VS-606 V7 OPTION UNIT

CC-Link COMMUNICATIONS INTERFACE UNIT

USER'S MANUAL

MODEL: SI-C/V7
CONFORMS TO CC-Link VER. 1.10

YASKAWA

MANUAL NO. SIEZ-C736-70.5

INTRODUCTION

This Instruction Manual describes operations and specifications of the Compact General-purpose Vector Control Inverter VS-606 V7 Series and the CC-Link Communication Interface Unit SI-C/V7 that is connected to the MITSUBISHI FA Field Network CC-Link for data communications. Read this manual and the SI-C User's Manual (SIEZ-C736-70.7) carefully and be sure you understand the infrormation provided before attempting any operations.

For handling of the inverter unit, refer to the VS-606 V7 Series Instruction Manual (TOE-S606-11).

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General Precautions

- Some drawings in this manual are shown with the protective cover or shields removed, in order to describe the details with more clarity. Make sure all covers and shields are replaced before operating this product, and operate it in accordance with the instructions in this manual.
- This manual may be modified when necessary because of improvements of the product, modification, or changes in specifications.
- A new version of the manual will be released under a revised manual number when any changes are made.
- Contact your Yaskawa representative or a Yaskawa office listed on the back of this manual to order a new manual if this manual is damaged or lost. Please provide the document number listed on the front cover of this manual when ordering.
- Yaskawa cannot guarantee the quality of any product which has been modified by the user. Yaskawa assumes no responsibility for any injury or damage caused by such a modified product.

Safety Information

Read this instruction manual and the related documents thoroughly before installation, operation, maintenance or inspection of this product. Make sure you understand product information, all precautions and safety information before using the product. Also, keep this manual in a convenient location so that it can be referred to whenever necessary.

The following symbols are used to indicate precautions in this manual.

⚠ WARNING	Indicates precautions that, if not heeded, could possibly result in serious injury to personnel.
⚠ CAUTION	Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

Even items described in ⚠ CAUTION may result in a vital acccident in some situations.
In either case, follow these important notes.

NOTE : Items to be observed by users are described in the relevant sections.

■ Receiving

⚠ CAUTION
● Do not use any option unit which is damaged or has missing parts. Failure to observe this caution may result in injury.

■ Installation and Wiring

⚠ WARNING

- Never touch the inside of the Inverter.

  Failure to observe this warning may result in electric shock.

- Disconnect all power before mounting or removing the option unit or wiring. Then wait at least the specified time (specified on the front cover) after the power supply is disconnected and all LEDs and CHARGE LED are extinguished.

  Failure to observe this warning may result in electric shock.

- Do not damage or apply excessive stress to the cables. Do not place heavy objects on the cables or place the cables between other objects.

  Failure to observe this warning may result in electric shock, malfunction or damage to the equipment.

■ Setting

⚠ CAUTION

- Do not change the inverter settings unnecessarily.

  Failure to observe this caution may result in injury or damage to the equipment.

CONTENTS

1 OUTLINE

The SI-C/V7 unit is an interface unit to perform data communications with the CC-Link master by connecting the Compact General-purpose Vector Control Inverter VS-606 V7 series to the open field network CC- Link.

This SI-C/V7 unit enables to run or stop the inverter, monitor the operation status, to specify or change various constants in the inverter from the CC-Link master.

The following is the inverter series on which the SI-C/V7 unit can be installed.

VS-606 V7 Single/3-phase 200/400V 3.7kW or less Series (Software No. 0020 and later)

VS-606 V7 3-phase 200/400V 5.5/7.5kW Series (Software No. 0100 or after)

2 RECEIVING

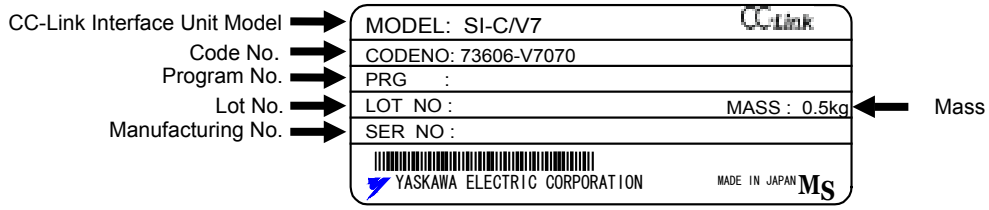
Check the following items as soon as the product is delivered.

Item	Inspection Method
Is the product what you have ordered?	Check it with the nameplate on the side of the SI-C/V7 unit (See 2.1.)
Is the inverter damaged?	Check the SI-C/V7 unit visually for any damage that may have occurred during transport.
Are any parts missing?	Check the parts list (See 2.2.)

If you find any irregularities, contact the agency from which you purchased the Inverter or your Yaskawa representative immediately.

2.1 Nameplate

The following diagram shows the nameplate on the side of the SI-C/V7 unit.



2.2 Parts List

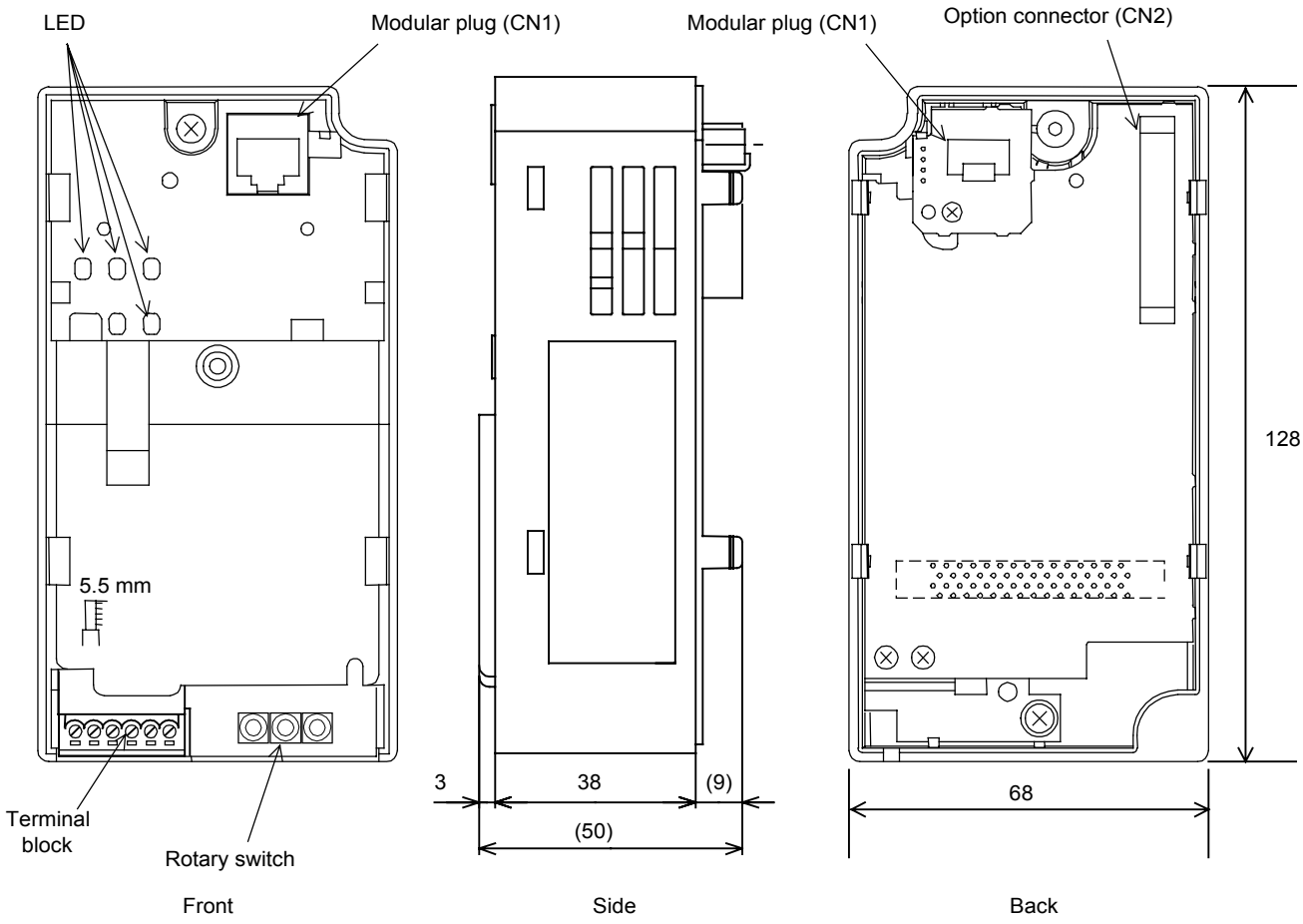
The SI-C/V7 unit contains the following parts.

Part Name	Q'ty
CC-Link Interface Unit	1
Mounting fixture	1
M3 × 8SW screw	1

3 NOMENCLATURE AND SETTINGS

3.1 Components

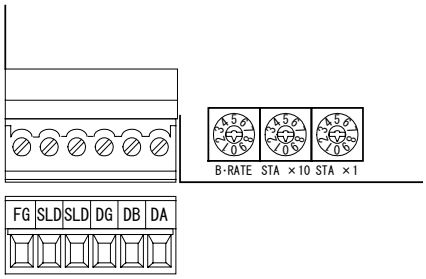
The names of components on the SI-C/V7 unit are shown in the following figure.



3.2 Terminal Block

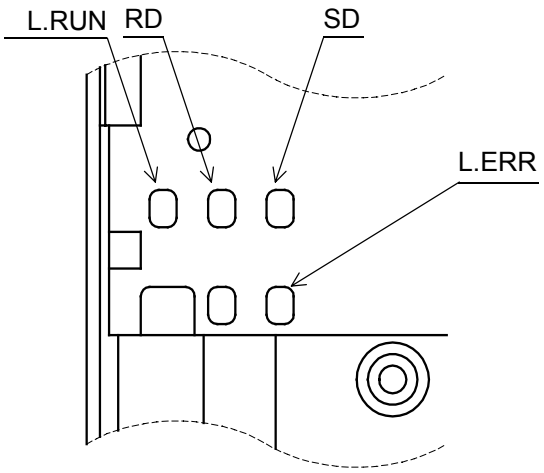
This terminal block connects the SI-C/V7 unit to the CC-Link communications line.

Terminal No.	Name	Explanation
1	DA	Communication data +
2	DB	Communication data −
3	DG	Signal Grounding
4	SLD	Shield
5	SLD	Shield
6	FG	Grounding



3.3 LEDs

These LED indicator lamps indicate the status of the CC-Link or the SI-C/V7 unit.



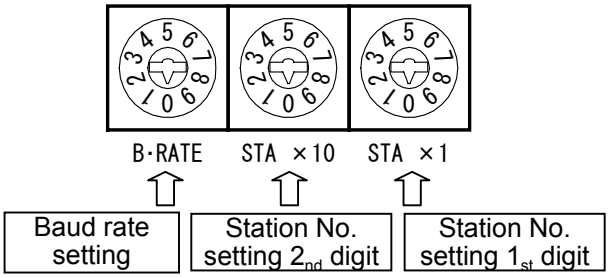
LED display				Meaning	Operator display	Corrective action
L.RUN (Green)	SD (Red)	RD (Red)	L.ERR (Red)			
☼	☼	☼	☼	Normal but an error occurring.	Normal	Remove the influence of noise.
☼	☼	☼	●	Normal	Normal	—
☼	☼	●	☼	H/W error	CAL* or BUS	Turn ON the power supply again.
☼	☼	●	●	H/W error	CAL* or BUS	Turn ON the power supply again.
☼	●	☼	☼	CRC error occurred and the SI-C cannot replay.	Normal	Remove the influence of noise.
☼	●	☼	●	Local data cannot be received.	CAL* or BUS	Confirm the PLC program.
☼	●	●	☼	H/W error	CAL* or BUS	Turn ON the power supply again.
☼	●	●	●	H/W error	CAL* or BUS	Turn ON the power supply again.
●	☼	☼	☼	Polling response is made but CRC error occurred in refresh receiving.	Normal	Remove the influence of noise.
●	☼	☼	●	H/W error	CAL* or BUS	Turn ON the power supply again.
●	☼	●	☼	H/W error	CAL* or BUS	Turn ON the power supply again.
●	☼	●	●	H/W error	CAL* or BUS	Turn ON the power supply again.
●	●	☼	☼	CRC error occurred in local data.	Normal	Remove the influence of noise.
●	●	☼	●	Local data are not provided or cannot be received because of noise.	CAL* or BUS	Remove the influence of noise.
●	●	●	☼	H/W error	CAL* or BUS	Turn ON the power supply again.
●	●	●	●	Data cannot be received because of disconnection, etc.	CAL or BUS	Check the wiring.
●	●	☼ ●	☼	Baud rate or station number is not correct.	Normal	Correct the setting and turn ON the power supply again.
☼	☼	☼	☼	Baud rate or station number is changed after the power supply is turned ON.	Normal	Return the setting to the former setting. Turn ON the power supply again.

☼:Lit ☼:Blinking ●:Not lit

* CAL is displayed in the inverter software version "0024" and after.

3.4 Rotary Switches

Use these switches to set the baud rate and station number of the CC-Link.



NOTE

Before turning ON the inverter power supply, set these three setting switches. Do not change the settings after turning ON the power supply. Be sure to change the settings after turning ON the inverter power supply.

■ Baud Rate Setting Switches

Switch	0	1	2	3	4
Communications Speed	156 kbps	625 kbps	2.5 Mbps	5 Mbps	10 Mbps

Note: If setting this switch to 5 or above, the LED lamp "L.ERR" lit, resulting in a communication error.

■ Station No. Setting Switches

1. The station number is set in the range of 1 to 64.

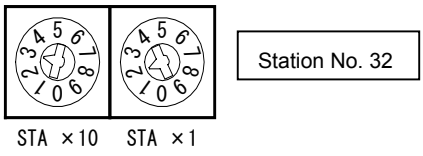
   "STA × 10" sets the 2nd order of the station number.

   "STA × 1" sets the 1st order of the station number.

   Example 1) Setting the station No. to 32:

   Set "STA × 10" to 3.

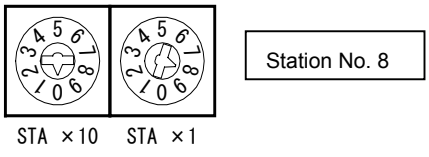
   Set "STA × 1" to 2.



   Example 2) Setting the station No. to "8".

   Set "STA × 10" to 0.

   Set "STA × 1" to 8.



2. The station number cannot be overlapped. Confirm that the station number to be set has not been set for any other station.

3. Maximum number of stations to be connected is 42 when the following conditions are satisfied.

$\{(1 \times a) + (2 \times b) + (3 \times c) + (4 \times d)\} \leq 64$

a: Number of the unit using the buffer memory for one station

b: Number of the unit using the buffer memory for two stations

c: Number of the unit using the buffer memory for three stations

d: Number of the unit using the buffer memory for four stations

$\{(16 \times A) + (54 \times B) + (88 \times C)\} \leq 2304$

A: Number of remote I/O stations ≤ 64 stations

B: Number of remote device stations ≤ 42 stations

C: Number of local stations ≤ 26 stations

4 INSTALLATION AND WIRING

4.1 Installing the SI-C/V7 Unit

Install the SI-C/V7 unit when the digital operator and the front cover of the inverter are removed.Use the following procedure to install the SI-C/V7 unit.

1. Turn OFF the inverter power supply and remove the digital operator and the front cover and then wait one minute after all the LEDs are turned OFF.
2. See Fig.1 for the three places where you should cut off the cover of the inverter CN2 connector. Use nippers to cut it off. Be careful so that the slippings do not fall into the inverter unit. Should they fall in, be sure to remove them.
3. Fix the mounting fixture as shown in Fig.1.
4. Slowly mount the SI-C/V7 unit on the main body of the inverter so that it is straight. When mounting, confirm that CN1 and CN2 are in the top half. (The wiring to the inverter must be completed in advance. After mounting the SI-C/V7 unit, the terminal for the inverter is hidden from view.)
5. Refer to Fig.2 for the location of the screws to attach the SI-C/V7 unit on the inverter. The screw has already been screwed in on the interface unit.
6. Install the digital operator and the front cover to the SI-C/V7 unit.

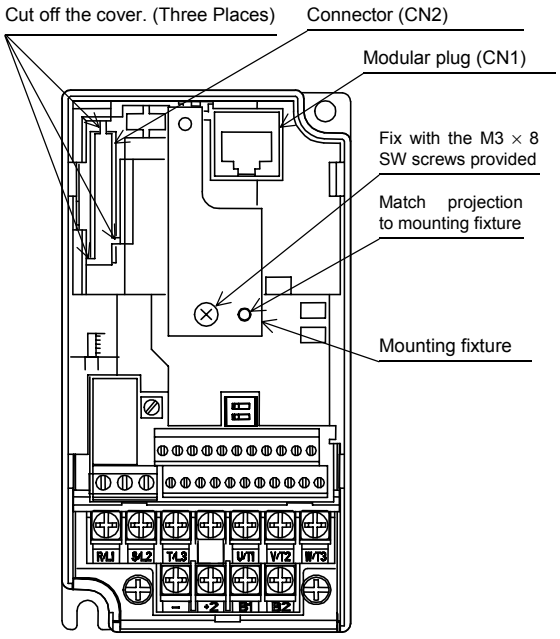


Fig. 1 Front of Inverter

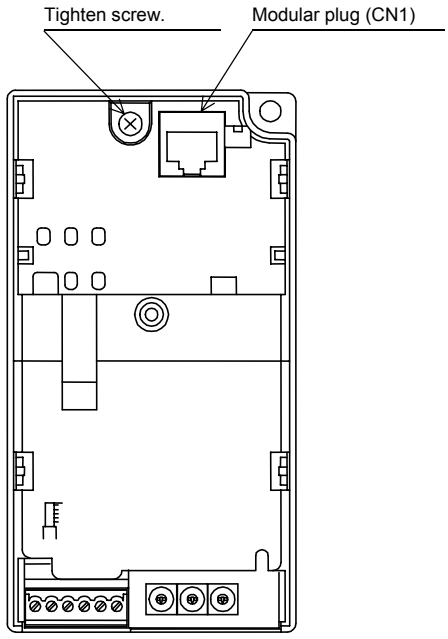


Fig. 2 Front of SI-C/V7 Unit

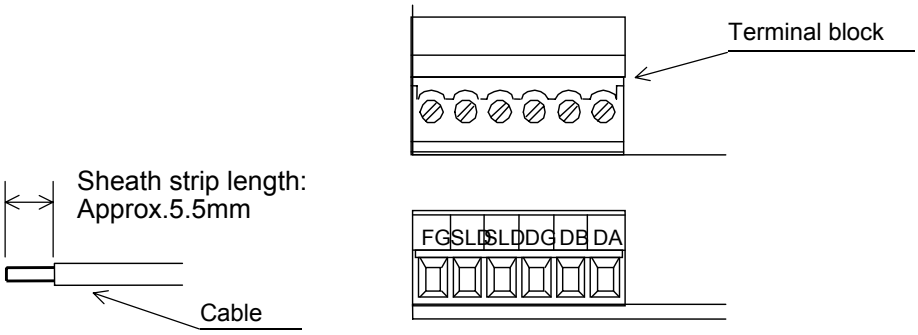
4.2 Wiring of the communications Cable

■ Wiring

Use the following procedure to wire the CC-Link master to the terminal block of the SI-C/V7 unit.

1. Use a thin flat screwdriver to loosen the terminal screws.
2. Insert the cable from the bottom of the terminal block.
3. Tighten the terminal screws firmly.

   (Tightening torque: 0.22 to 0.25 [N•m]

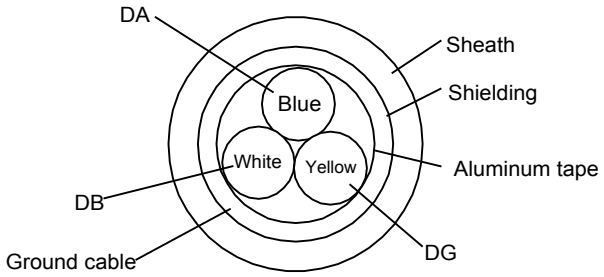


Note: 1. Separate the communications cables from the main circuit wiring or other power cables.

2. There is a scale indication of 5.5 mm on the top of the terminal block in the front face of the SI-C. Use this scale to confirm the strip length.

■ Communication Cable Specifications

Be sure to use a cable of the following specifications as the communication cable. No cable other than the recommended cable shown below can assure the performance of the CC-Link.

Item	Specifications
Model	FANC-SB 0.5 $mm^2 \times 3$ [Manufactured by Kuramo Electric Co., Ltd]
Conductor cross-sectional area	0.5mm^2
Conductor resistance (at 20°C)	37.8 Ω/km or less
Insulation resistance	10000MΩ/km or more
Withstand voltage	500 VDC for one minute
Static electricity (1 kHz)	60nF/km or less
Impedance	100±15Ω
Cross-section	
External dimensions	7mm
Approx. mass	65kg/km

■ Connection of Termination Resistor

When the SI-C/V7 is connected to the communication line as the end unit, connect a termination resistor between terminals DA and DB.

Use the termination resistor attached to the master unit or any one of 110 Ω, 1/2W on the market.

5 FUNCTIONS

SI-C/V7 is a communication interface unit for operations, adjustments, and monitoring using the PLC program with the VS-606V7 as a remote device station of the CC-Link. Both the bit data and the word data cyclic transmission are available, and high-speed communication up to 10 Mbps is possible.

5.1 Initial Settings

Set the following constants, whenever necessary, before starting communications between the Inverter and the PLC.

Constant No.	Name	Description	Factory setting
n003	Run command selection	0: Digital operator 1: Control circuit terminal 2: MEMOBUS communication 3: Communication card (option)	0
n004	Frequency reference selection	0: Digital operator 1: Frequency reference 1 (n024) 2: Control circuit terminal (0-10V) 3: Control circuit terminal (4-20mA) 4: Control circuit terminal (0-20mA) 5: Pulse train input 6: MEMOBUS communication 7: Operator circuit terminal (0-10V) 8: Operator circuit terminal (4-20mA) 9: Communication card (option)	0

To run or stop the inverter using CC-Link communication, set n003 to 3. To set frequency, set n004 to 9.

5.2 Basic Functions

The following describes the basic functions that can be operated from the PLC using the CC-Link communication function.

■ Run Command and Frequency Reference

Running or stopping the inverter, or setting or changning the operation frequencies can be performed from the PLC.

To perform these operations from the PLC, the inverter run command right and frquency reference right must be set to the PLC side.

The following describes how to switch these rights to the PLC side.

Switching by inverter constants

Run command right selection n003: 3 "Communication Option"
(Factory setting is "0.")

Frequency reference right selection n004: 9 "Communication Option"
(Factory setting is "0.")

Switching by inverter control circuit terminals

Allocate the multifunction input function "Communication/Control Circuit Terminal Changeover" (set value: 18) to either one of control circuit terminals S3 to S6 (n052 to n056). Turning ON the terminal input can change the commanding right to the PLC side.

When the control circuit terminal is selected, the commanding right depends on the settings of constants "n003" and "n004".

Therefore, if the setting of the above a: has been made, the commanding right always belongs to the option.

This function is available with the inverter software version "0024" and after. It is not available for the capacity of 5.5/7.5kW.

Switching by the PLC

1.Inverter constant setting

Run command right selection : Sends command code "2103h", write-in data "3" to the inverter.

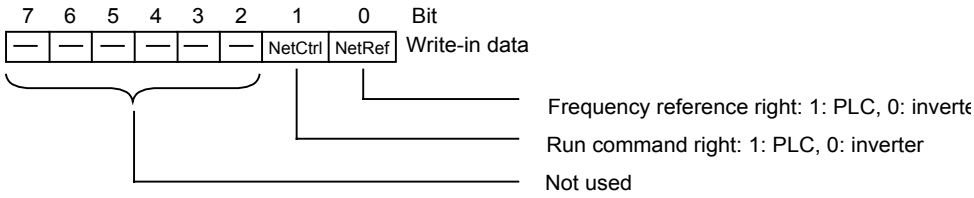
The setting of inverter parameter "n003" is changed to "3" and the run command right is passed to the PLC.

Frequency reference right selection : Sends command code "2104h", write-in data "9" to the inverter.

The setting of inverter parameter "n004" is changed to "9" and the frequency reference right is passed to the PLC.

2. Switching by NetRef, NetCtrl

Frequency reference right and run command right can be switched by using RW_{W2} command code of the remote register.



When this method is used to switch the commanding right, the former commanding right is returned at power ON after the inverter power supply is turned OFF. Therefore, use this method for temporary switching.

Command code	00FBh			
Write-in data	00h	01h	02h	03h
Frequency reference right	PLC	Inverter	PLC	Inverter
Run command right	PLC	PLC	Inverter	Inverter

Priority of PLC Commanding Right Setting

Run Command Rights

	Setting Status				
NetCtrl	1	0	0	0	0
Run command selection n003	—	3	Other than 3	Other than 3	Other than 3
Communication/ control circuit terminal changeover *1	—	—	ON (when communication selected)	OFF (when terminal selected)	OFF (when terminal selected)
Remote/local mode	—	—	—	Remote	Local
Run command right	PLC	PLC	PLC	Depends on inverter "n003" setting.	Inverter (Operator)

Note: "—" indicates that the set value is disregarded.

Frequency Reference Rights

	Setting Status				
NetRef	1	0	0	0	0
Frequency reference selection n004	—	9	Other than 9	Other than 9	Other than 9
Communication/control circuit terminal changeover *1	—	—	ON (when communication selected)	OFF (when terminal selected)	OFF (when terminal selected.
Remote/local mode	—	—	—	Remote	Local
Frequency reference right	PLC	PLC	PLC	Depends on inverter "n004" setting.	Inverter (Operator)

Note: 1. When the multi-speed reference of the multifunction input is input, the frequency reference value becomes multi-speed reference value (n024 to n032).

2. "—" indicates that the set value is disregarded.

3. This function is available for the inverter software version "0024" and after. It is not available for the capacity of 5.5/7.5kW.

■ Monitor

The inverter status information can be monitored.

Setting RW $_{W0}$ to the monitor code and turning ON the RYC signal stores the data corresponding to the monitor code to the PLC buffer memory.

For the details of the monitor codes and the units, refer to *5.3.2 List of Monitor Codes and Command Codes*.

■ Constant Setting/Reading

Write-in/read-out of the inverter constants and status information, and inverter reset can be performed from the PLC.

Set the command code to RW $_{W2}$ (set the write-in data to RW W3, too, when necessary) and turn ON the RYF (command code execution request flag) signal, the inverter performs the processing corresponding to the command code and returns the data.

For the command codes and write-in data units and ranges, refer to *5.3.2 List of Monitor Codes and Command Codes*.

5.3 List of CC-Link Data

■ List of Remote Inputs and Outputs

The inverter uses the PLC buffer menory for one station. The following table lists the inverter inputs and output viewed from the PLC.

Refer to the MITSUBISHI PLC Programming Manual for details on the PLC buffer memory.

List of Remote Inputs and Outputs

Remote Input (from PLC to Inverter)			Remote Output (from Inverter to PLC)		
Device No.	Signal Name	Remarks (Factory setting)	Device No.	Signal Name	Remarks (Factory setting)
RY0	Forward run command	—	RX0	During forward run	—
RY1	Reverse run command	—	RX1	During reverse run	—
RY2	Terminal S3 multifunction input terminal function	External fault (n052: 3)	RX2	Terminals MA-MB multifunction output	Fault (n057: 0)
RY3	Terminal S4 multifunction input terminal function	Fault reset (n052: 5)	RX3	Speed agree	—
RY4	Terminal S5 multifunction input terminal function	Multi-speed reference 1 (n052: 6)	RX4	Stall prevention operating *1	—
RY5	Terminal S6 multifunction input terminal function	Multi-speed reference 2 (n052: 7)	RX5	Not used	—
RY6	Terminal S7 multifunction input terminal function *1*2	Jog command (n052: 10)	RX6	Terminal P1 multifunction output	Running (n058: 1)
RY7	Not used	—	RX7	Terminal P2 multifunction output	Frequency agree (n059: 2)
RY8	Not used	—	RX8	Not used	—
RY9	Inverter output shutoff	—	RX9	Not used	—
RYA	Not used	—	RXA	Not used	—
RYB	Not used	—	RXB	Not used	—
RYC	Monitor command	—	RXC	Monitoring	—
RYD	Frequency setting command 1	RAM write-in	RXD	Completion of frequency setting 1	RAM write-in
RYE	Frequency setting command 2 *3	Frequency reference 1 (n024) write-in	RXE	Completion of frequency setting 2 *3	Frequency reference 1 (n024) write-in
RYF	Command code execution request	—	RXF	Completion of command code execution	—
RY10 to RY18	Not used	—	RX10 to RX18	Not used	—

Remote Input (from PLC to Inverter)			Remote Output (from Inverter to PLC)		
Device No.	Signal Name	Remarks (Factory setting)	Device No.	Signal Name	Remarks (Factory setting)
RY19	Multifunction I/O allocation change request	—	RX19	Completion of multifunction I/O allocation change	—
RY1A	Error reset	—	RX1A	Error	—
RY1B	Not used	—	RX1B	Remote station ready	—
RY1C	Not used	—	RX1C	Not used	—
RY1D	Not used	—	RX1D	Not used	—
RY1E	Not used	—	RX1E	Not used	—
RY1F	Not used	—	RX1F	Not used	—

*1. Available for inverter software version "0024" and after. Not used for inverter software version "0023" and before or for the inverter of capacity 5.5/7.5kW.

*2. S7 multifunction input terminal is set as external baseblock for the inverter software version "0023" and before, and for the inverter of capacity 5.5/7.5kW. Do not set external baseblock (set value: 12) to terminals S3 to S6.

*3. Use frequency setting reference 1 (RYD) when the setting is to be changed frequently.

List of Remote Registers

From PLC to Inverter			From Inverter to PLC		
Device No.	Name	Check Flag	Device No.	Name	Execution Request Flag
RW_{W0}	Monitor code	RYC	RW_{R0}	Monitor data	RXC
RW_{W1}	Setting frequency	RYA, RXB	RW_{R1}	Operation frequency	RXD, RXE
RW_{W2}	Command code	RYF	RW_{R2}	Response code	RXF
RW_{W3}	Write-in data		RW_{R3}	Read-out data	

■ List of Remote Inputs and Outputs

List of Remote Inputs and Outputs

Remote Inputs (from PLC to Inverter)			
Device No.	Signal Name	Contents	Remarks (Factory setting)
RX0	Forward running	ON: Forward running, OFF: Other than forward running (including DC injection braking)	—
RX1	Reverse running	ON: Reverse running, OFF: Other than reverse running (including DC injection braking)	—
RX2	Terminals MA-MB output	Multi-function contact output	Fault (n057: 0)
RX3	Speed agree	ON when operation frequency is in the range from setting frequency to the setting of "n023".	—
RX4	Stall prevention *1	ON at stall prevention	—
RX5	Not used	—	—
RX6	Terminal P1 output	Multi-function photocoupler output 1	Running (n058: 1)
RX7	Terminal P2 output	Multi-function photocoupler output 2	Frequency agree (n059: 2)
RX8	Not used	—	—
RXC	Monitoring	ON when the monitor data are being updated.	—
RXD	Completion of frequency setting 1	ON when the data are set as master speed frequency.	RAM write-in
RXE	Completion of frequency setting 2 *3	ON when the data are set to frequency reference 1 (n024). Also set as master speed frequency.	Frequency reference 1 write-in
RXF	Completion of command code execution	ON when execution of the specified command is completed.	—
RX10	Not used	—	—
RX18	System reservation	—	—
RX19	Completion of multi-function I/O allocation change	ON when changing multi-function I/O allocation is completed.	—
RX1A	Error	ON when an error occurs in the inverter.	—
RX1B	Remote station ready	ON when the inverter is ready for operation.	—
RX1C	System reservation	—	—

Remote Outputs (from Inverter to PLC)			
Device	Signal Name	Contents	Remarks (Factory setting)
RY0	Forward run command	ON: Forward run command, OFF: stop command	—
RY1	Reverse run command	ON: Reverse run command, OFF: stop command	—
RY2	S3 multi-function input terminal function	Multi-function input 3: (n052)	External fault (n052: 3)
RY3	S4 multi-function input terminal function	Multi-function input 4: (n053)	Fault reset (n053: 5)

Remote Outputs (from Inverter to PLC)			
Device	Signal Name	Contents	Remarks (Factory setting)
RY4	S5 multi-function input terminal function	Multi-function input 5: (n054)	Multi-speed 1 (n054: 6)
RY5	S6 multi-function input terminal function	Multi-function input 6: (n055)	Multi-speed 2 (n055: 7)
RY6	S7 multi-function input terminal functin *1 *2	Multi-function input 7: (n056)	Jogging (n056: 10)
RY7	Not used	—	—
RY8	Not used	—	—
RY9	Inverter output shutoff	ON: Motor coasts to a stop. OFF: Operation restarts if a forward or reverse run command is input.	—
RYA	Not used	—	—
RYB	Not used	—	—
RYC	Monitor command	Monitor data specified by the monitor code are set to RW_{R1}.	—
RYD	Frequency setting command 1 *3	Sets RW_{W1} setting frequency as main speed frequency.	—
RYE	Frequency setting command 2 *3	Sets RW_{W1} setting frequency to frequency reference 1 (n024) as master speed frequency. The data that are set here are stored even when the inverter power supply is turned OFF. These data are also used as operational frequency when the power supply is turned ON.	—
RYF	Command code execution request	Requests for execution of the command code.	—
RY10 to 17	Not used	—	—
RY18	System reservation	—	—
RY19	Multifunction I/O allocation change request	Changes multifunction I/O allocation.	—
RY1A	Error reset	Releases the inverter fault.	—
RY1B to 1F	Not used	—	—

*1. Available for inverter software version "0024" and after. Not used for inverter software version "0023" and before or for the inverter of capacity 5.5/7.5kW.

*2. S7 multifunction input terminal is set as external baseblock for the inverter software version "0023" and before, and for the inverter of capacity 5.5/7.5kW. Do not set external baseblock (set value: 12) to terminals S3 to S6.

*3. Be sure to use frequency setting reference 1 (RYD) when the setting is always to be changed.

*4. Turn RY19 ON, and the settings (the allocation of the inverter multi-function inputs and outputs) change. Refer to the following table, *"Changing RY19 Multi-function I/O Allocation."*

■ Changing RY19 Multifunction I/O Allocation

Constant No.	Name	RY19: OFF (Factory setting)	RY19: ON
n052	Multifunction input selection 3	3: External fault (NO contact input)	6: Multi-speed reference 1
nishiiku	Multifunction input seletion 4	5: Fault reset	7: Multi-speed reference 2
n054	Multifunction input selection 5	6: Multi-speed reference 1	8: Multi-speed reference 3
n055	Multifunction input selection 6 *1	7: Multi-speed reference 2	10: Jog command
n056	Multifunction input selection 7	10: Jog command	11: Accel/decel time change command
n057	Multifunction contact output	0: Fault	1: Running
n058	Multifunction output selection 1	1: Running	4: Frequency detection 1
n059	Multifunction output selection 2	2: Frequency agree	0: Fault
n095	Frequency detection level	0.00 Hz	6.00 Hz

* S7 multifunction input terminal is set as external baseblock for the inverter software version "0023" and before, and for the inverter of capacity 5.5/7.5kW.

Remote Registers

From PLC to Inverter

Remote Register	Name	Contents
RW_{W0}	Monitor code	Sets the monitor code. While the monitor execution request flag (RYC) is turned ON after setting the code, the monitored value is stored in RW_{R0}. While RW_{R0} is being updated, the monitoring signal (RXC) is turned ON.
RW_{W1}	Setting frequency	Sets operation frequency. At this time, turning ON the RYD flag sets these data to the inverter as master speed frequency. Turning ON the RYE flag writes in the set value to frequency reference 1 (n024) and stores the data in EEPROM. However, the unit of the set value depends on the setting of "n035" (frequency reference setting/display unit selection).
RW_{W2}	Command code	Sets the command code to execute parameter read/write, fault history, error reset, etc. Turning ON the command code execution request flag (RYF) makes the inverter perform processing corresponding to the command code; and the command code execution completion flag (RXF) is turned ON after execution of the command.
RW_{W3}	Write-in data	Sets the data when necessary for the write-in command code. Turn ON the command code execution request flag (RYF) after setting the command code and write-in data.

From Inverter to PLC

Remote Register	Name	Contents
RW_{R0}	Monitor data	The monitor data corresponding to the monitor code of RW_{R1}. While the monitor request flag (RYC) is turned ON, these data are updated and the monitoring signal (RXC) is turned ON.
RW_{R1}	Operation frequency	The current operation frequency is always set. However, the unit depends on the setting of n035 (frequency reference setting/display unit selection).* For example, when n035 is set to 0, Hz is used as the unit. When "n035" is set to 4, r/min is used.
RW_{R2}	Response code	"00h" is set when the command code and write-in data are correct. If any of them is incorrect, "01h" to "03h" is set.
RW_{R3}	Read-out data	Data corresponding to the command code are set.

* List of RW_{R1} Data Contents for Each Set Value of n035

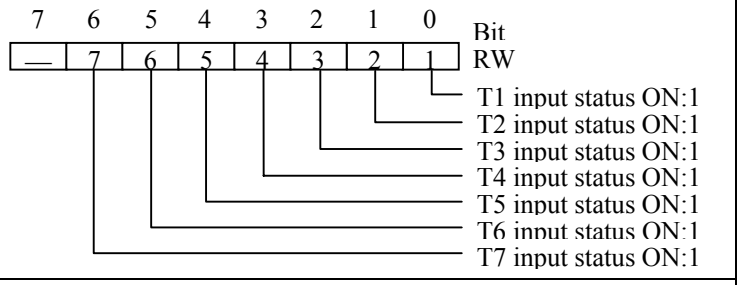
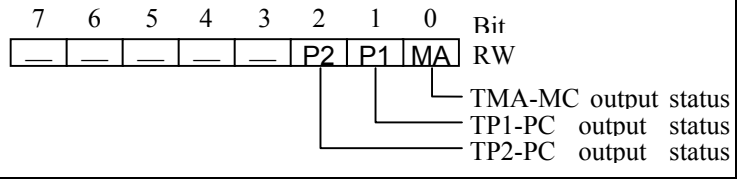
Frequency reference setting/display unit selection (n035)	Data Contents of RW_{R1} (operation frequency) data contents
0	Operation frequency: 0.01 Hz (less than 100 Hz) 0.1 Hz (100 Hz or more)
1	0.1% {Operation frequency ÷ Maximum operation frequency (n011)} × 100 (%)
2 to 39 (Number of motor poles)	Motor speed (1 r/min)
40 to 39999	Any desired unit

Note: For the details, refer to the VS-606 V7 Series Instruction Manual (TOE-S606-11.)

■ List of Monitor Codes and Command Codes

Monitor Codes

First Monitor Code

Monitor Code	Name	Unit	Remarks (Factory setting)
0000h	Not used	—	—
0001h	Operation frequency	"n035" set value 0: 0.01Hz (less than 100 Hz) : 0.1Hz (100 Hz or more) 1: 0.1% 2 to 39: r/min (Set number of motor poles) Any desired value between 40 and 39999	The unit depends on the set value of frequency reference setting/display unit selection "n035".
0002h	Output current	0.1 A	—
0003h	Output voltage	0.1 V	—
0004h	—	—	—
0005h	Frequency set value	"n035" set value: 0: 0.01Hz (less than 100Hz) : 0.1Hz (100Hz or more) 1: 0.1% 2 to 39: r/min (Sets the number of motor poles) 40 to 39999: Any unit	The unit depends on the setting of "n035" frequency reference setting/display unit selection.
0006h	—	—	—
0007h	Torque reference *1	0.1%	Motor rated torque: 100%
0008h	Main circuit DC voltage	1 V	—
0009h to 000Dh	—	—	—
000Eh	Output power	0.001 kW	—
000Fh	Input terminal status		
0010h	Output terminal status		

Monitor Code	Name	Unit	Remarks (Factory setting)
0011h	—	—	—
0012h	Motor exciting current	0.1%	—
0013h	—	—	—
0014h	Accumulated operation time *2	10 hours	Function alternates according to the setting of "n087" cumulative operation time function selection. 0: Accumulated inverter power ON time (factory setting) 1: Accumulated inverter operation time

Second Monitor Code

Monitor Code	Name	Unit	Remarks (Factory setting)
1001h	Fault alarm 1	—	—
1002h	Fault alarm 2	—	—
1003h	Fault alarm 3	—	—

NOTE

*1. "00h" when the inverter control mode is set to V/f control.

*2. Available only for 5.5/7.5kW of 200V and 400V classes. Remains "00h" for inverters of 3.7kW or less.

Command Codes

Item	Code No.	Data	Contents
Reading run command right	1103h	0: Operator 1: External terminal 2: MEMOBUS 3: PLC	Current run command right is set to RW_{R3}.
Reading frequency reference right	1104h	0: Operator 1: Frequency reference 1 2: Voltage reference (0 to 10V) 3: Current reference (4 to 20mA) 4: Current reference (4 to 20mA) 5: Pulse train input reference 6: MEMOBUS 7: Operator voltage reference 8: Operator current reference 9: PLC	Current frequency reference right is set to RW_{R3}.
Writing run command right	2103h	0: Operator 1: External terminal 2: MEMOBUS 3: PLC	Run command right can be changed.

Item	Code No.	Data	Contents
Writing frequency reference right	2104h	0: Operator 1: Frequency reference 1 2: Voltage reference (0 to 10V) 3: Current reference (4 to 20mA) 4: Current reference (4 to 20mA) 5: Pulse train input reference 6: MEMOBUS 7: Operator voltage reference 8: Operator current reference 9: PLC	Frequency reference right can be changed.
Error history	0074h	MSB LSB b15 to b8 | b7 to b0 History 2 (HEX) History 1 (HEX)	Error code is set to RW_{R3} in the hexagon data. Histories 1 (latest history) and 2 are entered in the lower byte and the upper byte, respectively.
Reading master speed frequency	006Dh	0 to 400Hz	Reads out inverter setting frequency RAM).
Reading frequency reference 1	006Eh	0 to 400Hz	Reads out inverter frequency reference 1.
Writing master speed frequency	00EDh	0 to 400Hz	Writes in inverter master speed frequency.
Writing frequency reference 1	00EEh	0 to 400Hz	Writes in inverter frequency reference 1
Reading parameter	1000h to 11B3h	Each constant set value Refer to APPENDIX.	Reads out constants or monitor data.
Writing parameter (RAM)	2000h to 21B3h	Each constant setting range Refer to APPENDIX.	Since constant set value is written in to RAM, the set value is eliminated when the inverter power supply is turned OFF. To let the constant to store the data, execute the inverter memory command code.
Parameter memory	FFFDh	0000h	Stores the currently set constant in non-volatile memory.
Clearing error histories [*1]	00F4h	9696h	
Inverter reset	00FDh	9696h	

* Available for inverter software version "0024" and after. Not used for version "0023" and before, and for inverter of 5.5/7.5kW.

Extension Command Codes

Command Code		Name	Data/Unit		Contents
Reading	Writing				
100h	200h	Operation signal status	Bit 0	Forward run	Inverter performs forward run.
			Bit 1	Reverse run	Inverter performs reverse run.
			Bit 2	Terminal 3 input	Multifunction input 3
			Bit 3	Terminal 4 input	Multifunction input 4
			Bit 4	Terminal 5 input	Multifunction input 5
			Bit 5	Terminal 6 input	Multifunction input 6
			Bit 6	Terminal 7 input	Multifunction input 7
			Bit 7	Reserved	—
			Bit 8	External fault (EF0)	Inverter stops at fault.
			Bit 9	Fault reset	Clears the inverter fault.
			Bit A	Reserved	—
			Bit B	Reserved	—
			Bit C	Reserved	—
			Bit D	Reserved	—
			Bit E	Fault history clear *1	Clears the fault history.
			Bit F	Inverter output shutoff *1	Inverter coasts to a stop.
101h	201h	Frequency reference	0 to 400.0Hz		Frequency value set from PLC
102h to 106h	202h to 206h	Reserved	Reserved		—
107h	207h	Multifunction output status	Bit 0	Terminals MA/MB output	Terminals MA and MB output status
			Bit 1	Terminal P1 output	Terminal P1 output status
			Bit 2	Terminal P2 output	Terminal P2 output status
			Bit 3 to F	Fixed to 0	—
108h to 10Fh	208h to 20Fh	Not used	—		—
110	—	Inverter status	Bit 0	Running	ON while inverter is running.
			Bit 1	Zero speed	ON while motor stops.
			Bit 2	Reverse running	ON at reverse run.
			Bit 3	Reset signal inputting	ON while reset signal is being input.
			Bit 4	Speed agree	ON when operation frequency agrees with setting frequency.
			Bit 5	Inverter operation ready	ON when inverter is ready to run.

Command Code		Name	Data/Unit		Contents
Reading	Writing				
		Inverter status	Bit 6	Minor fault	ON while inverter is having an alarm.
			Bit 7	Major fault	ON while inverter is having a fault.
			Bit 8	OPR error	ON at improper connection of operator.
			Bit 9	Recovery from power loss/momentary power loss	ON at recover from a power loss or momentary power loss.
			Bit A	Remote/local	ON when operator has run command right.
			Bit B	Terminals MA/MB output	Terminals MA/MB output status
			Bit C	Terminal P1 output	Terminal P1 output status
			Bit D	Terminal P2 output	Terminal P2 output status
			Bit E	Reserved	—
			Bit F	Reserved	—
111h	—	Reserved	—		—
112h	—	Torque monitor *1	00 to 100.0%		Sets current motor torque value.
113h	—	Reserved	—		—
114h	—	Operation frequency set value	0.0 to 400.0Hz		Frequency set to inverter (FREF): When the PLC does not have the frequency reference right, the set value is determined by the inverter setting.
115h	—	Operation frequency	0.0 to 400.0Hz		Current operation frequency (FOUT)
116h	—	Output current	0.1 A		Current operation frequency (IOUT)
117h	—	Analog input	0.1%		Terminal RP input
118h	—	Main circuit DC voltage	0.1 V		Sets the main circuit DC voltage value.
119h	—	Fault alarm 1	Refer to the following table.		—
11Ah	—	Fault alarm 2	Refer to the following table.		—
11Bh	—	Fault alarm 3	Refer to the following table.		—
11Ch	—		Not used		—
11Dh	—	External terminal input status	—		Terminals S1 to S7
11Eh	—	Analog input	0.1%		Terminal FR input
11Fh	—	Not used	—		—

* Available for inverter software version "0024" and after. Not used for version "0023" and before, and for inverter of 5.5/7.5kW.

Fault Alarm Signals and Currently Occurring Faults

Fault Alarm		Name	Fault Code
Fault Alarm 1 Command Code: 119h	Bit, 0	—	—
	Bit,1	Main circuit undervoltage(UV1)	19h
	Bit,2	Control power supply undervoltage(UV2)	18h
	Bit,3	—	—
	Bit,4	—	—
	Bit,5	—	—
	Bit,6	Overcurrent (OC)	17h
	Bit,7	Overvoltage (OV)	16h
	Bit,8	Inverter overheating (OH)	15h
	Bit,9	—	—
	Bit,A	Motor overload (OL1)	14h
	Bit,B	Inverter overload (OL2)	13h
	Bit,C	Overtorque 1 (OL3)	12h
	Bit,D	—	—
	Bit,E	—	—
	Bit,F	—	—
Fault Alarm 2 Command Code: 11Ah	Bit,0	External fault 3 (EF3)	05h
	Bit,1	External fault 4 (EF4)	04h
	Bit,2	External fault 5 (EF5)	03h
	Bit,3	External fault 6 (EF6)	02h
	Bit,4	External fault 7 (EF7)	01h
	Bit,5	—	—
	Bit,6	—	—
	Bit,7	—	—
	Bit,8	—	—
	Bit,9	—	—
	Bit,A	—	—
	Bit,B	—	—
	Bit,C	—	—
	Bit,D	Icorrect connection of operator (OPR)	0Dh
	Bit,E	—	—
	Bit,F	—	—
Fault Alarm 3 Command Code: 11Bh	Bit,0	Memobus transmission error (CE)	0Fh
	Bit,1	Option transmission error (BUS)	0Bh
	Bit,2	—	—
	Bit,3	—	—
	Bit,4	—	—
	Bit,5	—	—
	Bit,6	External fault (EF0)	08h
	Bit,7	—	—

Fault Alarm		Name	Fault Code
	Bit,8	—	—
Fault Alarm 3 Command Code: 11Bh	Bit,9	—	—
	Bit,A	—	—
	Bit,B	—	—
	Bit,C	—	—
	Bit,D	—	—
	Bit,E	—	—
	Bit,F	Hardware fault (CPFxx)	—

■ Details of Response Codes (RW_{R2})

These codes are sent to the PLC after execution of the command codes. Whether a command code has been executed normally can be known.

Error Code	Contents	Cause
00h	Normal	• The command code sent from the PLC was correct and was executed normally.
01h	Write-in mode error	• An attempt to write in a constant from the PLC was made during running. • An attempt to write in a constant from the PLC was made during UV occurrence. • An attempt to write in Any constant other than n001=8, 9, 10, 11, 20 (initialization) from the master was made at "F04" occurrence. • An attempt to write in a constant from the PLC was made while the data was being stored. • An attempt to write in data exclusively for read-out from the PLC was made.
02h	Improper command code	• An command code to be accessed was not registered. • Enter command "0900h" that was a register exclusively for write-in was read out.
03h	Data setting error	• A simple upper/lower limit error occurred in control data or at constant write-in. • A constant setting error occurred at constant write-in.

6 SPECIFICATIONS

Item	Specifications
Model	SI-C/V7
Type of station	Remote device station
Number of Exclusive Stations	1 station
Communication Speed	156 k bps to 10 M bps
Communication power supply	4.75 to 5.25 VDC (Supplied from inverter, insulated from operating power supply.)
Operating power supply	4.75 to 5.25 VDC (supplied from Inverter)
Ambient Temperature	–10 °C to +45 °C
Humidity	90 %RH max. (no condensation)
Storage Temperature	–20 °C to +60 °C
Location	Indoors (no corrosive gases, dust)
Altitude	1000 m max.

7 TROUBLESHOOTING

7.1 Inverter Errors

The following table outlines the faults displayed in the Inverter's operator and their causes and corrective actions.

Refer to the VS-606 V7 Instruction Manual (TOE-S606-11) for any faults displayed in the operator other than those described below.

Display	Meaning	Cause	Corrective Action
BUS	Option unit commuicaton error	Disconnection of communication line PLC power supply is not turned ON or reset.	Confirm that communication cable is connected. Check the PLC.
EF0	External fault from option unit	External fault is input from the PLC.	Turn OFF the external fault input.
CPF06	Option unit connection error	The Inverter and the communication option are not connected correctly.	Turn OFF the inverter power supply and confirm the option unit and Inverter connection. Then turn ON the power supply again. Replace the option unit if the fault occurs again.
CPF21	Communication option self diagnostic error	Option card fault	Turn ON the inverter power supply again. Replace the option unit if the fault occurs again.
CPF22	Communication option model code error		
CPF23	Communication option DPRAM error		

7.2 CC-Link Interface Card LED Display

This section describes the failures, causes and corrective actions displayed in the LEDs on the SI-C/V7.

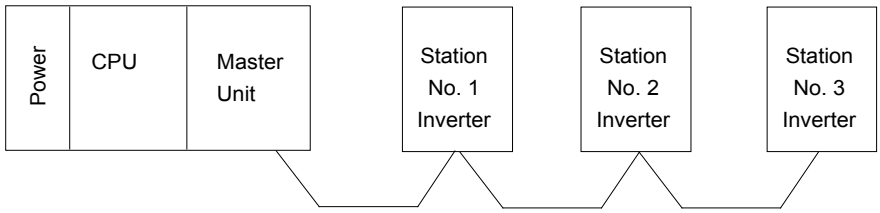
Confirm the following points when communication is halted during operation.

- The SI-C and the twisted pair cable are mounted correctly.
  Check that there is no imperfect contact or disconnection.
- The PLC program has been executed without fail. The PLC CPU has not been stopped.
- Data communication is not interrupted because of a momentary power loss.

LED Display							Cause	Corrective Action
Maters Unit	Remote Device Station(SI-C/V7)							
	Station No. 1		Station No. 2		Station No. 3			
TIME○ LINE○ or TIME● LINE○	L.RUN	●	L.RUN	☼	L.RUN	●	Station Nos. 1 and 3 use the same inverter station number.	Turn ON the power supply again after correcting the overlapped inverter station number.
	SD	*	SD	☼	SD	*		
	RD	☼	RD	☼	RD	☼		
	L.ERR	●	L.ERR	●	L.ERR	●		
	L.RUN	☼	L.RUN	●	L.RUN	☼	SI-C/V7 baud rate setting of Station No. 2 is different from the master unit setting.	Turn ON the inverter power supply again after correcting the baud rate setting.
	SD	☼	SD	●	SD	☼		
	RD	☼	RD	☼	RD	☼		
	L.ERR	●	L.ERR	●	L.ERR	☼		
	L.RUN	●	L.RUN	☼	L.RUN	☼	SI-C/V7 setting switches of station No. 3 are changed after the power supply is turned ON.	Return the SI-C/V7 switches to the original positions. Or turn ON the inverter power supply.
	SD	●	SD	☼	SD	☼		
	RD	☼	RD	☼	RD	☼		
	L.ERR	☼	L.ERR	●	L.ERR	●		
	L.RUN	●	L.RUN	☼	L.RUN	☼	SI-C/V7 setting switches of station No. 1 are set out of the range (B.RATE: 5 to 9, STA: 65 or more).	Correct the SI-C/V7 setting switches and turn the power supply again.
	SD	●	SD	☼	SD	☼		
	RD	☼	RD	☼	RD	☼		
	L.ERR	☼	L.ERR	●	L.ERR	●		
TIME● LINE● or TIME○ LINE●	L.RUN	☼	L.RUN	☼	L.RUN	☼	Two stations are affected by noise. (L.RUN may be extinguished.)	Make grounding for each inverter and master unit FG without fail.
	SD	☼	SD	☼	SD	☼		
	RD	☼	RD	☼	RD	☼		
	L.ERR	●	L.ERR	☼	L.ERR	●		
	L.RUN	☼	L.RUN	☼	L.RUN	☼	Transmission cable is affected by noise between the inverters of Station No. 2 and Station No. 3. (L.RUN may be extinguished.)	Confirm SLD connection of transmission cable. Also separate the cable from power cable as far as possible, at least 100mm.
	SD	☼	SD	☼	SD	☼		
	RD	☼	RD	☼	RD	☼		
	L.ERR	●	L.ERR	☼	L.ERR	☼		
	L.RUN	☼	L.RUN	☼	L.RUN	☼	Failed to mount the termination resistor. (L.RUN may be extinguished.)	Confirm that the termination resistor is mounted.
	SD	☼	SD	☼	SD	☼		
	RD	☼	RD	☼	RD	☼		
	L.ERR	☼	L.ERR	●	L.ERR	●		

☼:Lit ☼:Blinking ●:Not lit *:Lit or Not lit

The following describes the failures, causes, and corrective actions that can be judged according to the LED of the inverter CC-Link unit (SI-C/V7) under the conditions where the LED display of master unit SW, M/S or PRM has been extinguished (always set in the master unit), in the system configuraiton shown below.



LED Display							Cause	Corrective Action
Maters Unit	Remote Device Station(SI-C/V7)							
	Station No. 1		Station No. 2		Station No. 3			
TIME○ LINE○ or TIME● LINE○	L.RUN ☼ SD ☼ RD ☼ L.ERR ●		L.RUN ☼ SD ☼ RD ☼ L.ERR ●		L.RUN ☼ SD ☼ RD ☼ L.ERR ●		Normal	—
	L.RUN ● SD ● RD ● L.ERR ●		L.RUN ☼ SD ☼ RD ☼ L.ERR ●		L.RUN ☼ SD ☼ RD ☼ L.ERR ●		SI-C/V7 of station No. 1 is not mounted correctly.	Check how it is mounted and mount it correctly if necessary.
	L.RUN ∗ SD ∗ RD ∗ L.ERR ∗		L.RUN ☼ SD ☼ RD ☼ L.ERR ●		L.RUN ☼ SD ☼ RD ☼ L.ERR ●		SI-C/V7 of station No. 1 is defective. (Most of cases, all indicator lamps are extinguished.) An error may be displayed in the inverter.	Replace the SI-C/V7.
	L.RUN ☼ SD ☼ RD ☼ L.ERR ●		L.RUN ● SD ∗ RD ∗ L.ERR ●		L.RUN ● SD ∗ RD ∗ L.ERR ●		L.RUN of station No. 2 and after is extinguished. Transmission cable is disconnected between station Nos. 1 and 2 or is removed from the terminal block.	Refer to the LED lighting status to look for the disconnected part and correct it.
	L.RUN ● SD ∗ RD ∗ L.ERR ●		L.RUN ● SD ∗ RD ∗ L.ERR ●		L.RUN ● SD ∗ RD ∗ L.ERR ●		Communication cable shortcircuits.	Find out the shortcircuiting cable among the three communication cables and correct it.
	L.RUN ● SD ∗ RD ∗ L.ERR ∗		L.RUN ● SD ∗ RD ∗ L.ERR ∗		L.RUN ● SD ∗ RD ∗ L.ERR ∗		Communication cable is connected incorrectly.	Check the wiring in the SI-C/V7 terminal block and correct the incorrect wiring part.

☼:Lit ☼:Blinking ●:Not lit ∗:Lit or Not lit

How to check an error with LED indicator lamps

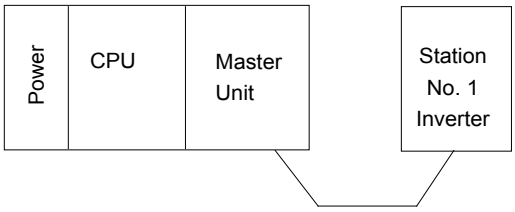
L.RUN: Lit when refresh data is received normally.
Extinguished when data is interrupted for a certain period.

SD: Lit when sending data is "1".

RD: Lit at detection of receiving data carrier.

L.ERR: Lit when local data is CRC abort error.

The following outlines the causes and corrective actions of the failures that can be determined according to the LED status of the SI-C/V7 in a system configuration where one master is connected to one inverter.



LED Display ☼: Lit ●: Not lit ☼:Blinking				Cause	Corrective Actions
L.RUN	SD	RD	L.ERR		
☼	☼	☼	☼	Normal but an error occurring.	Remove the influence of noise.
☼	☼	☼	●	Normal	
☼	☼	●	☼	H/W error	Turn ON the power supply again. Replace SI-C/V7.
☼	☼	●	●	H/W error	Turn ON the power supply again. Replace SI-C/V7.
☼	●	☼	☼	CRC error occurred and the SI-C/V7 cannot replay.	Remove the influence of noise.
☼	●	☼	●	Local data cannot be received.	Confirm the PLC program.
☼	●	●	☼	H/W error	Turn ON the power supply again. Replace SI-C/V7.
☼	●	●	●	H/W error	Turn ON the power supply again. Replace SI-C/V7.
●	☼	☼	☼	Polling response is made but CRC error occurred in reflesh receiving.	Remove the influence of noise.
●	☼	☼	●	H/W error	Turn ON the power supply again. Replace SI-C/V7.
●	☼	●	☼	H/W error	Turn ON the power supply again. Replace SI-C/V7.

LED Display ☼: Lit ●: Not lit ☼:Blinking				Cause	Corrective Actions
L.RUN	SD	RD	L.ERR		
●	☼	●	●	H/W error	Turn ON the power supply again. Replace SI-C/V7.
●	●	☼	☼	CRC data occurred in local data.	Remove the influence of noise.
●	●	☼	●	Local data are not provided or cannot be received because of noise.	Remove the influence of noise.
●	●	●	☼	H/W error	Turn ON the power supply again. Replace SI-C/V7.
●	●	●	●	Data cannot be received because of disconnection, etc.	Check the wiring.
●	●	*	☼	Baud rate or station number is not correct.	Correct the setting and turn the power supply OFF and then On again.
☼	☼	☼	☼	Baud rate or station number is changed after the power supply is turned ON.	Return the setting to the former setting. Turn ON the power supply again.

8 APPENDIX

8.1 List of Command and Monitor Codes

■ Command Data (Read and Write)

Command Code		Contents		
Read	Write			
1000h	2000h	Reserved		
1001h	2001h	Operation Signals	0	Forward run command 1: Forward run 0: Stop
			1	Reverse run command 1: Reverse run 0: Stop
			2	Multifunction input reference 3 (Function selected by n052)
			3	Multifunction input reference 4 (Function selected by n053)
			4	Multifunction input reference 5 (Function selected by n054)
			5	Multifunction input reference 6 (Function selected by n055)
			6	Multifunction input reference 7 (Function selected by n056)
			7	(Not used)
			8	External fault 1: Fault (EF0)
			9	Fault reset 1: Fault reset command
			A	(Not used)
			B-F	(Not used)
1002h	2002h	Frequency reference (Unit depends on constant n152.)		
1003h	2003h	V/f gain (1000/100%), setting range: 2.0% to 200.0%		
1004h to 1008h	2004h to 2008h	Reserved		
1009h	2009h		0	Multifunction output reference 1 (enabled at constant n057 = 18), 1: MA ON
			1	Multifunction output reference 2 (enabled at constant n058 = 18), 1: P1 ON
			2	Multifunction output reference 3 (enabled at constant n059 = 18), 1: P2 ON
			3-F	(Not used)
100Ah to 101Fh	200Ah to 201Fh	Reserved		

Note: Write in "0" to the unused bits. Do not write in any data to the reserved registers.

■ Monitor Data (Read Only)

Command Code		Contents		
Read	Write			
1020h	—	Status Signal	0	Running 1: Run 0: Stop
			1	Reverse running 1: Reverse run 0: Forward run
			2	Inverter operation ready
			3	Fault
			4	Data setting error 1: Error
			5	Multifunction output 1 1: MA ON
			6	Multifunction output 2 1: P1 ON
			7	Multifunction output 3 1: P2 ON
			8-F	(Not used)
1021h	—	Fault Contents	0	Overcurrent (OC)
			1	Overvoltage (OV)
			2	Inverter overload (OL2)
			3	Inverter overheating (Oh)
			4	(Not used)
			5	(Not used)
			6	PDI feedback loss (FbL)
			7	External fault (EF, EF0), emergency stop (STP)
			8	Hardware fault (Fxx)
			9	Motor overload (OL1)
			A	Overtorque detection (OL3)
			B	(Not used)
			C	Power loss (UV1)
			D	Control power supply error (UV2)
			E	MEMOBUS communication time-over (CE)
			F	Operator connection fault (OPR)
1022h	—	Data Link Status	0	Data being written
			1	(Not used)
			2	(Not used)
			3	Upper/lower limit error
			4	Consistency error
			5	(Not used)
			6	(Not used)
			7	(Not used)
			8-F	(Not used)

Command Code		Contents		
Read	Write			
1023h	—	Frequency reference by MEMOBUS (Unit depends on constant n152.)		
1024h	—	Operation frequency (Unit depends on constant n152.)		
1025h to 1026h	—	Reserved		
1027h	—	Output current (10/1A)		
1028h	—	Output voltage reference (1/1V)		
1029h to 102Ah	—	Reserved		
102Bh	—	External Terminal Input Status	0	Terminal S1 1: Closed
			1	Terminal S2 1: Closed
			2	Terminal S3 1: Closed
			3	Terminal S4 1: Closed
			4	Terminal S5 1: Closed
			5	Terminal S6 1: Closed
			6	Terminal S7 1: Closed
			7	(Not used)
			8-F	(Not used
102Ch	—	Inverter Status	0	Running 1: Running
			1	Zero speed 1: Zero speed
			2	Frequency agree 1: Agreed
			3	Minor fault (alarm being displayed)
			4	Frequency detection 1 1: Operation frequency ≤ (n095)
			5	Frequency detection 1 1: Operation frequency ≥ (n095)
			6	Inverter operation ready 1: Inverter operation ready
			7	Detecting undervoltage 1: Detecting undervoltage
			8	Baseblock 1: Inverter output baseblock
			9	Frequency reference mode Frequency detection 1 1: Operation frequency
			A	Run command mode Frequency detection 2 1: Operation frequency
			B	Overtorque detection 1: Detecting or overtorque error
			C	(Reserved)
			D	Fault retry
			E	Fault (including MEMOBUS communication time-over) 1: Time over
			F	MEMOBUS communication time-over 1: Time over

Command Code		Contents		
Read	Write			
102Dh	—	External Terminal Output Status	0	MA 1: Closed
			1	P1 1: Closed
			2	P2 1: Closed
			3	(Not used)
			4	(Not used)
			5	(Not used)
			6	(Not used)
			7	(Not used)
			8-F	(Not used)
102Eh to 1030h	—	Reserved		
1031h	—	Main circuit DC voltage (1/1V)		
1032h	—	Torque monitor (1/1%, 100% rated torque, with sign)1		
1033h to 1036h	—	(Not used)		
1037h	—	Output power (100/1kW, with sign)		
1038h	—	PID feedback [input equivalent to 100(%)/maximum operation frequency, 10/1%, with sign]		
1039h	—	PID input [±100(%)/±maximum operation frequency, 10/1%, with sign]		
103Ah	—	PID output [±100(%)/±maximum operation frequency, 10/1%, with sign]		
103Bh	—	Output current (10/1A)		
103Ch	—	Reserved		
103Dh*	—	Contents of Transmission Error	0	CRC error
			1	Improper data length
			2	(Not used)
			3	Parity error
			4	Overrun error
			5	Framing error
			6	Time-over
			7	(Not used)
			8-F	(Not used)
103Eh to 10FFh	—	Reserved		

* The contents of the transmission error are held until the fault reset signal is input. (The fault can be reset even during running.)

8.2 List of Constant Command Codes

■ Inverter Constants (Read and Write)

Primary Functions (Constants n001 to n049)

Constant No.	Command Code		Name	Setting Range	Unit	Factory setting
	Read	Write				
001	1101h	2101h	Password	0 to 4, 6, 8, 9	1	1
002	1102h	2102h	Control mode selection *6	0, 1	1	0*2
003	1103h	2103h	Run command selection	0 to 3	1	0
004	1104h	2104h	Frequency reference selection	0 to 9	1	5*5
005	1105h	2105h	Selecting stopping method	0, 1	1	0
006	1106h	2106h	Selecting reverse run prohibited	0, 1	1	0
007	1107h	2107h	STOP key function	0, 1	1	0
008	1108h	2108h	Selectin fgrequency reference in local mode	0, 1	1	0*5
009	1109h	2109h	Frequency reference setting method from digital operator	0, 1	1	0
010	110Ah	210Ah	Detecting fault contact of digital operator	0, 1	1	0
011	110Bh	210Bh	Maximum operation frequency	50.0 to 400.0Hz	0.1Hz	600Hz
012	110Ch	210Ch	Maximum voltage	0.1 to 255.0V*2	0.1V	200.0V*2
013	110Dh	210Dh	Maximum voltage operation frequency	0.2 to 400.0Hz	0.1Hz	60.0Hz
014	110Eh	210Eh	Medium operation frequency	0.1 to 399.9Hz	0.1Hz	1.5Hz
015	110Fh	210Fh	Medium operation frequency voltage	0.1 to 255.0V*2	0.1V	12.0V*2
016	1110h	2110h	Minimum operation frequency	0.1 to 10.0Hz	0.1Hz	1.5Hz
017	1111h	2111h	Minimum operation frequency voltage	0.1 to 50.0V*2	0.1V	12.0V*2
018	1112h	2112h	Selecting setting unit of accel/decel time	0, 1	1	0
019	1113h	2113h	Acceleration time 1	0.00 to 6000s	Setting of n018	10.0s
020	1114h	2114h	Deceleration time 1	0.00 to 6000s	Setting of n018	10.0s
021	1115h	2115h	Acceleration time 2	0.00 to 6000s	Setting of n018	10.0s
022	1116h	2116h	Deceleration time 2	0.00 to 6000s	Setting of n018	10.0s
023	1117h	2117h	S-curve selection	0 to 3	1	0
024	1118h	2118h	Frequency reference 1 (master speed frequency reference)	0.00 to 400.0Hz	0.01Hz (less than 100Hz) 0.1Hz (100Hz or more)	6.00Hz
025	1119h	2119h	Frequency reference 2	0.00 to 400.0Hz		0.00Hz
026	111Ah	211Ah	Frequency reference 3	0.00 to 400.0Hz		0.00Hz
027	111Bh	211Bh	Frequency reference 4	0.00 to 400.0Hz		0.00Hz
028	111Ch	211Ch	Frequency reference 5	0.00 to 400.0Hz		0.00Hz

Constant No.	Command Code		Name	Setting Range	Unit	Factory setting
	Read	Write				
029	111Dh	211Dh	Frequency reference 6	0.00 to 400.0Hz	0.01Hz (less than 100Hz) 0.1Hz (100Hz or more)	0.00Hz
030	111Eh	211Eh	Frequency reference 7	0.00 to 400.0Hz		0.00Hz
031	111Fh	211Fh	Frequency reference 8	0.00 to 400.0Hz		0.00Hz
032	1120h	2120h	Jog frequency	0.00 to 400.0Hz		0.00Hz
033	1121h	2121h	Frequency reference upper limit	0 to 100%	1%	100%
034	1122h	2122h	Frequency reference lower limit	0 to 100%	1%	0%
035	1123h	2123h	Selecting setting/displaying unit of frequency reference	0 to 3999	1	0
036	1124h	2124h	Motor rated current	0 to 150% of inverter rated current	0.1A	*3
037	1125h	2125h	Electronic thermal motor protection selection	0 to 2	1	0
038	1126h	2126h	Electronic thermal motor protection time constant setting	1 to 60min	1min	8min
039	1127h	2127h	Selecting cooling fan operation	0, 1	1	0

Secondary Functions (Constants n050 to n079)

Constant No.	Command Code		Name	Setting Range	Unit	Factory setting
	Read	Write				
050	1132h	2132h	Multi-function input selection 1 (terminal S1)	1 to 25	1	1
051	1133h	2133h	Multi-function input selection 2 (terminal S2)	1 to 25	1	2
052	1134h	2134h	Multi-function input selection 3 (terminal S3)	0 to 25	1	3
053	1135h	2135h	Multi-function input selection 4 (terminal S4)	1 to 25	1	5
054	1136h	2136h	Multi-function input selection 5 (terminal S5)	1 to 25	1	6
055	1137h	2137h	Multi-function input selection 6 (terminal S6)	1 to 25	1	7
056	1138h	2138h	Multi-function input selection7 (terminal S7)	1 to 25, 34, 35	1	10
057	1139h	2139h	Multi-function output selection 1	0 to 7, 10 to 19	1	0
058	113Ah	213Ah	Multi-function output selection 2	0 to 7, 10 to 19	1	1
059	113Bh	213Bh	Multi-function output selection 3	0 to 7, 10 to 19	1	2
060	113Ch	213Ch	Analog frequency reference gain	0 to 255%	1%	100%
061	113Dh	213Dh	Analog frequency reference bias	-100 to 100%	1%	0%
062	113Eh	213Eh	Filter time constant for analog frequency reference constant	0.00s to 2.00s	0.01s	0.10s
065	1141h	2141h	Monitor output type	0, 1	1	0
066	1142h	2142h	Monitor output type	0 to 5	1	0
067	1143h	2143h	Analog Monitor gain	0.00 to 2.00	0.01	1.00
068	1144h	2144h	Analog frequency reference gain (Operator voltage input)	-255 to 255%	1%	100%
069	1145h	2145h	Analog frequency reference bias (Operator voltage input)	-100 to 100%	1%	0%
070	1146h	2146h	Analog frequency reference filter time constant (Operator voltage input)	0.00 to 2.00s	0.01s	0.10s
071	1147h	2147h	Analog frequency reference gain (Operator current input)	-255 to 255%	1%	100%
072	1148h	2148h	Analog frequency reference bias (Operator current input)	-100 to 100%	1%	0%
073	1149h	2149h	Analog frequency reference filter time constant (Operator current input)	0.00 to 2.00s	0.01s	0.10s
074	114Ah	214Ah	Pulse train input frequency reference gain	0 to 255%	1%	100%
075	114Bh	214Bh	Pulse train input frequency reference bias	-100 to 100%	1%	0%
076	114Ch	214Ch	Pulse train input frequency reference filter time constant	0.00 to 2.00s	0.01s	0.10s

Constant No.	Command Code		Name	Setting Range	Unit	Factory setting
	Read	Write				
077	114Dh	214Dh	Multi-function analog input signal selection	0 to 4	1	0
078	114Eh	214Eh	Multi-function analog input signal selection	0, 1	1	0
079	114Fh	214Fh	Frequency reference bias (FBIAS) value	0 to 50%	1%	10%

Tertiary Functions (Constant n080 to n119)

Constant No.	Command Code		Name	Setting Range	Unit	Factory setting
	Read	Write				
080	1150h	2150h	Carrier frequency selection	1 to 4, 7 to 9	1	4*4
081	1151h	2151h	Momentary power loss ride thorough time	0 to 2	1	0
082	1152h	2152h	Automatic retry attempts	0 to 10 times	1	0 times
083	1153h	2153h	Jump frequency 1	0.00 to 4.00Hz	0.01Hz (less than 100Hz) 0.1Hz (100Hz or more)	0.00Hz
084	1154h	2154h	Jump frequency 2	0.00 to 4.00Hz		0.00Hz
085	1155h	2155h	Jump frequency 3	0.00 to 4.00Hz		0.00Hz
086	1156h	2156h	Jump frequency range	0.00 to 4.00Hz	0.01Hz	0.01Hz
089	1159h	2159h	DC injection braking current	0 to 100%	1%	50%
090	115Ah	215Ah	DC injection braking time at stop	0.0 to 25.5s	0.1s	0.5s
091	115Bh	215Bh	DC injection braking time at start	0.0 to 25.5s	0.1s	0.0s
092	115Ch	215Ch	Stall prevention during deceleration	0, 1	1	0
093	115Dh	215Dh	Stall prevention during acceleration	30 to 200%	1%	170%
094	115Eh	215Eh	Stall prevention during running	30 to 200%	1%	160%
095	115Fh	215Fh	Frequency detection	0.00 to 400.0Hz	0.01Hz (less than 100Hz) 0.1Hz (100Hz or more)	0.0Hz
096	1160h	2160h	Overtorque detection function selection 1	0 to 4	1	0
097	1161h	2161h	Overtorque detection function selection 2 (vector control mode)	0, 1	1	0
098	1162h	2162h	Overtorque detection level	30 to 200%	1%	160%
099	1163h	2163h	Overtorque detection time	0.1 to 10.0s	0.1s	0.1s
110	1164h	2164h	Hold operation frequency saving selection	0, 1	1	0
103	1167h	2167h	Torque compensation gain	0.0 to 2.5	0.1	1.0
104	1168h	2168h	Torque compensation time constant	0.0 to 25.5s	0.1s	*6
105	1169h	2169h	Torque compensation iron loss (V/f control mode)	0.0 to 6550	0.01W (less than 1000W) 0.1W (1000W or more)	*3
106	116Ah	216Ah	Motor rated slip	0.0 to 20.0Hz	0.1Hz	*3
107	116Bh	216Bh	Line to neutral (per phase)	0.000 to 65.50 Ω	0.001 Ω (less than 10 Ω) 0.01 Ω (10 Ω or more)	*3

Constant No.	Command Code		Name	Setting Range	Unit	Factory setting
	Read	Write				
108	116Ch	216Ch	Motor leakage inductance (vector control mode)	0.00 to 655.0mH	0.01mH (less than 100mH) 0.01mH (10mH or more)	*3
109	116Dh	216Dh	Torque compensation voltage limitter (vector control mode)	0 to 250%	1%	150%
110	116Eh	216Eh	Motor no-load current	0 to 99%	1%	*3
111	116Fh	216Fh	Slip compensation gain	0.0 to 2.5	0.1	*6
112	1170h	2170h	Slip compensation time constant	0.0 to 25.5s	0.1s	*6
113	1171h	2171h	Slip correction during regenerative operation (vector control mode)	0, 1	1	0
115	1173h	2173h	Stall prevention automatic decrease selection	0, 1	1	0
116	1174h	2174h	Accel/decel time during stall prevention	0, 1	1	0

Fourth Functions (Constants n120 to n179)

Constant No.	Command Code		Name	Setting Range	Unit	Factory setting
	Read	Write				
120	1178h	2178h	Frequency reference 9	0.00 to 400.0Hz	0.01Hz (less than 100Hz) 0.1Hz (100Hz or more)	0.00Hz
121	1179h	2179h	Frequency reference 10	0.00 to 400.0Hz		0.00Hz
122	117Ah	217Ah	Frequency reference 11	0.00 to 400.0Hz		0.00Hz
123	117Bh	217Bh	Frequency reference 12	0.00 to 400.0Hz		0.00Hz
124	117Ch	217Ch	Frequency reference 13	0.00 to 400.0Hz		0.00Hz
125	117Dh	217Dh	Frequency reference 14	0.00 to 400.0Hz		0.00Hz
126	117Eh	217Eh	Frequency reference 15	0.00 to 400.0Hz		0.00Hz
127	117Fh	217Fh	Frequency reference 16	0.00 to 400.0Hz		0.00Hz
128	11D3h	21D3h	PID control selection	0 to 8	1	0
129	11D4h	21D4h	PID feedback gain	0.00 to 10.00	0.01	1.00
130	1182h	2182h	Proportional gain (P)	0.0 to 25.0	0.1	1.0
131	1183h	2183h	Integral time (I)	0.0 to 360.0	0.1s	1.0
132	1184h	2184h	Differential time (D)	0.00 to 2.50	0.01s	0.00
133	1185h	2185h	PID offset adjustment	-100 to 100%	1%	0%
134	1186h	2186h	Upper limit of integral values (I)	0 to 100%	1%	100%
135	1187h	2187h	Primary delay time constant of PID control	0.0 to 10.0	0.1s	0.0
136	1188h	2188h	Selection of PID feedback loss detection	0 to 2	1	0
137	1189h	2189h	PID feedback loss detection level	0 to 100%	1%	0%
138	118Ah	218Ah	PID feedback loss detection time	0.0 to 25.5	0.1s	1.0
139	118Bh	218Bh	Energy-saving control selection	0, 1	1	0
140	118Ch	218Ch	Energy-saving coefficient K2	0.0 to 6550	0.1	*7
141	118Dh	218Dh	Energy-saving control voltage lower limit (at 60Hz)	0 to 120%	1%	50%
142	118Eh	218Eh	Energy-saving control voltage lower limit (at 6Hz)	0 to 25%	1%	12%
143	118Fh	218Fh	Power average time	1 to 200	1=24ms	1(24ms)
144	1190h	2190h	Search operation voltage limit	0 to 100%	1%	0%
145	1191h	2191h	Search operation voltage step (at 110%)	0.1 to 10.0%	0.1%	0.5%
146	1192h	2192h	Search operation voltage step (at 5%)	0.1 to 10.0%	0.1%	0.2%
149	1195h	2195h	Pulse train input input scaling	100 to 3300	1=10Hz	2500 (25KHz)
150	1196h	2196h	Pulse train output scaling	0, 1, 6, 12, 24, 36	—	0

Constant No.	Command Code		Name	Setting Range	Unit	Factory setting
	Read	Write				
151	1197h	2197h	MEMOBUS time-over detection	0 to 4	1	0
152	1198h	2198h	MEMOBUS frequency reference and frequency monitor unit	0 to 3	1	0
153	1199h	2199h	MEMOBUS slave address	0 to 32	1	0
154	119Ah	219Ah	MEMOBUS BPS selection	0 to 3	1	2
155	119Bh	219Bh	MEMOBUS parity selection	0 to 2	1	0
156	119Ch	219Ch	Transmission waiting time	10 to 65ms	1ms	10ms
157	119Dh	219Dh	RTS control	0, 1	1	0
158	119Eh	219Eh	Motor code	0 to 70	1	*7
159	119Fh	219Fh	Upper voltage limit for energy-saving control (at 60Hz)	0 to 120%	1%	120%
160	11A0h	21A0h	Upper voltage limit for energy-saving control (at 6Hz)	0 to 25%	1%	16%
161	11A1h	21A1h	Search operation power detection hold width	0 to 100%	1%	10%
162	11A2h	21A2h	Time constant of power detection filter	0 to 255	1=4ms	5(20ms)
163	11A3h	21A3h	PID output gain	0.0 to 25.0	0.1	1.0
164	11A4h	21A4h	PID feedback value selection	0 to 5	1	0
175	11AFh	21AFh	Reducing carrier frequency selection at low speed	0, 1	1	0
176	11B0h	21B0h	Constant copy function selection	rdy, rEd, Cpy, vFy, vA, Sno		rdy
177	11B1h	21B1h	Constant read selection prohibit	0, 1	1	0
178	11B2h	21B2h	Fault history	Latest 4 faults are displayed.	Setting disabled.	—
179	11B3h	21B3h	Software version No.	Lower 4 digits of software No. are displayed.	Setting disabled	—

*1. Not initialized.

*2. The upper limit value and the initial value in Setting Range will be doubled for the 400V class.

*3. Depends on the inverter capacity.

*4. Depends on the inverter capacity.

*5. "1" is set at factory for the operator model with JVOP-147 (without volume). Initializing the constant changes it to 0.

*6. Changing control mode selection (n002) makes the initial value correspond to the control mode.

*7. Refer to the following table.

*8. Depends on the inverter capacity.

Constant No.	Name	V/f Control Mode (n002 = 0)	Vector Control Mode (n002 = 1)
n014	Medium operation frequency	1.5Hz	3.0Hz
n015	Medium operation frequency voltage	12.0V*	11.0V*
n016	Minimum operation frequency	1.5Hz	1.0Hz
n017	Minimum operation frequency voltage	12.0V*	4.3V*
n104	Torque compensation time constant	0.3s	0.2s
n111	Slip compensation gain	0.0	1.0
n112	Slip compensation gain time constant	2.0s	0.2s

* Doubled for the 400V class.

VS-606 V7 OPTION UNIT
CC-Link COMMUNICATIONS INTERFACE UNIT
USER'S MANUAL

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