
STATUS
TOSHIBA
RUN
PRG
MON
50.0
%
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 Instruction Manual

Pid control

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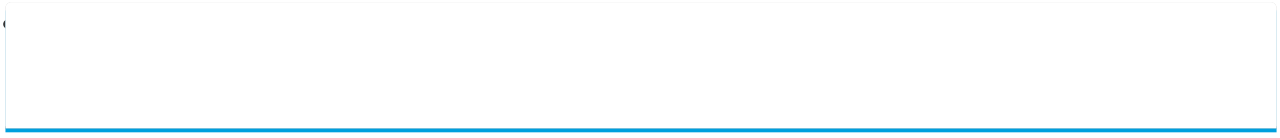

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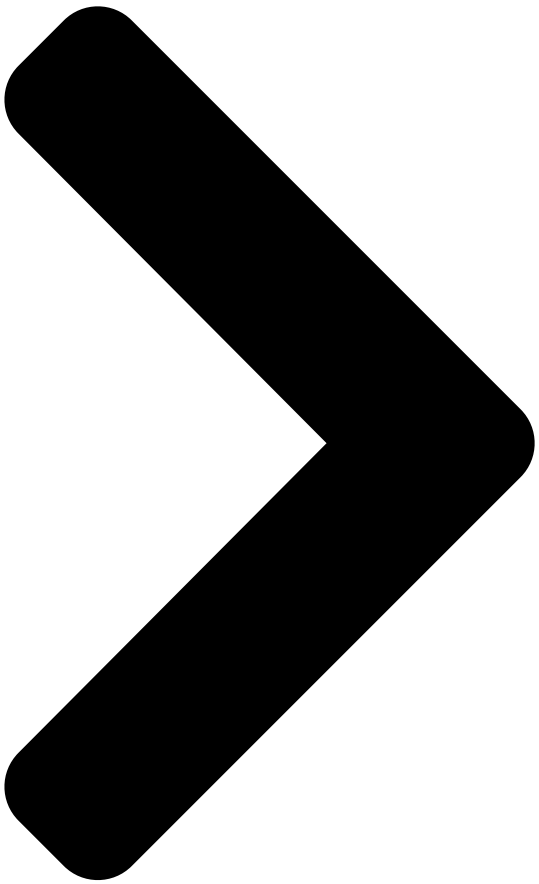
Bookmarks



E6581879

TOSHIBA

TOSVERT VF-S15

PID control Instruction Manual

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Related Manuals for Toshiba TOSVERT VF-S15

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 TOSVERT VF-S15 Manual

(79 pages)

Inverter Toshiba Tosvert VF-S15 Series Instruction Manual

Rs485 communication function (76 pages)

Inverter Toshiba TOSVERT VF-AS3 Manual

(69 pages)

Computer Accessories Toshiba TOSVERT VF-S15 series Function Manual

Tosvert vf-s15 series cc-link option unit (51 pages)

Inverter Toshiba TOSVERT VF-MB1 Function Manual

Tosvert vf-mb1/s15 series ethercat option unit ipe003z (49 pages)

Computer Hardware Toshiba TOSVERT VF-MB1 Function Manual

(48 pages)

Inverter Toshiba TOSVERT VF-S15 Series Communication Function Manual

(45 pages)

Inverter Toshiba TOSVERT VF-S15 Series Instruction Manual Supplementary

(15 pages)

Inverter Toshiba TOSVERT VF-S15 Instruction Manual

Traverse control (6 pages)

Inverter Toshiba TOSVERT VF-S15 Instruction Manual

Shock monitoring function (6 pages)

Inverter Toshiba TOSVERT VF-S15 Instruction Manual

(5 pages)

Adapter Toshiba VF-S15 Instruction Manual

Option adapter (3 pages)

Adapter Toshiba VF-S15 Instruction Manual

Option adapter (2 pages)

Adapter Toshiba VF-S15 Instruction Manual

Option adapter (2 pages)

Summary of Contents for Toshiba TOSVERT VF-S15

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Page 2: Table Of Contents

E6581879 □ Contents □ Introduction .....2 PID control function ..... 3 2.1. Process PID control ..... 3 2.2. Speed PID control .....5 Parameter list of PID control.....7 Setting for PID control.....10 4.1. Fundamental

setting..... 10 4.1.1. Feedback value .....

Page 3: Introduction

E6581879 1. Introduction VF-S15 has two types of PID control function. You can select the type for your application. Process PID control: The control is performed gently in response to change in temperature or pressure for fan and pump. Speed PID control : The control is performed at high speed in response to change in speed for winder.

Page 4: Pid Control Function

E6581879 2. PID control function Select one from the two types of PID control function for your application. 2.1. Process PID control Process PID control is selected for temperature or pressure control of fan and pump which is performed gently in response to change the speed. [Process PID control (f360=1)] [Diagram] Output frequency upper limit...

Page 5 E6581879 3) Set the following parameters to suit the system. a) Set the acceleration time and deceleration time to short for quick response within the range not to cause inverter trip. Title Function Acceleration time 1 Deceleration time 1 b) Set the following parameters if necessary. Item Title Function...

Page 6: Speed Pid Control

E6581879 2.2. Speed PID control Speed PID control is selected for speed control of a winder to which fast response is required. Acceleration/ deceleration time is automatically set to the shortest time. It also responds much faster by controlling with the increase/ decrease rate which is separated from acceleration/ deceleration time. Delay filter is set to the feedback value for the stable operation.

Page 7 E6581879 3) Set the following parameters to suit the system. Speed PID control set the acceleration time and the deceleration time to the smallest automatically regardless of parameter (acc,dec) setting. It also responds much faster by controlling with the increase/ decrease rate which is separated from acceleration/ deceleration time. Set the following parameters if necessary.

Page 8: Parameter List Of Pid Control

E6581879 3. Parameter list of PID control Default Title Function Adjustment range setting Frequency setting mode 0:Setting dial 1 (save even if power is off) fmod selection 1 1: Terminal VIA 2: Terminal VIB 3: Setting dial 2 (press in center to save) 4: RS485 communication 5: UP/DOWN from external logic input 6: CANopen communication...

Page 9 E6581879 Integral gain 0.01-100.0 (s 0.20 f363 Differential gain 0.00-2.55 (s) 0.00 f366 Process upper limit 0.0-fh (Hz) f367 f368 Process lower limit 0.0-f367 (Hz) f369 PID control feedback signal 0:Disabled selection 1: Terminal VIA 2: Terminal VIB 3: Terminal VIC 4 to 6: - Process increasing rate 0.1-600.0 (s)

Page 10 E6581879 You need to convert the process value and the feedback value into frequency for the PID control. f702 (Frequency free unit display magnification) and f703 (Frequency free unit coverage selection) enable to set process value and feedback value easily. The functions convert frequency display to temperature or pressure level by calculation.

Page 11: Setting For Pid Control

E6581879 4. Setting for PID control First, set the process value and feedback value. : 4.1 Then, set other parameters to suit the motor and the system if necessary. : 4.2, 4.3 Note) Set process value and feedback value by converting each pressure level into frequency. Actual output frequency is different from setting frequency for PID control.

Page 12: Process Value

E6581879 It is possible to set or switch the forward/ reverse characteristics. a) Example of setting reverse characteristic Parameter setting (Converted frequency) f217 (60Hz) f219 (0Hz) 20mA f216 f218 b) Example of switching characteristic by S3 input terminal (positive logic) Parameter setting (Converted frequency) f219...

Page 13 E6581879 2. Perform the setting of feedback input level after converting it into frequency. <Note> Input process value needs to be less than maximum feedback value. If the

input process value is same as maximum feedback value or more, the deviation becomes zero when the feedback value reaches maximum.

Page 14 E6581879 [Example of system] Inverter R/L1 U/T1 Power supply S/L2 V/T2 Pressure T/L3 W/T3 sensor Pump Process value 0 to 10Vdc Feedback value 1 to 2 atm 4 to 20mA [Parameter setting] Feedback value Process value Feedback value Process value (Converted frequency) (Converted frequency) 2 atm...

Page 15 E6581879 Title Function Setting (Example) f107 Analog input terminal selection (VIB) 0:0-+10V f210 VIB input point 1 setting 0(%) f211 VIB input point 1 frequency 0(Hz) f212 VIB input point 2 setting 100(%) f213 VIB input point 2 frequency 60(Hz) f216 VIC input point 1 setting 20(%)

Page 16: Override Function

E6581879 4.1.3. Override function Speed type Override functions (f660, f661) enable to add or multiply for fine adjustment of process value. It is possible to set multiplication gain by analog input or parameter f729. Refer to the inverter instruction manual for the detail of the setting. * This function is valid also for process type PID, but it is rarely used.

Page 17: Set To Suit The Motor

E6581879 4.2. Set to suit the motor Set only the parameters necessary for the motors. These parameters are valid for actual output frequency as a result of PID control. Title Function Description Maximum frequency 1) Set the maximum frequency of the output frequency. 2) This is the basis of the acceleration time (acc) and deceleration time (dec).

Page 18: Agreement Between Process And Feedback Value

E6581879 4.3.3. Agreement between process and feedback value It is possible to output agreement signal between the process value and the feedback value. Signal is output when the frequency command value by f389 and the feedback value by f369 are within ± f167.

Page 19: Pid Control Adjustment

E6581879 5. PID control adjustment 5.1. Summary of adjustment <In case with the estimate of PID gain> Set the estimated value of PID gain and check the operation of the system. Adjust the gain if necessary. <In case without the estimate of PID gain> 1) First, operate the inverter by default setting gain and check the operation of the system.

Page 20: Integral (I) Gain

E6581879 Output frequency High proportional gain f362 Process value reference Quick response Low proportional gain f362 Slow response Time 5.2.2. Integral (I) gain Set the integral (I) gain of PID control by f363. The integral gain reduces the deviation remaining after proportional control (residual deviation offset) to zero.

Page 21: Applied Adjustment (Common)

E6581879 5.3. Applied adjustment (Common) Make the following adjustments for increasing stability if necessary. 5.3.1. PID integral / differential clear You can reset the PID integral value and differential value by input terminal signal. [Input terminal function] Positive Negative Function Description (Positive logic) logic logic...

Page 22: Applied Adjustment (For Speed Pid Control)

E6581879 5.4. Applied adjustment (for speed PID control) Adjust the following for stability of speed PID control if necessary. 5.4.1. Delay filter The delay filter set with f361 moderates radical change in deviation (primary delay control) to stabilize the system. Processing speed increases with the smaller setting value and decreases with the larger setting value.

Page 23: Analog Input Characteristics

E6581879 6. Analog input characteristics Set the analog input characteristics in case inputting the feedback value and the process value by the analog input terminals. *The following examples are setting from 0 to 60Hz Terminal VIA (0-10V input) f204 (60Hz) f202 (0Hz) f203...