

Thank you for purchasing iV5/iP5A CC-Link option board of LS Variable Frequency Drives!

Safety Instruction

- To prevent injury and danger in advance for safe and correct use of the product, be sure to follow the Safety Instructions.
- The instructions are divided as 'WARNING' and 'CAUTION' which mean as follow.



WARNING

This symbol indicates the possibility of death or serious injury.



CAUTION

This symbol indicates the possibility of injury or damage to property.

- The meaning of each symbol in this manual and on your equipment is as follows.



This is the safety alert symbol.



This is the dangerous voltage alert symbol.

- After reading the manual, keep it in the place that the user always can contact easily.
- Before you proceed, be sure to read and become familiar with the safety precautions at the beginning of this manual. If you have any questions, seek expert advice before you proceed. Do not proceed if you are unsure of the safety precautions or any procedure.



WARNING

- **Be cautious about dealing with CMOS elements of option board.**
It can cause malfunction by static electricity.
- **Connection changing like communication wire change must be done with power off.**
It can cause communication faulty or malfunction.
- **Be sure to connect exactly between Inverter and option board.**
It can cause communication faulty or malfunction.
- **Check parameter unit when setting parameter.**
It can cause communication faulty

Introduction

CC-Link master unit can operate the inverter and monitor the state of inverter in Control and Communication Link network (abbreviated as CC-Link from here on) through CC-Link option board. CC-Link provides the version 1.10. This CC-Link option board supports the inverter iP5A and iV5 series.

1. Specification

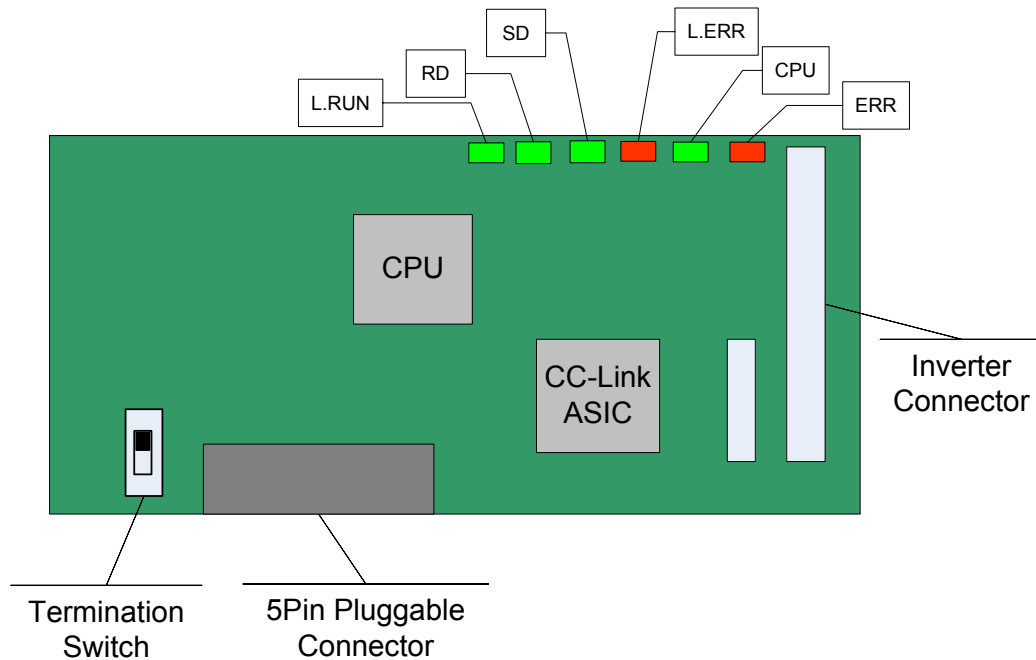
Transmission Speed	156k, 625k, 2.5M, 5M, 10Mbps
Station Type	Remote device station
Number of Occupied Stations	1 station
Version	V1.10
The Number of station connected	$(1 \times a) + (2 \times b) + (3 \times c) + (4 \times d) \leq 64$ a: Number of modules occupying 1 station b: Number of modules occupying 2 stations c: Number of modules occupying 3 stations d: Number of modules occupying 4 stations $16 \times A + 54 \times B + 88 \times C \leq 2304$ A: Number of remote I/O stations ----- Max. 64 B: Number of remote device stations ----- Max. 42 C: Number of Local/Intelligent device stations ----- Max. 26
Interface	5 pin pluggable connector
Cable	CC-Link dedicated cable, Ver.1.10 compatible CC-Link dedicated cable
External Diameter	Less than 8.0 mm

2. Product Components

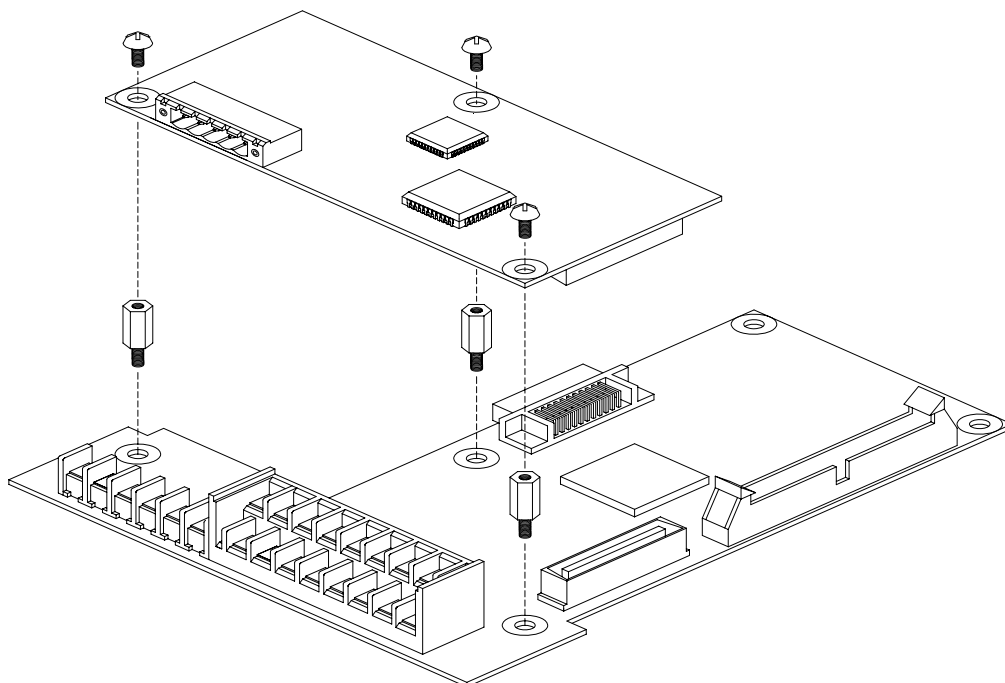
SV-iV5/iP5A CC-Link option board	1 ea
Mounting poles for fixing on the inverter	1 ea
SV-iV5/iP5A CC-Link user manual	1 ea

3. The external and Mounting of the Option Board

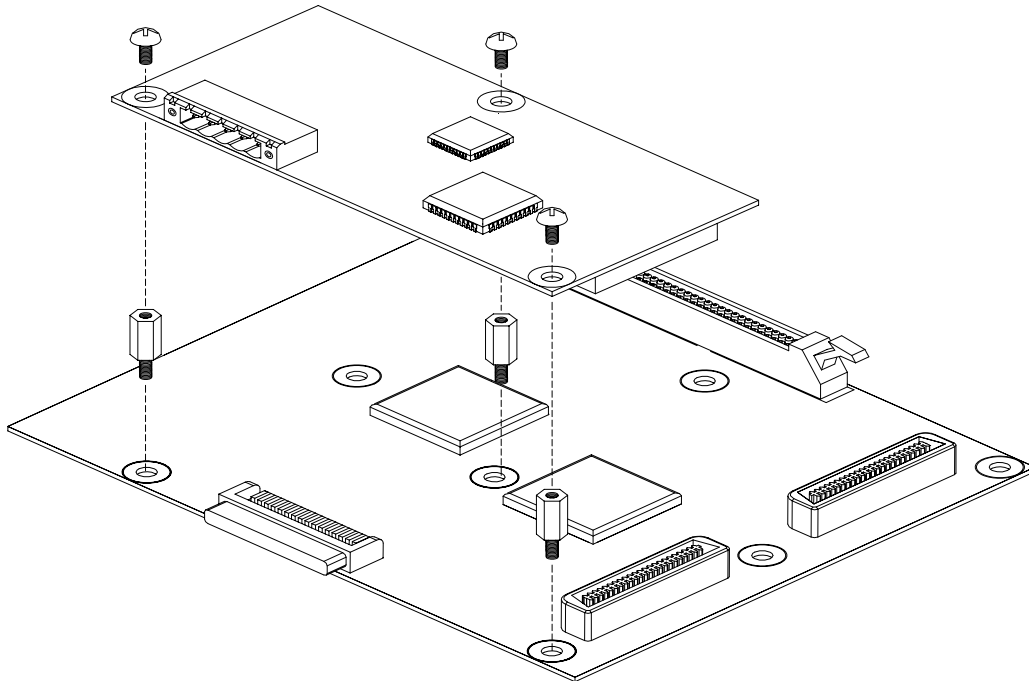
(1) The outside of the option board



(2) Mounting the option board on the inverter



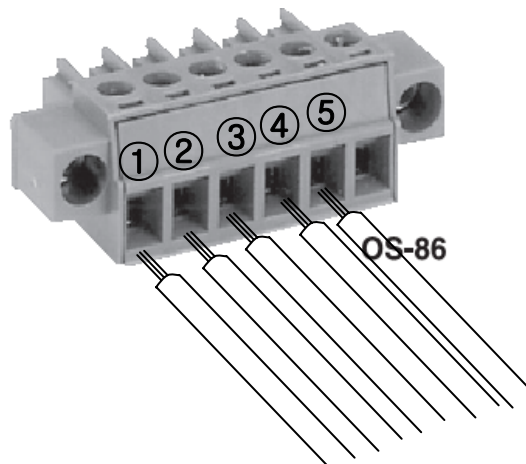
<SV-iP5A CC-Link option board mounting>



<SV-iV5 CC-Link option board mounting>

(3) CC-Link signal connector structure and wiring

① DA(Blue) ②DB(White) ③DG(Yellow) ④SLD(Shielded twisted Cable) ⑤FG



<Wiring Method>

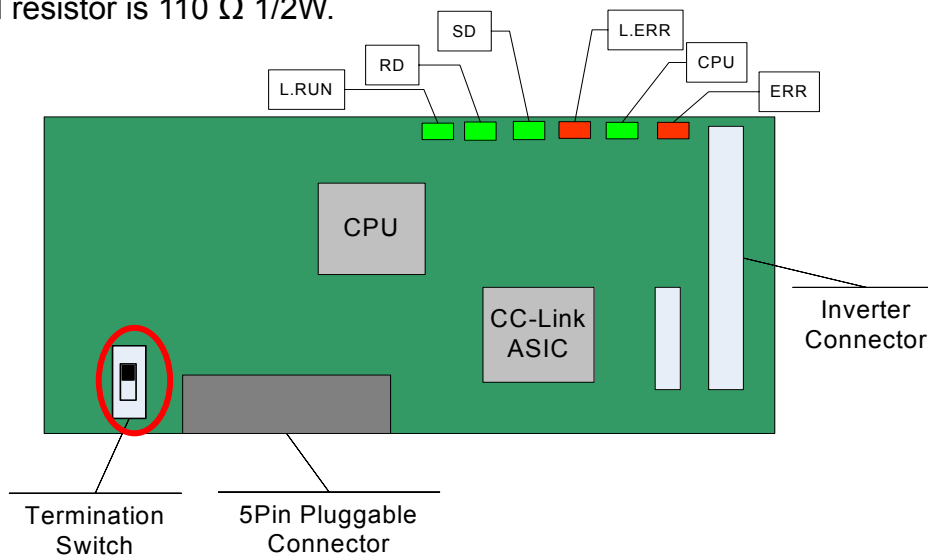
※ Signal connector OSADA OS-86-5P type is used for iV5/iP5A CC-Link option board. (5-Pin connector)

4. Network Connection

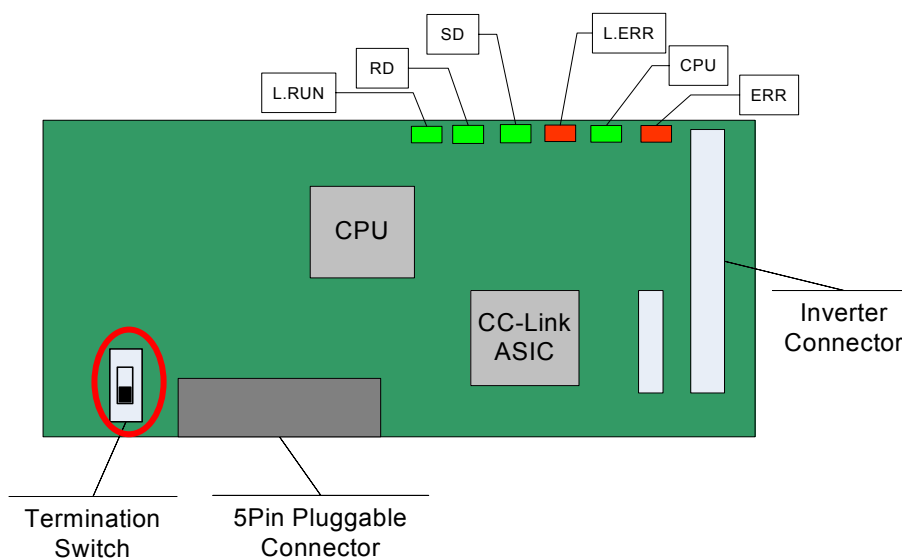
Connection terminal of communication cable

No.	Signal	Description	Cable Color
1	DA	Transmitting/Receiving data	Blue
2	DB	Transmitting/Receiving data	White
3	DG	Signal Ground	Yellow
4	SLD	Shield	Shielded twisted Cable
5	FG	Frame Ground	-

※ If the iV5/iP5A CC-Link option board is placed at the end of the network, the setting switch of terminal resistor of the last option board must be turned On. Terminal resistor is 110 Ω 1/2W.



When the switch of terminal resistor is placed in up side → Terminal resistor is available.



When the switch of terminal resistor is placed in down side → Terminal resistor is not available.

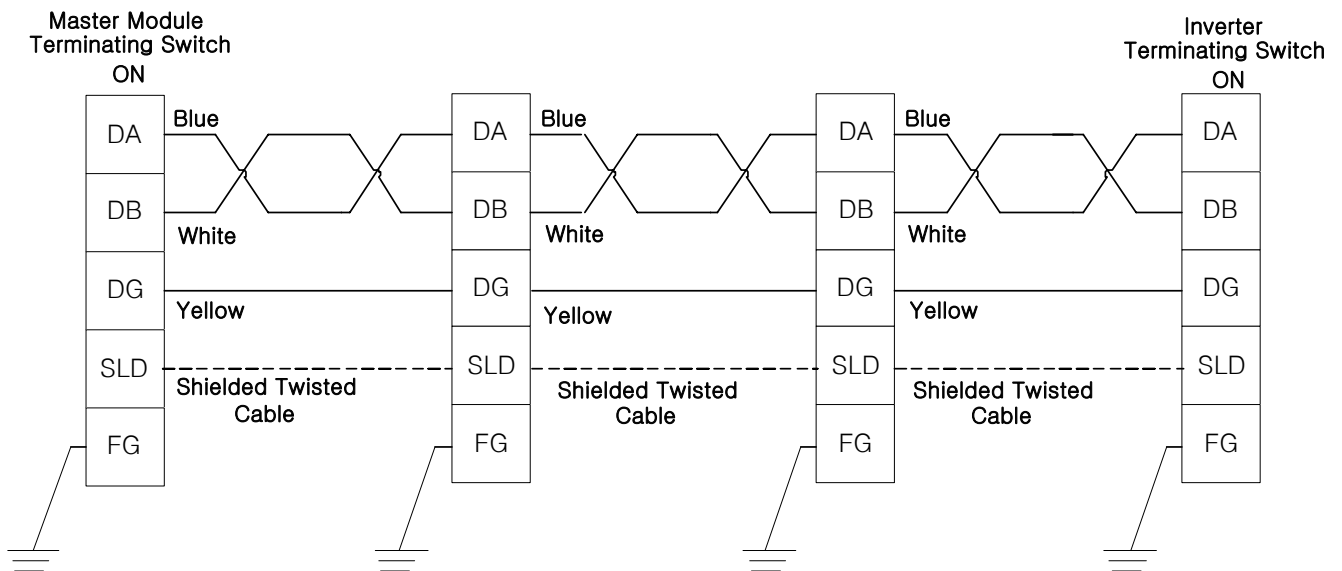
<Hardware Installation>

Warning) Configure the communication network after turn off the power of inverter.

Wiring of CC-Link communication cable)

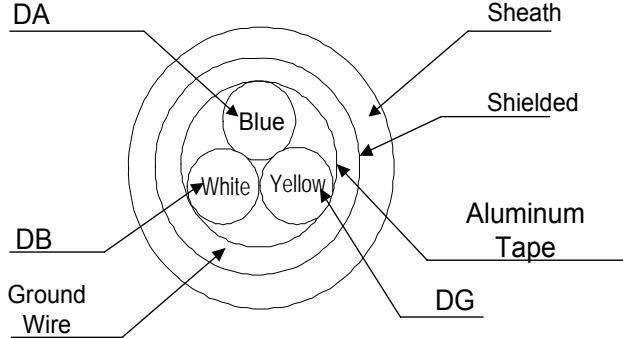
Connect the dedicated CC-Link communication cable to terminal block as following procedure.

To reduce the noise, CC-Link option board at both ends of the network has to be terminated. Turn on the setting switch of terminal resistor on CC-Link option board.



<Communication Cable Feature>

We recommend the cable as below described specification. If not, we can not guarantee the performance of CC-Link communication.

Items	Specification	
Type	Shielded twisted cable ^{note1)}	
Conductor Size	20AWG * 3	
Conductor Resistor (20℃)	37.8Ω / km or less	
Insulation Resistor	10000MΩ / km or more	
Withstanding Voltage	DC500V 1 minute	
Capacitance (1 kHz)	60 nF / km or less	
Characteristic Impedance ^{note2)}	1MHz	110 ± 15Ω
	5MHz	110 ± 6Ω
Cross Section		
External Diameter	7 mm	

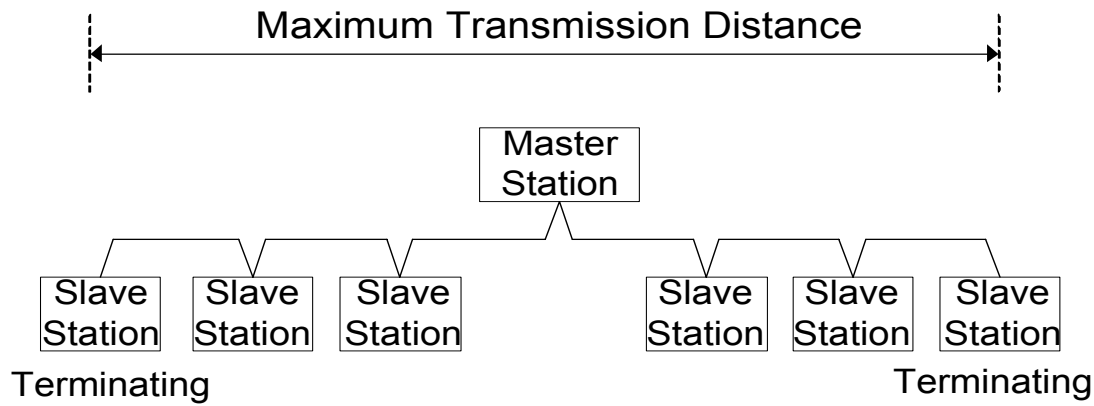
^{note1)} PLFEV-AMESB [LS cable manufactured] recommended

^{note2)} Measuring Method of Characteristic Impedance

- Cable Length: 100m or more

Measuring method is not designated, but Open/Short method has to measure the characteristic impedance in a range within each specified frequency by approximate value which is measured value.

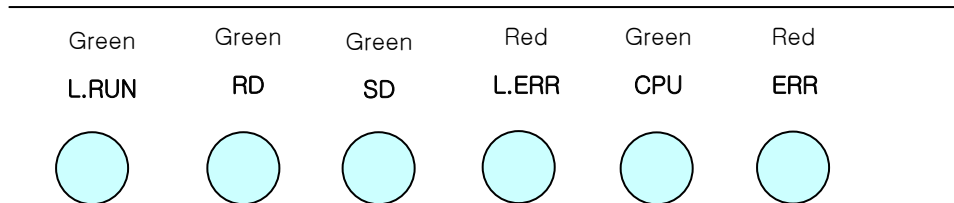
<Maximum Transmission Distance>



Baudrate	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps
Cable Length between Stations	20m or more				
Max. Transmission Distance	1200m	900m	400m	160m	100m

5. LED Display

4 green LEDs and 2 red LEDs on the CC-Link option board display the status of CC-Link option board. LED is organized as following.



LED Indication	Color	Function
L. RUN	Green	On – Station ID and Baud Rate are normally set and Refresh data is received normally. Off – CC-Link communication is not established. Check if Station ID and Baud rate are set correctly at keypad.
RD	Green	On – Communication data receiving. Off – Communication data reception is not established. Check if the communication cable is connected correctly.
SD	Green	On – Communication data transmitting. Off – Communication data transmission is not established.
L.ERR	Red	On – CRC Error Off – Normal State
CPU	Green	Flickering at the 1 second interval – It means that CC-Link option board is energized and the status is normal. Off – It means that CC-Link option board is de-energized or CC-Link option board has a fault itself.
ERR	Red	Flickering simultaneously with CPU LED – Interface communication has a fault between CC-Link option board and inverter.
		Flickering at the 0.2 second intervals – It indicates the error when the memory saves is failed.
		Flickering at the 2 second intervals – It indicates the error when a ASIC has a fault.
		Flickering reversely with CPU LED – It indicates the status of communication command lost.

6. Trouble Shooting

LED Indication						Cause	Countermeasure
L. RUN	RD	SD	L. ERR	CPU	ERR		
OFF	OFF	OFF	OFF	OFF	OFF	Power supply is de-energized.	Check if the option board is installed on the inverter. Check if the inverter is turned On.
-	-	-	-	Flickering at the 1 second intervals	Flickering at the 1 second intervals	Failure of storing into internal memory	Replace the option board.
-	-	-	-	Flickering at the 1 second intervals	Flickering simultaneously with CPU LED	Abnormal communication between option board and inverter	Replace the option board.
-	-	-	-	Flickering at the 1 second intervals	Flickering reversely with CPU LED	Communication cable is disconnected.	Check if communication cable is connected correctly.
-	-	-	-	Flickering at the 1 second intervals	Flickering at the 2 second intervals	ASIC Hardware fault	Replace the option board.
OFF	OFF	OFF	OFF	Flickering at the 1 second intervals	OFF	Communication is not established.	Check if communication cable is connected correctly.
OFF	-	OFF	-	Flickering at the 1 second intervals	OFF	The value of StationID and Baudrate are not correct.	Set the value of Station ID and Baudrate correctly, then executes Comm Update.

LED Indication						Cause	Countermeasure
L. RUN	RD	SD	L. ERR	CPU	ERR		
ON	-	-	Flickering	Flickering at the 1 second intervals	OFF	After Option board is turned On, the value of Station ID and Baudrate are changed.	Change the value of Station ID and Baudrate to the previous value or Executes 'Comm Update' to apply the changed value of Station ID and Baudrate.
ON	ON	OFF	Flickering	Flickering at the 1 second intervals	OFF	CRC Error occurrence	CRC error is occurred by influenced of noise. Check if communication cable and power supply cable are separated.

Opt Status Parameter Value (iP5A COM-65, iV5 EXT_63)	Cause	Countermeasure
0	Normal	-
1	Communication option board defect.	Replace the option board.
2		
3		
4		
5	Status indication of communication command lost	Check if communication cable is connected correctly.

7. Quick Communication Start

◆ In case of iP5A inverter

Install the CC-Link option board while inverter power supply is turned off. After inverter power supply is turned on, check if COM-01 parameter is 'CC-Link'.

- (1) Connect to the network with communication cable through CC-Link option board.
- (2) Set the Station ID of inverter at parameter COM-61 Station ID.
- (3) Set Baudrate at COM-62 Baudrate .
- (4) Set to 'Yes' at COM-67 Comm Update.
- (5) Check if RUN LED of CC-Link Option board is turned On. If not, Check if the parameter value of COM-61 and COM-62 of Keypad are correct.

◆ In case of iV5 inverter

Install the CC-Link option board while inverter power supply is turned off. After inverter power supply is turned on, check if EXT_01 parameter is 'CC-Link'.

- (1) Connect to the network with communication cable through CC-Link option board.
- (2) Set the Station ID of inverter at parameter EXT_61 Station ID.
- (3) Set Baudrate at EXT_62 Baudrate
- (4) Set to 'Yes' at EXT_99 Comm Update.
- (5) Check if L.RUN LED of CC-Link Option board is turned On. If not, Check if the parameter value of EXT_61 and EXT_62 of Keypad are correct.

8. Keypad Parameter related with CC-Link Communication

◆ In case of iP5A inverter

Code	Parameter Name	Default	Range
DRV-03	Drive mode	Fx/Rx-1	Keypad Fx/Rx-1 Fx/Rx-2 Int. 485
DRV-04	Freq mode	Fx/Rx-1	KeyPad-1 Keypad-2 V1 V1S I V1+I Pulse Int. 485 Ext. PID
IO-92	COM Lost Cmd	None	None FreeRun Stop
IO-93	COM Time Out	1.0sec	0.1~120.0sec
COM-01	Opt B/D	-	-
COM-02	Opt mode	None	None Command Freq Cmd+Freq
COM-03	Opt Version	-	-
COM-31 ~COM-38	Output 1 ~ Output 8	-	0x0000 ~0xFFFF
COM-41 ~COM-48	Input 1 ~ Input 8	-	0x0000 ~0xFFFF

Code	Parameter Name	Default	Range
COM-61	Station ID	1	1~64
COM-62	Baudrate	0	0 (156k) 1 (625k) 2 (2.5M) 3 (5M) 4 (10M)
COM-63	Opt Status	0	-
COM-64	Rcv Frame	-	-
COM-65	Err Frame	-	-
COM-67	Comm UpDate	No	No Yes

◆ In case of iV5 inverter

Code	Parameter Name	Default	Range
DIO_97	Lost Command	None	None FreeRun Stop
DIO_98	Comm. Timer	1.0sec	1.0~30.0sec
FUN_01	Run/Stop Src	Terminal 1	Terminal 1 Terminal 2 Keypad Option
FUN_02	Spd Ref Sel	Keypad1	Analog Keypad1 Keypad2 Option Line SPD Ref Line SPD Opt
EXT_01	Opt B/D	-	-
EXT_02	Opt Version	-	-

Code	Parameter Name	Default	Range
EXT_10	Output Num	3	0~8
EXT_11 ~EXT_18	Output 1 ~ Output 8	-	0x0000 ~0xFFFF
EXT_19	Input Num	2	0~8
EXT_20 ~EXT_27	Input 1 ~ Input 8	-	0x0000 ~0xFFFF
EXT_61	Station ID	1	1~64
EXT_62	Baudrate	0	0 (156k) 1 (625k) 2 (2.5M) 3 (5M) 4 (10M)
EXT_63	Opt State	0	-
EXT_64	Rcv Frame	-	-
EXT_65	Err Frame	-	-
EXT_99	Comm UpDate	No	No

(1) The communication option board installed on the inverter

iP5A	Opt B/D (COM-01)
iV5	Opt B/D (EXT_01)

- ✓ It displays the name of option board installed on the inverter.
- ✓ It displays 'CC-Link' when CC-Link option board is installed correctly and there is no fault.

(2) Run command source setting

iP5A	Opt mode (COM -02)
iV5	Run/Stop Src (FUN_01)

- ✓ It sets the run command source of inverter.
- ✓ When it commands Run/Stop operation to inverter by CC-Link communication,
 - ➔ In case of iP5A, the parameter sets to 'Command' of COM-02 Opt mode.
 - ➔ In case of iV5, the parameter sets to 'Option' of FUN_01 Run/Sop Src.

(3) Freq Ref Src (DRV-07) – Inverter frequency reference source setting

iP5A	Opt mode (COM -02)
iV5	Spd Ref Sel (FUN_02)

- ✓ It sets the frequency command source of inverter.
- ✓ When it commands Command frequency by CC-Link communication,
 - ➔ In case of iP5A, the parameter sets to 'Freq' or 'Cmd+Freq' of COM-02 Opt mode.
 - ➔ In case of iV5, the parameter sets to 'Option' of FUN_02 Spd Ref Sel.

(4) Run Mode when Communication Command Lost (Lost Command)

iP5A	COM Lost Cmd (IO-92)
iV5	Lost Command (DIO_97)

- ✓ It designates the Run mode when Lost Command is occurred during the preset Lost Command time.

None: It keeps the current designated operation when Lost Command is occurred.

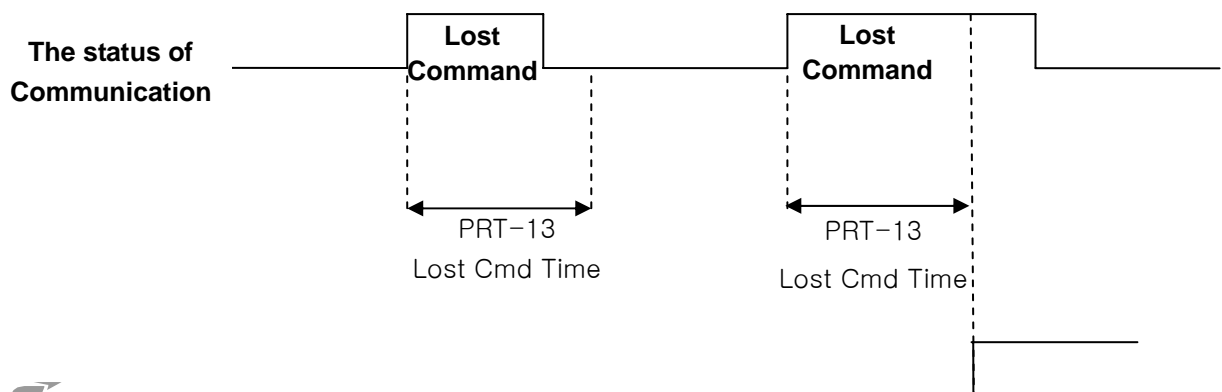
FreeRun: After the status of inverter is changed to Lost Command, motor will free-run to stop.

Stop: After the status of inverter is changed to Lost Command, motor will decelerate to stop.

(5) Decision time of communication command lost

iP5A	COM Time Out (IO-93)
iV5	Comm. Timer (DIO_98)

- ✓ If Preset Frequency is lost for the decision time of communication command lost, it is recognized to Lost Command.
- ✓ If the communication is recovered within the decision time of communication command lost, it is not recognized to Lost Command.



(6) Communication option board version

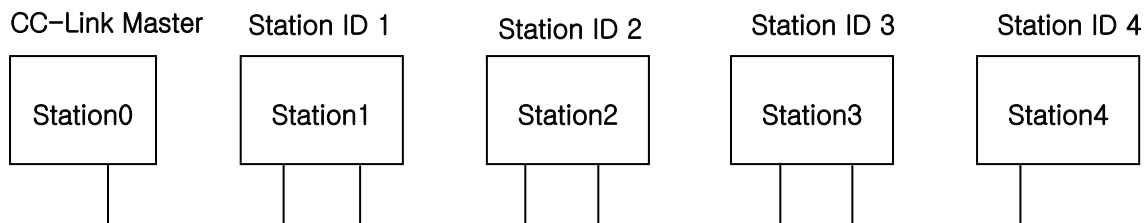
iP5A	Opt Version (COM-03)
iV5	Opt Version (EXT_02)

- ✓ It displays the version of option board installed on the inverter.

(7) Station ID setting

iP5A	Station ID (COM-61)
iV5	Station ID (EXT_61)

- ✓ It sets the Station ID of CC-Link. It can set Station Number from 1 to 64. Station ID can not be duplicated. Check if Station ID is not duplicated.
- ✓ The value of Station ID will be applied to CC-Link option board after 'Comm Update' sets to 'YES'.

⚠ Caution)**The example of network**

- ✓ Same station numbers can not be used more than once in a network.
- ✓ Set the station number sequentially in order of connection. (Do not create a dead station as station 1, station 2, and station 4.)

(8) Baudrate setting

iP5A	Baudrate (COM-62)
iV5	Baudrate (EXT_62)

- ✓ It sets the parameter of Baudrate of CC-Link communication. It can be set from 0 (156 Kbps) to 4 (10 Mbps).
- ✓ The value of Baudrate will be applied to CC-Link option board after 'Comm Update' sets to 'YES'.

(9) Communication status display

iP5A	Opt Status (COM-63)
iV5	Opt Status (EXT_63)

- ✓ It displays the status of CC-Link option board.

Set value	Status
0	Normal status
1	Option board fault
2	
3	
4	
5	Comm. Command lost

(10) Display of received frame number

iP5A	Rcv Frame (COM-63)
iV5	Rcv Frame (EXT_63)

- ✓ It displayed the number of received communication frame.
 ✓ The parameter will be initialized after 'Comm Update' execution.

(11) Status display of error frame

iP5A	Err Frame (COM-64)
iV5	Err Frame (EXT_64)

- ✓ It displayed the status of error frame.
 ✓ The displayed type is Type:# Num:##. Error Type is as shown below.

0	No error
1	CRC error
2	The error of RY number setting of master
3	The error of RWw number setting of master

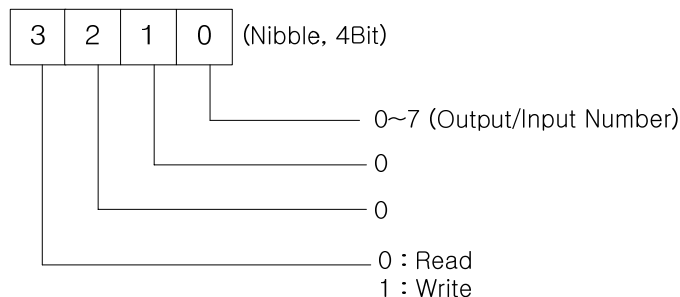
- ✓ The parameter will be initialized after 'Comm Update' execution.

(12) Remote register command (from inverter to master)

iP5A	Output 1~ Output 8 (COM-31~COM-38)
iV5	Output 1~ Output 8 (EXT_11~EXT_18)

- ✓ It sets the inverter address to read from Output 1~8 when read operation of command code RWw2 of remote register is executed.
- ✓ It defines the method to read the Output 1~8 with command code RWw2.
- ✓ Input of the value of RWw2 is described as shown below. To access to Status, the value of Nibble 3, Nibble 2 and Nibble 1 must be 0.
- ✓ Nibble 0 determines which value of status will be read among Output 1~8. If the value of Nibble 0 is 0, it is Output 1. If the value of Nibble 0 is 1, it is Output 2.
- ✓ For example, If RWw2 sets to 0x0003, the saved value in address which is set in Output 4 will be read.

< RWw2 >

**(13) Remote register command (from master to inverter)**

iP5A	Input 1~ Input 8 (COM-41~COM-48)
iV5	Input 1~ Input 8 (EXT_20~EXT_27)

- ✓ It sets the inverter address to write to Input 1~8 when write operation of command code RWw2 of remote register is executed.
- ✓ It defines the method to write the Input 1~8 with command code RWw2.
- ✓ The value of Nibble 3 must be 1 (Write) to write Control.
- ✓ The value of Nibble 2 and 1 must be 0.
- ✓ Nibble 0 determines which value of status will be written among Input 1~8. If the value of Nibble 0 is 0, it is Output 1. If the value of Nibble 0 is 1, it is Output 2.
- ✓ For example, If RWw2 sets to 0x1004, the saved value in address RWw3 which is set in Output 5 will be written.

(14) Comm Update

iP5A	Comm UpDate (COM-67)
iV5	Comm UpDate (EXT_99)

- ✓ The value of Station ID and Baudrate parameter will be applied to CC-Link option board after 'Comm Update' sets to 'YES'.
- ✓ The changed Station ID and Baudrate will be applied to CC-Link option board after 'Comm Update' sets to 'YES'.

9. CC-Link Data List

Inverter occupies the 1 station of buffer memory of master.

In this chapter, It defines the input/output data information between master and inverter.

9.1 Remote I/O

Remote Output Signals (Master unit to Inverter)		Remote Input Signals (Inverter to Master unit)	
Device No.	Signal Function	Device No.	Signal Function
RY0	Forward running command	RX0	Forward running
RY1	Reverse running command	RX1	Reverse running
RY2~8	N/A	RX2	Accelerating
		RX3	Decelerating
		RX4	Reach to preset speed
		RX5	DC Braking
		RX6	Brake Open (Only for iP5A)
		RX7	iP5A - AUX1 output terminal
			iV5 – 30A~30C
RY9	Inverter output cutoff	RX8	iP5A – AUX2 output terminal
			iV5 – 1A~1B
RY9	Inverter output cutoff	RX9	iP5A – AUX3 output terminal
			iV5 - 2A~2B

Remote Output Signals (Master unit to Inverter)		Remote Input Signals (Inverter to Master unit)	
Device No.	Signal Function	Device No.	Signal Function
RYA~B	N/A	RXA	iP5A – AUX4 output terminal
			iV5 – OC1
		RXB	N/A
RYC	Monitor command	RXC	Monitoring
RYD	Frequency setting command 1 (RAM)	RXD	Frequency setting completion 1 (RAM)
RYE	Frequency setting command 2 (EEPROM)	RXE	Frequency setting completion 2
RYF	Execution request of the command code	RXF	Execution completion of the command code (EEPROM)
RY10~19	N/A	RX10~19	N/A
RY1A	Reset the error	RX1A	Trip status
RY1B	N/A	RX1B	Available status to run
RY1C~1F	System reservation	RX1C~1F	System reservation

9.2 Remote Output

Remote Output Signals (Master to Inverter)			
Device No.	Signal Function	Description	
RY0	Forward running command	ON OFF	Forward running start Stop command
RY1	Reverse running command	ON OFF	Reverse running start Stop command
RY2~8	N/A		
RY9	Interrupting of inverter output		When it is turned On, motor free-run to stop.
RYA~B	N/A		-
RYC	Monitor command		When monitor command (RYC) is switched On, the corresponding monitor value to RWw1 is saved in RWr1. RXC (Monitoring) is switched On.

Remote Output Signals (Master to Inverter)		
Device No.	Signal Function	Description
RYD	Frequency setting command 1 (RAM)	When frequency setting command 1 (RYD) is switched On, the data (RWw1) is written to RAM of the inverter. In case of iP5A, the data of command frequency will be inputted. In case of iV5, the data of command Rpm will be inputted. Frequency setting completion 1 (RXD) is turned On after completion of write.
RYE	Frequency setting command 2 (RAM, EEPROM)	When the frequency setting command 2 (RYE) is switched on, the Command frequency (RWw1) is written to RAM and EEPROM of the inverter. On completion of write, frequency setting completion 2 (RXE) is switched on. The Command frequency is remained even if power of inverter is switched Off and then On. (The Command frequency means the value of Command frequency for iP5A and the value of command Rpm for iV5.)
RYF	Request for command code execution	It requests the execution of the command code (RWw2). In case command code is Write request, the value of RWw3 is valid.
RY10~19	N/A	-
RY1A	Inverter Reset	If an inverter has an error, RY1A is switched On. It makes that the inverter does reset to remove the trip after elimination of the cause of the fault.
RY1B	N/A	-
RY1C~1F	System reservation	-

9.3 Remote Input

Remote Input Signals (Inverter to Master)		
Device No.	Signal Function	Description
RX0	Forward running command	ON Forward running OFF Other than forward running (during stop or reverse running)
RX1	Reverse running command	ON Reverse running OFF Other than reverse running (during stop or forward running)
RX2	Accelerating	Accelerating when it is turned On
RX3	Decelerating	Decelerating when it is turned On
RX4	Reach to preset speed	Reach to preset speed when it is turned On
RX5	N/A	-
RX6	N/A	-
RX7	30A~30C output terminal	When Trip is occurred, it outputs the terminal.
RX8	Relay1 output terminal	When it is turned On, it outputs the terminal.
RX9	Relay2 output terminal	When it is turned On, it outputs the terminal.
RXA	OC1 output terminal	When it is turned On, it outputs the terminal.
RXB	N/A	-
RXC	Monitoring	Switched On (RXC) when monitor data is updating. When the monitor command (RYC) is switched On, the monitor value (RWw0) is written to RWr0 and monitoring (RXC) is switched On. Switched Off (RXC) when the monitor command (RYC) is switched Off.
RXD	Frequency setting completion 1 (RAM)	Switched On (RXD) when the Command frequency is written to the inverter by switching On of frequency setting command 1 (RYD).
RXE	Frequency setting completion 2 (EEPROM)	Switched On (RXE) when frequency command is written to the inverter by switching On of frequency setting command 2 (RYE).

Remote Input Signals (Inverter to Master)		
Device No.	Signal Function	Description
RXF	Execution completion of the command code	When the execution request of the command code (RYF) is switched On, the command code in RWw2 is executed. The execution completion of the command code (RXF) is switched On after completion of execution of command code. When the command code execution error occurs, a value other than '0' is set in the reply code (RWr2).
RX10~19	N/A	-
RX1A	Trip status	It is turned On when the trip of inverter has occurred.
RX1B	Available status to run	It is turned On when the inverter can be available. It means that the inverter power is energized stably and there is no fault.
RX1C~1F	System reservation	-

9.4 Remote Register (from master to inverter)

Remote Register	Name	Description	Request for Execution
RWw0	Monitor code	Set the monitor code to be referenced. Set the monitor code (RWw0) and then switching On the monitor command flag (RYC), the corresponding to monitored data is written to RWr0 and Monitoring (RXC) is switched On.	RYC
RWw1	Command frequency (0.01 Hz Scale) (0.1 Rpm Scale)	Specify the Command frequency. At this time, when Frequency setting command 1 (RYD) is switched On, it is stored in RAM of the inverter. When Frequency setting command 2 (RYE) is switched On, it is stored in EEPROM that it can save the Command frequency even if power is switched Off and then On. To command the frequency through communication, Ref Freq Src of DRV-07 must be set to 'Fieldbus'. (The Command frequency means the value of Command frequency for iP5A and the value of command Rpm for iV5.)	RYD RYE
RWw2	Command code	Set the command code for execution of read/ write/ error history/ error reset, etc. of parameter. The corresponding process to command code (RWw2) is executed by switching On the execution request of command code (RYF) after completion of command code (RWw2) setting. Execution completion of the command flag (RXF) is switched On after completion of command execution. When command code is Write, the data of Write set in RWw3.	RYF
RWw3	Write data	The execution request flag of command code (RYF) is switched On after setting of Write data and Command code.	

(from inverter to master)

Remote Register	Name	Description	Request for Execution
RWr0	Monitor data	The data value specified to the upper byte of RWw0 of monitor code is set in RWr0 and Monitoring (RXC) is switched On.	RYC
RWr1	Output frequency	-	RYD RYE
RWr2	Reply code	When command code (RWw2) and Write data (RWw3) is normal, 0x00 is set in reply code (RWr2). If it has a fault, the value from 0x01 to 0x03 is set in replay code.	RYF
RWr3	Read data	When command code (RWw2) is Read, the corresponding read data is set.	

9.5 Monitor Code.

Instance ID	Object Name	Unit
0x00	N/A	-
0x01	Output frequency	0.01 Hz
0x02	Output current	0.01 A
0x03	Output voltage	1 V
0x04	N/A	-
0x05	Preset frequency	0.01 Hz (Only for IP5A)
0x06	Run speed	1 rpm (Motor Speed)
0x07	N/A	-
0x08	DC Link voltage	0.1 V
0x09~0x0D	N/A	-
0x0E	Output electricity	0.01 kW
0x0F	Input terminal status	Note1)
0x10	Output terminal status	Note2)
0x11~0x15	N/A	-
0x16	Inverter run status	Note3)

Note1) Bit information of input terminal

In case of iP5A inverter

RWr0

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	-	M8	M7	M6	M5	M4	M3	M2	M1

In case of iV5 inverter

RWr0

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
-	P7	P6	P5	P4	P3	P2	P1	-	-	-	-	RST	BX	RX	FX

When status of each input terminal is turned On, the value is 1.

When status of each input terminal is turned Off, the value is 0.

Note2) Bit information of output terminal

In case of iP5A inverter

RWr0

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	-	-	-	-	-	AX4	AX3	AX2	AX1

In case of iV5 inverter

RWr0

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	-	-	-	-	-	OC1	AX2	AX1	30AC

When status of each input terminal is turned On, the value is 1.

When status of each input terminal is turned Off, the value is 0.

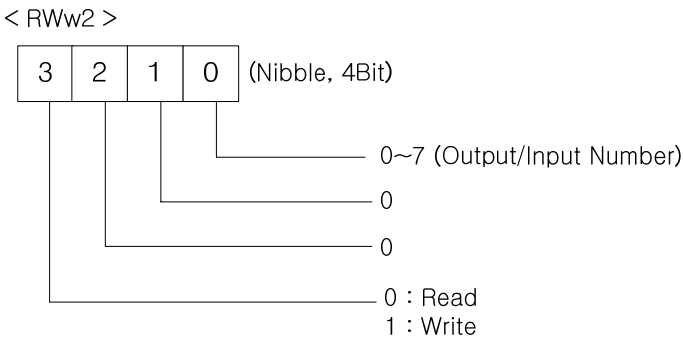
Note3) Bit information of inverter run status

This is applied for iP5A and iV5 identically.

B15	-
B14	REM. Freq.(Int. 485, OPT)
B13	REM. R/S (Int. 485, OPT)
B12	Reverse direction command (the value is 1, when it is commanded.)
B11	Forward direction command (the value is 1, when it is commanded.)
B10	Brake open signal
B9	not Used
B8	On stop
B7	DC Braking
B6	Reach to preset speed
B5	Decelerating
B4	Accelerating
B3	Fault (Trip)
B2	Reverse running
B1	Forward running
B0	Stop

9.6 Command Code

It sets the command code at remote register. It saves the executed value in remote register RWr after execution of read command code.



Command code is divided in 2 kinds.
First command code, It reads the data from the address set in Output 1~8 by setting 0x0000 ~ 0x0007 in RWw2.
Second command code, It writes the RWw3 data to the address set in Input 1~8 by setting 0x1000~0x1007 in RWw3.

◆ iP5A, iV5 Output 1~8 address information

iP5A	Output 1~ Output 8 (COM-31~COM-38)
iV5	Output 1~ Output 8 (EXT_11~EXT_18)

◆ iP5A, iV5 Input 1~8 address information

iP5A	Input 1~ Input 8 (COM-41~COM-48)
iV5	Input 1~ Input 8 (EXT_20~EXT_27)

9.7 Replay Code

It sets the reply code for monitor code and command code to RWr2.

Error Code	Description	Cause
0x00	Normal	It means that the code from master is executed correctly.
0x01	Insertion mode error	It means that the inserted value is not valid at Monitor code RWw0 and command code RWw2.
0x02	Abnormal command code	It means that the inserted address value is not valid at COM-31~37 Status 1~8 or COM-51~58 Control 1~8.
0x03	Range error of the data written	It means that the inserted value exceeds the range of data written.
0x04	Write prohibition error	EXT_21~28 Input 1 ~ Input 8 parameters have to be written the Write address of inverter. If it writes the Read address, it displays the error.

10. Common Area of iV5 communication

◆ Please refer to IP5A user manual for the common area for iP5A.

10.1 Common area of SV-iV5

Address	Parameter	Unit	R/W	Data value
0x0000	Inverter model	-	R	5: SV-iV5
0x0001	Inverter capacity	-	R	SV-iV5 2:2.2 3:3.7 4:5.5 5:7.5 6:11 7:15 8:18.5 9:22 A:30 B:37 C:45 D:55 E:75 F:90 10:110 11:132 12:160 14:220 (Unit : kW)
0x0002	Inverter Input Voltage	-	R	0: 220V Class 1: 440V Class
0x0003	Version	-	R	0100h : Ver 1.00 0110h : Ver 1.10
0x0005	Freq. Command	0.01Hz	R/W	Not Used
0x0006	Run/Stop Command	-	R/W	Not Used
0x0007	Acceleration Time	0.1 sec	R/W	SV-iV5 : Only for DeviceNet ^{note 6)}
0x0008	Deceleration Time	0.1 sec	R/W	SV-iV5 : Only for DeviceNet ^{note 6)}
0x0009	Output Current	0.1 A	R	
0x000A	Output Frequency	0.01 Hz	R	SV-iV5 : Only for DeviceNet ^{note 7)}
0x000B	Output Voltage	0.1 V	R	-
0x000C	DC Link Voltage	0.1 V	R	-
0x000D	Output Power	0.1 kW	R	Note8)
0x000E	Operating Status	-	R	Bit00 Stop
				Bit01 Forward running (FX)
				Bit02 Reverse running (RX)
				Bit03 Fault (Trip)
				Bit04 Accelerating
				Bit05 Decelerating
				Bit06 Reach to preset speed

Address	Parameter	Unit	R/W	Data value	
				Bit07	Ready to operate ^{note9)}
				Bit08	Stopping
				Bit09	Check of the encoder direction ^{note10)}
				Bit10	Torque on limit
				Bit11	Forward command ^{note11)}
				Bit12	Reverse command ^{note11)}
				Bit13	Option Run/Stop command
				Bit14	Option Frequency command
				Bit15	PID Enable ^{note12)}
0x000F	Trip Information	-	R	Bit00	Over Current1 (OCT U, V, W)
				Bit01	Over Voltage(OV)
				Bit02	Not Used
				Bit03	BX
				Bit04	Low Voltage (LV)
				Bit05	Fuse Open (FO)
				Bit06	Ground Fault (GF)
				Bit07	Inverter Over Heat (IOH)
				Bit08	E-Thermal (ETH)
				Bit09	Over Load (OLT)
				Bit10	HW-Diag
				Bit11	External-B (EXT-B)
				Bit12	Over Current2 (Arm Short U, V, W)
				Bit13	Option Error
				Bit14	Encoder Error

Address	Parameter	Unit	R/W	Data value	
				Bit15	Inverter Over Load (IOLT)
0x0010	Input Terminal Information	-	R	Bit00	FX
				Bit01	RX
				Bit02	BX
				Bit03	RST
				Bit04	Not Used
				Bit05	Not Used
				Bit06	Not Used
				Bit07	Not Used
				Bit08	P1
				Bit09	P2
				Bit10	P3
				Bit11	P4
				Bit12	P5
				Bit13	P6
				Bit14	P7
				Bit15	Not Used
0x0011	Output Terminal Information	-	R	Bit00	30A – 30C
				Bit01	1A – 1B
				Bit02	2A – 2B
				Bit03	OC1 - EG
				Bit04~15	Not Used
0x0012	Analog Input 1	-	R	Analog Input 1 (Ai1 in iV5 User Manual) -100.0%(FC17h)~.100.0%(03E8h)	
0x0013	Analog Input 2	-	R	Analog Input 2 (Ai2 in iV5 User Manual) -100.0%(FC17h) ~ 100.0%(03E8h)	
0x0014	Analog Input 3	-	R	Analog Input 3 (Ai3 in iV5 User Manual) -100.0%(FC17h) ~ 100.0%(03E8h)	
0x0015	RPM	-	R	Reverse speed is expressed as 1's complement. ^{note13)}	
0x0017	Speed Command	Hz	R/W	SV-iV5 : Only for Device Net ^{note14)}	
0x001D	Speed Command 1	RPM	R	Target Speed Command	
0x001E	Speed Command 2	RPM	R	Ramp Speed Command ^{note15)}	

Address	Parameter	Unit	R/W	Data value
0x001F	Input command of speed controller	RPM	R	Reference speed of Speed controller ^{note16)}
0x0020	Motor Speed	RPM	R	^{note13)}
0x0021	Torque Reference	0.1%	R	Torque Reference ^{note17)}
0x0022	Torque Feedback	0.1%	R	Torque Feedback ^{note18)}
0x0023	Current without load	0.1%	R	% value of PAR_26 Flux-Curr (Read during operation : Refer to 0x050A ^{note32)})
0x0024	PID Reference	0.1%	R	PID Reference ^{note19)}
0x0025	PID Feedback	0.1%	R	PID Feedback ^{note20)}
0x0026	PID Output	0.1%	R	PID Output ^{note21)}
0x0027	Inverter Temperature	deg	R	Inverter Temperature
0x0028	Line Speed	0.1%	R	Motor speed at WEB Control ^{note22)}
0x0029	Diameter	0.1%	R	Calculated diameter at WEB Control ^{note23)}
0x002A	Tension Output	0.1%	R	Tension Output at WEB Control ^{note24)}
0x002B	Dancer Input	0.1%	R	Dancer Input at WEB Control ^{note25)}
0x002C	Taper Input	0.1%	R	Taper Input at WEB Control ^{note26)}

note6) Because other series (iS5, iG5, etc.) use addresses 0x0007 and 0x0008 for the acceleration & deceleration time in DeviceNet, same addresses are used for iV5. Besides Device Net, acceleration & deceleration time of addresses 0x0503 and 0x0504 may be used for SV-iV5.

note7) Hz is used for the motor speed feedback when it communicates through only DeviceNet.

note8) Negative output is calculated in 2's complement. For the calculation method, please refer to note17.

note9) Indicates that the inverter is at a state of operating without trip. Indicates '1' before, during, after operation, when there is no trip.

note10) Indicates '0' when at stop (bit0='1'), '1' when at forward run (bit1='1'), '0' at reverse run (bit2='1')
When it is not connected correctly, it indicates '0' when at forward run (bit1='1'), '1' at reverse run (bit2='1')

note11) The relationship between Bit11 Forward Command, Bit12 Reverse Command, Bit01 Forward Run(FX), and Bit02 Reverse Run(RX) are as follows. Bit11, Bit12 indicate information of the present run command and Bit01, Bit02 indicate the present operation status. For example, if stop command is put in while running forward, Bit11 Forward Command would be '0,' but Bit01 Forward Run (FX) would be '1' when decelerating and be '0' after it stops.
When Reverse Run command is put in, while running forward at a speed of 1800 RPM, Bit12 Reverse command and Bit01 Forward Run (FX) remain '1' until the rotating direction of the motor changes, decelerating from 1800 RPM.

note12) Indicates '1,' when CON_20 Proc PID Enb(0x7514) is set to Enable('1') and when it's running (bit13='1'). It indicates '0' at stop.

note13) For SV-iV5, both positive and negative direction speed get indicated. For the positive direction speed, if it is 1800 RPM, it gets indicated as 0708h and 1800 as decimal number. For the negative direction speed, if it is -1800 RPM, it gets indicated as F8F7h. This negative number is expressed as 1's complement and the absolute value gets calculated as below.

$$(FFFFh - F8F7h)_{(10)} = 0708h_{(10)} = 1800$$

A negative sign gets in front of this absolute value and -1800RPM is the end result.

The calculation of the negative speed is as below.

$$\text{Speed (RPM)} = (FFFFh - FXXXh(\text{received negative speed data}))_{(10)} \times (-1)$$

note14) When communicating through Device Net, speed command is given with Hz.

note15) Checks up with the PostRamp Ref value during run. Speed is displayed by absolute value.

note16) Checks up with the PreRamp Ref value during run. Indicate speed by classifying signs and refer to note13.

note17) Checks up with the DIS_01's Torque Ref value during run. Calculate with 2's complement since negative torque value comes out during reverse run.

eg) When the read value is FE0Ch, it gets calculated as follows.

$$\text{Torque(\%)} = (FFFFh - FE0Ch + 0001h)_{(10)} \times (-1)$$

$$= (01F3h + 0001h)_{(10)} \times (-1)$$

$$= (01F4h)_{(10)} \times (-1)$$

$$= -500$$

It is -50% since the unit is 0.1%

The formula would be,

$$\text{Torque (\%)} = (FFFFh - FXXXh (\text{received negative torque data}) + 0001h)_{(10)} \times (-1)$$

note18) Default display checks up as Tq. For the calculation, refer to note17.

note19) When CON_20 Proc PID Enb is set to Enable, read during run and save the value of 0x050B PID input command. DIS_04 Process PID output checks up at Ref/FB's Process PID command value. It reads and saves the value of 0x050B PID input command only during run, so in case of changed value of the 0x050B PID input command at stop, you'll still be able to know the former command value through the 0x0024 PID Reference value. In this case, a value other than the DIS_04's Process PID command value gets saved and saves the same DIS_04's Process PID command value after reading the value from 0x050B when starting Run.

note20) When CON_20 Proc PID Enb is set to Enable, it checks up with DIS_04 Process PID output Ref/FB's Process PID F/B value.

note21) When CON_20 Proc PID Enb is set to Enable, it checks up with DIS_04 Process PID output Ref/FB's Process PID output value.

note22) Line Speed means the value of max. line speed expressed in % during WEB control.

note23) There are DIS_01 Diameter and WEB_01 Diameter.

note24) Tension output means the total sum of tension inputs including WEB_19 Tension Input, Analog Input, 0x0511 Tension Input Command during tension control mode with load cell used, where Taper, Stall and Boost are taken into account, that is, the final reference of PID control during tension control mode. Negative number is calculated in 2's complement.

note25) Dancer Input is the sum of WEB_29 Dancer Pos, Analog Input and 0x0512 Dancer Input during dancer control mode, that is, the final reference of PID control during dancer control mode. Negative number is calculated in 2's complement.

note26) Taper Input is the sum of WEB_21 Taper Input, Analog Input and 0x0514 Taper Input when taper function is used, that is, the number of final taper. Negative number is calculated in 2's complement.

10.2 <Reference Data(Write Data)> Area: SV-iV5 Communication Command Area

Address	Parameter	Unit	R/W	Data Value		
0x0500	Input Terminal Command ^{note27)}	-	R/W	Bit00	Stop	Not available when CC-Link communication
				Bit01	FX	
				Bit02	RX	
				Bit03	RST	
				Bit04	BX	
				Bit05	Not Used	
				Bit06	Not Used	
				Bit07	Not Used	
				Bit08	P1	
				Bit09	P2	
				Bit10	P3	
				Bit11	P4	
				Bit12	P5	
				Bit13	P6	
				Bit14	P7	
				Bit15	Not Used	
0x0501	Output Terminal Command ^{note28)}	-	R/W	Bit00	1A – 1B	
				Bit01	2A – 2B	
				Bit02	OC1 – EG	
				Bit03~15	Not Used	
0x0502	Speed Command	0.1RPM	R/W	Speed Command when FUN_02 is Option (check DIS_01 PreRamp Ref) ^{note29)}		
0x0503	Acceleration Time	0.1sec	R/W	Main Accel. Time Setting ^{note30)}		
0x0504	Deceleration Time	0.1sec	R/W	Main Decel. Time Setting ^{note30)}		
0x0505	Torque Command	0.1%	R/W	Torque Command when CON_26 is Option ^{note31)}		
0x0506	Forward Torque Limit	0.1%	R/W	Forward Torque Limit ^{note32)}		
0x0507	Reverse Torque Limit	0.1%	R/W	Reverse Torque Limit ^{note32)}		
0x0508	Regeneration Torque Limit	0.1%	R/W	Regeneration Torque Limit ^{note32)}		
0x0509	Torque Bias	0.1%	R/W	Torque Bias ^{note33)}		
0x050A	Current without load Command	0.1%	R/W	Current without load Command ^{note34)}		

Address	Parameter	Unit	R/W	Data Value
0x050B	PID Input Command	0.1%	R/W	PID Input Command ^{note35)}
0x050C	Draw Input Command	0.1%	R/W	Draw Input Command ^{note36)}
0x050D	Line Speed Cmd	01.%	R/W	Line Speed Cmd ^{note 37)}
0x050E	WEB Accel Time	0.01sec	R/W	Accel Time When WEB Control ^{note 38)}
0x050F	WEB Decel Time	0.01sec	R/W	Decel Time When WEB Control ^{note 38)}
0x0510	Diameter Preset	0.1%	R/W	Diameter Preset ^{note 39)}
0x0511	Tension input Cmd	0.1%	R/W	Tension input Cmd ^{note 40)}
0x0512	Dancer input Cmd	0.1%	R/W	Dancer input Cmd ^{note 41)}
0x0513	Tension Feedback	0.1%	R/W	Tension Feedback ^{note 42)}
0x0514	Taper input Cmd	0.1%	R/W	Taper input Cmd ^{note 43)}
0x0515	WEB PID P1 Gain	0.1%	R/W	WEB PID P1 Gain set ^{note 44)}
0x0516	WEB PID I1 Gain	0.1sec	R/W	WEB PID I1 Gain set ^{note 44)}
0x0517	WEB PID D Gain	0.1%	R/W	WEB PID D Gain set ^{note 44)}
0x0518	WEB PID Rewind Output Gain	0.1%	R/W	WEB PID Rewind Output Gain set ^{note 44)}
0x0519	WEB PID Unwind Output Gain	0.1%	R/W	WEB PID Unwind Output Gain set ^{note 44)}
0x051A	WEB Jog Accel Time	0.1sec	R/W	WEB Jog Accel Time set ^{note 38)}
0x051B	WEB Jog Decel Time	0.1sec	R/W	WEB Jog Decel Time set ^{note 38)}

note27) If CC-Link option board is used, Stop, FX, RX, RST and BX is not used.

note28) If you try to output terminal Cmd, Set the corresponding terminal into "Not Used" among the multi-function output terminals(DIO_41 ~ DIO_43). If the set value is other than "Not Used", inverter is operated with the set value and it can not output the multi-function output through communication. Also, it can not set the fault output through 30ABC.

note29) As Input value, positive is available only and DIS_01 PreRamp Ref is changed whether it is positive or negative according to RUN direction. Max value is limited by FUN_04 Max Speed. eg) if FUN_04 Max Speed = 1800RPM, 18000 → 4650h because the unit is 0.1RPM.

note30) 0x0503 Acc Time is saved at FUN_40 Acc Time-1(0x7428).

FUN▶ Acc Time-1
40 10.00 sec

In case that the unit of FUN_40 Acc Time-1 is 0.01sec as like left figure, the set range of 0x0503 is 0.0sec(0000h) ~ 599.9sec(176Fh).

FUN▶ Acc Time-1
40 600.0 sec

In order to set over 600sec, set FUN_40 Acc Time-1 to 600.0sec and changes the unit into 0.1sec. the set range of 0x0503 is 600.0sec(1770h) ~ 6000.0sec(EA60h) in this case.

FUN_40 activates writing action when new value is inserted in 0x0503. If the same value is inserted in 0x0503, writing action is not activated. Accelerating time before power off can be read from 0x0503 since the value is saved in FUN_40.

0x0504 Dec time and FUN_41 Dec Time-1(0x7429) have same relation and possible to input Dec time by same manner with setting input range of 0x0504.

note31) Torque Cmd, CON_01 is "Torque", CON_26 is set to "Option" and can be settable when driving.

note32) Only when CON_28 Trq Lmt Src is set to Option (Opt Opt Opt), torque limits can be set through communication. You can verify the value from DIS_01 PosTrq Limit, NegTrq Limit, RegTrq Limit .

note33) If CON_32 Trq Bias Src is set to Option, you can verify from DIS_01 Torque Bias.

note34) Unloaded current command can be commanded in the value set in PAR_26 in % through communication. In this case, the value set in PAR_26 means 100%. The value equal to or less than 100% can be set. The value input is DIS_01 Flux Ref that can be verified during operation mode.

note35) This can be verified from DIS_04 Process PID controller. Feedback and output can be verified during operation mode.

note36) Only in case of giving the value through analog input or communication after setting CON_22 to a certain value, draw function can be used. In this case, communication means to replace the analog input value with communication, not to change the draw quantity of CON_22.

Accordingly it cannot be identified from the loader, but from the value of address changed.

note37) When commanding the line speed through communication, FUN_02 Spd Ref Sel should be set to Line SPD Opt. In this case, the % value for the maximum line speed is input. For example, Max. line speed is 100[m/m], the line speed at the time of 100% Input is 100[m/m]. This can be verified from DIS_01 Line SPD CMD.

note38) When WEB_11 AccDecWeb is set to "No" during WEB control mode, acceleration/deceleration time is operated depending on the acceleration/deceleration time of FUN_40 and FUN_41. If WEB_11 AccDecWeb is set to "Yes", the acceleration/deceleration time of FUN_40 and FUN_41 is disregarded, and it is operated based on the setting of WEB acceleration/deceleration time. If WEB_56 JogTime Sel is set to "No", acceleration/deceleration time of jog speed is operated based on the acceleration/deceleration time of FUN_40 and FUN_41. In case of setting WEB_56 JogTime Sel to "Yes", the acceleration/deceleration time of FUN_40 and FUN_41 is disregarded. Jog operation is conducted by the setting of WEB Jog acceleration/deceleration time. WEB acceleration/deceleration time is stored in WEB_12 AccTimeWeb(0x7C0C), WEB_13 DecTimeWeb(0x7C0D) respectively, and the characteristics during Write Operation mode are same as 0x0503 and FUN_40 Acc Time-1 in (note 30). Jog acceleration/deceleration time is stored in WEB_57 JogAcc Time(0x7C39) and WEB_58 JogDec Time (0x7C3A)

respectively, and for the characteristics during Write Operation mode, please refer to (Note 30) same as WEB acceleration/deceleration time.

note39) This is the diameter initialization through communication. When setting one of DIO_01~07 to Dia Preset with power ON, you can conduct initialization. Setting range is WEB_10 Min Diameter ~ 100.0% (03E8h).

This can be verified from WEB_01 Diameter.

note40) Tension input command means the tension input carried out through communication when load cell is used. Communication command value is not inputted, it is read '0000h'.

When WEB_28 PIDRef Sel is set to "Taper Out", it can be verified from Process PID Command value of DIS_04 Process PID output controller during operation mode. In this case, the process PID command value can be influenced by the setting of (note 26) Taper Input Value.

Input range is -100.0% (FC17h) ~ 100.0% (03E8h).

note41) Dancer input command means the dancer inputs carried out through communication when dancer is used. Communication command value is not inputted, it is read '0000h'.

When WEB_28 PIDRef Sel is set to "Dancer Pos", it can be verified from Process PID command value of DIS_04 Process PID output controller during operation mode.

In this case, the process PID command value is the sum of WEB_29 dancer Pos, analog input and communication command value.

Input range is -100.0%(FC17h) ~ 100.0%(03E8h).

note42) In case of conducting tension feedback through communication, WEB_47 PID F/B Src should be set to "Option". It can be verified from Process PID F/B value of DIS_04 Process PID Output controller. The input range is -150.0%(FA23h) ~ 150.0%(05DCh).

To conduct tension feedback in analog, you should set to "Analog". If set to "None", tension feedback becomes 0. If tension feedback set to "Option", the communication cycle should be done in 10[ms] or less.

In case of the warper, it requires the tension control mode using the encoder, where the encoder pulse should be counted to use it as tension feedback. In this case, the inverter has no function of counting the pulse number, and therefore PLC counts the Encoder Pulse, calculates it into speed, converts it into %, and finally it should be communicated as tension feedback. For example, Max. Line Speed = 100[m/m], Gear Ratio = 1,

When assuming that, Diameter = 100[mm], Encoder Pulse = 1024, Communication Cycle 10[ms],

The formula will be expressed as follow;

$$Speed = \frac{LineSpeed}{Diameter \times \pi} = \frac{100}{0.1 \times \pi} = 318.3 [rpm]$$

$$318.3 \times \frac{1024}{60} \times \frac{1}{100} = 54.32 \text{ will be the maximum pulse number that is received at every}$$

10[ms].

Address 0x050D ~ 0x051B can be communicated only when CON_02 Application is set to "WEB Control".

note43) Taper input command means the taper inputs carried out through communication. When having the other value than 'None' of WEB_20 Taper Type, it is added to the taper inputs carried out through WEB_21 Taper Input and Analog input, and then the final tapers are determined. When inputting the negative number, you may input it in 2's complement.

Input Range is -100.0%(FC17h) ~ 100.0%(03E8h).

note44) The value of 0x0515~0x0519 is stored in WEB_30 ProcPID Kp1(0x7C1E), WEB_32 ProcPID Ki1(0x7C20), WEB_37 ProcPID Kd(0x7C25), WEB_42 PIDOGainRe(0x7C2A) and WEB_43PIDOGainUn(0x7C2B) respectively. For the characteristics when the equal value is repeatedly input, please refer to (note 30).

When inputting the negative number in 0x0518 and 0x0519, you may input it in 2's complement.

Input range is -250.0%(F63Ch) ~ 250.0%(09C4h).