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VF-AS3
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# Toshiba TOSVERT VF-AS3 Instruction Manual

Industrial totally enclosed box type inverter

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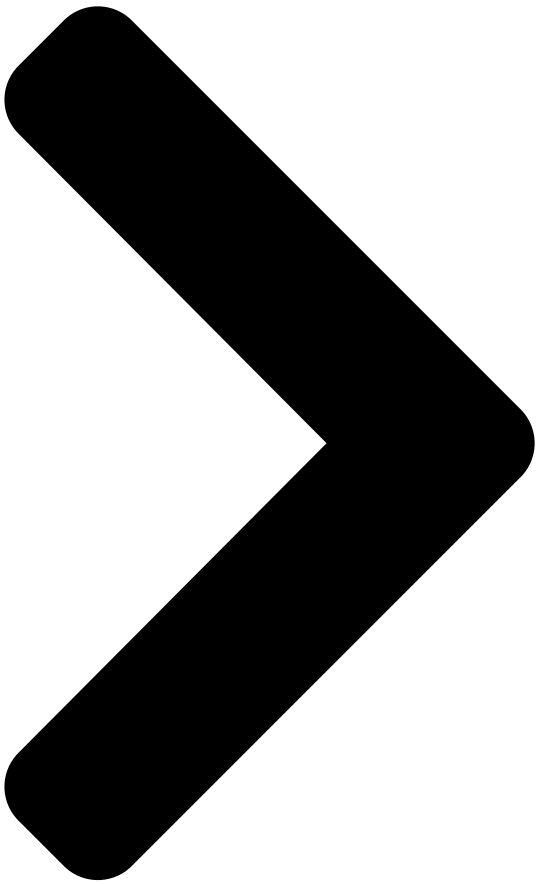
See also: Instruction Manual , Manual



# Industrial Inverter

TOSHIBA

## Instruction Manual

## Totally enclosed box type Inverter

### 3-phase 480V class 0.4 to 75kW

1. Make sure that this instruction manual is delivered to the end user of the inverter unit.
2. This manual gives supplementary information of some items referred in the instruction manual E6582062 supplied with the product. Read this manual and E6582062 before installing or operating the inverter unit, and store them in a safe place for reference.

### (For 3-phase motors)

Notice

E6582162c

Industrial Inverter

(For 3-phase motors)

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# Industrial Inverter

(For 3-phase motors)

## Instruction Manual

Totally enclosed box type Inverter

**TOSVERT VF-AS3**

3-phase 480V class 0.4 to 75kW

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# Related Manuals for Toshiba TOSVERT VF-AS3

Inverter Toshiba TOSVERT VF-AS3 Instruction Manual

High-performance industrial inverter for 3-phase motors, 3-phase 240v class 0.4 to 55kw, 3-phase 480v class 0.4 to 280kw (622 pages)

Inverter Toshiba TOSVERT VF-AS3 Instruction Manual

Industrial inverter (for 3-phase motors) (599 pages)

Inverter Toshiba TOSVERT VF-AS3 Instruction Manual

High-performance industrial inverter for 3-phase motors 280/480v class 0.4 to 55/280kw (242 pages)

Inverter Toshiba TOSVERT VF-AS3 Instruction Manual

Embedded ethernet function (84 pages)

Inverter Toshiba TOSVERT VF-S15 Manual

(79 pages)

Inverter Toshiba TOSVERT VF-AS3 Manual

(69 pages)

Inverter Toshiba Tosvert VF-AS3 Quick Start Manual

Industrial inverter for 3-phase motors (68 pages)

Industrial Equipment Toshiba TOSVERT VF-AS3 Instruction Manual

Pid control instruction manual (62 pages)

Media Converter Toshiba TOSVERT VF-S15 Series Manual

(51 pages)

Computer Hardware Toshiba TOSVERT VF-MB1 Function Manual

(48 pages)

Media Converter Toshiba TOSVERT VF-AS3 Instruction Manual

(32 pages)

Inverter Toshiba TOSVERT VF-AS3 Option Instruction Manual

(22 pages)

Inverter Toshiba TOSVERT VF-AS3 Installation Manual

Flange mounting kit (20 pages)

Inverter Toshiba TOSVERT VF-AS1 Instruction Manual

High performance (19 pages)

Inverter Drive Toshiba tosvert VF-AS3 Instruction Manual

(19 pages)

Inverter Toshiba TOSVERT VF-AS3 Quick Start Manual

(14 pages)

# Summary of Contents for Toshiba TOSVERT VF-AS3

Page 1 E6582162c Safety precautions Introduction Industrial Inverter Contents (For 3-phase motors) Read first Installation and wir- Instruction Manual Measures to satisfy standards Selection and installation of Totally enclosed box type Inverter peripheral devices Table of parameters Specifications 3-phase 480V class 0.4 to 75kW Notice 1.

## Page 3: Safety Precautions

• Do not install and operate the inverter if it is damaged or any of its components is missing. This will result in electric shock or fire. Please call your Toshiba distributor for repairs. • Do not

place any inflammable object near the inverter.

Page 4 E6582162c CAUTION • For transporting or carrying the inverter, do not hold by the front cover. The cover will come off and the unit will drop, resulting in injury. • Do not install the inverter in any place with large vibration. The unit will fall due to the vibration, resulting in injury.

Page 5 Thank you for purchasing Toshiba's totally enclosed box type inverter, "TOSVERT VF-AS3". To handle TOSVERT VF-AS3 correctly, this instruction manual explains how to install the enclosed box type inverter, refer to the inverter manual E6582062 for how to wire the inverter, operation pro- cedure, how to run the motor, measures for protective functions (when an alarm/trip occurs) and etc.

## Page 7: Table Of Contents

E6582162c Contents Safety precautions .....I-1 II Introduction .....II-1 1 Read first.....1-1 1. 1 Check product purchase .....1-1 1. 2 Indication of product type .....1-4 1. 3 Structure of equipment.....1-6 2 Installation and wiring.....2-1 2. 1 Installation .....2-2 2. 2 How to remove covers of inverter .....2-6 2.

## Page 9: Read First

Read first This chapter explains check items when you receive the inverter, names of parts of the inverter, and the flow of basic procedures before operation. 1. 1 Check product purchase CAUTION • Use the inverter that conforms to specifications of the power supply and the three-phase motor to be operated.

Page 10 E6582162c Inverter main unit Rating label Applicable 90kW/125HP (Normal Duty) motor capacity 75kW/100HP (Heavy Duty) 3PH-380/480V Rated voltage Model Number: VFAS3-4750PCE * Refer to [1.2] of E6582062 for (HD) and (ND). Carton box Danger label Name Rating label plate Name plate Inverter type Type indication label TRANSISTOR INVERTER...

Page 11 E6582162c Danger label kit Quick start Danger labels in 6 languages for sticking . • French • German • Italian • Spanish CD-ROM • Chinese Instruction manual is included as electronic data. • Japanese Top cover • Labels for communication option Affix to lower side of * Top cover is not provided for UL type1 communication...

## Page 12: Indication Of Product Type

E6582162c 1. 2 Indication of product type Explanation of the indication of the inverter type. VFAS3 - 4 004 P C E Model name Input voltage Applicable motor capacity of HD (for ND) Additional function II E: IP55 (UL type12) TOSVERT 4: 380 V - 480 V 004: 0.4 kW (0.75 kW)

Page 13 E6582162c Type and frame size This inverter has five types of units with frame size A1E to A5E according to the capacity. The following table shows the relationships between the types and the frame sizes. Frame size Frame size Type-Form (Standard model: IP20) (Totally enclosed box type: IP55) VFAS3-4004PCE...

## Page 14: Structure Of Equipment

E6582162c 1. 3 Structure of equipment The following is brief explanation of the names and functions of parts that compose the inverter. 1. 3. 1 Outside view This inverter has five types of units with frame size A1E to A5E (made of resin or metal) according to the capacity.

## Page 15: Installation And Wiring

Installation and wiring WARNING • Never disassemble, modify or repair. This can result in electric shock, fire and other injury. Please call your Toshiba distributor for repairs. Disassembly prohibited • Do not stick your fingers into openings such as cable wiring holes and cooling fan covers.

## Page 16: Installation

E6582162c 2. 1 Installation Take special care with the installation environment of inverter. Install the inverter in a location that secures space for ventilation and heat emitting, considering heat generation and occurrence of noise. 2. 1. 1 Installation environment WARNING •...

Page 17 WARNING • Do not install and operate the inverter if it is damaged or any of its components is missing. This will result in electric shock or fire. Please call your Toshiba distributor for repairs. Prohibited • Mount the inverter on a metal plate.

Page 18 E6582162c • Carry the inverter with the cover attached, and avoid holding or putting your hands in the wiring holes. Otherwise you can have your hands pinched and injured. • Install the inverter at a place which can support the unit's mass. If you install the inverter at a place which does not support the unit's mass, the unit will fall, Mandatory resulting in injury.

Page 19 E6582162c 2) Set the top cover on the inverter, to fix it with 2 mounting screws for the inverter top side. Frame size A1E, A2E, and A3E Frame size A4E and A5E 3) Tighten 2 mounting screws on top with the standard torque. 2.

## Page 20: How To Remove Covers Of Inverter

E6582162c 2. 2 How to remove covers of inverter WARNING • Never open the front cover when the power is on. The unit contains high voltage parts and contact with them will result in electric shock. Prohibited • Confirm the gasket is put into the groove of front cover before putting front cover. If the gasket is not put into the groove of front cover correctly, it can result in the electric shock or fire.

## Page 21: Wiring

2. 3 Wiring WARNING • Never disassemble, modify or repair. This can result in electric shock, fire and other injury. Please call your Toshiba distributor for repairs. Disassembly prohibited • Do not stick your fingers into openings such as cable wiring holes and cooling fan covers.

Page 22 E6582162c 2. 3. 1 Cautions for wiring WARNING • Never remove the front cover when the power is on. The unit contains high voltage parts and contact with them will result in electric shock. Prohibited • Mount the front cover after wiring. If you turn the power on without attaching the front cover, this will result in electric shock or other injury.

Page 23 E6582162c Wiring • For power terminals, use ferrules with insulation sleeve terminal and crimp-style terminal with insulation sleeve. Connect the terminals so that adjacent terminals do not touch each other. • For the sizes of electric wires used in the power circuit, refer to the table in [4. 1]. •...

Page 24 E6582162c Connection to power supply and motor This diagram shows a standard wiring of the power circuit. Connection to the power supply and motor wiring is common to all the types. Inverter Power supply Connect the power supply Connect the motor to [U/T1], to [R/L1], [S/L2], and [T/L3].

## Page 25: Standard Connection Diagram

E6582162c Standard connection diagram This diagram shows a standard wiring of the power circuit and control circuit. [Standard connection diagram – source logic] This diagram shows an example of a standard connection. Power supply Three-phase 380 - 480 V-50/60 Hz +DC -DC PA/+ PC/-...

Page 26 E6582162c [Standard connection diagram – source logic] This diagram shows an example of a standard connection. Power supply Three-phase 380 - 480 V-50/60 Hz +DC -DC PA/+ PC/- DC reactor Motor MCCB or ELCB R/L1 U/T1 S/L2 Power V/T2 filter circuit T/L3 W/T3...

Page 27 E6582162c 2. 3. 3 Power terminals Terminal Applicable Function symbol frame size Grounding terminal for inverter case. All frame sizes Frame size A4E [PE] Grounding terminal. and A5E [R/L1] Connected to an AC power supply. [S/L2] All frame sizes 480 V class: Three-phase 380 - 480 V-50/60 Hz [T/L3] [U/T1]...

Page 28 E6582162c Frame size A2E VFAS3-4055PCE, VFAS3-4075PCE Charge lamp M4 screw Grounding terminal (M5 screw) CAUTION • Following type of screwdriver should be used for M4 screw; PH2 (phillips, bit type2), shaft diameter 5.8 mm or less. Mandatory action Frame size A3E VFAS3-4110PCE, VFAS3-4150PCE, VFAS3-4185PCE Charge lamp M5 screw...

Page 29 E6582162c Frame size A5E VFAS3-4450PCE, VFAS3-4550PCE, VFAS3-4750PCE Charge lamp M12 screw Grounding terminal (M12 screw) Grounding terminal (M8 screw) For tightening torque and wire strip length, refer to the table below. • After finishing the wiring

installation, tighten all power terminal screws with proper torque again. Important Power terminal torque Torque...

Page 30 E6582162c Grounding terminal torque Torque Strip length Type-Form Frame size Screw size (N • m) (lb • in) (mm) VFAS3-4004PCE VFAS3-4007PCE VFAS3-4015PCE VFAS3-4022PCE VFAS3-4037PCE VFAS3-4055PCE VFAS3-4075PCE VFAS3-4110PCE VFAS3-4150PCE VFAS3-4185PCE VFAS3-4220PCE 38.9 VFAS3-4300PCE 88.5 VFAS3-4370PCE VFAS3-4450PCE 11.8 VFAS3-4550PCE VFAS3-4750PCE Note) 1(N m)=8.850(lb •...

## Page 31: Measures To Satisfy Standards

Measures to satisfy standards This chapter explains the measures to comply with the EMC Directive, UL/CSA Standards, etc. by introducing examples. 3. 1 How to deal with CE marking CE mark is put on all products of VF-AS3 to declare that they are in conformity with the requirements of Low Voltage Directive and EMC Directive, also the products integrating the safety function are in conformity with the requirements of machine directive as safety component.

Page 32 E6582162c Product Category Subcategory Test standard standards Radiated noise CISPR11 (EN55011) Emission Conducted noise CISPR11 (EN55011) Electrostatic discharge IEC61000-4-2 Radio-frequency electromagnetic field IEC61000-4-3 Electrical fast transient/burst IEC61000-4-4 IEC61800-3 Surge IEC61000-4-5 Immunity Conducted radio-frequency common IEC61000-4-6 mode Voltage dips, short interruptions and IEC61000-4-11 voltage variations EMC Directive compliance of this inverter...

Page 33 E6582162c Examples of measures to comply with EMC Directive The following are measures to comply with the EMC Directive when you use totally enclosed box type of VF-AS3 by installing it in other machines and systems. • Examples of general measures •...

Page 34 E6582162c Measures for operation with external signals To operate with external signals, take measures as shown in the figure below (e.g.: using a potentiometer and Fwd/Rev terminals). Ferrite core Shielded wires 3. 1. 2 Compliance with Low Voltage Directive The Low Voltage Directive provides for the safety of machines and systems. Low Voltage Directive Compliance of this inverter Inverters are CE-marked in accordance with the requirement of Low Voltage Directive, and can therefore be installed in machines or systems and exported without problem to European...

## Page 35: Compliance With Ul/Csa Standards

E6582162c 3. 2 Compliance with UL/CSA standards The VF-AS3 models, that conform to the UL Standard and CSA Standard have the UL/CSA mark on the nameplate. 3. 2. 1 Compliance with Installation The totally enclosed box type of VF-AS3 series are provided in a Type 12 enclosure with installation of the top cover included in the package.

Page 36 E6582162c Short-Circuit Current Rating (SCCR) and Wire size Branch circuit protection Applicable Grounding Power Voltage SCCR motor wire sizes wire with Fuses class (kA) Inverter model sizes (kW) (HP) Class Rating (A) VFAS3-4004PCE 0.75 Class J AWG14 AWG14 VFAS3-4007PCE Class J AWG14 AWG14 VFAS3-4015PCE...

## Page 37: Compliance With Safety Standards

For details, refer to [6. 30. 19] of E6582062 in this CD-ROM. 3. 2. 7 Other Contact your Toshiba distributor or Toshiba sales representative (see the back cover of this manual), if you need the hard copy (paper) of this document. 3. 3 Compliance with safety standards Refer to “VF-AS3 Safety function manual"...

## Page 39: Selection And Installation Of Peripheral Devices

• All options to be used must be those specified by Toshiba. The use of options other than those specified by Toshiba will result in an accident. • In using a power distribution device and external options for the inverter, they must be installed in a cabinet.

Page 40 E6582162c Wire size for HD rating Wire size (mm Voltage Applicable Power circuit Braking Inverter type-form Ground- class motor (kW) DC wire resistor ing wire Input Output (Optional) 3-phase VFAS3- 4004PCE 480 V 0.75 4007PCE 4015PCE 4022PCE 4037PCE 4055PCE 4075PCE 4110PCE 4150PCE 18.5...

## Page 41: Selection Of A Wiring Device

E6582162c 4. 2 Selection of a wiring device According to the table [4. 2. 1], select an appropriate wiring device depending on the voltage class and capacity of the inverter. 4. 2. 1 Selection table of a wiring device Select a wiring device depending on the inverter type and input current in the table next. Wiring devices for HD rating Rated current (A) Molded-case circuit...

Page 42 • When using an auxiliary contacts 2a type magnetic contactor (MC), use the 2a contacts in parallel to increase the liability of the contacts. • Selection is for assuming a normal power supply capacity and using a Toshiba 4-pole standard motor with input power 200 V/400 V-50 Hz.

Page 43 E6582162c 4. 2. 3 Installation of a magnetic contactor (MC) When installing a magnetic contactor (MC) on the primary or secondary side of the inverter, select fol- lowing the below. Installation on the primary side When the power side and the inverter need to be detached in the following cases, install a magnetic contactor (MC) between the power supply and the inverter (primary side).

Page 44 E6582162c For motor protection VF-AS3 MCCB or ELCB U/T1 R/L1 Motor S/L2 V/T2 T/L3 W/T3 • Be sure to have interlock for the commercial power supply is applied to the inverter output terminal. • Do not turn the magnetic contactor (MC) in the secondary circuit ON/OFF during run. It can cause failure due to rush current flowing to the inverter.

## Page 45: External Option And Insert Type Option

E6582162c 4. 3 External option and insert type option Refer to E6582062 [10.3] and [10.4] except for mounting/removing Option adaptor shown in below. 1.5 N•m 13.3 lb•in 1.5 N•m 13.3 lb•in Note: Keep the parts to assemble if the Option adaptor is removed from the product 4.

## Page 47: Table Of Parameters

Table of parameters For parameters, refer to the instruction manual E6582062 (chapter 11). For standard default settings, refer to values in E6582062 [11.4], totally enclosed box type inverters have the same default setting as standard VF-AS3 inverters one. 5. Table of parameters...

## Page 49: Specifications

Specifications In this chapter, the inverter's model and type, standard specification, outside dimensions, and approx. mass are described. 6. 1 Model and main standard specification Standard specification depending on model < 480 V class: HD rating > Item Specification Voltage class 480 V class Frame size Applicable motor (kW)

Page 50 E6582162c Item Specification Voltage class 480 V class Frame size Applicable motor (kW) Applicable motor (HP) Type VFAS3- Form 4220PCE 4300PCE 4370PCE 4450PCE 4550PCE 4750PCE Output capacity (kVA) 35.3 46.9 56.8 67.1 80.8 Output current (A) 46.3 61.5 74.5 88.0 Output voltage 3-phase 380 V to 480 V (The maximum output voltage is equal to the input supply voltage) Overload current rating...

Page 51 E6582162c < 480V class: ND rating > Item Specification Voltage class 480V class Frame size Applicable motor (kW) 0.75 18.5 Applicable motor (HP) Type VFAS3- Form 4004PCE 4007PCE 4015PCE 4022PCE 4037PCE 4055PCE 4075PCE 4110PCE 4150PCE 4185PCE 12.6 17.9 24.2 29.9 35.3 Output capacity (kVA) 12.7...

Page 52 E6582162c Common specification Item Specification Control system Sinusoidal PWM control Output voltage adjustment Adjustable within the range of 50 - 660 V (480 V class) by correcting the supply voltage Setting between 0.01 - 590 Hz. Default max. frequency is set to 0.01 - 80 Hz. Output frequency range Maximum frequency adjustment (30 to 590Hz) 0.01 Hz: operation panel input (60 Hz base),...

Page 53 Safe Torque Off comply with IEC61800-5-2 Embedded Ethernet (dual port with switch): EtherNet/IP, Modbus-TCP, Webserver Communication function Embedded RS485 (2 channel): Toshiba inverter protocol, Modbus-RTU Optional: PROFINET, DeviceNet, PROFIBUS-DP, EtherCAT Use environments Indoor use. Place not exposed to direct sunlight and free of corrosive and explosive gases.

## Page 54: Outside Dimensions And Mass

E6582162c 6. 2 Outside dimensions and mass Outside dimensions and weight Dimensions (mm) Approximate Frame Type-Form size mass (kg) VFAS3-4004PCE 13.2 (12.1) VFAS3-4007PCE 13.2 (12.1) 743.5 VFAS3-4015PCE 13.4 (12.3) (250) (678) VFAS3-4022PCE 13.6 (12.5) VFAS3-4037PCE 13.7 (12.6) VFAS3-4055PCE 17.1 (16.0) 743.5 (250) (678)

Page 55 E6582162c 227.5 22.5 W1(Mounting dimension) (22.5) 162.5 W1(Mounting dimension) (20) (17) W1(Mounting dimension) (26) (17) 6. Specifications...

Page 56 6QUJKDC 5EJPGKFGT +PXGTVGT %QTRQTCVKQP □□□□...