VS-606 V7 OPTION UNIT

CC-Link COMMUNICATION INTERFACE UNIT

INSTRUCTIONS

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

Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

YASKAWA

MANUAL NO. TOBZ-C736-70.5

Introduction

This Instruction Manual describes the operations and specifications of the CC-Link Interface Unit (hereafter called the SI-C/V7 unit). The SI-C/V7 unit is an interface unit to achieve data communications with the CC-Link master by connecting the Compact General-purpose Vector Control Inverter in the VS-606 V7 series to the open field network CC-Link. Read this manual carefully and be sure you understand the information provided before attempting any operations.

For the operation of the Inverter, refer to the VS-606 V7 Series Instruction Manual (TOE-S606-11).

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 have 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 damage to the product.

■ 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.

⚠ CAUTION
・Do not touch the elements of the option unit with bare hands. Failure to observe this caution may result in equipment damage caused by static electricity. ・Insert the connectors firmly. Failure to observe this caution may result in malfunction or damage to the equipment.

■ Setting

⚠ CAUTION
・Be careful when changing Inverter settings. The Inverter is factory set to suitable settings. Failure to observe this caution may result in damage to the equipment.

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 supports 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 series (software No. 0020 and later)

2 RECEIVING

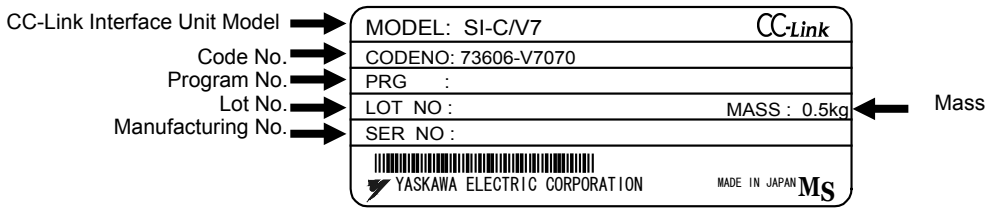
Products are rigorously inspected before delivery. Confirm the following points before installation.

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.)

Contact your Yaskawa representative immediately if any problem should be found concerning the shipment.

2.1 Nameplate

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



2.2 Parts List

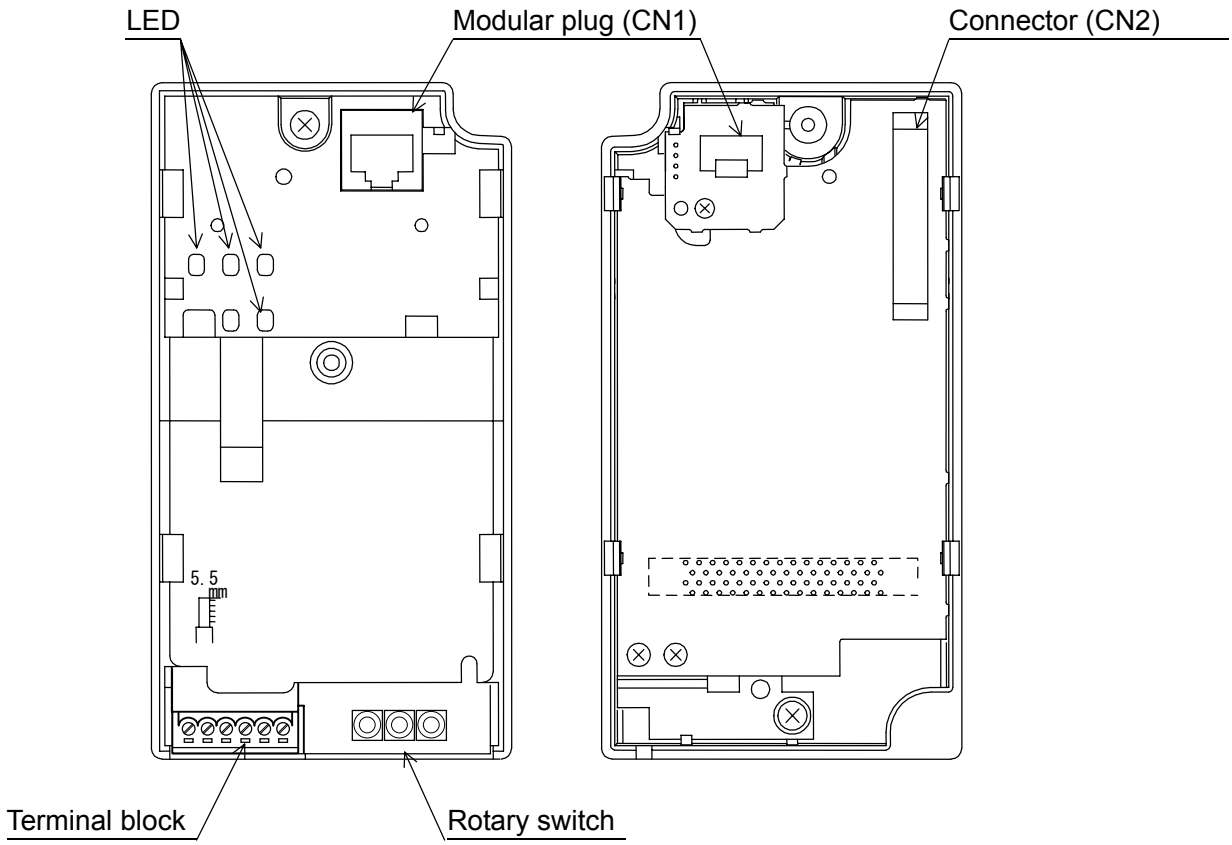
The SI-C/V7 unit contains the following parts.

Parts Name	Q'ty
CC-Link Interface Unit	1
Mounting fixture	1
M3×8SW screw	1
Instruction Manual (TOBZ-C736-70.5)	1

3. NOMENCLATURE AND SETTINGS

3.1 Components

The appearance of SI-C/V7 unit and the names of its components are shown below.

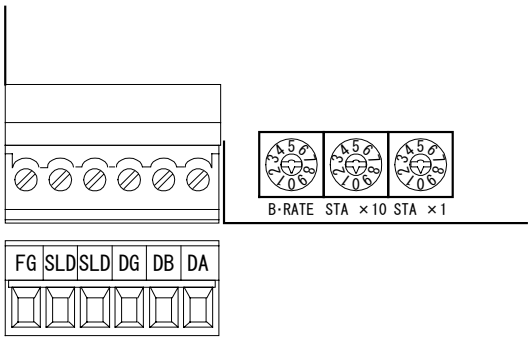


3.2 Terminal Block

The table below shows CC-Link bus connection terminals.

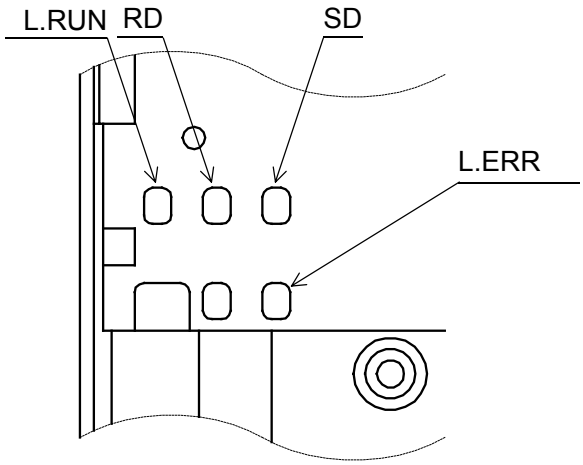
Table 1 Function of CC-Link Bus Connection Terminals

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.



The following table shows the fault displays of LEDs on the SI-C/V7 unit.

LED display				Meaning	Operator display of Inverter
L.RUN (Green)	RD (Red)	SD (Red)	L.ERR (Red)		
●	●	●	●	Power supply OFF Communication cable disconnection	At cable disconnection Before communication starts: CAL* After communication has started: BUS
○	○	○	●	Normal (Communication data)	Normal
○	○	○	☼	Normal (A CRC error occurred because of noise.)	Normal
○	○	○	☼ (0.4s cycle)	Normal (Either baud rate or station number setting is changed after the power supply has turned ON.)	Normal
○	○	●	☼	A CRC error occurred and a SI-C/V7 unit cannot reply.	Normal
○	○	●	●	A local data cannot be received.	Normal
●	○	○	☼	A CRC error occurred at the received data.	Normal
●	○	○	●	A SI-C/V7 unit is not linked with the network.	Normal
●	○	●	☼	A CRC error occurred at local station because of noise.	Normal
●	○	●	●	A local data cannot be received.	CAL* or BUS
●	●	☼	○	Baud rate or station number setting is not correct.	CAL* or BUS

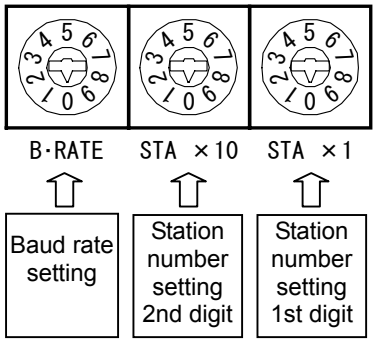
○ ··· Lit, ☼ ··· Blinking, ● ··· Not lit

* "CAL" display will appear when the inverter software version is 0024 or later.

3.4 Rotary Switch

These switches set the baud rate and station number of the CC-Link.

NOTE Set these three setting switches before turning ON the inverter power supply. Do not change the settings after turning ON the power supply. Be sure to change the settings after turning ON the inverter power supply.



3.4.1 Baud Rate Setting Switch

Switch	0	1	2	3	4
Communication 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" lights, resulting in a communication error.

3.4.2 Station Number Setting Switches

1) Set the station number in the range from 1 to 64.
"STA × 10" sets the 2nd order of the station number.
"STA × 1" sets the 1st order of the station number.

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

4. INSTALLATION AND WIRING

NOTE

Be sure to perform installation and wiring after the inverter power supply is turned OFF and at least one minute after all the indicator lamps are extinguished. The CC-Link cable must be separated from the main circuit wiring or other power cables.

4.1 Installation

The SI-C/V7 unit is mounted with the digital operator and the front cover of the inverter removed. Mount the unit in accordance with the following procedure.

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 nippers 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.

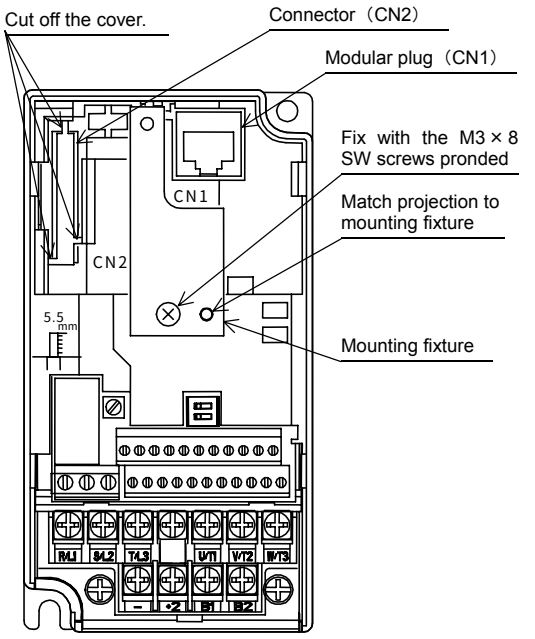


Fig. 1 Front of Inverter

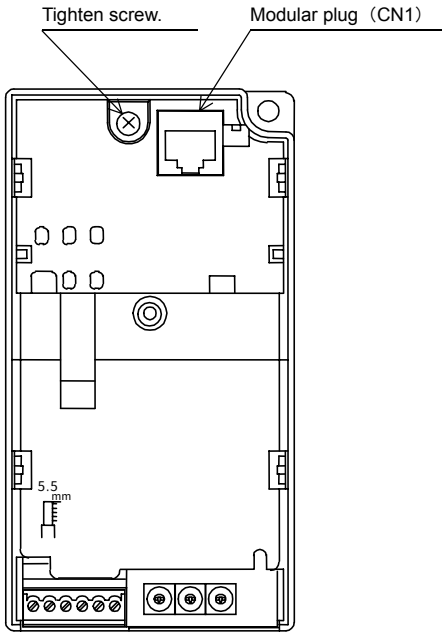
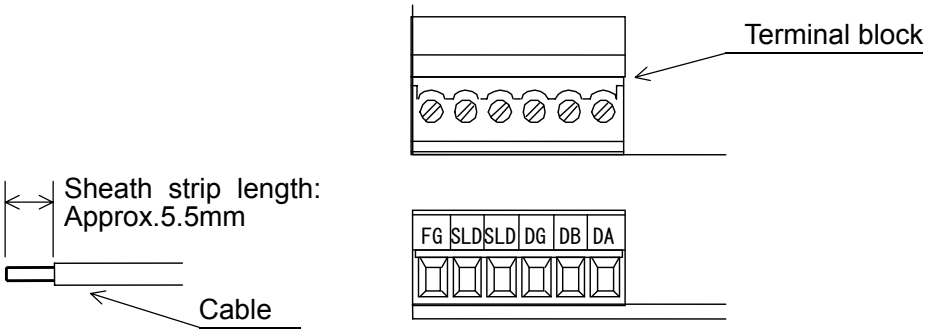


Fig. 2 Front of the SI-C/V7 unit

4.2 Wiring of CC-Link Cable

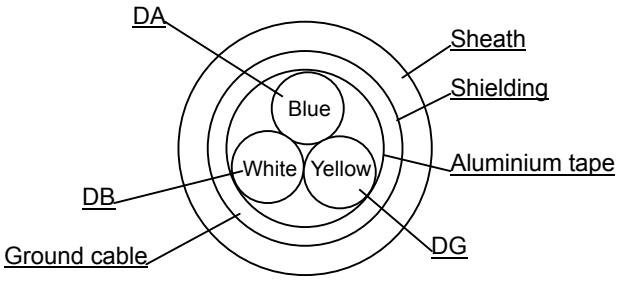
4.2.1 Wiring

Follow the steps below to wire the CC-Link communication cable on the terminal block.
1) Use a thin minus driver to loosen the screws.
2) Insert the cable from the bottom of the terminal block.
3) Tighten the terminal screws so firmly that the cable will not be removed.
   (Tightening torque: 0.22 to 0.25 [N・m])



4.2.2 Communication Cable Specifications

Be sure to use a cable of the following specifications as the communication cable. Any cable other than the recommended cable shown below cannot assure the performance of the CC-Link.

Item	Specifications
Model	FANC-SB 0.5 mm^2 × 3 [Manufactured by Kuramo Electric Co., Ltd]
Conductor cross-sectional area	0.5mm^2
Conductor resistance (at 20℃)	37.8Ω/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

Notes: 1. Separete the CC-Link communication cable from the main circuit wiring or other power cables.
2. There is a scale indiation of 5.5 mm on the top of the terminal block in the front face of the SI-C/V7. Use this scale to confirm the strip length.

4.3 Interconnection

Fig. 3 shows the interconnection between the inverter, the SI-C/V7 unit and the CC-Link master.

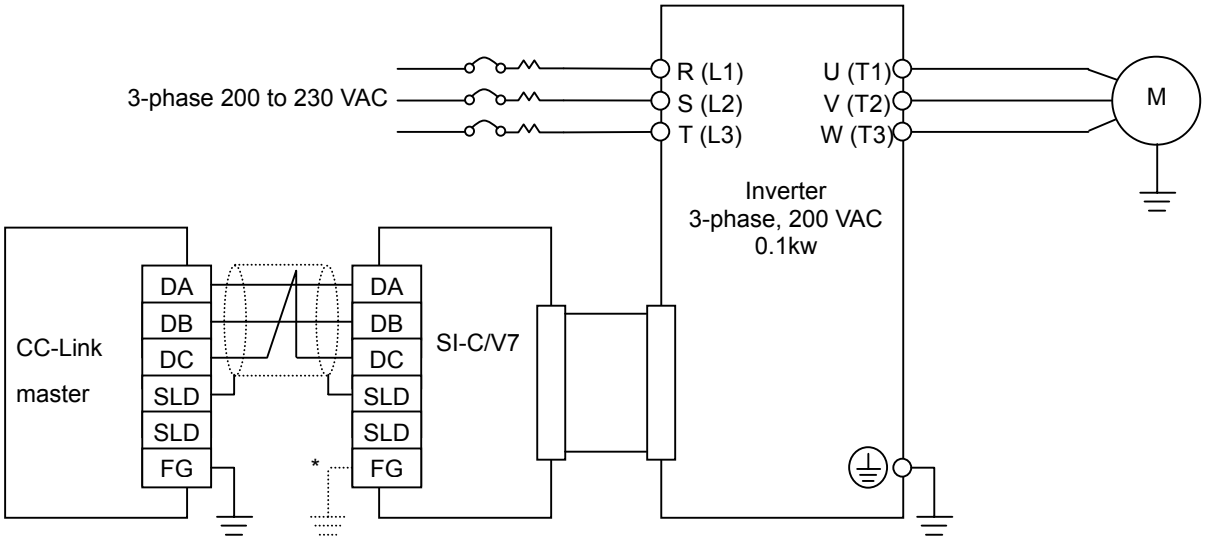


Fig. 3 Interconnection between Devices

5. SETTING

SI-C/V7 is a communication interface unit to execute operation, adjustment and monitoring using the PLC program with the VS-606 V7 as an exclusive remote device station. Both the bit data and the word data cyclic transmission are enabled, and high-speed communications up to 10 Mbps is available.

5.1 Setting Constants

Set the constants when operating or stopping the inverter from the PLC, or when setting or changing inverter frequencies.

◆When operating or stopping the inverter from the PLC:
Set the constant n003(Run command selection) to 3 (communication).
[The factory setting is 0 (digital operator)]

◆When setting or changing inverter frequency from the PLC:
Set the constant n004(Frequency reference selection) to 9 (communication card).
[The factory setting is 0 (set by potentiometer on digital operator)]

Refer to the Inverter's Instruction Manual or CC-Link Interface Unit User's Manual for details.

6. REMOTE I/O LIST

The inverter alone uses one station of the PLC buffer memory. The following lists the inverter inputs and outputs viewed from the PLC.

・List of Remote I/O

Remote Outputs (PLC → Inverter)			Remote Outputs (Inverter → PLC)		
Device No.	Signal Name	Remarks (Factory Setting)	Device No.	Signal Name	Remarks (Factory Setting)
RY0	FWD run command		RX0	FWD running	
RY1	REV run command		RX1	REV running	
RY2	S3 multifunction input terminal function	External fault (n052: 3)	RX2	Terminal MA-MB output	Fault (n057: 0)
RY3	S4 multifunction input terminal function	Fault reset (n052: 5)	RX3	Speed agree	
RY4	S5 multifunction input terminal function	Multi-step speed reference 1 (n052: 6)	RX4	Stall prevention *1	
RY5	S6 multifunction input terminal function	Multi-step speed reference 2 (n052: 7)	RX5	Not used	
RY6	S7 multifunction input terminal function	Jog command (n052: 10)	RX6	Terminal P1 output	Running (n058: 1)
RY7	Not used		RX7	Terminal P2 output	Frequency agree (n059: 2)
RY8	Not used		RX8	Not used	
RY9	Inverter output shut-off		RX9	Not used	
RYA	Not used		RXA	Not used	
RYB	Not used		RXB	Not used	
RYC	Monitor command		RXC	Monitoring	
RYD	Frequency setting reference 1	RAM write-in	RXD	Frequency setting completion 1	RAM write-in
RYE	Frequency setting reference 2 *3	EEPROM write-in	RXE	Frequency setting completion 2 *3	EEPROM write-in
RYF	Request to execute command code		RXF	Completion of command code execution	
RY10 to RY18	Not used		RX10 to RX18	Not used	
RY19	Request to change multifunction input allocation		RX19	Completion of changing of multifunction input allocation	
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 For inverter software version "0024" or later. Not used for software version "0023" and before and the inverters of capacity 5.5/7.5kW.

*2 Do not use the S7 multifunction input terminal for inverter software version "0023" and before and the inverters of capacity 5.5/7.5kW.

*3 To be written in to frequency reference 1 (n024).

・List of Remote Registers

PLC → Inverter			Inverter → PLC		
Device No.	Name	Execution Request 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}	Output frequency	RXA
RW_{W2}	Command code	RYF	RW_{R2}	Response code	RXF
RW_{W3}	Write-in data		RW_{R3}	Read data	

For details, refer to "CC-Link INTERFACE UNIT SI-C/V7 USER'S MANUAL."
Contact your Yaskawa representative for further information of the user's manual.

VS-606 V7 OPTION UNIT
CC-Link COMMUNICATION INTERFACE UNIT
INSTRUCTIONS

IRUMA BUSINESS CENTER (SOLUTION CENTER)
480, Kamifujisawa, Iruma, Saitama 358-8555, Japan
Phone 81-4-2962-5696 Fax 81-4-2962-6138

YASKAWA ELECTRIC AMERICA, INC.
2121 Norman Drive South, Waukegan, IL 60085, U.S.A.
Phone 1-847-887-7000 Fax 1-847-887-7370

YASKAWA ELÉTRICO DO BRASIL COMÉRCIO LTD.A.
Avenida Fagundes Filho, 620 Bairro Saude-Sao Pãulo-SP, Brazil CEP: 04304-000
Phone 55-11-5071-2552 Fax 55-11-5581-8795

YASKAWA ELECTRIC EUROPE GmbH
Am Kronberger Hang 2, 65824 Schwalbach, Germany
Phone 49-6196-569-300 Fax 49-6196-569-312

YASKAWA ELECTRIC UK LTD.
1 Hunt Hill Orchardton Woods Cumbernauld, G68 9LF, United Kingdom
Phone 44-1236-735000 Fax 44-1236-458182

YASKAWA ELECTRIC KOREA CORPORATION
7F, Doore Bldg. 24, Yeoido-dong, Youngdungpo-Ku, Seoul 150-877, Korea
Phone 82-2-784-7844 Fax 82-2-784-8495

YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.
151 Lorong Chuan, #04-01, New Tech Park 556741, Singapore
Phone 65-6282-3003 Fax 65-6289-3003

YASKAWA ELECTRIC (SHANGHAI) CO., LTD.
No.18 Xizang Zhong Road. Room 1702-1707, Harbour Ring Plaza Shanghai 200001, China
Phone 86-21-5385-2200 Fax 86-21-5385-3299

YASKAWA ELECTRIC (SHANGHAI) CO., LTD. BEIJING OFFICE
Room 1011A, Tower W3 Oriental Plaza, No.1 East Chang An Ave.,
Dong Cheng District, Beijing 100738, China
Phone 86-10-8518-4086 Fax 86-10-8518-4082

YASKAWA ELECTRIC TAIWAN CORPORATION
9F, 16, Nanking E. Rd., Sec. 3, Taipei, Taiwan
Phone 886-2-2502-5003 Fax 886-2-2505-1280

YASKAWA ELECTRIC CORPORATION

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In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice
for ongoing product modifications and improvements.

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