09FF	Factor area	Hexadecimal Address Notation
Area per type	1000 – 1FFF	SV-iS7, SV-IG parameter	Hexadecimal Address Notation
	2000 – 2FFF	SV-IS3	Hexadecimal Address Notation
	3000 – 3FFF	SV-IV	Hexadecimal Address Notation
	4000 – 4FFF	SV-IH	Hexadecimal Address Notation
	5000 – 5FFF	SV-IS5	Hexadecimal Address Notation
	6000 – 6FFF	SV-IG5	Hexadecimal Address Notation
	7000 – 7FFF	SV-IV5	Hexadecimal Address Notation
	8000 – 8FFF	SV-IC5	Hexadecimal Address Notation
	9000 – 9FFF	SV-IP5A	Hexadecimal Address Notation
	A000 – AFFF	SV-IG5A	Hexadecimal Address Notation