



Toshiba TOSVERT VF-S15 Instruction Manual

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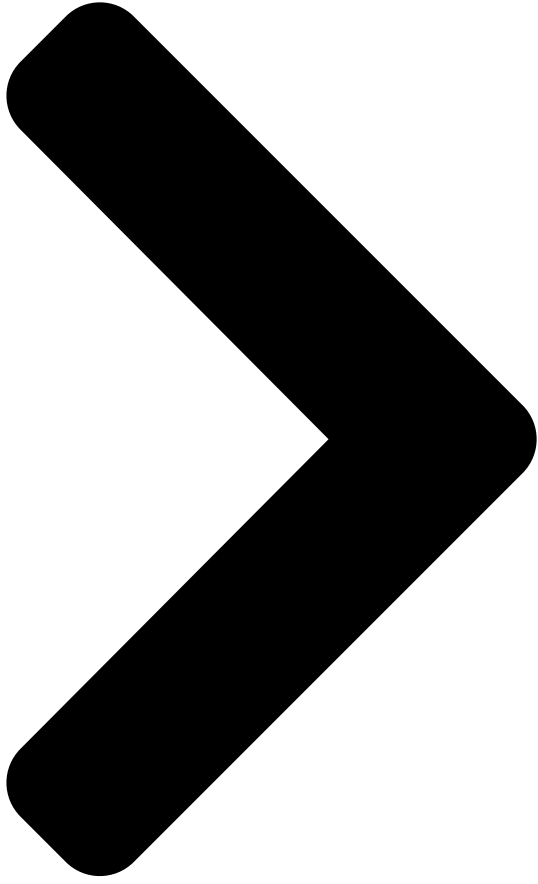
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Summary of Contents for Toshiba TOSVERT VF-S15

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[Page 3: Introduction](#)

E6581865 1. Introduction My function-S adds programming capability to inverter's input/output signals without external relays or a PLC (programmable logic controller) in some cases. The function makes it possible to reduce the space and cost required for the system. 2. Parameters used My function-S uses the parameters □□□□...

[Page 4](#) E6581865 <Standard> <My function-S> Coast stop Coast stop Output frequency Output frequency [Hz] [Hz] terminal F terminal F terminal S1 The combined terminal function can be used for output signals. For example, you can assign the low speed detection signal (function No: 4) and small current detection (function No: 26) to one terminal (Terminal OUT).

[Page 5](#) E6581865 □ Relay sequence function In case that an inverter is controlled by a PLC (programmable logic controller), the PLC receives, processes, and sends the signals as processing result to the inverter. (See Fig 3-1.) The relay sequence function enables the inverter to perform itself in 28 steps without a PLC. Because the function uses internal data and signals directly, the processing speed is faster than control with the PLC.

[Page 6: Setting Parameters](#)

E6581865 Setting parameters This chapter explains how to set parameters related to the My function-S using the composition of the My function-S and the rules. □ Input terminals Input signal terminals that can be used with the My function-S are as follows; ●...

[Page 7](#) E6581865 ● Internal terminals (8 terminals) Internal terminals cannot be turned on and off electronically unlike actual input terminals. Internal terminals can be turned on and off using communication function or My function-S. You can not assign the multiple functions as same as the virtual input terminals. They correspond to the internal relay used in PLC.

[Page 8](#) E6581865 □ Output terminals Output signal terminals used with the My function-S are following. ● Output terminals (3 terminals: RY, OUT, FL) VF-S15 has 3 output terminals. You can assign the multiple functions to the output terminals. A table of output terminal functions is shown in Appendix 4. Only the positive logic settings are used for My function-S.

[Page 9](#) E6581865 □ Parameters Table 4-1 is the My function-S parameters. Table 4-1 Table of My function-S parameters Title Function Adjustment range Default setting Input terminal number □: No function □: Terminal F □: Terminal R □: Terminal RES □: Terminal S1 □: Terminal S2 □: Terminal S3 □: Terminal VIB...

[Page 10](#) E6581865 Title Function Adjustment range Default setting Step 1 Input function Same as a900 a906 □ target 21 (Objects) Step 2 Input function Same as a901 a907 □ command 22 (Commands) Step 2 Input function Same as a900 a908 □ target 22 (Objects) Unit 2...

[Page 11](#) E6581865 Title Function Adjustment range Default setting Step 1 Input function Same as a900 a953 □ target 71 (Objects) Step 2 Input function Same as a901 a954 □ command 72 (Commands) Step 2 Input function Same as a900 a955 □ target 72 (Objects) Unit 7...

[Page 12](#) E6581865 □ Enable or disable state of My function-S You can set enable or disable state of the My function-S When you set the My function-S parameters, be sure to set a□□□ = □ (disabled) to prevent the system from starting accidentally. After setting the My function-S parameters, change □□□□...

[Page 13: Examples Of Setting](#)

E6581865 5. Examples of setting This chapter gives some examples of setting. Note that the settings described below are examples and there are other ways to set a function for some examples. ● Examples of the setting of the combined terminal function Example 1: Performing 2 functions by 1 terminal.

[Page 14](#) E6581865 □ Examples of the setting of the combined terminal function <Example 1: Performing 2 functions by 1 terminal> Standby signal is connected with Terminal F (Forward run command). (F+ST) Standby signal is connected with Terminal R (Reverse run command). (R+ST) See Fig 5-1 for wiring diagram and Fig.5-2 for block diagram.

[Page 15](#) E6581865 <Example 2: Performing 2 functions by 1 terminal> Performing standby and forward run command by the Terminal S1. (ST+F) See Fig 5-3 for wiring diagram and Fig.5-4 for block diagram. Assign the standby (ST) to Terminal S1. Assign the forward run command (F) to virtual input terminal 1. If the Terminal S1 is turned on, the virtual terminal is turned on automatically.

[Page 16](#) E6581865 <Example 3: Performing 3 functions by 1 terminal> Performing standby, forward run command and preset-speed command 1 by the Terminal S1. (ST+F+SS1) See Fig 5-5 for wiring diagram and Fig.5-6 for block diagram. Assign the standby (ST) to Terminal S1. Assign the forward run command (F) to virtual input terminal 1.

[Page 17](#) E6581865 <Example 4: Output signal by logical product of 2 functions> Output the signal on the condition of detecting both a low-speed signal and a small current signal from Terminal OUT. See Fig 5-7 for block diagram. Compute by logical product (AND) of a low-speed signal and a small current signal. Transfer the result to the My function-S output1, and output signal from Terminal OUT.

[Page 18](#) E6581865 □ Examples of the setting of the relay sequence function This section gives an explanation of the relay sequence function using ladder diagrams. One unit consists of maximum 4 steps. If your sequence consists of 5 steps or more, you need to change the composition to 4 steps or less.

[Page 19](#) E6581865 Parameter setting Title Parameter setting Description a977□ □ (Default)□ Set to “Disabled” of the My function-S. Assign the “no function” to the Terminal F. f111□ □□ Use the Terminal F as a simple input terminal (IX1). Assign the “no function” to the Terminal R. Prior f112□...

[Page 20](#) E6581865 Title Parameter setting Description Step 1 Read IX1 (F) terminal input signal. (LD IX1) a900□ □□ □ □ □ □ □ □ a901□ □□ Step 2 NEQ command □ □ □ a902□ □□ Unit 1 a903□ □ (Default)□ Step 3 NOP command (no operation) a904□...

[Page 21](#) E6581865 Step 1 Step 2 Step 3 Step 4 Forward run command is assigned to VT1. Reverse run command is assigned to VT2. VT1: Virtual input terminal 1 IT1: Internal terminal 1 VT2: Virtual input terminal 2 IT2: Internal terminal 2 Parameter setting Title Parameter setting...

[Page 22](#) E6581865 Step 1 Read IX2(R) terminal input signal. (LD IX2) a912□ □□ a913□ □□ □ □ Step 2 OR command IX □ self-hold circuit a914□ □□□ □ □ Unit 3 a915□ □□ Step 3 ANDN command □ □ a916□ □□ Transfer the result to the internal terminal 2 (IT2) □...

[Page 23](#) E6581865 <Example 7: Automatic stop by some conditions> Automatically stop on the condition of 5Hz or less of output frequency and 120% or more of output current. Start by push type (non self-hold type) switch. See Fig 5-10 for wiring diagram and timing chart. SW-IX1 Inverter IX1 (F)

[Page 24](#) E6581865 Step 1 Step 2 Step 3 Step 4 Frequency □FE00□ ≤ 5Hz Output ≤ 5Hz Output current □FD03□ ≥ 120% frequency Output ≥120% current VT1: Virtual input terminal (forward run command) IT1: Internal terminal 1 IT2: Internal terminal 2 IT3: Internal terminal 3 IT4: Internal terminal 4 Parameter setting by the ladder diagram...

[Page 25](#) E6581865 Title Parameter setting Description Step 1 Read the output frequency (LD Output frequency) a912□ □□□□□ a913□ □□□ Step 2 LE command (Comparison to 5Hz) a914□ □□□□ Unit 3 □ (Default)□ a915□ Step 3 NOP command (no operation) □ (Default)□ a916□...

[Page 26: Appendix 1 Table Of My Function-S Parameters](#)

E6581865 Appendix 1 Table of My function-S parameters Table 8-1 is the My function-S parameters. Table 8-1 Table of My function-S parameters Title Function Adjustment range Default setting Input terminal number □: No function □: Terminal F □: Terminal R □: Terminal RES □: Terminal S1 □: Terminal S2...

[Page 27](#) E6581865 Title Function Adjustment range Default setting a912 Input function target 31 Same as a900 □ Input function command 32 Same as a901 a913 □ a914 Input function target 32 Same as a900 □ Input function command 33 Same as a901 a915 □...

[Page 28: Appendix 2 Computing Functions](#)

E6581865 Appendix 2 Computing functions Table 8-2 is the computing functions provided by the My function-S. Table 8-2 Computing functions Input function Computation Function Description command name No operation Unnecessary sections (columns) of the My function-S program. Transfer Used mainly to read data. ...

[Page 29](#) E6581865 (Note 1) CLRN Clear (Inversion) Clear data (Inversion). ON delay Delay the timing of turning data on by the time (ON timer 2) specified with to . Delay the timing of data output by specified time in case the signal is on when the power is turned on.

[Page 30: Appendix 3 Input Terminal Function Selection Parameters](#)

E6581865 Appendix 3 Input terminal function selection parameters Table 8-3 is the function setting of 12 input terminals (including 4 virtual input terminals). Table 8-4 is the input terminal functions. Table 8-3 Input terminal function selection parameters Communication Adjustment Title Function Default setting range (Note 1)

[Page 31](#) E6581865 Table 8-4 Input terminal functions Parameter setting Parameter setting Function Positive Negative Positive Negative logic logic logic No function 89 Frequency UP 1 88 F: Forward run command 91 Frequency DOWN 2 3 90 4 5 R: Reverse run command 92...

[Page 32: Appendix 4 Output Terminal Function Selection Parameters](#)

E6581865 Appendix 4 Output terminal function selection parameters Table 8-5 is the function setting of 3 output terminals. Table 8-6 is the output terminal functions. Table 8-5 Output terminal function selection parameters Communication Adjustment Title Function Default setting (Note 1) f130 0130 ...

[Page 33](#) E6581865 Input Parameter Function Operation output specifications (in case of positive logic) setting setting ON: 50% or more of calculated value of f309 set overload protection Braking resistor level overload pre-alarm OFF: Less than 50% ON: While operation frequency is output or DC braking is in operation Run/stop (db) ...

[Page 34](#) E6581865 Input Parameter Function Operation output specifications (in case of positive logic) setting setting Traverse deceleration ON: Traverse deceleration in progress in progress Parts replacement ON: Any one of cooling fan, control board capacitor, or main circuit alarm capacitor reaches parts replacement time ON: Torque current is 70% of f616 setting value or more...

[Page 35](#) E6581865 Input Parameter Function Operation output specifications (in case of positive logic) setting setting My function-S output 1 ON: My function-S output 1 is ON. My function-S output 2 ON: My function-S output 2 is ON. My function-S output 3 ON: My function-S output 3 is ON.

[Page 36: Appendix 5 Internal Data](#)

E6581865 Appendix 5 Internal data Table 8-7 is the internal data that the My function-S can handle. This data is not rewritable. It can be used only as input data for comparison and computation. Table 8-7 Data that My function-S can handle Communication Unit Input setting...

[Page 37](#) E6581865 Communication Unit Input setting Function (Communication) FD00 Output frequency 0.01Hz FD02 Frequency reference 0.01Hz FD03 Output current 0.01% FD04 Input voltage (DC detection) 0.01% FD05 Output voltage 0.01% FD15 Frequency setting value (after compensation) 0.01Hz ...

[Page 38: Appendix 6 Examples Of Computing Function Settings](#)

E6581865 Appendix 6 Examples of computing function settings Of the computing functions listed in Appendix 2, this chapter explains in detail the timer function, counter function, peak hold function, set & reset function, and clear function, and gives examples of their settings. ...

[Page 39](#) E6581865 Power ON *Diffenece between ON (ON timer) and ON2 (ON timer 2) Input The operation of above 2 commands is signal different in case the signal is already ON when the power is ON. Output (14: ON timer) Timer setting time Output (23: ON timer 2)

[Page 40](#) E6581865 □ Input function command 15: OFF (OFF timer), 24: OFF2 (OFF timer 2)
When the input signal is turned OFF, the OFF command delays the timing of putting out an OFF signal by the setting time of the OFF timer, as shown in the figure below. The timer is activated only when it receives an OFF signal, as illustrated in the timing chart.

[Page 41](#) E6581865 □ Input function command 16: COUNT 1 (counter), Input function command 17: COUNT 2 (counter) COUNT1 and COUNT2 commands make the inverter count the number of times the input signal is turned on and off, as shown in the figure below, and put out a signal when reaching the specified count.

[Page 42](#) E6581865 □ Input function command 18: HOLD (peak hold) The HOLD command makes the inverter hold the peak value of analog input signal and monitor date, as illustrated in the timing chart below. Hold reset signal Specify a hold reset signal using the input function parameter Input which pairs off with the peak hold command parameter.

[Page 43](#) E6581865 □ Input function command 19: SET □ Input function command 20: RESET
The SET command turns on (sets) the output signal when the input signal is turned on, as shown in the figure below, and holds the output signal ON even if the input signal is turned off. The RESET command is used to turn off the output signal.

[Page 44](#) E6581865 □ Input function command 21: CLR (clear) □ Input function command 22: CLRN (clear (inversion)) The CLR command turns off the input signal setted by the My function-S when the clear signal is turned on, as shown in the figure below. The CLRN command turns off the input signal when the clear signal is turned off.