



TOSHIBA

STATUS

RUN PRG MON 850.0 % Hz

RUN

STOP

EASY

MODE

VF-S15

3PH-200/240V-0.4kW/0.5HP

警告

- けが、感電、火災のおそれがあります。
- 取扱説明書の注意事項を読むこと。
- 通電中及び電源遮断後15分以内は端子カバーを開けないこと。
- 確実に接地を行うこと。

DANGER

- Risk of injury, electric shock or fire.
- Read the instruction manual.
- Do not open the cover while power is applied or for 15 minutes after power has been removed.
- Ensure proper earth connection.

Toshiba TOSVERT VF-S15 series Function Manual

Tosvert vf-s15 series cc-link option unit

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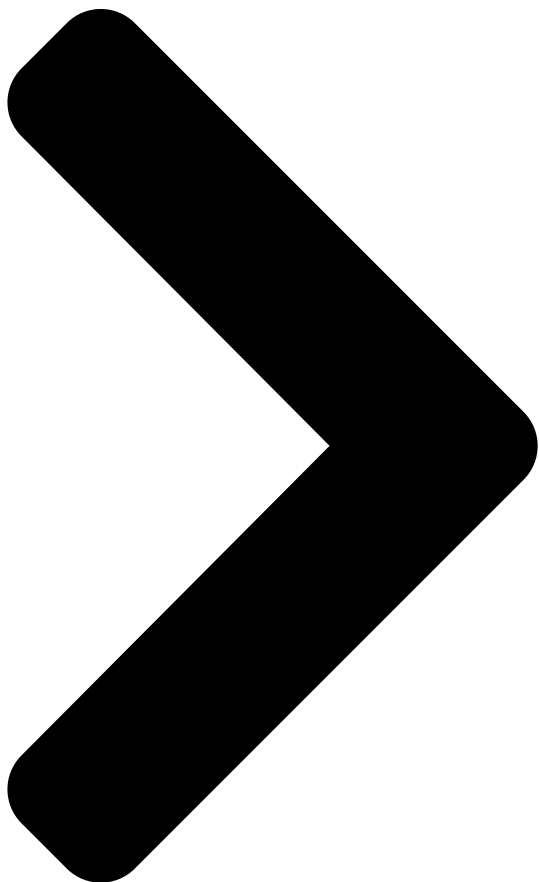
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TOSHIBA TOSVERT V5-S15 series

®

1. Read this manual before installing or operating. Keep this instruction manual on hand of the end user, and make use of this manual in maintenance and inspection.
2. All information contained in this manual will be changed without notice. Please contact your Toshiba distributor to confirm the latest information.

option unit Function Manual

CCL003Z

NOTICE

E6581830□

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Related Manuals for Toshiba TOSVERT VF-S15 series

[Inverter Toshiba Tosvert VF-S15 Instruction Manual](#)

Industrial inverter (394 pages)

[Inverter Toshiba Tosvert VF-S15 Instruction Manual](#)

Industrial inverter (for 3-phase induction motors) (371 pages)

[Inverter Toshiba VF-S15 Instruction Manual](#)

For 3-phase induction motors (360 pages)

[Inverter Toshiba VF-S15 Instruction Manual](#)

Industrial inverter for 3-phase induction motors (217 pages)

[Inverter Toshiba TOSVERT VF-S15 Manual](#)

(79 pages)

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Industrial inverter (54 pages)

[Media Converter Toshiba TOSVERT VF-S15 Series Manual](#)

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[Inverter Toshiba TOSVERT VF-S15 Series Communication Function Manual](#)

(45 pages)

[Inverter Toshiba TOSVERT VF-S15 Instruction Manual](#)

My function-s (44 pages)

[Controller Toshiba TOSVERT VF-S15 Instruction Manual](#)

Functions for lift application (25 pages)

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Pid control (23 pages)

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[Inverter Toshiba TOSVERT VF-S15 Instruction Manual](#)

Traverse control (6 pages)

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[Adapter Toshiba VF-S15 Instruction Manual](#)

Option adapter (3 pages)

[Adapter Toshiba VF-S15 Instruction Manual](#)

Option adapter (2 pages)

Summary of Contents for Toshiba TOSVERT VF-S15 series

Page 1 1. Read this manual before installing or operating. Keep this instruction manual on hand of the end user, and make use of this manual in maintenance and inspection. 2. All information contained in this manual will be changed without notice. Please contact your Toshiba distributor to confirm the latest information.

Page 2 E658130 Introduction ® Thank you for purchasing the “CC-Link option (CCL003Z)” for TOSVERT VF-S15 drive. This option can connect with open field network CC-Link and data communications with the CC-Link master through installing this option in the VF-S15 and using

it. Besides this instruction manual, the “CC-Link option Instruction Manual”...

[Page 3](#) E658130 Handling in general Warning Do not connect or disconnect a network cable while the drive power is on. It may lead to electric shocks or fire. Prohibited See the instruction manual attached with the option unit for cautions the handling. Otherwise, it may lead to electric shocks, fire, injuries or damage to product.

[Page 4: Table Of Contents](#)

E658130 Table of Contents OVERVIEW 4 - BASIC SPECIFICATIONS
.....- 4 - 2.1. CC-Link Version 5 - 2.1.1. CC-Link Ver. 1.10
.....- 5 - 2.1.2. CC-Link Ver. 2 5 - NAMES AND FUNCTIONS
.....- 6 - 3.1.

[Page 5: Overview](#)

E658130 1. Overview The option allows the VF-S15 drive to be connected into a CC-Link network. CC-Link supports a maximum of 42 nodes, allowing for the Master and this option is based on CC-Link V1.1 and V2.0. The CCL-003Z is able to operate RUN/STOP, monitor the status of the drive, set the drive's parameter and etc.

[Page 6: Cc-Link Version](#)

E658130 2.1. CC-Link Version 2.1.1. CC-Link Ver. 1.10 The conventional CC-Link products, whose inter-station cable lengths have equally been changed to 20cm (7.87 inch) or more to improve the inter-station cable length restriction, are defined as CC-Link Ver. 1.10. In comparison the conventional products are defined as CC-link Ver.

[Page 7: Names And Functions](#)

E658130 3. Names and functions The drawing below shows names and functions of main parts.
3.1. Outline Connector to the inverter Release tab LED indicator (See 4.5) CC-Link Connector - 6
~...

[Page 8: Installation On Inverter](#)

E658130 4. Installation on inverter Refer to VF-S15 option adapter instruction manual (E6581838) for the installation on the inverter. The following steps must be performed before installing. 1. Shut off all input power. Mandatory 2. Wait at least 15 minutes and check to make sure that the charge lamp is no longer lit. 4.1.

[Page 9: Connection Of Cc-Link Master Unit And Inverter](#)

E658130 4.3. Connection of CC-Link master unit and inverter The example of the connection of the CC-Link master unit and the inverter is shown. □ Motor R/L1 U/T1 S/L2 V/T2 Inverter T/L3 VF-S15 W/T3 CC-Link Master CCL003Z Unit *Connection of Several Inverters Factory Automation can be applied to several inverters which share a link system as CC-Link remote device stations and are controlled and monitored by PLC user programs.

[Page 10: The Maximum Connection Number Of Units](#)

E658130 4.4. The maximum connection number of units 1. Maximum number of units connected to one master station (CC-Link Ver.1.10) 42 units (when only inverters are connected) If any other units are included, the number of stations occupied depends on the unit and therefore the following conditions must be satisfied: $\{(1 \times \dots$

[Page 11](#) E658130 2. Maximum number of units connected to one master station (CC-Link Ver.2.00) 42 units (when connections are inverter only) If any other units are included, the number of stations occupied depends on the unit and therefore the following conditions must be satisfied: $\{(a + a2 + a4 + a8) + (b + b2 + b4 + b8) \times \dots$

[Page 12: Led Indicator](#)

E658130 4.5. LED indicator The LEDs shows the present status of the network and module Refer to 7.3 for detail. L.RUN L.ERR ■ Layout of LED L.RUN Light on during communication. Light on during send the data of CC-Link. Light on during receive the data of CC-Link. L.ERR Light on during communication error.

[Page 13: Functions](#)

E658130 Functions This option is a communication interface unit that allows the PLC program to operate, monitor and set the parameter of the inverter as a remote station of CC-Link. It is able to communicate with a maximum speed of 10Mbps not only transmitting bit data but also by word data. Moreover, more data transmissions are possible by the use of CC-Link V2.0.

[Page 14: Communication Parameters For Ccl003Z](#)

E658130 5.2. Communication parameters for CCL003Z Title Function Description
Communication error detection c100 0.0 - 100.0 sec. delay time 0: Stop and controlled by cmod, fmod c101 1: Operation continue Inverter operation at the 2: Deceleration stop communication loss action 3: Coast stop 4: Network error stop (err8 trip) 5: Preset speed operation (by c102 setting)

[Page 15: Cc-Link Function Setting](#)

E658130 5.3. CC-Link function setting 5.3.1. Station number setting Use parameter c120 to set station number of the inverter. Set this parameter within the range of 1 to 64. Title Function Description CC-Link station 1 to 64 c120 number selection *Use different station numbers for different devices.

[Page 16: Cc-Link Extended Setting](#)

E658130 5.3.3. CC-Link extended setting Remote register function can be extended. Title Function Description CC-Link extended selection c122 * 0: Occupies one station (V1.10) 1: Occupies one station double (V2.0) 2: Occupies one station quadruple (V2.0) 3: Occupies one station octuple (V2.0) □...

[Page 17: Basic Functions](#)

E658130 5.4. Basic functions This clause shows the basic function of this CC-Link option using by CC-Link communication. 5.4.1. Run and frequency operation command The PLC program can operate the inverter to run, stop, set the operation frequency and change the parameters. If the PLC controls these operations, select the command mode and the frequency setting mode.

[Page 18: I/O Signal List](#)

E658130 5.5. I/O signal list 5.5.1. One station is occupied (CC-Link Ver.1) (c122=0) This option occupies one station area of the buffer memory of the PLC. In the case of c122 = 0, there are remote I/O (RX, RY both 32 bits) and the remote register (RWw, RWr both 4 word) in the communication data for one station area.

[Page 19: Double Setting Is Selected \(Cc-Link Ver.2\) \(C122=1\)](#)

E658130 5.5.2. Double setting is selected (CC-Link Ver.2) (c122=1) This option occupies one station area of the buffer memory of the PLC. In the case of c122 = 1, there are remote I/O (RX, RY both 32 bits(same as CC-LINK Ver.1)) and the remote register (RWw, RWr both 8 word) in the communication data for one station area.

[Page 20: Octuple Setting Is Selected \(Cc-Link Ver.2\) \(C122=3\)](#)

E658130 5.5.4. Octuple setting is selected (CC-Link Ver.2) (c122=3) This option occupies one station area of the buffer memory of the PLC. In the case of c122 = 3, there are remote I/O (RX, RY both 32 bits(same as CC-LINK Ver.1)) and the remote register (RWw, RWr both 32 word) in the communication data for one station area.

[Page 21](#) E658130 5.5.5. Trip history When “Quadruple setting” or “Octuple setting” of CC-LINK V.2 is selected, the past trip information can be referred to by the following methods.
Upper 8 Upper 8 Trip history No. Trip history No.. Bits Bits RWr n+8 RWw n+8 Lower 8 Lower 8...

[Page 22: Detail Of Input And Output Signals](#)

E658130 5.5.6. Detail of input and output signals 1. Output signals (Master -> Inverter) The output signals from the master unit are indicated. (Input signals to inverter) Device No. Signal Description RYn0 Forward run command OFF: Stop command ON: Forward run command*** RYn1 Reverse run command OFF: Stop command ON: Reverse run command***...

[Page 23](#) E658130 ■Input function selection from the CC-Link. The function numbers selection

of the RYn2 to RYn8 function valid from the command of the CC-Link are following boldface numbers. Positive logic Negative logic Function Speed control PM control No function is assigned ●/●...

[Page 24](#) E658130 2. Input signal (Inverter -> Master) The following shows input signals to the master unit. (The output signals for the inverter.) Device No.. Signal Description OFF: Other than forward running RXn0 Forward running (during stop or reverse rotation) ON : Forward running OFF: Other than reverse running RXn1 Reverse running...

[Page 25: Remote Register Assignment](#)

E658130 5.5.7. Remote Register Assignment Divide the monitor code (RWw n) into half and select the monitor value 1 (RWr n) from the lower 8 bits and the monitor value 2 (RWr n) from the higher 8 bits. For example: When output voltage is selected for the monitor value 1 and output torque is selected for the monitor value 2.

[Page 26](#) E658130 Address Signal Description Set the command code for actions such as operation mode switching, parameter read, write, error reference, error clear, etc. The command will RWwn+10 Instruction code 2 be executed by turning (RYnF) on after the register setting is completed. When the command execution is completed, (RXnF) turns on.

[Page 27](#) E658130 2. Remote register (Inverter -> Master) Address Signal Description When (RYnC) is on, the monitored value specified to the lower 8 bits of RWr n Monitor value 1 the monitor code (RWwn) is set. When "0" is set to the higher 8 bits of the monitor code (RWwn), the current output frequency is always set.

[Page 28](#) E658130 Address Signal Description For a normal reply, the reply data to the instruction specified by the RWrn+13 Read data 3 instruction code is set. When (RYnF) is on, the response code correspond to the instruction RWrn+14 Reply code 4 code of (RWw n+14) is set.

[Page 29: Instruction Codes](#)

E658130 5.5.8. Instruction Codes Code No. Item Description 0: Terminal block Command mode selection 1003H 1: Panel keypad (including extension panel) read 2: RS485 communication Command mode selection 3: No function 2003H write 4: Communication option 0: Setting dial 1(save even if power is off) 1: Terminal VIA Frequency setting mode 2: Terminal VIB...

[Page 30](#) E658130 Code No. Item Description To read parameters a900 to c999, 6000H is subtracted from the parameter number. 4900H to 6999H Read parameters (RAM) A900 □ A900H - 6000H = 4900H, (Ex: C123 -> C123H - 6000H = 6123H) To write parameters a900 to c999, the parameter Write parameters A900H to number doesn't change.

[Page 31: The Details Of An Error Code](#)

E658130 5.5.9. The details of an error code The following data are stored as fault history data when the inverter trip occurred. Error code Description Decimal Hexadecimal Trip display No error nerr Overcurrent during acceleration Overcurrent during deceleration Overcurrent during constant speed operation Overcurrent (An overcurrent on the load side at start-up) Overcurrent at start-up...

[Page 32](#) E658130 Error code Description Decimal Hexadecimal Trip display Analog input break detection fault e-18 CPU communications error e-19 Over torque boost fault e-20 CPU fault 2 e-21 Optional unit fault 2 e-23 CPU fault 3 e-26 Main module overload PTC fault e-32 Over-torque trip 2 Servo lock fault...

[Page 33: Description Of Reply Code](#)

E658130 5.5.10. Description of reply code When executing the frequency setting (RYnD) or instruction code execution (RYnF), check the reply code (RWr (n+2), (n+10), (n+14), (n+16), (n+18)) in the remote register after execution. Reply code Data Item Description (Hexadecimal No.) Normal completion of instruction code 0000H Normal (No error)

[Page 34: Description Of Monitor Code](#)

E658130 5.5.11. Description of monitor code Divide the monitor code (RWw n) into half and select the monitor value 1 (RWr n) from the lower 8 bits and the monitor value 2 (RWr n) from the upper 8 bits. For Example: When output voltage is selected for the monitor value 1 and

output torque is selected for the monitor value 2.

[Page 35: Description Of Input Terminal Information](#)

E658130 5.5.12. Description of input terminal information Data composition of input terminal information (Code No. = 0FH). Terminal name Function (parameter name) Input terminal function selection 1A(f111) 1B(f151) 1C(f155) Input terminal function selection 2A(f112) 2B(f152) 2C(f156) Input terminal function selection 3A(f113) / 3B(f153) Input terminal function selection 4A(f114) / 4B(f154)

[Page 36: Programming Examples](#)

Mitsubishi Electric Corp. QJ61BT11N □Input module Mitsubishi Electric Corp. QX40 □Output module Mitsubishi Electric Corp. QY40P □CC-Link dedicated cable Kuramo Electric Corp. FANC-110SBH Toshiba TOSVERT VF-S15(2 units) □Inverter One station is occupied □CC-Link option Toshiba CCL003Z(2 units) - 35 -...

[Page 37](#) E658130 2. Network parameter setting of the master station Network parameters are set as below. Item Setting Conditions Item Setting Conditions Start I/O No. 0000 Remote register (RWw) W100 Operation Data link alarm Input clear Special relay (SB) settings station setting Special register (SW) Setting at CPU Refresh...

[Page 38](#) E658130 3. The relation between the device of the 4. The relation between the device of the programmable controller CPU and remote I/O programmable controller CPU and remote register (RX,RY) of the remote device station is as follows: (RWw, RWr) of the remote device station is as The devices used actually are indicated in shaded follows: regions.

[Page 39: Program Example For Reading The Inverter Status](#)

E658130 6.1. Program example for reading the inverter status Example 1 shows a ladder logic to read the inverter status. Y30 of the output unit is turned on when inverter of station 2 is forward running SW80.1 (M0) Check the ready of the station 2 X1020 Turn on the relay of output...

[Page 40: Program Example For Setting The Operation Mode](#)

E658130 6.2. Program example for setting the operation mode a ladder logic to Example 2 shows write data in the inverter. The operation mode of station 1 inverter can be changed to network operation. Operation mode writing code number: 2003H (hexadecimal) Network operation set data: 0004H (hexadecimal) The reply code at the time of instruction code execution is set to D2.

[Page 41: Program Example For Setting The Operation Commands](#)

E658130 6.3. Program example for setting the operation commands a ladder logic to Example 3 shows give a forward command to station 2 inverter. SW80.1 Check the ready of the Station 2 (M0) Forward rotation command (RY20) (Y1020) Example 3 6.4.

[Page 42: Program Example For Monitoring The Output Frequency](#)

E658130 6.5. Program example for monitoring the output frequency a ladder logic to Example 5 shows read the output frequency of station 1 inverter to D1. Output frequency reading code number: 0001H (hexadecimal) When the output frequency is 50Hz, D1 is 1388H (5000) (unit: 0.01Hz). SW80.0 (M0) Check the ready of the station 1...

[Page 43: Program Example For Parameter Writing](#)

E658130 6.6. Program example for parameter writing a ladder logic to Example 6 shows change the setting of f311 of station 1 inverter to 1 f311: Reverse-run prohibition reading code number: 2311H (hexadecimal) Reverse-run prohibition set data: 1 (decimal) SW80.0 (M0) Check the ready of the Station 1 [PLS M300]...

[Page 44: Program Example For Parameter Reading](#)

E658130 6.7. Program example for parameter reading a ladder logic to Example 7 shows read parameter f311 of station 1 inverter to D2. f311: Reverse-run prohibition reading code number: 1311H (hexadecimal) The reply code at the time of instruction code execution is set to D1. SW80.0 (M0) Check the ready of the station 1...

[Page 45](#) E658130 6.8. Program example for trip information reading a ladder logic to Example 8 shows read the trip information of station 1 inverter to D1. Trip history No. 1, No. 2 reading code number: 74H (hexadecimal) The reply code at the time of instruction code execution is set to D2. SW80.0 (M0) Check the ready of the Station 1...

[Page 46: Program Example For Resetting The Inverter At Inverter Error](#)

E658130 6.9. Program example for resetting the inverter at inverter error Example 9 shows a ladder logic to reset the station 2 inverter. SW80.1 [M0 Check the ready of the station 2 X103 Turn on the error reset request flag [Y103A] (RY3A).

[Page 47: Instructions](#)

E658130 6.10. Instructions 1. Programming instructions 1.1 Since the buffer memory data of the master station is kept transferred (refreshed) to/from the inverters, the TO instruction need not be executed every scan in response to data write or read requests. The execution of the TO instruction every scan does not pose any problem. 1.2 If the FROM/TO instruction is executed frequently, data may not be written reliably.

[Page 48: Unusual Diagnosis](#)

E658130 Unusual diagnosis 7.1. Option error The error message is displayed when there is hardware error, software error or lose of connection of wire. Display of trip information ▼ (Optional unit fault 2 : 0037H) : Option error 7.2. Disconnection error of network cable ▼ Display of trip information err8 (Optional unit fault 1...

[Page 49: How To Check The Error Using The Leds](#)

E658130 7.3. How to check the error using the LEDs The following example explains the causes of fault which may be judged from the LED status of the CC-Link unit (CCL003Z) of the inverter. 1. When One Inverter Is Connected The following example indicates the causes of faults which may be judged from the LED status of the CC-Link unit (CCL003Z) of the inverter under the condition that the SW, M/S and PRM LEDs of the master unit are off (the master unit setting is correct) in the system configuration...

[Page 50](#) E658130 2. When two or more inverters are connected The following example explains the causes and corrective actions for fault which may be judged from the LED status of the CC-Link units (CCL003Z) of the inverters under the condition that the SW, M/S and PRM LEDs of the master unit are off (the master unit setting is proper) in the system configuration shown below: Master Station...

[Page 51](#) E658130 3. Communication stops during operation ■ Check that the CC-Link units and the CC-Link dedicated cable are connected properly. (Check for contact fault, break in the cable, etc.) ■ Check that the PLC program is executed properly. ■ Check that data communication has not stopped due to an instantaneous power failure, etc. LED Status Cause Corrective Action...

This manual is also suitable for:

[Cc-link ccl003z](#)