LS Industrial Systems Co., Ltd. STARVERT Inverter Series

LSBus Driver

Supported version TOP Design Studio

n Studio V1.0 or higher



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

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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
	SV-iS7	Built-in communication port	RS-485	_	5.1. Cable table 1
		Built-in communication port	RS-485		5.1. Cable table 1
	SV-IGSA	RS485 option baud	RS-485		5.2. Cable table 2
STARVERT		Built-in communication port RS-485		5.1. Cable table 1	
	20-162M	RS485 option baud	RS-485	<u>3. TOP</u> communication <u>setting</u> <u>4. External device</u> <u>setting</u>	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	SV-iV RS485 option baud			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.

PLC select [CO	M2]						
Filter : [All]			\sim	Search :			
				Model	○ Vendor		
Vendor	•	Model					
M2I Corporation		2	XGI/XGR/XEC Series				
MITSUBISHI Electric Corpo	oration	\$	XGK/XBM/XBC Series				
OMRON Industrial Automa	ation	8	GLOFA-GM Series	GLOFA-GM Series			
LS Industrial Systems		8	MASTER-K(80S/120S/200	S/300S/1000S) Serie	s		
MODBUS Organization		8	STARVERT Series				
SIEMENS AG.			VCODE DETD HE Bander S	anian III 1206 (1207			
Rockwell Automation			XCODE RFID HF Reader S	enes 18-1306/1307			
GE Fanuc Automation		P	MASTER-K(500H/1000H)	Series			
PANASONIC Electric Work	s)	MASTER-K 10S, 10S1 Serie	es			
YASKAWA Electric Corpora	ation						
YOKOGAWA Electric Corpo	oration						
Schneider Electric Industri	ies						
KDT Systems							
RS Automation	~						
PLC Setting[STARV	/ERT Series]					
Alias Name :	PLC1						
Interface : Computer Link							
	comparer ente	Protocol : Starvert Link					
Protocol :	Starvert Link	Cha	~	Co	mm Manual		
Protocol : String Save Mode :	Starvert Link First LH HL	Cha	v	Co	mm Manual		
Protocol : String Save Mode : Use Redundancy Operate Condition :	Starvert Link First LH HL	Cha	inge	Co	mm Manual		
Protocol : String Save Mode : Use Redundancy Operate Condition : ANC Change Condition :	Starvert Link First LH HL	Cha	inge (Second)	Co	mm Manual		
Protocol : String Save Mode : Use Redundancy Operate Condition : ANC Change Condition : 1	Starvert Link First LH HL	Cha 5	(Second)	Co	mm Manual		
Protocol : String Save Mode : Use Redundancy Operate Condition : ANC Change Condition : T Change Condition : T C Change Condition : T C C C C C C C C C C C C C	Starvert Link First LH HL	Cha 5	(Second)	Co	mm Manual		
Protocol : String Save Mode : Use Redundancy Operate Condition : ANL Change Condition : III Change Condition : III Primary Option Timeout	Starvert Link First LH HL	Cha 5	(Second)	Co	mm Manual		
Protocol : String Save Mode : Use Redundancy Operate Condition : ANC Change Condition : III Change Condition : IIII Change Condition : IIIII Change Condition : IIIII Change Condition : IIII Change Condition : IIIII Change Condition : IIII Change Condition : IIIII Change Condition : IIIII Change Condition : IIIIIIII Change Condition : IIIIIII Change Condition : IIIIIIIIII Change Condition : IIIIIIIIII Change Condition : IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Starvert Link First LH HL	Cha 5 (msec	(Second)	03	mm Manual		
Protocol : String Save Mode : Des Redundancy Operate Condition : ANC Change Condition : III Change Condition : III Primary Option Timeout Send Wait Petry	Starvert Link First LH HL	Cha 5 msec msec	(Second)	0)	mm Manual		
Protocol : String Save Mode : Use Redundancy Operate Condition : ANC Change Condition : T Change Condition : T Primary Option Timeout Send Wait Retry Station Num	Starvert Link First LH HL Condition	Cha 5 (msec msec	(Second)	0) 1	mm Manual		
Protocol : String Save Mode : Use Redundancy Operate Condition : ANC Change Condition : ANC Change Condition : T Primary Option Timeout Send Wait Retry Station Num	Starvert Link First LH HL Condition 300 © 5 © 1 ©	Cha 5 msec msec	(Second)	0) 10	mm Manual		
Protocol : String Save Mode : Use Redundancy Operate Condition : ANL Change Condition : III Change Condition : IIII Change Condition : III Change Condition : IIII Change Condition : IIIII Change Condition : IIII Change C	Starvert Link First LH HL Condition	Cha 5 msec msec	(Second)	0	mm Manual		
Protocol : String Save Mode : Use Redundancy Operate Condition : ANL Change Condition : In I Change Condition : In I	Starvert Link First LH HL Condition 300 © 5 © 1 ©	Cha 5 msec msec	(Second)	0	mm Manual		
Protocol : String Save Mode : Des Redundancy Operate Condition : ANC Change Condition : T C Primary Option Timeout Send Wait Retry Station Num	Starvert Link First LH HL Condition 300 © 5 © 1 ©	Cha 5 msec msec	(Second)		mm Manual		
Protocol : String Save Mode : Des Redundancy Operate Condition : AN Change Condition : I Primary Option Timeout Send Wait Retry Station Num	Starvert Link First LH HL Condition 300 © 5 © 1 ©	Cha 5 (msec msec	(Second)	•	mm Manual		

Settings		Contents			
ТОР	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 cor			
		Model	Interface	Protocol	
		STARVERT Series	Computer Link	STARVERT Link	
		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.			



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	ТОР	External device	Remarks	
Circuit (a art)	RS-232C	RS-232C		
Signal Level (port)	RS-422/485	RS-422/485		
Baud Rate		200		
Data Bit	8			
Stop Bit	1			
Parity Bit	Nc	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.

Project Option		×
Change HMI[H] Change PLC[C] Change PLC[D]		
PIC Setting SYS: RD ISDXX Option Models Setting Fieldbas (0) Predebas (0) RFID (0) Decess Setting COMULT LINK Protocol: Starvert Link Decess Setting Protocol: Starvert Link Change Operate Condition: Interface: Promary Option Triesout Station Num Protocol: Station Num Protocol: Station Num Protocol: Station Num Proto		mm Manual
	Apply	Close

Items	Settings	Remarks
Interface	Configure the communication interface between the TOP and an external device.	Refer to "2. External
Protocol	Configure the communication protocol between the TOP and an external device.	device selection".
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	ТОР	External device	Remarks	
Circuit (north)	RS-232C	RS-232C		
Signal Level (port)	RS-422/485	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]

\bigcirc				
	<u>م</u>	1001	PLC	×
	🔯 Syste	Driver(COM2)	PLC1(STARVERT Series) -	
Run		Interface	Computer Link 💌	
		Protocol	Starvert Link	
	PLC	Timeout	300 🖨 msec	
VNC		Send Wait	0 🚔 msec	
Viewer	(二)	Retry	5	
	Ethernet	Station N	1	
Screen	. out			
shot				
	Diagnostic			
	[System]	Diagnostic	Appl	y Cancel
	L			
Items	Settings			Remarks
Interface	Configure the communication interface between the TOP and an external device.			Refer to "2. Exter
Protocol	Configure the communication protocol between the TOP and an external device.			device selection
TimeOut (ms)	(ms) Set the time for the TOP to wait for a response from an external device.			
SendWait (ms)	endWait (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.

ОК	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		Ch	eck	Remarks
System	How to connect the sys	stem	OK	NG	1 Cretem configuration
configuration	Connection cable name	2	ОК	NG	<u>1. system configuration</u>
TOP	Version information		OK	NG	
	Port in use		OK	NG	
	Driver name		OK	NG	
	Other detailed settings		ОК	NG	
	Relative prefix	Project setting	OK	NG	
		Communication	OK	NC	2. External device selection
		diagnostics	ÜK	NG	3. Communication setting
	Serial Parameter	Transmission	OK	NG	
		Speed	ÜK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
External device	CPU name		OK	NG	
	Communication port na	OK	NG		
	Protocol (mode)	OK	NG		
	Setup Prefix	OK	NG		
	Other detailed settings		OK	NG	4. External device cetting
	Serial Parameter	Transmission	OK	NC	4. External device setting
		Speed	ÜK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
	Check address range				6. Supported addresses
			OK	NG	(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.

대한민국대표 터치패널 Touch Operation Panel

SV-iS7

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

			Settings					
Group	Code no.	Function notation	Notation	Contonto				
			value	Contents				
	01	Int485 St ID	1	Set pref	ix when using	RS-485 comr	nunication.	
		(Integrated communication inverter ID)		0~250				
	02	Int485 Proto	2	Set communication protocol.				
		(Integrated communication protocol)		0	ModBus RTU			
				1	- Reserved -			
				2	LS Inverter-only protocol			
	03	Int485 BaudR	5	Set com	Set communication speed.			
		(Integrated communication speed)		0	1200 bps			
				1	2400 bps			
				2	4800 bps			
COM				3	9600 bps			
				4	19200 bps			
				5	38400 bps			
	04	Int485 Mode	0	Set com	mmunication transmission format.			
		(Set integrated communication frame)			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	F 0 1000 [m[cos]					
		(After receiving, sending delay_	5					
		Cmd Source ^{*Note 1)}						
	06	(Operation command method)	3	Int 485 (communication operation)				
DRV		*Note 1)						
	07	Freq Ref Src (Note 1)	7	Int 485 (communication operation)				
		(Frequency Settings Method)			• •			

*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.

	Code		Settings				
Group		Function details	Notation	Contents			
			value				
	159	Communication protocol setting	1	Set communication protocol.			
				0	MODBUS RTU		
				1	LS Inverter-o	only protocol	
	160	Inverter Prefix	1	Set prefix when using RS-485 communication.			
				1~32			
	161	Communication speed	4 Set communication speed.				
				0	1200 bps		
				1	2400 bps		
Input/Output				2	4800 bps		
				3	9600 bps		
				4	19200 bps		
	165	Set data/parity/stop bit	0	Set communication transmission format.			
					Data Bit	Stop Bit	Parity Bit
			0 8 bit 1		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)



*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.

TOP	Cable connection and signal	PLC	Cable connection and signal	PLC
Signal name	direction	Signal name	direction	Signal name
RDA	• •	SDA	•	SDA
RDB		SDB		SDB
SDA	-• •	RDA	╞━┥│ │┕━─	RDA
SDB		RDB	└──	RDB
SG		SG		SG



5.2. Cable table 2

■ 1:1 connection

TOP COM Port (9 pin)

TOP COM				PLC		
Pin	Signal	Pin	Cable connection	Signal	Din arrangement	
arrangement*Note 1)	name	number		name	Fin analgement	
1 5	RDA	1 ·	•	·Р		
		2		N		
		3		G		
Based on	RDB	4	├ -•	S		
communication		5		T1		
cable connector	SDA	6	⊢ ↓ ↓	T2	6PIN terminal block	
front,		7				
D-SUB 9 Pin male		8				
(male, convex)	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