

TOSHIBA

Industrial Inverter
(For 3-phase induction motors)

English**Deutsch****Italiano****Español**

***TOSVERT* VF-S15** with Safety function

Quick Start Manual
Schnellstartanleitung
Guida rapida all'avvio
Manual de inicio rápido

TOSHIBA INDUSTRIAL PRODUCTS AND SYSTEMS CORPORATION

3-phase 240V class	0.4 to 15kW
1-phase 240V class	0.2 to 2.2kW
3-phase 500V class	0.4 to 15kW

NOTICE

1. Make sure that this instruction manual is delivered to the end user of the inverter unit.
2. Read this manual before installing or operating the inverter unit, and store it in a safe place for reference.

Quick Start Manual

TOSVERT VF-S15 with Safety function

EN

I. Safety precautions

The items described in these instructions and on the inverter itself are very important so that you can use safely the inverter, prevent injury to yourself and other people around you as well as to prevent damage to property in the area. Thoroughly familiarize yourself with the symbols and indications shown below and then continue to read the manual. Make sure that you observe all warnings given.

* Read the safety precautions of the instruction manual (CD-ROM) for information not mentioned here.

Explanation of markings

Marking	Meaning of marking
 Warning	Indicates that errors in operation may lead to death or serious injury.
 Caution	Indicates that errors in operation may lead to injury (*1) to people or that these errors may cause damage to physical property. (*2)

(*1) Such things as injury, burns or shock that will not require hospitalization or long periods of outpatient treatment.

(*2) Physical property damage refers to wide-ranging damage to assets and materials.

Meanings of symbols

Marking	Meaning of marking
	Indicates prohibition (Don't do it). What is prohibited will be described in or near the symbol in either text or picture form.
	Indicates an instruction that must be followed. Detailed instructions are described in illustrations and text in or near the symbol.
	-Indicates warning. What is warned will be described in or near the symbol in either text or picture form. -Indicates caution. What the caution should be applied to will be described in or near the symbol in either text or picture form.

■ Limits in purpose

This inverter is used for controlling speeds of three-phase induction motors in general industrial use. Single-phase input model is output by the inverter as three-phase output and cannot drive a single-phase motor.



Safety precautions

- ▼ This product is intended for general purpose uses in industrial application. It cannot be used applications where may cause big impact on public uses, such as power plant and railway, and equipment which endanger human life or injury, such as nuclear power control, aviation, space flight control, traffic, safety device, amusement, or medical. It may be considerable whether to apply, under the special condition or an application where strict quality control may not be required. Please contact your Toshiba distributor.
- ▼ Please use our product in applications where do not cause serious accidents or damages even if product is failure, or please use in environment where safety equipment is applicable or a backup circuit device is provided outside the system.
- ▼ Please do not use our product for any load other than three-phase induction motors in general industrial use. (Use in other than properly applied three-phase induction motors may cause an accident.) Single-phase input model is output by the inverter as three-phase output and cannot drive a single-phase motor.

■ Handling  Warning	
 Disassembly prohibited	• Never disassemble, modify or repair. This can result in electric shock, fire and injury. Call your Toshiba distributor for repairs.
 Prohibited	• Never remove the terminal block cover when power is on. The unit contains many high voltage parts and contact with them will result in electric shock. • Do not stick your fingers into openings such as cable wiring holes and cooling fan covers. This can result in electric shock or other injury. • Do not place or insert any kind of object (electrical wire cuttings, rods, wires etc.) into the inverter. This can result in electric shock or fire. • Do not allow water or any other fluid to come in contact with the inverter. This can result in electric shock or fire.
 Mandatory action	• Turn the power on only after attaching the terminal block cover. If the power is turned on without the terminal block cover attached, this can result in electric shock or other injury. • If the inverter begins to emit smoke or an unusual odor, or unusual sounds, immediately turn the power off. Continuous use of the inverter in such a state may cause fire. Call your Toshiba distributor for repairs. • Always turn the power off if the inverter is not used for long periods of time since there is a possibility of malfunction caused by leaks, dust and other material. If power is left on with the inverter in that state, it may result in fire.
■ Handling  Caution	
 Contact prohibited	• Do not touch heat radiating fins or discharge resistors. These devices are hot, and you'll get burned if you touch them.
 Mandatory action	• Use an inverter that conforms to the specifications of power supply and three-phase induction motor being used. If the inverter being used does not conform to those specifications, not only will the three-phase induction motor not rotate correctly, but it may also cause serious accidents through overheating and fire.
■ Transportation & installation  Warning	
 Prohibited	• Do not install or operate the inverter if it is damaged or any component is missing. This can result in electric shock or fire. Call your Toshiba distributor for repairs. • Do not place any inflammable objects near the inverter. • If an accident occurs in which flame is emitted, this could lead to fire. • Do not install in any location where the inverter could come into contact with water or other fluids. This can result in electric shock or fire.
 Mandatory action	• Operate under the environmental conditions prescribed in the instruction manual. Operations under any other conditions may result in malfunction. • Mount the inverter on a metal plate. The rear panel gets very hot. Do not install in an inflammable object, this can result in fire. • Do not operate with the terminal block cover removed. This can result in electric shock. Failure to do so can lead to risk of electric shock and can result in death or serious injury. • An emergency stop device must be installed that fits with system specifications (e.g. shut off input power then engage mechanical brake). Operation cannot be stopped immediately by the inverter alone, thus resulting in an accident or injury. • All options used must be those specified by Toshiba. • The use of any other option may result in an accident. • When using switchgear for the inverter, it must be installed in a cabinet. • Failure to do so can lead to risk of electric shock.
■ Transportation & installation  Caution	
 Prohibited	• When transporting or carrying, do not hold by the front panel covers. • The covers may come off and the unit will drop, resulting in injury. • Do not install in any area where the unit would be subject to large amounts of vibration. This could cause the unit to fall, resulting in bodily injury.

 Mandatory action	• When removing and installing the terminal cover with a screwdriver, be sure not to scratch your hand as these results in injury. • Pressing too hard on the screwdriver may scratch the inverter. • Always turn the power off when removing the wiring cover. • After wiring is complete, be sure to replace the terminal cover. • The main unit must be installed on a base that can bear the unit's weight. • If the unit is installed on a base that cannot withstand that weight, the unit may fall, resulting in injury. • If braking is necessary (to hold motor shaft), install a mechanical brake. The brake on the inverter will not function as a mechanical hold, and if used for that purpose, injury may result.
■ Wiring	
 Prohibited	 Warning • Do not connect input power to the output (motor side) terminals (U/T1, V/T2, W/T3). Connecting input power to the output could destroy the inverter or cause a fire. • Do not insert a braking resistor between DC terminals (between PA/+ and PC/- or PO and PC/-). It could cause a fire. • First shut off input power and wait at least 15 minutes before touching terminals and wires on equipment (MCCB) that is connected to inverter power side. • Touching the terminals and wires before that time could result in electric shock. • Do not shut down the external power supply on ahead when VIA or VIB terminals are used as logic input terminal by external power supply. It could cause unexpected result as VIA or VIB terminals are ON status.
 Mandatory action	• Electrical construction work must be done by a qualified expert. Connection of input power by someone who does not have that expert knowledge may result in fire or electric shock. • Connect output terminals (motor side) correctly. If the phase sequence is incorrect, the motor will operate in reverse and that may result in injury. • Wiring must be done after installation. • If wiring is done prior to installation, that may result in injury or electric shock. • The following steps must be performed before wiring: (1) Turn off all input power.; (2) Wait at least 15 minutes and check to make sure that the charge lamp is no longer lit.; and (3) Use a tester that can measure DC voltage (400VDC or 800VDC or more), and check to make sure that the voltage to the DC main circuits (across PA/+ - PC/-) is 45V or less. If these steps are not properly performed, the wiring will cause electric shock. • Tighten the screws on the terminal block to specified torque. If the screws are not tightened to the specified torque, it may lead to fire. • Check to make sure that the input power voltage is +10%, -15% of the rated power voltage ($\pm 10\%$ when the load is 100% in continuous operation) written on the name plate. If the input power voltage is not +10%, -15% of the rated power voltage ($\pm 10\%$ when the load is 100% in continuous operation), this may result in fire. • Set a parameter $F109$ when VIA or VIB terminals are used as logic input terminal. If it is not set, it could result in malfunction.
 Be Grounded	• Ground must be connected securely. If the ground is not securely connected, it could lead to electric shock or fire.
■ Wiring	
 Prohibited	 Caution • Do not attach devices with built-in capacitors (such as noise filters or surge absorbers) to the output (motor side) terminals. This could cause a fire.
■ Operations	
 Prohibited	 Warning • Never touch the internal connector while the upper terminal cover of control panel is opened. There is a risk of electrical shock because it carries a high voltage. • Do not touch inverter terminals when electrical power is going to the inverter even if the motor is stopped. Touching the inverter terminals while power is connected to it may result in electric shock. • Do not touch switches when the hands are wet and do not try to clean the inverter with a damp cloth. Such practices may result in electric shock.

 Mandatory action	• Turn the input power on only after attaching the terminal block cover. When enclosed inside a cabinet and used with the terminal block cover removed, always close the cabinet doors first and then turn the power on. If the power is turned on with the terminal block cover or cabinet doors open may result in electric shock. • Make sure that operation signals are off before resetting the inverter after malfunction. If the inverter is reset before turning off the operating signal, the motor may restart suddenly, resulting in injury. • If incorrect setting, the drive may have some damage or unexpected movement. Be sure to set the setup menu correctly.
■ Operations	
 Prohibited	 Caution • Observe all permissible operating ranges of motors and mechanical equipment. (Refer to the motor's instruction manual.) Not observing these ranges may result in injury.
 Mandatory action	• Use an inverter that conforms to the specifications of power supply and three-phase induction motor being operated. If the inverter being used does not conform to those specifications, not only will the three-phase induction motor not rotate correctly, but it may cause serious accidents through overheating and fire. • The leakage current through the input/output power cables of inverter and capacitance of motor may affect to peripheral devices. The value of leakage current is increased under the condition of the PWM carrier frequency and the length of the input/output power cables. In case the total cable length (total of length between an inverter and motors) is more than 100m, overcurrent trip may occur even the motor no-load current. Make enough space among each phase cable or install the filter (MSF) as countermeasure.
■ Maintenance and inspection	
 Prohibited	 Warning • Do not replace parts. This could be a cause of electric shock, fire and bodily injury. To replace parts, call your Toshiba distributor.
 Mandatory action	• The equipment must be inspected daily. If the equipment is not inspected and maintained, errors and malfunctions may not be discovered and that could result in accidents. • Before inspection, perform the following steps. ; (1) Turn off all input power to the inverter. ; (2) Wait at least 15 minutes and check to make sure that the charge lamp is no longer lit. ; and (3) Use a tester that can measure DC voltages (400V/800V DC or more), and check that the voltage to the DC main circuits (across PA/+ - PC/-) is 45V or less. Performing an inspection without carrying out these steps first could lead to electric shock.
■ Disposal	
 Mandatory action	 Caution • If you dispose of the inverter, have it done by a specialist in industry waste disposal (*). If you dispose of the inverter by yourself, this can result in explosion of capacitor or produce noxious gases, resulting in injury. (*) Persons who specialize in the processing of waste and known as "industrial waste product collectors and transporters" or "industrial waste disposal persons". Please observe any applicable law, regulation, rule or ordinance for industrial waste disposal.

II. Safety function

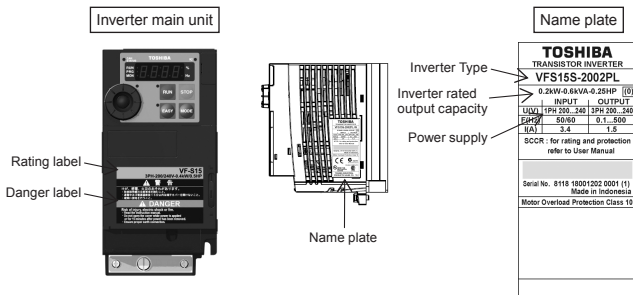
There are the following manuals at the back of the Japanese manual (Japanese model) in CD-ROM. Refer to the manuals for safety function.

Safety function (STO) : E6581860 VF-S15 Safety function manual
ATEX : E6581861 VF-S15 ATEX Guide

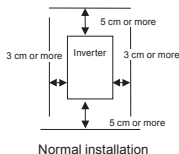
Please operate the inverter in the following procedure 1 to 6.

1. Check the purchase

Check that the inverter type is the same as your order.



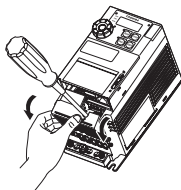
2. Install the inverter



* For side-by-side installation, refer to the instruction manual.

3. Remove the terminal block cover

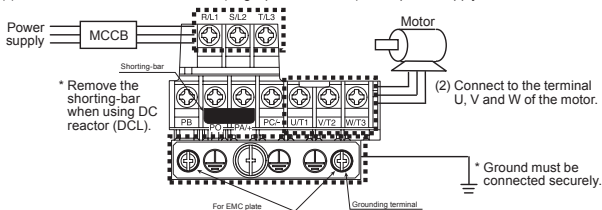
ex. VFS15S-2002PL



- (1) Insert a screwdriver or other thin object into the hole indicated with the mark.
- (2) While pressing on the screwdriver, rotate the terminal cover downward to remove it.
- (3) Next, remove the inside terminal block cover.

4. Connect to the power supply and the motor (wiring)

- (1) Connect to the terminal R, S and T(single phase: R and S) of the power supply.



Power circuit terminal block

EN

Screw size	Tightening torque	
M3.5 screw	1.0 N·m	8.9 lb·in
M4 screw	1.4 N·m	12.4 lb·in
M5 screw	2.4 N·m	20.8 lb·in
M6 screw	4.5 N·m	40.0 lb·in
M4 screw (grounding terminal)	1.4 N·m	12.4 lb·in
M5 screw (grounding terminal)	2.8 N·m	24.8 lb·in

Voltage class	Applicable motor (kW)	Wire size (mm ²)			
		Power circuit Note 1)			Grounding cable
		Input		Output	
		without DCL	With DCL		
3-phase 240V	0.2-1.5	1.5	1.5	1.5	2.5
	2.2	2.5	1.5	1.5	2.5
	4.0	4.0	2.5	2.5	4.0
	5.5	10	4.0	6.0	10
	7.5	16	6.0	10	16
	11	25	10	16	16
	15	35	16	25	16
	0.2-0.75	1.5	1.5	1.5	2.5
1-phase 240V	1.5	2.5	2.5	1.5	2.5
	2.2	4.0	4.0	1.5	4.0
	0.4-2.2	1.5	1.5	1.5	2.5
3-phase 500V	4.0	2.5	1.5	1.5	2.5
	5.5	4.0	1.5	2.5	4.0
	7.5	6.0	2.5	2.5	6.0
	11	10	4.0	6.0	10
	15	16	6.0	10	16

Note 1) The power circuit wire length is assumed to be 30m or less.

5. Turn on the power supply

Set the setup menu after power on.

 Caution		If incorrect setting, the drive may have some damage or unexpected movement. Be sure to set the setup menu correctly.		
Setting dial	LED display	Operation		
	"SEt"	Power on		
	EU ↔ JP	Turn the setting dial and select region.		
	ASIA ↔ USA			
	in it	Press the setting dial		
	0.0	Finish setup		
Parameter setting	EU	ASIA	USA	JP
Main region	Europe	Asia, Oceania	North America	Japan
 Motor	230/400(V)	230/400(V)	230/460(V)	200/400(V)
	50(Hz)	50(Hz)	60(Hz)	60(Hz)

Note) When you operate the inverter with external signals, please select Sink logic, Source logic, or PLC(external power supply) by SW1.

6. Operate the inverter

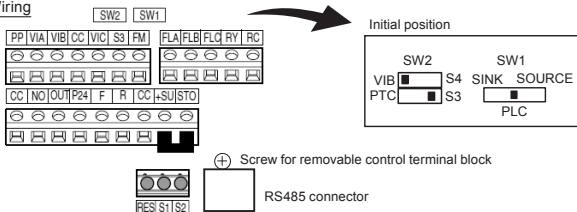
Panel operation is possible with default settings.



7. Operate the inverter with external signals

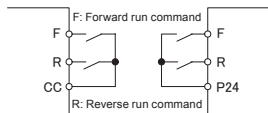
Wire the control circuit, set the parameter and select SW1.

7.1 Wiring



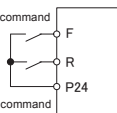
Operation command

<Sink logic>



Forward run when F-CC or P24-F is ON.

<Source logic>



Screw size	Recommended tightening torque
M3 screw	0.5 N·m 4.4 lb·in

Stripping length: 6 (mm)

Screwdriver:

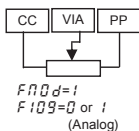
Small-sized flat-blade type

(Blade thickness: 0.5 mm, blade width: 3.5 mm)

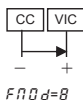
Conductor	1 wire	2 wires of same size
Solid	0.3-1.5mm ²	0.3-0.75mm ²
Stranded	(AWG 22-16)	(AWG 22-18)

Frequency setting

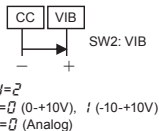
1) Potentiometer



2) Current input (4 to 20mA)



3) Voltage input (0 to 10V) or (-10 to +10V)



7.2 Parameter setting

Determine the operation method with $F_{\text{ref}} d$ and frequency setting with $F_{\text{ref}} d$.

Title	Function	Adjustment range	Default setting
$F_{\text{ref}} d$	Command mode selection	0: Terminal block, 1: Panel 2: RS485, 3: CANopen, 4: Option	1
$F_{\text{ref}} d$	Frequency setting mode selection 1	0: Setting dial 1, 1: Terminal VIA 2: Terminal VIB, 3: Setting dial 2 4: RS485, 5: UP/DOWN from logic input 6: CANopen, 7: Communication option 8: Terminal VIC 11: Pulse train input, 14: S-C	0

Select the signal of terminal VIA and VIB

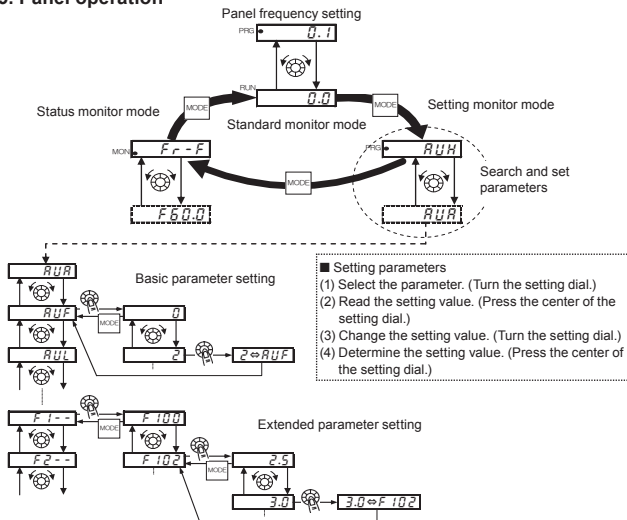
$F_{\text{ref}} d$	Analog input terminal selection (VIB)	0: 0-+10V, 1: -10-+10V	0
$F_{\text{ref}} d$	Analog/logic input selection (VIA/VIB)	0 to 4 *See the instruction manual for detail.	0

8. Main parameters

Contents	Title	Function	Adjustment range	Default setting
Set acceleration/ deceleration time to suit the machinery. The ACC/DEC value is time that output frequency reach from 0Hz to FH value.	ACC	Acceleration time 1	0.0-3600 (360.0) (s)	10.0
	DEC	Deceleration time 1	0.0-3600 (360.0) (s)	10.0
	FH	Maximum frequency	30.0-500.0 (Hz)	80.0
Set the upper and lower limit of the output frequency	UL	Upper limit frequency	$0.5 \sim FH$ (Hz)	*1
	LL	Lower limit frequency	$0.0 \sim UL$ (Hz)	0.0
Select the V/f control mode to suit the machine	Pt	V/F control mode selection	0: V/F constant 1: Variable torque 2: Automatic torque boost control 3: Vector control 4: Energy-saving 5: Dynamic energy-saving 6: PM motor control 7: V/F 5-point setting	*1
Adjust the electronic thermal for the motor protection.	thr	Motor electronic-thermal protection level 1	10-100 (%(A))	100

*1: Default setting values vary depending on the setup menu setting.

9. Panel operation



10. Refer to the instruction manual for applied operation or malfunction.

Schnellstartanleitung

TOSVERT VF-S15 mit Sicherheitsfunktion

DE

I. Regeln zum sicheren Betrieb

Hier aufgeführten und am Frequenzumrichter angebrachten Anweisungen müssen eingehalten werden, um den Umrichter sicher zu betreiben und Unfälle mit Verletzungen des Anwenders und anderer Personen in der Nähe sowie Sachschäden zu vermeiden. Machen Sie sich mit den nachstehenden Symbolen und Hinweisen gründlich vertraut, und lesen Sie dann die Anleitung weiter durch. Bitte beachten Sie stets alle Warnhinweise.

* Lesen Sie auch die Sicherheitshinweise in der Betriebsanleitung (CD-ROM); diese enthalten zusätzliche, hier nicht aufgeführte Informationen.

Erläuterung der Hinweise

Symbol	Bedeutung des Symbols
 Warnung	Weist darauf hin, dass Bedienfehler zu schweren Verletzungen oder zum Tod führen können.
 Vorsicht	Weist darauf hin, dass Bedienfehler zu Verletzungen (*1) oder zu Sachschäden (*2) führen können.

(*1) Diese umfassen Verletzungen, Verbrennungen oder Stromschläge, die keinen Krankenhausaufenthalt oder langwierige ambulante Behandlungen erfordern.

(*2) Sachschäden umfassen unterschiedliche Beschädigungen von Anlagen und anderen Gegenständen.

Bedeutung der Symbole

Symbol	Bedeutung des Symbols
	Weist auf ein Verbot hin. Die zu unterlassende Handlung ist in Text- oder Bildform bei dem Symbol erläutert.
	Weist auf eine Anweisung hin, die befolgt werden muss. Ausführliche Anweisungen sind in Bild- oder Textform bei dem Symbol erläutert.
	-Weist auf eine Warnung hin. Wovon gewarnt wird, ist in Text- oder Bildform bei dem Symbol erläutert. -Weist auf eine Vorsicht hin. Welche Maßnahmen mit Vorsicht durchzuführen sind, ist in Text- oder Bildform bei dem Symbol erläutert.

■ Beschränkungen beim Einsatz

Der Frequenzumrichter dient zur Steuerung der Drehzahl von Drehstrom-Asynchronmotoren zur allgemeinen industriellen Verwendung.

Bei Modellen mit einphasiger Einspeisung gibt der Frequenzumrichter eine Dreiphasen-Ausgangsspannung aus, die nicht zum Antrieb eines Einphasenmotors eingesetzt werden kann.



Regeln zum sicheren Betrieb

- ▼ Dieses Produkt ist für allgemeine industrielle Anwendungen bestimmt. Es darf nicht in Anwendungen, in denen es einen großen Einfluss auf öffentliche Einrichtungen wie Kraftwerke oder Eisenbahnen haben kann, oder in Geräten und Anlagen, die mit einer Gesundheitsgefährdung oder Lebensgefahr für Menschen verbunden sind, wie z. B. Leitanlagen für Kernkraftwerke, Steuerungen in Luft- und Raumfahrzeugen, Verkehrsregelungsanlagen, Sicherheitsgeräte, Unterhaltungsgeräte oder medizinische Geräte, eingesetzt werden. Die Verwendung kann in Fällen besonderer Bedingungen oder in Anwendungen, in denen keine strenge Qualitätskontrolle erforderlich ist, in Erwägung gezogen werden. Bitte wenden Sie sich an Ihren Toshiba-Händler.
- ▼ Bitte verwenden Sie das Gerät ausschließlich in Anwendungen, in denen selbst eine Funktionsstörung des Gerätes nicht zu schweren Unfällen oder Schäden führen kann, bzw. verwenden Sie es in einer Umgebung, in der Sicherheitsgeräte oder ein Reservegerät außerhalb des Systems vorhanden sind.
- ▼ Bitte setzen Sie das Gerät nicht für andere Lastgeräte als Drehstrom-Asynchronmotoren zur allgemeinen industriellen Verwendung ein. (Eine andere Verwendung könnte zu Unfällen führen.) Bei Modellen mit einphasiger Einspeisung gibt der Frequenzumrichter eine Dreiphasen-Ausgangsspannung aus, die nicht zum Antrieb eines Einphasenmotors eingesetzt werden kann.

DE

■ Handhabung  Warnung	
 Nicht zerlegen	Zerlegen, modifizieren oder reparieren Sie das Gerät nicht. Dies kann zu Verletzungen durch Stromschlag, zu Bränden oder anderen Verletzungen führen. Wenn Reparaturen nötig werden, setzen Sie sich mit Ihrem Toshiba-Händler in Verbindung.
 Verboten	- Wenn das Gerät unter Strom steht, darf die Klemmleistenabdeckung niemals entfernt werden. Viele Teile im Gerät stehen unter Hochspannung, und die Berührung dieser Teile führt zu einem Stromschlag. - Stecken Sie die Finger nicht in Öffnungen wie Kabeldurchführungen und Ventilatorabdeckungen. Dies kann zu Stromschlag oder anderen Verletzungen führen. - Führen Sie keine Gegenstände (Kabelstücke, Stäbe, Drähte usw.) in den Umrichter ein, und legen Sie keine solchen Gegenstände darin ab. Dies kann zu Verletzungen durch Stromschlag und zu Bränden führen. - Der Umrichter darf nicht mit Wasser oder anderen Flüssigkeiten in Kontakt kommen. Dies kann zu Verletzungen durch Stromschlag und zu Bränden führen.
 Vorgeschrieben	- Schalten Sie die Stromversorgung erst ein, nachdem die Klemmleistenabdeckung angebracht wurde. Wenn das Gerät bei entfernter Klemmleistenabdeckung eingeschaltet wird, kann es zu Stromschlag oder anderen Verletzungen kommen. - Wenn vom Umrichter Rauch oder ungewöhnlicher Geruch bzw. ungewöhnliche Geräusche ausgehen, muss die Stromversorgung sofort ausgeschaltet werden. Wenn der Umrichter in einem solchen Zustand weiter betrieben wird, kann dies zu einem Brand führen. Wenn Reparaturen nötig werden, setzen Sie sich mit Ihrem Toshiba-Händler in Verbindung. - Wenn der Umrichter für längere Zeit nicht benutzt wird, muss die Stromversorgung stets ausgeschaltet werden, da sonst die Gefahr besteht, dass auslaufende Flüssigkeiten, Staub oder andere Einflüsse zu Fehlfunktionen führen. Wenn die Stromversorgung des Gerätes in einem solchen Fall eingeschaltet bleibt, kann dies zu einem Brand führen.
■ Handhabung  Vorsicht	
 Nicht berühren	Berühren Sie keinesfalls die Wärme abstrahlenden Lamellen oder die Entlade-Widerstände. Diese Teile sind heiß und können bei Berührung Verbrennungen verursachen.
 Vorgeschrieben	Stellen Sie sicher, dass der Frequenzumrichter die Spezifikationen in Bezug auf Spannungsversorgung und verwendeten Drehstrom-Asynchronmotor erfüllt. Wenn der Umrichter diese Spezifikationen nicht erfüllt, läuft einerseits der Drehstrom-Asynchronmotor nicht ordnungsgemäß, und es kann andererseits zu schweren Unfällen durch Überhitzung und Feuer kommen.
■ Transport und Installation  Warnung	
 Verboten	- Installieren oder betreiben Sie den Frequenzumrichter nicht, wenn er beschädigt ist oder wenn eine Komponente fehlt. Dies kann zu Verletzungen durch Stromschlag und zu Bränden führen. Wenn Reparaturen nötig werden, setzen Sie sich mit Ihrem Toshiba-Händler in Verbindung. - Positionieren Sie keine entflammaren Gegenstände in der Nähe des Umrichters. Falls es aufgrund eines Unfalls zu einer Flammenbildung kommt, kann dies zu einem Brand führen. - Installieren Sie den Umrichter nicht an einem Ort, an dem er mit Wasser oder anderen Flüssigkeiten in Kontakt kommen kann. Dies kann zu Verletzungen durch Stromschlag und zu Bränden führen.
 Vorgeschrieben	- Betreiben Sie das Gerät unter den in der Betriebsanleitung beschriebenen Umgebungsbedingungen. Der Betrieb unter anderen Bedingungen kann zu einer Fehlfunktion führen. - Stellen Sie den Umrichter auf einer Metallplatte auf. Die Rückenplatte wird sehr heiß. Installieren Sie den Umrichter nicht in einem Schrank aus entflammarem Material, da dies zu einem Brand führen könnte. - Betreiben Sie das Gerät nicht, während die Klemmleistenabdeckung ausgebaut ist. Dies könnte zu Verletzungen durch Stromschlag führen. Bei Nichtbeachtung kann es zu einem Stromschlag kommen, der zu schweren Verletzungen oder zum Tode führen kann. - Es muss eine Not-Halt-Einrichtung installiert werden, die den Systemspezifikationen entspricht (z. B. Ausschalten der Stromversorgung, gefolgt von der Betätigung der mechanischen Bremse). Es besteht ein Unfall- und Verletzungsrisiko, da der Motorbetrieb nicht allein durch den Umrichter sofort angehalten werden kann. - Es dürfen ausschließlich von Toshiba spezifizierte optionale Komponenten eingesetzt werden. - Die Verwendung anderer optionaler Komponenten kann zu Unfällen führen. - Wenn ein Getriebe für den Umrichter eingesetzt wird, muss dieses in einem Schrank installiert sein. Andernfalls besteht Stromschlaggefahr.

■ Transport und Installation  Vorsicht	
 Verboten	- Fassen Sie das Gerät beim Transport oder beim Tragen nicht an den Frontplatten-Abdeckungen an. Die Abdeckungen können sich lösen, und das Gerät kann herunterfallen, was zu Verletzungen führen kann. - Installieren Sie das Gerät nicht an einem Ort, an dem es starken Vibrationen ausgesetzt ist. Dies könnte zu einem Herunterfallen des Gerätes und dadurch zu Verletzungen führen.
 Vorgeschrieben	- Achten Sie beim Entfernen und Anbringen der Klemmleistenabdeckung mit einem Schraubendreher darauf, sich nicht an der Hand zu verletzen. - Vermeiden Sie einen zu starken Druck auf den Schraubendreher, da der Umrichter sonst zerkratzt werden könnte. - Schalten Sie stets die Stromversorgung aus, bevor Sie die Kabelabdeckung entfernen. - Nach Abschluss der Verkabelungsarbeiten bringen Sie die Klemmleistenabdeckung unbedingt wieder an. - Das Hauptgerät muss auf einer Unterlage installiert werden, die das Gewicht des Gerätes tragen kann. Wenn das Gerät auf einer Unterlage installiert wird, die das Gewicht nicht trägt, kann es herunterfallen, was zu Verletzungen führen könnte. - Wenn eine Bremsfunktion erforderlich ist (zum Anhalten der Antriebswelle), installieren Sie eine mechanische Bremse. Die Bremse des Umrichters funktioniert nicht als mechanische Arretierung; wenn sie zu diesem Zweck verwendet wird, kann es zu Verletzungen kommen.
■ Verdrahtung  Warnung	
 Verboten	- Schließen Sie die Stromversorgung nicht an die (motorseitigen) Ausgangsklemmen (U/T1, V/T2, W/T3) an. Wenn die Eingangsspannung mit dem Ausgang verbunden wird, könnte dies den Umrichter zerstören oder einen Brand verursachen. - Schließen Sie keinen Bremswiderstand an die Gleichstromklemmen (zwischen PA/+ und PC/- oder PO und PC/-) an. Dies könnte zu einem Brand führen. - Schalten Sie zunächst die Versorgungsspannung am Eingang ab und warten Sie 15 Minuten lang ab, bevor Sie Klemmen und Leitungen an Komponenten (Leistungsschaltern) berühren, die mit der Versorgungsspannungsseite des Umrichters verbunden sind. Wenn die Klemmen und Leitungen früher berührt werden, könnte dies zu einem Stromschlag führen. - Schalten Sie die externe Stromversorgung nicht zuerst aus, wenn die Klemmen VIA oder VIB als Logikeingangsklemmen der externen Stromversorgung verwendet werden. Dies könnte zu unerwarteten Ergebnissen führen, da die Klemmen VIA oder VIB den Schaltzustand EIN haben.
 Vorgeschrieben	- Elektrische Montagearbeiten müssen von einer entsprechend geschulten Fachkraft durchgeführt werden. Der nicht fachmännische Anschluss der Stromversorgung kann zu einem Brand oder zu Verletzungen durch Stromschlag führen. - Schließen Sie die (motorseitigen) Ausgangsklemmen korrekt an. Bei falscher Phasenfolge läuft der Motor rückwärts, was zu Verletzungen führen kann. - Die Verkabelung muss nach der Installation durchgeführt werden. Wenn die Kabel schon vor der Montage angeschlossen werden, kann dies zu Verletzungen oder Stromschlägen führen. - Vor der Verkabelung müssen die folgenden Schritte durchgeführt werden: (1) Schalten Sie die Stromversorgung vollständig ab.; (2) Warten Sie mindestens 15 Minuten, und stellen Sie sicher, dass die Ladeleuchte nicht mehr leuchtet. (3) Vergewissern Sie sich mit Hilfe eines Spannungsprüfers, der Gleichspannung (400–800 V DC oder mehr) messen kann, dass die Spannung für die Gleichstrom-Zwischenkreise (an PA/+ – PC/-) 45 V oder weniger beträgt. Wenn diese Schritte nicht ordnungsgemäß durchgeführt werden, kommt es während der Verkabelung zu einem Stromschlag. - Ziehen Sie die Schrauben der Klemmleiste mit dem angegebenen Drehmoment fest. Wenn die Schrauben nicht mit dem angegebenen Anzugsdrehmoment festgezogen werden, kann dies zu einem Brand führen. - Stellen Sie sicher, dass die Eingangsspannung im Bereich +10 % / -15 % der auf dem Leistungsschild angegebenen Nennspannung liegt (±10 %, wenn die Last bei ununterbrochenem Betrieb 100 % beträgt). Wenn die Eingangsspannung nicht im Bereich +10 % / -15 % der Nennspannung liegt (±10 %, wenn die Last bei ununterbrochenem Betrieb 100 % beträgt), kann dies zu einem Brand führen. - Setzen Sie den Parameter $F109$, wenn die Klemmen VIA oder VIB als Logikeingangsklemmen verwendet werden. Wenn der Parameter nicht gesetzt wird, kann dies zu einer Fehlfunktion führen.
 Erdung sicherstellen	Die Erdung muss sicher angeschlossen sein. Wenn die Erdung nicht sicher angeschlossen ist, kann dies zu Verletzungen durch Stromschlag oder zu Bränden führen.
■ Verdrahtung  Vorsicht	
 Verboten	Schließen Sie an die (motorseitige) Ausgangsklemmen keine Geräte (z. B. Entstörfilter oder Überspannungsableiter) mit integrierten Kondensatoren an. Dies könnte zu einem Brand führen.

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■ Betrieb	 Warnung
 Verboten	• Berühren Sie nicht den internen Anschluss, wenn die Abdeckung der oberen Klemmleiste des Bedienfelds geöffnet ist. Dieser steht unter Hochspannung; daher besteht ein Stromschlagrisiko. • Berühren Sie die Klemmen des Frequenzumrichters nicht, wenn die Stromversorgung des Umrichters eingeschaltet ist, selbst wenn der Motor gestoppt ist. Wenn Sie die Umrichterklappen bei eingeschalteter Stromversorgung berühren, kann es zu Verletzungen durch Stromschlag kommen. • Berühren Sie die Schalter nicht mit nassen Händen, und reinigen Sie den Umrichter nicht mit einem feuchten Tuch. Dies könnte zu Verletzungen durch Stromschlag führen.
 Vorgeschrieben	• Schalten Sie die Stromversorgung erst ein, nachdem die Klemmleistenabdeckung angebracht wurde. Wenn das Gerät in einem Schrank installiert ist und mit demontierter Klemmleistenabdeckung betrieben wird, schließen Sie vor dem Einschalten des Gerätes stets die Schranktüren. Wenn das Gerät eingeschaltet wird, während die Klemmleistenabdeckung oder die Schranktüren geöffnet sind, kann es zu Verletzungen durch Stromschlag kommen. • Stellen Sie sicher, dass die Betriebssignale deaktiviert sind, bevor der Umrichter nach einer Fehlfunktion zurückgesetzt wird. Wenn der Umrichter vor der Deaktivierung des Betriebssignals zurückgesetzt wird, kann der Motor plötzlich wieder anlaufen, was zu Verletzungen führen kann. • Bei unsachgemäßer Einstellung kann der Antrieb beschädigt werden und sich unerwartet in Bewegung setzen. Beim Programmieren von Einrichtermenüs ist besondere Vorsicht geboten.
■ Betrieb	 Vorsicht
 Verboten	• Beachten Sie alle zulässigen Betriebsparameterbereiche für Motoren und mechanische Anlagen. (Informationen dazu finden Sie in der Betriebsanleitung des Motors.) Wenn diese Parameterbereiche nicht beachtet werden, kann dies zu Verletzungen führen.
 Vorgeschrieben	• Stellen Sie sicher, dass der Frequenzumrichter die Spezifikationen in Bezug auf Spannungsversorgung und verwendeten Drehstrom-Asynchronmotor erfüllt. Wenn der Umrichter diese Spezifikationen nicht erfüllt, läuft einerseits der Drehstrom-Asynchronmotor nicht ordnungsgemäß, und es kann andererseits zu schweren Unfällen durch Überhitzung und Feuer kommen. • Kriechströme durch die Eingangs-/Ausgangsstromleitungen des Umrichters und die Kapazität des Motors können die Peripheriegeräte beeinträchtigen. Das Ausmaß der Kriechströme kann in Abhängigkeit von der PWM-Trägerfrequenz und der Länge der Eingangs-/Ausgangsstromkabel verstärkt werden. Falls die gesamte Kabellänge (gesamte Länge zwischen Umrichter und Motor) mehr als 100 m beträgt, kann es selbst beim Motor-Leerlaufstrom zu einer Überstromauslösung kommen. Stellen Sie sicher, dass ausreichend Abstand zwischen den einzelnen Phasenkabeln vorhanden ist, oder installieren Sie als Gegenmaßnahme ein Filter (MSF).
■ Instandhaltung und Inspektion	 Warnung
 Verboten	• Ersetzen Sie keine Teile. Dies kann zu Bränden oder zu Stromschlag und anderen Verletzungen führen. Setzen Sie sich zum Auswechseln von Teilen mit Ihrem Toshiba-Händler in Verbindung.
 Vorgeschrieben	• Die Anlagen müssen jeden Tag inspiziert werden. Werden die Anlagen nicht inspiziert und instandgehalten, so werden Störungen und Fehlfunktionen eventuell nicht festgestellt, was zu Unfällen führen kann. • Führen Sie vor der Inspektion die folgenden Schritte durch: (1) Schalten Sie die Stromversorgung des Umrichters vollständig aus.; (2) Warten Sie mindestens 15 Minuten, und stellen Sie sicher, dass die Ladeleuchte nicht mehr leuchtet.; und (3) Stellen Sie mit Hilfe eines Spannungsprüfers, der Gleichspannung (400/800 V DC oder mehr) messen kann, sicher, dass die Spannung für die Gleichstrom-Zwischenkreise (an PA/+ - PC/-) 45 V oder weniger beträgt. Wenn eine Inspektion ausgeführt wird, ohne dass diese Schritte zuvor durchgeführt wurden, kann dies zu Verletzungen durch Stromschlag führen.
■ Entsorgung	 Vorsicht
 Vorgeschrieben	• Wenn Sie den Umrichter entsorgen möchten, lassen Sie dies von einem Spezialisten für die Entsorgung industrieller Abfälle (*) durchführen. Wenn der Umrichter unsachgemäß entsorgt wird, kann dies zu einer Explosion des Kondensators oder zur Bildung giftiger Gase führen, die Verletzungen verursachen können. (*) Personen, die auf die Abfallbehandlung spezialisiert sind und beispielsweise als Transporteure oder Entsorger für industrielle Abfälle bezeichnet werden. Bitte beachten Sie sämtliche einschlägigen Gesetze, Verordnungen, Regelungen oder Bestimmungen über die Entsorgung industrieller Abfälle.

II. Sicherheitsfunktion

Die folgenden Anleitungen befinden sich am Ende der japanischen Anleitung (japanisches Modell) auf der CD-ROM. Entnehmen Sie Details zur Sicherheitsfunktion diesen Anleitungen:

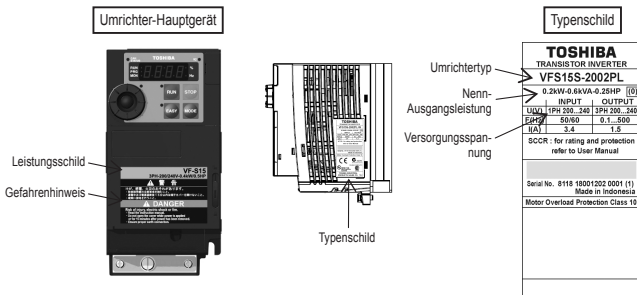
Sicherheitsfunktion (STO) : E6581860 VF-S15 Sicherheitsfunktions-Anleitung
ATEX : E6581861 VF-S15 ATEX-Anleitung

Führen Sie zur Inbetriebnahme des Umrichters die folgenden Schritte 1 bis 6 durch.

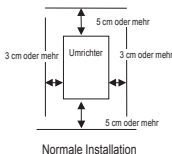
1. Lieferung überprüfen

Vergewissern Sie sich, dass der gelieferte Umrichter Ihrer Bestellung entspricht.

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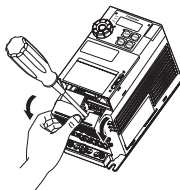
2. Umrichter installieren



* Zur Installation nebeneinander siehe die Betriebsanleitung.

3. Klemmleistenabdeckung entfernen

Bsp. VFS15S-2002PL



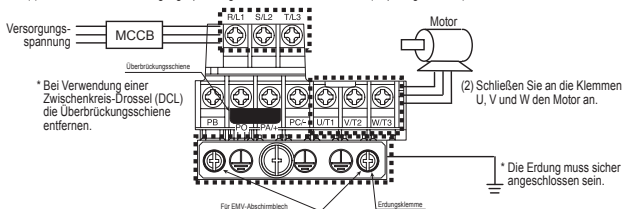
(1) Führen Sie einen Schraubendreher oder einen anderen dünnen Gegenstand in die durch das Symbol gekennzeichnete Öffnung ein.

(2) Während Sie auf den Schraubendreher Druck ausüben, schwenken Sie die Klemmleistenabdeckung nach unten, und nehmen Sie sie ab.

(3) Entfernen Sie anschließend die innere Klemmleistenabdeckung.

4. Stromversorgung und Motor anschließen (Verkabelung)

(1) Schließen Sie die Versorgungsspannung an die Klemmen R, S und T (eiphasig: R und S) an.



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Schraubengröße	Anzugsdrehmoment	
Schraube M3,5	1,0 N·m	8,9 lb·in
Schraube M4	1,4 N·m	12,4 lb·in
Schraube M5	2,4 N·m	20,8 lb·in
Schraube M6	4,5 N·m	40,0 lb·in
Schraube M4 (erdungsklemme)	1,4 N·m	12,4 lb·in
Schraube M5 (erdungsklemme)	2,8 N·m	24,8 lb·in

Spannungs- klasse	Motor- Nennleistung (kW)	Aderquerschnitt (mm²)			
		Hauptschaltkreis Anmerkung 1)			Erdkabel
		Eingang		Ausgang	
		ohne DCL	Mit DCL		
3-phasig, 240 V	0,2-1,5	1,5	1,5	1,5	2,5
	2,2	2,5	1,5	1,5	2,5
	4,0	4,0	2,5	2,5	4,0
	5,5	10	4,0	6,0	10
	7,5	16	6,0	10	16
	11	25	10	16	16
	15	35	16	25	16
1-phasig, 240 V	0,2-0,75	1,5	1,5	1,5	2,5
	1,5	2,5	2,5	1,5	2,5
	2,2	4,0	4,0	1,5	4,0
3-phasig, 500 V	0,4-2,2	1,5	1,5	1,5	2,5
	4,0	2,5	1,5	1,5	2,5
	5,5	4,0	1,5	2,5	4,0
	7,5	6,0	2,5	2,5	6,0
	11	10	4,0	6,0	10
	15	16	6,0	10	16

Anmerkung 1: Die Leitungslänge des Hauptschaltkreises darf maximal 30 m betragen.

5. Stromversorgung einschalten

Nehmen Sie nach dem Einschalten die Einstellungen im Einrichtmenü vor.

 Vorsicht		Bei unsachgemäßer Einstellung kann der Antrieb beschädigt werden und sich unerwartet in Bewegung setzen. Beim Programmieren von Einrichtmenüs ist besondere Vorsicht geboten.		
Einstellregler	LED-Anzeige		Betrieb	
	S E t *		Versorgungsspannung eingeschaltet	
	EU	JP	Einstellregler drehen und Region wählen	
	ASIA	USA		
	init		Einstellregler drücken	
	0.0		Einrichtung abgeschlossen	
Programmierung	EU	ASIA	USA	JP
Hauptregionen	Europa	Asien, Ozeanien	Nordamerika	Japan
 Motor	230/400(V)	230/400(V)	230/460(V)	200/400(V)
	50(Hz)	50(Hz)	60(Hz)	60(Hz)

Anmerkung: Wenn Sie den Umrichter über externe Signale ansteuern, müssen Sie mit SW1 „Sink logic“ (negative Logik), „Source logic“ (positive Logik) oder „PLC“ (SPS: externe Stromversorgung) wählen.

6. Umrichter bedienen

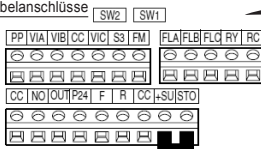
Mit den Grundeinstellungen ist der Betrieb mit dem Bedienfeld möglich.



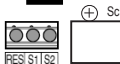
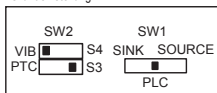
7. Ansteuerung des Umrichters über externe Signale

Schließen Sie den Steuerkreis an, stellen Sie die Parameter ein und wählen Sie SW1.

7.1 Kabelanschlüsse



Grundeinstellung

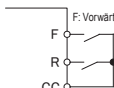


(+) Schraube für abnehmbare Steuerkreis-Klemmleiste

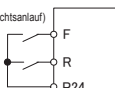
RS485-Anschluss

Befehlssignale

<Negative Logik>



<Positive Logik>



Vorwärtsbetrieb, wenn F-CC oder P24-F EIN ist.

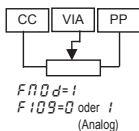
Schrauben- größe	Empfohlenes Anzugsdrehmo- ment
Schrau- be M3	0,5 N·m 4,4 lb·in

Abisolierlänge: 6 (mm)
Schraubendreher:
Kleiner Schlitzschraubendreher
(Klingenstärke: 0,5 mm,
Klingenbreite: 3,5 mm)

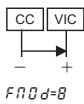
Leiter	1 Ader	2 Adern mit dem gleichen Querschnitt
Massiv	0,3-1,5mm ² (AWG 22-16)	0,3-0,75mm ² (AWG 22-18)
Litze		

Frequenzeinstellung

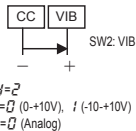
1) Potentiometer



2) Stromeingang (4 bis 20 mA)



3) Spannungseingang (0 bis 10 V) oder (-10 bis +10 V)



7.2 Parametereinstellung

Legen Sie mit **F100** die Ansteuerungsart und mit **F107** die Frequenzeinstellungsmethode fest.

Bezeichnung	Funktion	Einstellbereich	Grundeinstellung
F100	Auswahl des Befehlsmodus	0: Klemmleiste, 1: Bedienfeld 2: RS485, 3: CANopen, 4: Option	1
F107	Frequenzeinstellmodus-Auswahl 1	0: Einstellregler 1, 1: Klemme VIA 2: Klemme VIB, 3: Einstellregler 2 4: RS485; 5: „Schneller“/„Langsamer“-Signal vom Logikeingang 6: CANopen, 7: Kommunikationsoption 8: Klemme VIC 11: Impulseingang, 14: S r Q	0

Wählen Sie den Signaltyp an Klemme VIA und VIB

F107	Auswahl Analogeingangsklemme (VIB)	0: 0-+10V, 1: -10-+10V	0
F109	Auswahl Analog-/Logikeingang (VIA/VIB)	0 bis 4 * Einzelheiten finden Sie in der Betriebsanleitung.	0

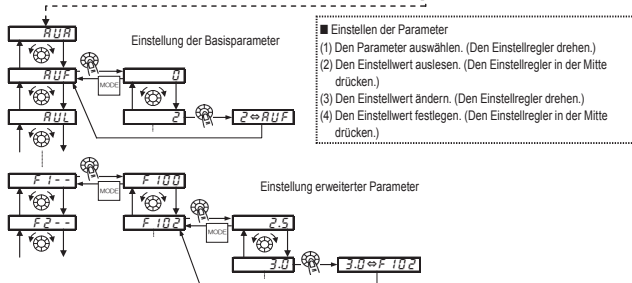
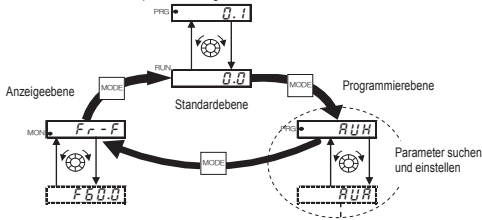
8. Hauptparameter

Inhaltsverzeichnis	Bezeichnung	Funktion	Einstellbereich	Grundeinstellung
Hochlauf-/Runterlaufzeit an die Maschinenanforderungen anpassen. Der Wert für RL entspricht der Zeit, die die Ausgangsfrequenz für den Übergang zwischen 0 Hz und dem Wert von FH benötigt.	RL	Hochlaufzeit 1	0,0-3600 (360,0) (s)	10,0
	RL	Runterlaufzeit 1	0,0-3600 (360,0) (s)	10,0
	FH	Maximalfrequenz	30,0-500,0 (Hz)	80,0
Einstellung des oberen und unteren Grenzwerts für die Ausgangsfrequenz	UL	Obere Grenzfrequenz	0,5- FH (Hz)	*1
	LL	Untere Grenzfrequenz	0,0- UL (Hz)	0,0
Auswahl einer für die Maschine geeigneten U/f-Kennlinie	Pt	U/f-Kennlinien-Wahl	0: U/f konstant 1: Variables Drehmoment 2: Automatische Drehmoment-Anhebung 3: Vektorregelung 4: Energieeinsparen 5: Dynamisches Energiesparen 6: PM-Motorsteuerung 7: U/f 5-Punkt-Kennlinie	*1
	EL	Elektronischer Motorschutz 1	10-100 (%(A))	100

*1: Die Standardeinstellwerte richten sich nach der Einstellung im Einrichtungsmenü.

9. Steuerung über das Bedienfeld

Frequenzeinstellung am Bedienfeld



Guida rapida all'avvio

TOSVERT VF-S15 con Funzione di sicurezza

IT

I. Precauzioni per la sicurezza

Le informazioni contenute nel presente manuale e nelle etichette applicate sull'inverter sono molto importanti per un corretto utilizzo dell'inverter e per prevenire lesioni alle persone o danni alle proprietà nell'area. Familiarizzare con i simboli e le indicazioni mostrate di seguito prima di continuare la lettura del manuale. Rispettare tutte le avvertenze.

* Leggere i consigli per la sicurezza del manuale di istruzioni (CD-ROM) per le informazioni non riportate nella presente guida.

Spiegazione dei simboli

Simbolo	Significato del simbolo
 Pericolo	Indica che gli errori di funzionamento potrebbero avere conseguenze letali o molto gravi.
 Avvertimento	Indica che gli errori di funzionamento potrebbero provocare lesioni (*1) alle persone o danni alle cose. (*2)

(*1) Lesioni, ustioni o scosse elettriche che non richiedono né l'ospedalizzazione né lunghi periodi di convalescenza.

(*2) Con danni alle cose si intendono danni a beni e materiali.

Significato dei simboli

Simbolo	Significato del simbolo
	Indica proibizione (azioni da non compiere). L'oggetto della proibizione comparirà nel simbolo o a fianco dello stesso, sotto forma di testo o pittogramma.
	Indica un'istruzione da seguire. All'interno del simbolo o a fianco dello stesso compaiono pittogrammi o testo con istruzioni dettagliate.
	- Indica la presenza di un pericolo. Il pericolo viene descritto nel simbolo, o a fianco dello stesso, sotto forma di testo o pittogramma. - Indica la necessità di agire con cautela. L'oggetto dell'avvertimento viene descritto nel simbolo, o a fianco dello stesso, sotto forma di testo o pittogramma.

■ Limiti di utilizzo

Questo inverter è utilizzabile per il controllo della velocità dei motori trifase a induzione utilizzati per uso industriale generale.

Le versioni con ingresso monofase dispongono comunque di uscita trifase e quindi non sono idonei per azionare motori monofase.



Precauzioni per la sicurezza

- ▼ Questo prodotto è stato creato per uso generico in applicazioni industriali. Non può essere utilizzato per applicazioni in cui può provocare un impatto notevole sugli usi pubblici, quali impianti di alimentazione e autostrade e in apparecchiature che possono minacciare l'incolumità delle persone, come il controllo di energia nucleare, nell'aviazione, nel controllo dello spazio aereo, del traffico, negli apparecchi di sicurezza, nelle apparecchiature di intrattenimento o mediche. Da considerare le modalità di uso, in condizioni speciali o in applicazioni in cui è richiesto un severo controllo di qualità. Contattare il rivenditore Toshiba.
- ▼ Utilizzare l'inverter in applicazioni in cui un eventuale malfunzionamento non possa essere causa di incidenti o danni gravi. Installare sempre l'inverter con tutti gli adeguati dispositivi di sicurezza.
- ▼ Le versioni con ingresso monofase dispongono comunque di uscita trifase e quindi non sono idonei per azionare motori monofase.

■ Modo d'impiego  Pericolo	
 Divieto di smontaggio	Non eseguire mai operazioni di smontaggio, modifica o riparazione dell'unità. Tali operazioni potrebbero causare scosse elettriche, incendio e lesioni. Chiamare il distributore Toshiba per assistenza.
 Divieti	- Non togliere il coperchio della morsetteria quando l'alimentazione è in funzione. L'unità contiene molte parti sottoposte ad alta tensione e il contatto con le stesse è causa di scosse elettriche. - Non infilare le dita nelle aperture, ad esempio nei fori per il passaggio dei cavi o nei coperchi della ventola di raffreddamento. Potrebbe causare scosse elettriche o lesioni. - Non introdurre oggetti nell'inverter (fil, cavi, bacchette, ecc.). La mancata osservanza di questo divieto potrebbe causare scosse elettriche o incendio. - Proteggere l'inverter dal contatto con acqua o altri liquidi. La mancata osservanza di questo divieto potrebbe causare scosse elettriche o incendio.
 Azioni obbligatorie	- Accendere l'unità solo se il coperchio della morsetteria è chiuso. Se l'alimentazione è attivata senza il coperchio della morsetteria si possono rischiare scosse elettriche o altri ferimenti. - Se l'inverter emette fumo, odori insoliti o strani rumori, scollegare immediatamente l'alimentazione. L'uso continuato dell'inverter in tali condizioni può provocare un incendio. Chiamare il distributore Toshiba per assistenza. - Scollegare sempre l'alimentazione se l'inverter non viene utilizzato per lunghi periodi di tempo. L'eventuale infiltrazione di polvere, liquidi o altro potrebbe essere causa di malfunzionamenti. La mancata osservanza di questa indicazione potrebbe causare un incendio.
■ Modo d'impiego  Avvertimento	
 Divieto di contatto	Non toccare le alette del dissipatore o i resistori di frenatura. Si tratta di dispositivi che possono raggiungere temperature elevate e quindi provocare ustioni.
 Azioni obbligatorie	Utilizzare solo inverter conformi alle specifiche di alimentazione e del motore trifase a induzione. Se l'inverter non è conforme a queste specifiche, oltre a non far ruotare correttamente il motore trifase a induzione potrebbe surriscaldarsi e innescare un incendio.
■ Trasporto e installazione  Pericolo	
 Divieti	- Non installare né azionare l'inverter se danneggiato o non completo di tutti i componenti. La mancata osservanza di questo divieto potrebbe causare scosse elettriche o incendio. Chiamare il distributore Toshiba per assistenza. - Non posizionare oggetti infiammabili vicino all'inverter. Se si verifica un incidente in cui vengono generate fiamme, potrebbe innescarsi un incendio. - Non installare l'inverter ove vi sia rischio di contatto con acqua o altri liquidi. La mancata osservanza di questo divieto potrebbe causare scosse elettriche o incendio.
 Azioni obbligatorie	- Usare l'inverter solo in presenza delle condizioni ambientali descritte nel manuale di istruzioni. Utilizzi effettuati in presenza di altre condizioni potrebbero provocare il malfunzionamento dell'inverter. - Montare l'inverter su una base metallica. Il pannello posteriore può raggiungere temperature elevate. Per evitare il rischio di incendio, non installare l'inverter vicino a materiali infiammabili. - Non azionare l'unità se il coperchio della morsetteria è stato rimosso. Ciò potrebbe provocare folgorazioni. La mancata osservanza di questa indicazione potrebbe causare scosse elettriche, con conseguenze gravi o letali. - È obbligatorio installare un dispositivo d'arresto d'emergenza idoneo alle specifiche del sistema (ad es. un dispositivo di spegnimento automatico che attivi il freno meccanico). L'inverter non è in grado di effettuare un arresto immediato e ciò potrebbe provocare incidenti e lesioni. - Tutte le opzioni utilizzate devono essere specificate da Toshiba. L'utilizzo di altre opzioni può essere causa di anomalie. - Se si usa un interruttore di comando per l'inverter, esso dovrà essere installato all'interno di un armadio. Il mancato rispetto di tale accorgimento potrebbe provocare scosse elettriche.

■ Trasporto e installazione  Avvertimento	
 Divieti	- Non trasportare l'inverter sorreggendolo per i coperchi del pannello anteriore. I coperchi potrebbero distaccarsi e l'unità cadere, provocando lesioni. - Non installare l'inverter in aree soggette a forti vibrazioni. L'unità potrebbe infatti cadere e provocare lesioni personali.
 Azioni obbligatorie	- Durante la rimozione o il montaggio del coperchio della morsetteria attenzione a non ferirsi con il cacciavite. - Evitare inoltre di esercitare eccessiva pressione sul cacciavite, per non danneggiare accidentalmente l'inverter. - Disinserire sempre l'alimentazione prima di rimuovere il coperchio del cablaggio. - Terminate le operazioni di cablaggio, rimontare il coperchio della morsetteria. - L'unità principale deve essere installata su una base in grado di sostenerne il peso. - Se l'unità è montata su una base che non è in grado di sostenere il peso, l'unità potrebbe cadere e provocare lesioni. - Se è necessaria la frenatura (per mantenere bloccato l'albero motore), installare un freno meccanico. Il freno dell'inverter non agisce da arresto meccanico, pertanto, se utilizzato con tale finalità, potrebbe provocare lesioni.
■ Cablaggio  Pericolo	
 Divieti	- Non collegare i morsetti di alimentazione in ingresso a quelli di alimentazione in uscita (lato motore) (U/T1, V/T2, W/T3). Collegare l'alimentazione in ingresso ai morsetti di uscita potrebbe distruggere l'inverter o causare un incendio. - Non inserire resistori di frenatura tra i morsetti del bus c.c. (tra PA/+ e PC/- o PO e PC/-). La mancata osservanza di questo divieto potrebbe causare un incendio. - Disinserire l'alimentazione in ingresso e attendere almeno 15 minuti prima di toccare i morsetti e i cavi (MCCB) dell'apparecchiatura collegata all'inverter sul lato alimentazione. Toccare i morsetti prima che sia trascorso il periodo indicato significa esporsi al rischio di scossa elettrica. - Non disinserire l'alimentazione esterna quando i morsetti VIA o VIB sono utilizzati come ingresso digitale con alimentazione esterna e sono ancora attivi. La mancata osservanza di questo divieto potrebbe produrre risultati inaspettati, perché i morsetti VIA o VIB rimarranno attivati.
 Azioni obbligatorie	- I lavori elettrici devono essere svolti da un esperto qualificato. - Il collegamento di alimentazione eseguito da personale privo della necessaria esperienza potrebbe provocare scosse elettriche o incendi. - Collegare i morsetti di uscita (lato motore) correttamente. Se la sequenza di fase è errata, il motore funzionerà all'incontrario e ciò potrebbe provocare lesioni. - Il cablaggio deve essere effettuato dopo l'installazione. - Se il cablaggio viene effettuato prima dell'installazione, potrebbe causare lesioni o scosse elettriche. - Prima di effettuare il cablaggio occorre eseguire i passaggi seguenti: (1) Spegnerne l'alimentazione; (2) Attendere almeno 15 minuti e controllare che la spia CHARGE sia spenta; e (3) Utilizzare un tester capace di misurare la tensione c.c. (400 V c.c., 800 V c.c. o superiori) e controllare che la tensione erogata ai circuiti principali in c.c. (attraverso PA/+ - PC/-) sia inferiore o pari a 45 V. Se i passaggi sopradescritti non vengono eseguiti correttamente, il cablaggio potrebbe provocare scosse elettriche. - Serrare le viti della morsetteria alla coppia specificata. - Se le viti non sono serrate alla coppia specificata, potrebbero causare un incendio. - Controllare che la tensione di alimentazione in ingresso sia +10%, -15% della tensione riportata sulla targhetta ($\pm 10\%$ se il carico è pari al 100% con funzionamento continuo). Se la tensione di alimentazione in ingresso non è +10%, -15% della tensione nominale ($\pm 10\%$ se il carico è pari al 100% con funzionamento continuo) esiste il rischio di incendio. - Impostare il parametro F_{IGG} quando i morsetti VIA o VIB sono utilizzati per l'ingresso digitale. Se il parametro non viene impostato, l'unità potrebbe non funzionare correttamente.
 Messa a terra	- La messa a terra deve essere cablata adeguatamente. - In caso contrario, potrebbero verificarsi scosse elettriche o incendi.
■ Cablaggio  Avvertimento	
 Divieti	Non collegare apparecchi provvisti di condensatori integrati (quali ad esempio filtri antidisturbo o filtri di rete) ai morsetti di uscita (lato motore). La mancata osservanza di questo divieto potrebbe causare un incendio.

■ Funzionamento		 Pericolo
 Divieti	- Non toccare mai il connettore interno quando il coperchio superiore della morsetteria del pannello di controllo è aperto. Esiste infatti il rischio di scossa elettrica per la presenza di alta tensione. - Non toccare i morsetti dell'inverter quando l'unità è in tensione, anche se il motore è fermo. Il mancato rispetto di questo divieto potrebbe causare scosse elettriche. - Non toccare gli interruttori con le mani bagnate e non cercare di pulire l'inverter con un panno umido. Il mancato rispetto di questo divieto potrebbe causare scosse elettriche.	
 Azioni obbligatorie	- Accendere l'unità solo se il coperchio della morsetteria è chiuso. Se l'unità è installata in un armadio e viene utilizzata senza il coperchio della morsetteria, chiudere sempre le porte dell'armadio prima di accendere l'inverter. L'accensione dell'unità effettuata quando il coperchio della morsetteria è rimosso o le porte dell'armadio sono aperte potrebbe provocare scosse elettriche. - Prima di ripristinare l'inverter dopo un guasto, controllare sempre che le spie di funzionamento siano spente. Se il ripristino venisse effettuato prima dello spegnimento delle spie di funzionamento, il motore potrebbe riavviarsi improvvisamente e provocare lesioni. - Le impostazioni errate danneggiano l'unità e producono movimenti inaspettati. Accertarsi di aver configurato correttamente tutti i parametri di funzionamento.	
■ Funzionamento		 Avvertimento
 Divieti	Rispettare i limiti operativi dei motori e delle apparecchiature meccaniche. (Fare riferimento al manuale di istruzioni del motore). La mancata osservanza di tali limiti può essere causa di lesioni.	
 Azioni obbligatorie	- Utilizzare solo inverter conformi alle specifiche di alimentazione e del motore trifase a induzione. Se l'inverter non è conforme a queste specifiche, oltre a non far ruotare correttamente il motore trifase a induzione potrebbe surriscaldarsi e innescare un incendio. - La corrente dispersa verso terra attraverso i cavi di alimentazione in ingresso/uscita dell'inverter può influenzare i dispositivi periferici. Il valore della corrente di dispersione aumenta in funzione della frequenza portante PWM e della lunghezza dei cavi di alimentazione in ingresso/uscita. Se la lunghezza totale dei cavi (lunghezza totale tra inverter e motori) è superiore a 100 m, la protezione da sovracorrente potrebbe scattare anche in assenza di carico sul motore. Lasciare una distanza sufficiente tra un cavo di fase e l'altro, oppure installare un filtro di uscita come contromisura.	
■ Manutenzione e ispezione		 Pericolo
 Divieti	Non effettuare sostituzioni di parti. La mancata osservanza di questo divieto potrebbe causare scosse elettriche, incendi e lesioni. Per sostituire i pezzi, rivolgersi al distributore Toshiba.	
 Azioni obbligatorie	- L'apparecchiatura deve essere controllata ogni giorno. Se le operazioni d'ispezione e manutenzione non vengono eseguite ogni giorno, potrebbero verificarsi errori di funzionamento e guasti, con possibili conseguenze di incidenti. - Prima di procedere al controllo, eseguire i passaggi seguenti. : (1) Disinserire completamente l'alimentazione dell'inverter. ; (2) Attendere almeno 15 minuti e controllare che la spia CHARGE sia spenta. ; e (3) Utilizzare un tester capace di misurare le tensioni in c.c. (400/800 V c.c. o superiori) e controllare che la tensione ai circuiti principali c.c. (attraverso PA/+ - PC/-) sia 45 V o inferiore. Condurre questo controllo senza prima avere effettuato queste operazioni potrebbe esporre al rischio di scossa elettrica.	
■ Smaltimento		 Avvertimento
 Azioni obbligatorie	Lo smaltimento dell'inverter deve essere effettuato da personale specializzato nello smaltimento di rifiuti industriali (*). Lo smaltimento inappropriato dell'inverter può provocare l'esplosione dei condensatori o la produzione di gas tossici, con pericolo di lesioni. (*) Gli specialisti nel processo di smaltimento dei rifiuti sono noti come "raccoltori e trasportatori di prodotti di rifiuto industriali" o "addetti allo smaltimento dei rifiuti industriali". Rispettare tutte le leggi, le norme, le regole o le ordinanze applicabili per lo smaltimento di rifiuti industriali.	

II. Funzione di sicurezza

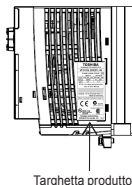
Alla fine del manuale giapponese (modello giapponese) sono presenti i seguenti manuali sul CD-ROM. Vedere i manuali per la funzione di sicurezza.

Funzione di sicurezza (STO) : E6581860 Manuale de funzione di sicurezza VF-S15
ATEX : E6581861 Guida ATEX VF-S15

Utilizzare l'inverter applicando la seguente procedura riportata nei passaggi da 1 a 6.

1. Verifica del prodotto acquistato

Controllare che il tipo di inverter sia lo stesso ordinato.



Modello inverter

Potenza

nominale

di uscita

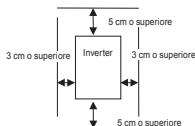
dell'inverter

Alimentazione

Targhetta produttore

TOSHIBA			
TRANSISTOR INVERTER			
VFS15S-2002PL			
0.2KW-0.6KVA-0.25HP (0)			
INPUT	OUTPUT		
U(V)	1PH 200...240	3PH 200...240	
F(Hz)	50/60	0.1...500	
I(A)	3.4	1.5	
SCCR : for rating and protection refer to User Manual			
Serial No. 8118 18001202 0001 (1)			
Made in Indonesia			
Motor Overload Protection Class 10			

2. Montare l'inverter

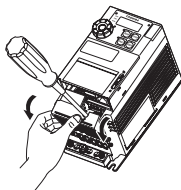


Montaggio normale

* Per montaggio fianco a fianco, vedere il manuale di istruzioni.

3. Togliere il coperchio blocco morsetteria

es. VFS15S-2002PL



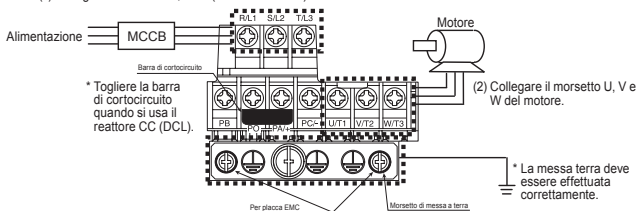
(1) Inserire un cacciavite o altro utensile sottile nel foro indicato con il simbolo .

(2) Mantenendo la pressione sul cacciavite, ruotare il coperchio della morsetteria verso il basso per rimuoverlo.

(3) Quindi, togliere il coperchio blocco morsetteria interno.

4. Collegare l'alimentazione e il motore (cablaggio)

(1) Collegare il morsetto R, S e T(monofase: R e S) dell'alimentazione.



Blocco morsetti del circuito di alimentazione

IT

Dimensione vite	Coppia di serraggio	
Vite M3,5	1,0 N·m	8,9 lb·in
Vite M4	1,4 N·m	12,4 lb·in
Vite M5	2,4 N·m	20,8 lb·in
Vite M6	4,5 N·m	40,0 lb·in
Vite M4 (morsetto di messa a terra)	1,4 N·m	12,4 lb·in
Vite M5 (morsetto di messa a terra)	2,8 N·m	24,8 lb·in

Classe di tensione	Motore applicabile (kW)	Sezione cavo (mm²)			Cavo di messa a terra
		Circuito di alimentazione Nota 1)			
		Ingresso		Corrente	
senza DCL	Con DCL				
trifase 240 V	0,2-1,5	1,5	1,5	1,5	2,5
	2,2	2,5	1,5	1,5	2,5
	4,0	4,0	2,5	2,5	4,0
	5,5	10	4,0	6,0	10
	7,5	16	6,0	10	16
	11	25	10	16	16
Monofase 240 V	15	35	16	25	16
	0,2-0,75	1,5	1,5	1,5	2,5
	1,5	2,5	2,5	1,5	2,5
Trifase 500 V	2,2	4,0	4,0	1,5	4,0
	0,4-2,2	1,5	1,5	1,5	2,5
	4,0	2,5	1,5	1,5	2,5
	5,5	4,0	1,5	2,5	4,0
	7,5	6,0	2,5	2,5	6,0
	11	10	4,0	6,0	10
	15	16	6,0	10	16

Nota 1) Il cavo del circuito di alimentazione deve essere circa 30 m.

5. Accendere l'alimentazione

Configurare il menu di impostazione dopo l'accensione.

 Avvertimento		Le impostazioni errate danneggiano l'unità e possono produrre avviamenti intempestivi. Accertarsi di aver configurato correttamente il menu di impostazione.		
Quadrante di regolazione	Display LED	Operazione		
	"S E t"	Accensione		
	EU JP ASIA USA	Ruotare il quadrante di regolazione e selezionare la località.		
	in it	Premere il quadrante di regolazione		
	0.0	Ultimare la configurazione		
Impostazione parametro	EU	ASIA	USA	JP
Località principale	Europa	Asia, Oceania	Nord America	Giappone
	230/400(V)	230/400(V)	230/460(V)	200/400(V)
	50(Hz)	50(Hz)	60(Hz)	60(Hz)

Nota) Quando si utilizza l'inverter con i segnali esterni, selezionare logica sink, logica source o PLC (alimentazione esterna) da SW1.

6. Utilizzare l'inverter

Il funzionamento pannello è possibile con le impostazioni predefinite.

La frequenza (velocità) può essere modificata con il quadrante di regolazione.



Avviare con il tasto RUN e arrestare con il tasto STOP.

7. Utilizzare l'inverter con i segnali esterni

Collegare il circuito di controllo, impostare il parametro e selezionare SW1.

7.1 Cablaggio

Posizione iniziale

Comando di funzionamento

<logica sink>

F: Comando marcia avanti
R: Comando marcia indietro

<logica source>

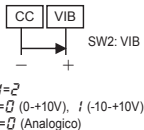
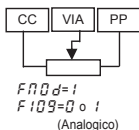
Marcia avanti quando F-CC o P24-F si trova su ON.

Dimensione vite	Coppia di serraggio consigliata	Lunghezza di strippaggio: 6 (mm) Cacciavite: Cacciavite piccolo a punta piatta (Spessore lama: 0,5 mm, larghezza lama: 3,5 mm)
Vite M3	0,5 N·m 4,4 lb·in	

Conduttore	Un filo	Due fili di uguale diametro
Solido	0,3 - 1,5 mm ² (AWG 22-16)	0,3 - 0,75 mm ² (AWG 22-18)
A trefoli		

Impostazione frequenza

- 1) Potenzenziometro 2) Ingresso corrente (da 4 a 20 mA) 3) Ingresso segnale (da 0 a 10V) oppure (da -10 a +10 V)



7.2 Impostazione parametro

Stabilire il metodo di funzionamento con Fnd e l'impostazione di frequenza con $F107$.

Titolo	Funzione	Campo regolazioni	Impostazione predefinita
Fnd	Sceita modalità di comando	0: Morsetteria, 1: Pannello 2: RS485, 3: CANopen, 4: Opzione	1
Fnd	Selezione modalità impostazione frequenza 1	0: Quadrante di regolazione 1, 1: Morsetto VIA 2: Morsetto VIB, 3: Quadrante di regolazione 2 4: RS485, 5: UP/DOWN da ingresso logico 6: CANopen, 7: Opzione di comunicazione 8: Morsetto VIC 11: ingresso treno di impulsi, 14: SrQ	0

Selezionare il segnale tramite il morsetto VIA e VIB

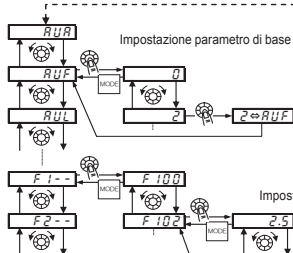
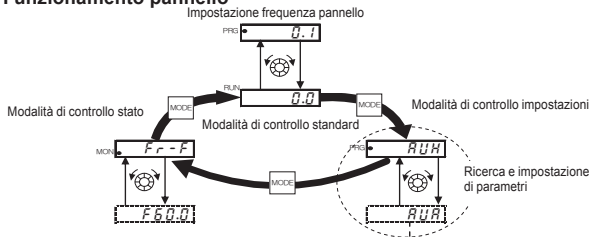
$F107$	Selezione morsetto di ingresso analogico (VIB)	0: 0-+10V, 1: -10-+10V	0
$F109$	Selezione ingresso analogico/logico (VIA/VIB)	0 a 4 *Vedere il manuale di istruzioni per maggiori dettagli.	0

8. Parametri principali

Indice	Titolo	Funzione	Campo regolazioni	Impostazione predefinita
Impostazione tempo di accelerazione / decelerazione adatto al macchinario. Il valore ACC / DEC è il tempo che la frequenza di uscita impiega per raggiungere da 0Hz il valore FH .	ACC	Tempo di accelerazione 1	0,0-3600 (360,0) (s)	10,0
	DEC	Tempo di decelerazione 1	0,0-3600 (360,0) (s)	10,0
	FH	Frequenza massima	30,0-500,0 (Hz)	80,0
Configurare il limite superiore e inferiore della frequenza di uscita	UL	Limite massimo frequenza	0,5- FH (Hz)	*1
	LL	Limite minimo frequenza	0,0- UL (Hz)	0,0
Selezionare la modalità di controllo V/F appropriata per la macchina	Pt	Selezione modalità di controllo V/F	0: costante V/F 1: coppia variabile 2: controllo automatico incremento coppia 3: controllo vettoriale 4: risparmio energetico 5: risparmio energetico dinamico 6: controllo motore PM 7: impostazione V/F a cinque punti	*1
Regolare la protezione termoelettronica del motore.	thr	Livello protezione termoelettronica motore 1	10-100 (%(A))	100

*1: I valori dell'impostazione predefinita variano a seconda della configurazione del menu di impostazione.

9. Funzionamento pannello



■ Parametri di impostazione

- (1) Selezionare il parametro. (Ruotare il quadrante di regolazione.)
- (2) Leggere il valore di impostazione. (Premere al centro del quadrante di regolazione.)
- (3) Modificare il valore di impostazione. (Ruotare il quadrante di regolazione.)
- (4) Stabilire il valore di impostazione. (Premere al centro del quadrante di regolazione.)

10. Vedere il manuale di istruzioni per il funzionamento applicato o per il tipo di guasto

Manual de inicio rápido

TOSVERT VF-S15 con función de seguridad

ES

I. Precauciones de seguridad

Los aspectos descritos en estas instrucciones y en el propio convertidor son muy importantes para utilizar el convertidor de forma segura, sin causar daños a personas ni a objetos cercanos. Familiarícese con los símbolos e indicaciones que se muestran a continuación y continúe leyendo el manual. Asegúrese de respetar todas las advertencias.

* Lea las precauciones de seguridad del manual de instrucciones (CD-ROM) para obtener información no incluida aquí.

Explicación de las marcas

Marca	Significado de la marca
 Advertencia	Indica que un uso erróneo puede provocar la muerte o lesiones graves.
 Precaución	Indica que un uso erróneo puede provocar lesiones (*1) en personas o daños materiales. (*2)

(*1) Pueden ser lesiones, quemaduras o descargas, que no precisarán hospitalización o tratamiento a largo plazo como paciente externo.

(*2) Daños materiales hace referencia a una amplia variedad de daños a objetos y materiales.

Significado de los símbolos

Marca	Significado de la marca
	Indica prohibición (No lo haga). El objeto de la prohibición se describirá en el símbolo o cerca de éste, ya sea en forma de texto o imagen.
	Indica una instrucción de obligado cumplimiento. Las instrucciones detalladas se describen mediante ilustraciones y texto en el símbolo o cerca de éste.
	-Indica advertencia. El objeto de la advertencia se describirá en el símbolo o cerca de éste, ya sea en forma de texto o imagen. -Indica precaución. El objeto de la precaución se describirá en el símbolo o cerca de éste, ya sea en forma de texto o imagen.

■ Limitaciones de uso

Este convertidor se utiliza para controlar velocidades de motores trifásicos de inducción de uso industrial general.

El modelo de entrada monofásica convierte la tensión en salida trifásica y no puede accionar un motor monofásico.



Precauciones de seguridad

- ▼ Este producto está destinado para uso general en aplicaciones industriales. No se puede utilizar en aplicaciones en las que pueda provocar un fuerte impacto sobre servicios públicos como la red eléctrica o el ferrocarril, y equipos que puedan poner en peligro la vida humana o provoquen lesiones, como dispositivos de control de energía nuclear, dispositivos de control aéreo o espacial, control del tráfico, dispositivos de seguridad, entretenimiento o aparatos médicos. Se puede considerar su uso en condiciones especiales o en una aplicación que no precise un control de calidad estricto. Póngase en contacto con su distribuidor Toshiba.
- ▼ Utilice nuestro producto en aplicaciones que no provoquen accidentes o daños graves aunque falle el producto, o bien utilícelo en un entorno donde existan equipos de seguridad o se disponga de un aparato de circuito de reserva externo al sistema.
- ▼ No utilice el convertidor para cargas distintas a las de motores trifásicos de inducción para uso industrial general. (Un uso distinto al de motores trifásicos de inducción correctamente aplicados podría ocasionar incidentes.) El modelo de entrada monofásica convierte la tensión en salida trifásica y no puede accionar un motor monofásico.

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■ Manipulación  Advertencia	
 Desmontaje prohibido	No desmonte, modifique o repare nunca este producto. Podría ocasionar descargas eléctricas, incendios y graves lesiones. Para las reparaciones, llame a su distribuidor Toshiba.
 Prohibido	- No quite la tapa del bloque de terminales con el aparato conectado. La unidad contiene muchas piezas de alto voltaje y el contacto con las mismas podría provocar descargas eléctricas. - No introduzca los dedos en aberturas como los orificios pasacables o las tapas del ventilador de refrigeración. Podría sufrir descargas eléctricas u otras lesiones. - No deposite ni introduzca ningún tipo de objeto en el convertidor (recortes de cable eléctrico, varillas, alambres, etc.). Podrían provocar descargas eléctricas o incendios. - No deje que el convertidor entre en contacto con agua u otros líquidos. Podrían provocar descargas eléctricas o incendios.
 Acción obligatoria	- Conecte la alimentación únicamente cuando la tapa del bloque de terminales esté colocada. Si conecta la alimentación sin tener colocada la tapa del bloque de terminales, podría sufrir una descarga eléctrica u otras lesiones. - Si el convertidor desprende humos, olores o sonidos extraños, desconéctelo de inmediato. El uso continuado del convertidor en dicho estado puede originar un incendio. Para las reparaciones, llame a su distribuidor Toshiba. - Desconecte la alimentación del convertidor si no se va utilizar durante largos períodos de tiempo, ya que podrían producirse desperfectos por fugas, polvo y otras materias. De permanecer encendido en tal estado, el convertidor podría incendiarse.
■ Manipulación  Precaución	
 Contacto prohibido	No toque las aletas de radiación de calor ni las resistencias de descarga. Estos dispositivos están muy calientes, por lo que podría sufrir quemaduras si los toca.
 Acción obligatoria	Utilice un convertidor que se ajuste a las especificaciones eléctricas y al motor trifásico de inducción empleado. Si el convertidor utilizado no se ajusta a dichas especificaciones, no sólo se impedirá que el motor trifásico de inducción gire correctamente, sino que podrían producirse accidentes graves por recalentamiento e incendios.
■ Transporte e instalación  Advertencia	
 Prohibido	- No instale o utilice el convertidor si está dañado o le falta algún componente. Podrían provocar descargas eléctricas o incendios. Para las reparaciones, llame a su distribuidor Toshiba. - No coloque objetos inflamables cerca del convertidor. - Si se produce un accidente con emisión de llamas, podría producirse un incendio. - No instale el convertidor en un lugar donde pudiera entrar en contacto con agua u otros líquidos. Podrían provocar descargas eléctricas o incendios.
 Acción obligatoria	- Utilice el convertidor en las condiciones ambientales indicadas en el manual de instrucciones. De utilizarse en otras condiciones, podrían producirse desperfectos. - Monte el convertidor sobre una placa metálica. El panel trasero se recalienta excesivamente. No instale el convertidor en un objeto inflamable, ya que podría producirse un incendio. - No utilice el convertidor con la tapa del bloque de terminales quitada. Podrían producirse descargas eléctricas. De no cumplir esta recomendación, podría existir un riesgo de descarga eléctrica con resultado de muerte o lesiones graves. - Debe instalarse un dispositivo de parada de emergencia conforme a las especificaciones del sistema (p.ej., desconexión de la entrada de tensión y accionamiento del freno mecánico). El convertidor no puede parar la marcha por sí sólo, lo que podría provocar un accidente o lesiones. - Sólo se pueden utilizar las opciones especificadas por Toshiba. - El uso de cualquier otra opción podría provocar un accidente. - Si se utiliza un dispositivo de conmutación para el convertidor, dicho dispositivo deberá instalarse dentro de un armario. - De no cumplir esta recomendación, podría producirse un riesgo de descarga eléctrica.

■ Transporte e instalación  Precaución	
 Prohibido	• Cuando transporte o desplace el convertidor, no lo sujete por las tapas del panel frontal. Las tapas pueden desprenderse dejando caer la unidad, lo que podría provocar lesiones. • No instale el convertidor en lugares donde pueda estar sometido a vibraciones intensas. Esto podría hacer caer el aparato, provocando lesiones corporales.
 Acción obligatoria	• Cuando desmonte e instale la tapa del bloque de terminales utilizando un destornillador, procure no arañarse la mano, ya que podría sufrir heridas. • Si ejerce demasiada presión sobre el destornillador, podría arañar el convertidor. • Desconecte la alimentación cuando vaya a quitar la tapa del bloque de terminales. • Una vez realizadas todas las conexiones, vuelva a colocar la tapa del bloque de terminales. • La unidad principal debe instalarse sobre una base que pueda soportar su peso. • Si se instala sobre una base que no soporte dicho peso, la unidad podría caerse y provocar lesiones. • Si fuese necesario un dispositivo de freno (para retener el eje del motor), instale un freno mecánico. La instalación del freno en el convertidor no funcionará como retención mecánica, por lo que, de utilizarse con tal finalidad, podría provocar lesiones.
■ Cableado  Advertencia	
 Prohibido	• No conecte la alimentación a los terminales (lado motor) de salida (U/T1, V/T2, W/T3). Conectar la tensión de entrada a la salida podría destruir el convertidor o provocar un incendio. • No inserte una resistencia de frenado entre los terminales de CC (entre PA/+ PC/- o PO y PC/-). Podría provocar un incendio. • En primer lugar, desconecte la tensión de entrada y espere al menos 15 minutos antes de tocar los terminales y cables del equipo (MCCB) conectados a la parte eléctrica del convertidor. • Si toca los terminales y cables antes, podría sufrir una descarga eléctrica. • No desconecte la fuente de alimentación externa cuando los terminales VIA y VIB se utilicen como terminales de entrada lógica externa. Podría tener resultados imprevistos ya que los terminales VIA y VIB están en estado activado.
 Acción obligatoria	• Los trabajos de electricidad deben ser realizados por personal cualificado. • Si la conexión de la tensión de entrada fuera realizada por alguien sin conocimientos expertos, podría producirse un incendio o una descarga eléctrica. • Conecte los terminales de salida (lado motor) correctamente. Si la secuencia de fases es incorrecta, el motor funcionará de forma inversa, pudiendo provocar lesiones. • El cableado debe realizarse después de la instalación. • Si el cableado se realiza antes de la instalación, podrían producirse lesiones o descargas eléctricas. • Antes de realizar el cableado, deben seguirse estos pasos: (1) Desconecte la alimentación. ; (2) Espere al menos 15 minutos, y compruebe que el indicador de carga ya no está encendido. ; y (3) Utilice un medidor que pueda medir tensiones CC (400V/800 V CC o más), y compruebe que la tensión a los circuitos principales de CC (a través de PA/+ - PC/-) no es mayor de 45 V. Si estos pasos no se realizan correctamente, el cableado provocará descargas eléctricas. • Apriete los tornillos del bloque de terminales con el par especificado. • Si los tornillos no se aprietan con el par especificado, podría producirse un incendio. • Compruebe que la tensión de alimentación de entrada es el +10%, -15% de la tensión de alimentación nominal ($\pm 10\%$ cuando la carga es del 100% en funcionamiento continuo) y que figura en la placa de identificación. Si la tensión de alimentación de entrada no es el +10%, -15% de la tensión de alimentación nominal ($\pm 10\%$ cuando la carga es del 100% en funcionamiento continuo), podría producirse un incendio. • Ajuste el parámetro F $\frac{1}{2}$ $\frac{1}{2}$ cuando los terminales VIA o VIB sean utilizados como terminal de entrada. Si no se configura, podría producirse un desperfecto.
 Conexión a tierra	• La conexión a tierra debe realizarse de forma segura. • Si la conexión a tierra no se realiza de forma segura, podría producirse una descarga eléctrica o un incendio.
■ Cableado  Precaución	
 Prohibido	• No conecte dispositivos con condensadores integrados (como filtros de ruido o disipador de sobretensiones) a los terminales (lado motor) de salida. Podría provocar un incendio.

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■ Operaciones		⚠ Advertencia
	Prohibido	- No toque el conector interno cuando la tapa de terminales superior del panel de control esté abierta. Existe riesgo de descarga al portar alta tensión. - No toque los terminales del convertidor cuando éste reciba tensión eléctrica aunque el motor esté parado. Si toca los terminales del convertidor con la alimentación conectada, podría sufrir una descarga eléctrica. - No toque los interruptores con las manos mojadas, ni intente limpiar el convertidor con un paño húmedo. De hacerlo, podría sufrir una descarga eléctrica.
	Acción obligatoria	- Conecte la alimentación de entrada únicamente cuando la tapa del bloque de terminales esté colocada. Si se coloca en un armario y se utiliza con la tapa del bloque de terminales quitada, cierre las puertas del armario antes de conectar la alimentación. Si se conecta la alimentación con la tapa del bloque de terminales o las puertas del armario abiertas, podría producirse una descarga eléctrica. - Asegúrese de que las señales de funcionamiento están apagadas antes de reiniciar el convertidor después de una avería. Si el convertidor se reinicia antes de que se apague la señal de funcionamiento, el motor podría ponerse en marcha repentinamente y provocar lesiones. - En el caso de un ajuste incorrecto, el mecanismo puede experimentar ciertos daños o un movimiento imprevisto. Configure el menú de ajuste correctamente.
■ Operaciones		⚠ Precaución
	Prohibido	Observe todos los rangos de operación tolerados de motores y equipos mecánicos. (Consulte el manual de instrucciones del motor.) De no observar estos rangos, se podrían producir lesiones.
	Acción obligatoria	- Utilice un convertidor que se ajuste a las especificaciones eléctricas y al motor trifásico de inducción empleado. Si el convertidor utilizado no se ajusta a dichas especificaciones, no sólo se impedirá que el motor trifásico de inducción gire correctamente, sino que podrían producirse accidentes graves por recalentamiento e incendios. - La corriente de fuga a través de los cables eléctricos de entrada/salida del convertidor y la capacidad del motor podrían afectar a los dispositivos periféricos. El valor de la corriente de fuga aumenta según la frecuencia portadora PWM y la extensión de los cables eléctricos de entrada/salida. Si la extensión total del cable (longitud total entre el convertidor y los motores) es mayor de 100 m, puede producirse un fallo por sobrecarga aunque la intensidad del motor esté sin carga. Deje espacio suficiente entre cada cable de fase o instale el filtro (MSF) como contramedida.
■ Inspección y mantenimiento		⚠ Advertencia
	Prohibido	No sustituya las piezas. Esto podría provocar una descarga eléctrica, incendio o lesión corporal. Para sustituir las piezas, llame a su distribuidor Toshiba.
	Acción obligatoria	- Este equipo debe inspeccionarse todos los días. Si no se realiza inspección y mantenimiento alguno del equipo, no se podrán detectar errores y desperfectos que podrían ocasionar accidentes. - Antes de realizar la inspección, siga estos pasos. : (1) Desconecte toda entrada de alimentación al convertidor. ; (2) Espere al menos 15 minutos, y compruebe que el indicador de carga ya no está encendido. ; y (3) Utilice un medidor que pueda medir tensiones CC (400V/800V CC o más), y compruebe que la tensión a los circuitos principales de CC (a través de PA/+ - PC/-) es de 45V o menos. Realizar una inspección sin haber realizado estos pasos primero podría provocar una descarga eléctrica.
■ Eliminación		⚠ Precaución
	Acción obligatoria	Si va a deshacerse del convertidor, encargue dicha tarea a un especialista en eliminación de residuos industriales (*). Si lo va a desechar personalmente, el condensador podría explotar o se podrían liberar gases tóxicos y provocar lesiones. (*) Las personas especializadas en el tratamiento de residuos se denominan "recogedores y transportistas de residuos industriales" o "personas encargadas de la eliminación de residuos industriales". Observe la legislación vigente en materia de eliminación de residuos industriales.

II. Función de seguridad

Los manuales siguientes se encuentran al final del manual en japonés (modelo japonés) en el CD-ROM. Consulte dichos manuales para informarse sobre la función de seguridad.

Función de seguridad (STO) : E6581860 Manual de la función de seguridad VF-S15

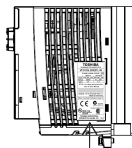
ATEX : E6581861 Guía ATEX VF-S15

Utilice el convertidor siguiendo los pasos 1 a 6.

1. Compruebe la compra realizada

Compruebe que el tipo de convertidor coincide exactamente con el del pedido.

Unidad principal del convertidor



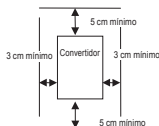
Placa de identificación

Placa de identificación

TOSHIBA			
TRANSISTOR INVERTER			
VFS15S-2002PL			
0.2KW-0.6KVA-0.25HP (0)			
INPUT		OUTPUT	
U/V	1PH 200...240	3PH 200...240	
FREQ	50/60	0.1...500	
AV	3.4	1.5	
SCCR : for rating and protection refer to User Manual			
Serial No. 8118 18001202 0001 (1)			
Made in Indonesia			
Motor Overload Protection Class 10			

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2. Instale el convertidor

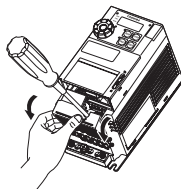


Instalación normal

* En el caso de instalación yuxtapuesta, consulte el manual de instalación.

3. Retire la tapa del bloque de terminales

ej. VFS15S-2002PL



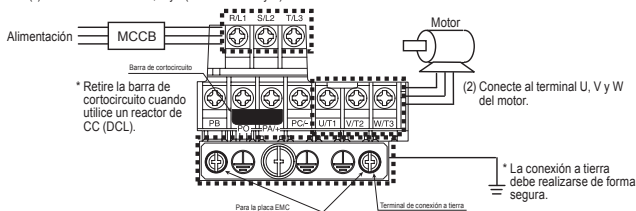
(1) Inserte un destornillador u otro objeto fino en el orificio indicado con la marca .

(2) Mientras presiona el destornillador, gire la tapa de los terminales hacia abajo para retirarla.

(3) A continuación, quite la tapa interior del bloque de terminales.

4. Conecte la fuente de alimentación y el motor (cableado)

(1) Conecte al terminal R, S y T(monofásico: R y S) de la fuente de alimentación.



Bloque de terminales del circuito principal

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Tamaño del tornillo	Par de apriete	
Tornillo M3,5	1,0 N·m	8,9 lb·in
Tornillo M4	1,4 N·m	12,4 lb·in
Tornillo M5	2,4 N·m	20,8 lb·in
Tornillo M6	4,5 N·m	40,0 lb·in
Tornillo M4 (terminal de conexión a tierra)	1,4 N·m	12,4 lb·in
Tornillo M5 (terminal de conexión a tierra)	2,8 N·m	24,8 lb·in

Clase de voltaje	Motor correspondiente (kW)	Dimensiones del cable (mm ²)			
		Circuito principal Nota 1)			Cable a tierra
		Entrada		Salida	
		sin DCL	Con DCL		
Trifásico 240V	0,2-1,5	1,5	1,5	1,5	2,5
	2,2	2,5	1,5	1,5	2,5
	4,0	4,0	2,5	2,5	4,0
	5,5	10	4,0	6,0	10
	7,5	16	6,0	10	16
	11	25	10	16	16
	15	35	16	25	16
Monofásico 240V	0,2-0,75	1,5	1,5	1,5	2,5
	1,5	2,5	2,5	1,5	2,5
	2,2	4,0	4,0	1,5	4,0
	0,4-2,2	1,5	1,5	1,5	2,5
Trifásico 500V	4,0	2,5	1,5	1,5	2,5
	5,5	4,0	1,5	2,5	4,0
	7,5	6,0	2,5	2,5	6,0
	11	10	4,0	6,0	10
	15	16	6,0	10	16

Nota 1) Se estima que la longitud del cable del circuito principal es de 30 m o menos.

5. Encienda la fuente de alimentación

Configure el menú de ajuste tras el encendido.

	Precaución	En el caso de un ajuste incorrecto, el mecanismo puede experimentar ciertos daños o un movimiento imprevisto. Configure el menú de ajuste correctamente.
---	-------------------	--

Dial de ajuste	Indicador LED	Función
	"S E t"	Conecte la alimentación.
	EU JP ASIA USA	Gire el dial de ajuste y seleccione una región.
	in it	Pulse el dial de ajuste.
	0.0	Complete la configuración

Configuración de parámetros	EU	ASIA	USA	JP
Región principal	Europa	Asia, Oceanía	Norteamérica	Japón
	230/400(V)	230/400(V)	230/460(V)	200/400(V)
	50(Hz)	50(Hz)	60(Hz)	60(Hz)

(Nota) Cuando utilice el convertidor con señales externas, seleccione lógica negativa (Sink), lógica positiva (Source) o PLC (fuente de alimentación externa) mediante el SW1.

6. Utilice el convertidor

El panel se puede utilizar sin la configuración por defecto.

La frecuencia (velocidad) se puede modificar con el dial.

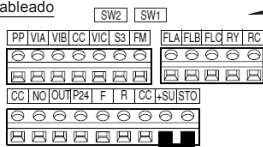


Arranca con el botón RUN y se detiene con el botón STOP.

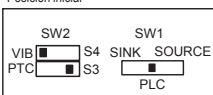
7. Utilice el convertidor con señales externas

Conecte el circuito de control, defina el parámetro y seleccione SW1.

7.1 Cableado



Posición inicial



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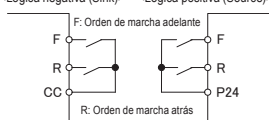


(+) Tornillo para bloque de terminales de control desmontable

Conector RS485

Mando de funcionamiento

<Lógica negativa (Sink)> <Lógica positiva (Source)>



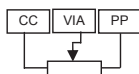
Marcha adelante cuando F-CC o F24-F está en ON.

Tamaño del tornillo	Par de apriete recomendado	Longitud de desajado:
Tornillo M3	0,5 N·m 4,4 lb·in	6 (mm)
		Destornillador:
		Tipo plano pequeño (Grosor de la hoja: 0,5 mm, anchura de la hoja: 3,5 mm)

Conductor	1 hilo	2 hilos del mismo tamaño
Macizo	0,3-1,5 mm ² (AWG 22-16)	0,3-0,75 mm ² (AWG 22-18)
Trenzado		

Configuración de la frecuencia

- 1) Potenciometro 2) Entrada de corriente (de 4 a 20 mA) 3) Entrada de tensión (de 0 a 10 V) o (de -10 a +10 V)



$F_{NO}d=1$
 $F_{IO}g=0$ o 1
(Analógico)



$F_{NO}d=8$



$F_{NO}d=2$
 $F_{IO}g=0$ (-10V), 1 (-10~+10V)
 $F_{IO}g=0$ (Analógico)

7.2 Configuración de parámetros

Determine el método de funcionamiento con $F_{NO}d$ y la configuración de la frecuencia con $F_{IO}g$.

Título	Función	Escala de ajuste	Configuración por defecto
$F_{NO}d$	Selección del modo de mando	0: Bloque de terminales, 1: Panel 2: RS485, 3: CANopen, 4: Opción	1
$F_{IO}g$	Selección del modo de configuración de la frecuencia 1	0: Dial de ajuste 1, 1: Terminal VIA 2: Terminal VIB, 3: Dial de ajuste 2 4: RS485, 5: UP/DOWN de entrada lógica 6: CANopen, 7: Opción de comunicación 8: Terminal VIC 11: Entrada de tren de impulsos, 14: SrQ	0

Seleccione la señal del terminal VIA y VIB

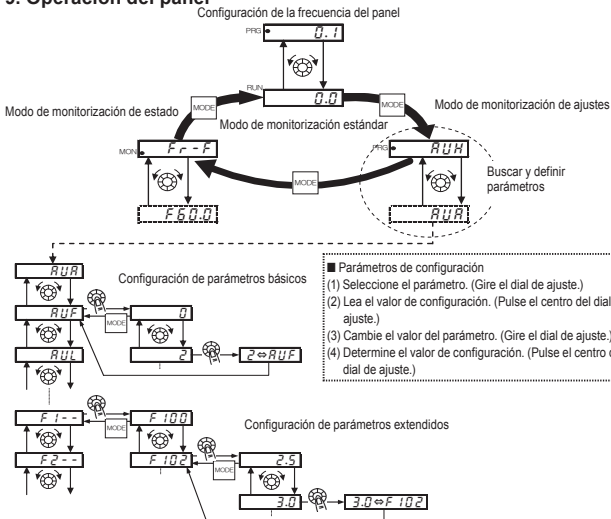
$F_{IO}g$	Selección de terminal de entrada analógica (VIB)	0: 0~+10V, 1: -10~+10V	0
$F_{IO}g$	Selección de entrada analógica/lógica (VIA/VIB)	0 a 4 *Consulte el manual de instrucciones para obtener más información.	0

8. Parámetros principales

Contenido	Título	Función	Escala de ajuste	Configuración por defecto
Defina el tiempo de aceleración/desaceleración para adecuarlo a la maquinaria. El valor ACC/dEC es el tiempo que tarda la frecuencia de salida desde 0Hz al valor FH .	ACC	Tiempo de aceleración 1	0.0-3600 (360.0) (s)	10,0
	dEC	Tiempo de desaceleración 1	0.0-3600 (360.0) (s)	10,0
	FH	Frecuencia máxima	30.0-500.0 (Hz)	80,0
Defina el límite superior e inferior de la frecuencia de salida	UL	Frecuencia límite superior	0,5- FH (Hz)	*1
	LL	Frecuencia límite inferior	0,0- UL (Hz)	0,0
Seleccione el modo de control V/f según la maquinaria	Pt	Selección del modo de control V/F	0: Constante V/F 1: Par variable 2: Control de aumento automático de par 3: Control vectorial 4: Ahorro de energía 5: Ahorro de energía dinámico 6: Control del motor PM 7: Configuración de V/F de 5 puntos	*1
Ajuste el nivel de protección termo-electrónica del motor.	thr	Nivel de protección termo-electrónica del motor 1	10-100 (%(A))	100

*1: Los valores de configuración por defecto varían en función de la configuración del menú de ajuste.

9. Operación del panel



10. Consulte el manual de instrucciones en relación con la operación aplicada o avería

TOSVERT VF-S15

Additional sheet

TOSVERT VF-S15 listed on the following table integrates the "Safe Torque Off" function.

Read this additional sheet and the instruction manual attached the product before using "Safe Torque Off" function.

■ Safety function

Safe Torque Off (STO) function according to EN/IEC 61508 SIL2 and ISO 13849-1 category 3 PL"d".

Range	Reference		
	Three phase 200 to 240Vac	Single phase 200 to 240Vac	Three phase 380 to 500Vac
0.2 kW	VFS15-2002PM-_/Y-A*	VFS15S-2002PL-_/W1/Y-A*	-----
0.4 kW	VFS15-2004PM-_/W1/Y-A*	VFS15S-2004PL-_/W1/Y-A*	VFS15-4004PL-_/W1/Y-A*
0.75 kW	VFS15-2007PM-_/W1/Y-A*	VFS15S-2007PL-_/W1/Y-A*	VFS15-4007PL-_/W1/Y-A*
1.5 kW	VFS15-2015PM-_/W1/Y-A*	VFS15S-2015PL-_/W1/Y-A*	VFS15-4015PL-_/W1/Y-A*
2.2 kW	VFS15-2022PM-_/W1/Y-A*	VFS15S-2022PL-_/W1/Y-A*	VFS15-4022PL-_/W1/Y-A*
3.7 / 4.0 kW	VFS15-2037PM-_/W1/Y-A*	-----	VFS15-4037PL-_/W1/Y-A*
5.5 kW	VFS15-2055PM-_/W1/Y-A*	-----	VFS15-4055PL-_/W1/Y-A*
7.5 kW	VFS15-2075PM-_/W1/Y-A*	-----	VFS15-4075PL-_/W1/Y-A*
11 kW	VFS15-2110PM-_/W1/Y-A*	-----	VFS15-4110PL-_/W1/Y-A*
15 kW	VFS15-2150PM-_/W1/Y-A*	-----	VFS15-4150PL-_/W1/Y-A*

Related Documents

Title of Documentation	Reference number
VF-S15 Instruction manual	E6581611
VF-S15 Quick Start manual	E6581929
VF-S15 Safety manual (Note)	E6581860
VF-S15 Atex manual (Note)	E6581861

(Note) E6581860 is Original instructions.

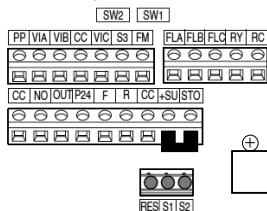
These are at the back of the Japanese manual (Japanese model) in CD-ROM.

1. Description of control terminals

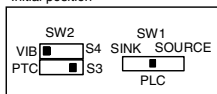
The model integrated the "Safe Torque Off" function has STO terminal.

In default setting, terminals +SU and STO is short-circuited by shorting bar.

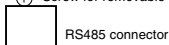
1.1 Terminal layout of control blocks



Initial position



⊕ Screw for removable control terminal block



■ Control circuit terminals

Terminal symbol	Input / output	Function	Electrical specifications	Inverter internal circuits
FM	Output	Multifunction programmable analog output. Default setting: output frequency. The function can be changed to meter option (0-1mA), 0-10Vdc voltage or 0-20mA (4-20mA) current output by parameter $F681$ setting. Resolution Max. 1/1000.	1mA dc full-scale ammeter or QS60T(option) 0-20mA (4-20mA) DC ammeter Permissible load resistance: 600Ω or less 0-10V DC volt meter Permissible load resistance: 1kΩ or more	
P24	Output	24Vdc power output	24Vdc-100mA	
	Input	This terminal can be used as a common terminal when an external power supply is used by changing SW1 to PLC side.	-	
+SU	Input	DC power input terminal for operating the control circuit. Connect a control power backup device (option or 24Vdc power supply) between +SU and CC.	Voltage: 24Vdc ± 10% Current: 1A or more	
	Output	It is used with STO for safety function. +SU and STO terminals are short-circuited by metal bar and the inverter is put into a standby state at default setting. When the circuit between them is opened, the motor is coasting stop.	-	
STO Note 1)	Input	When +SU and STO are short-circuited, the inverter is put into a standby state. (Default setting) And when the circuit between them is opened, the motor is coasting stop. These terminals can be used for inter lock. This terminal is not a multifunction programmable input terminal. It is a terminal with the safety function that complies with SIL II of the safety standard IEC61508.	Independently of SW1 ON: DC17V or more OFF: Less than DC12V (OFF: Coast stop)	

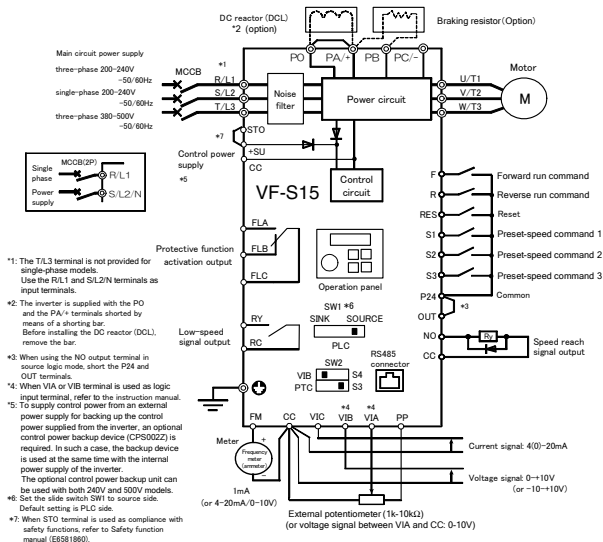
Note 1) When STO terminal is used as the safety function, refer to Safety manual and ATEX manual.

Note 2) Refer the other control terminals to section 2.3.2 of instruction manual.

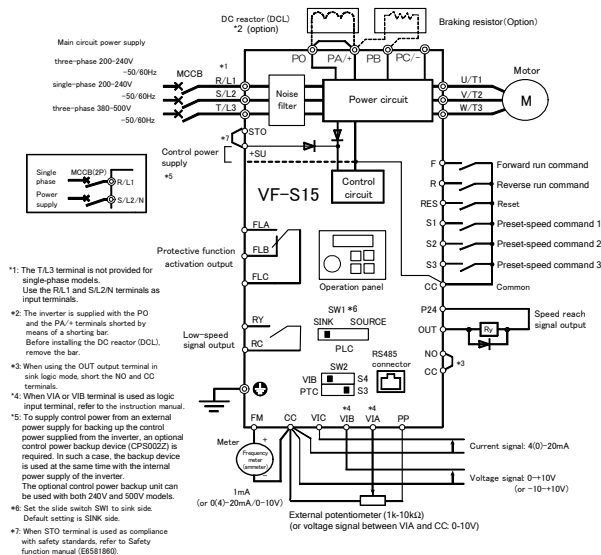
2. Standard connection diagram

This diagram shows a standard wiring of the main circuit.

Standard connection diagram – SOURCE (Positive) (common;P24)



Standard connection diagram – SINK (Negative) (common:CC)



3. Additional functions

Following functions and information are available in the model.

[Output terminal functions]

Function No.	Code	Function	Action
152	STO	Safe torque off signal	ON : Opening terminals between +SU and STO. OFF: Shorting terminals between +SU and STO.
153	STON	Inversion of safe torque off signal	Inversion of STO

[Trip information]

Error code	Failure code	Problem	Possible causes	Remedies
P-F	003B	Safe torque off error	•Error of safe torque off circuit	•Contact your Toshiba distributor.

[Alarm information] The message in the table is displayed to give a warning but does not cause the inverter to trip.

Error code	Problem	Possible causes	Remedies
P-R	STO signal OFF	•STO terminal is in open-circuit. •Input voltage of STO terminal is low. •P24 terminal (24Vdc power output) is in overload.	•Close STO and + SU circuit. •Check the load of P24 terminal, if STO and +SU is shorted. •Use P24 terminal within 100mA, including the transient response.

Appendix: Manufacturer's Declaration of Conformity

TOSHIBA

EU DECLARATION OF CONFORMITY

We : TOSHIBA (TSIJ)
1-19-30, Aoi Higashi-Ku, Nagoya,
Aichi, 461-0004 JAPAN

Hereby declare under our own responsibility that the products:

Trademark	Toshiba
Product, Type	TOSVERT VF-S15 & dedicated options
List of reference and options	See next pages

Are in conformity with the requirements of the following directives and conformity was checked in accordance with the following standards.

Directive	Harmonized standard / Notified body reference
LV Directive 2014/35/EU	EN 61800-5-1:2007 Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – Electrical, thermal and energy. (IEC 61800-5-1:2007)
EMC Directive 2014/30/EU	EN 61800-3: 2004 + A1:2011 Adjustable speed electrical power drive systems – part 3: EMC requirements and specific test methods. (IEC 61800-3:2004)
Machine Directive 2006/42/EC	EN ISO 13849-1:2008 :Category 3 PLd Safety of machinery – Safety-related parts of control systems. EN61800-5-2:2007 SIL2 Adjustable speed electrical power drive systems – Part 5-2: Safety requirements – Functional. (IEC 61800-5-2:2007) EN 62061-2 :SIL2 CL2 Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems. A mandatory certification has been carried out by INERIS Parc Technologique ALATA bp 2, 60550 Verneuil en Halatte - France (European Notified Body identified under the number 0080) EC type examination 0080.5454.520.02.12.0058
ATEX Directive 2014/34/EU (*) According to art 41.2, certificates issued under Directive 94/9/EC shall be valid under this Directive	EN50495:2010 :SIL2 Safety devices required for the safe functioning of equipment with respect to explosion risks. EC type examination certificate ref INERIS 11 ATEX 0023X(*)  II (2) GD The manufacturing quality assurance system of the manufacturing plants have been audited under the following references by INERIS Parc Technologique ALATA bp 2, 60550 Verneuil en Halatte - France (European Notified Body identified under the number 0080) : notification references • INERIS07ATEXQ709 for TSiC in Japan • INERIS08ATEXQ705 for SEMB in Indonesia

And also the standards:

UL508C: 2010, CSA 22.2N14 & CSA 22.2N274: 2013
IEC 61508 (2010) (part 1, 2 and 3) :SIL2
EN 954-1 (1998) : Category 3
IEC 60204-1: 2009 (Stop function Category 0 & 1 with Preventa relay) :

Subject to correct installation, maintenance and use conforming to its intended purpose, to the applicable regulations and standards, to the supplier's instructions and to accepted rules of the art.

This declaration becomes invalid in the case of any modification to the products not authorized by us.

Compliance with the ATEX, Machinery & EMC Directives will require the application of the ATEX guide, Safety guide and EMC guide giving requirements, details and advices for installation of products used.
The guides are attached with the product.

TOSHIBA**EU DECLARATION OF CONFORMITY**

Person in charge of technical documentation:

Name: Fredric Roussel
Certification Manager, S.T.I.E.
Rue Andre Blanchet, 27120 Pacy sur Eure, France
Signature:



Issued at Nagoya, Aichi – JAPAN: 20th Apr 2016:

Name: Shin Okada
Offer Marketing, Senior Manager

Signature:



TOSHIBA

EU DECLARATION OF CONFORMITY

List of references VF-S15:

Single phase 200V to 240Vac

Reference	Range
VFS15S-2002PL- /W1/Y-A*	0.2 kW
VFS15S-2004PL- /W1/Y-A*	0.4 kW
VFS15S-2007PL- /W1/Y-A*	0.75 kW
VFS15S-2015PL- /W1/Y-A*	1.5 kW
VFS15S-2023PL- /W1/Y-A*	2.2 kW

Three phase 200V to 240Vac

Reference	Range
VFS15-2002PM- /W1/Y-A*	0.2 kW
VFS15-2004PM- /W1/Y-A*	0.4 kW
VFS15-2007PM- /W1/Y-A*	0.75 kW
VFS15-2015PM- /W1/Y-A*	1.5 kW
VFS15-2022PM- /W1/Y-A*	2.2 kW
VFS15-2037PM- /W1/Y-A*	3.7 / 4.0 kW
VFS15-2055PM- /W1/Y-A*	5.5 kW
VFS15-2075PM- /W1/Y-A*	7.5 kW
VFS15-2110PM- /W1/Y-A*	11 kW
VFS15-2150PM- /W1/Y-A*	15 kW

Three phase 380V to 500Vac

Reference	Range
VFS15-4004PL- /W1/Y-A*	0.4 kW
VFS15-4007PL- /W1/Y-A*	0.75 kW
VFS15-4015PL- /W1/Y-A*	1.5 kW
VFS15-4022PL- /W1/Y-A*	2.2 kW
VFS15-4037PL- /W1/Y-A*	3.7 / 4.0 kW
VFS15-4055PL- /W1/Y-A*	5.5 kW
VFS15-4075PL- /W1/Y-A*	7.5 kW
VFS15-4110PL- /W1/Y-A*	11 kW
VFS15-4150PL- /W1/Y-A*	15 kW

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EU DECLARATION OF CONFORMITY

Options list:

Category	Option	Reference
Communication option	CANopen 2 x RJ45	CAN001Z
	CANopen Sub-D	CAN002Z
	CANopen open terminal	CAN003Z
	CC-Link	CCL003Z
	DeviceNet	DEV003Z
	EtherNET/IP – Modbus TCP	IPE002Z
	EtherCAT	IPE003Z
	PROFINET	PNE001Z
	PROFIBUS-DP	PDP003Z
	Communication adaptor	SBP009Z
Extension panel	LED keypad	RKP007Z
Parameter writer	Parameter writer	PWU003Z
Power option	EMC input RFI filter	EMFS11-2007AZ
		EMFS11-4015BZ
		EMFS11-4025CZ
		EMFS11-4047DZ
		EMFS11-4049EZ
		EMFS11-2083bZ
		EMFS11S-2009AZ
		EMFS11S-2016BZ
		EMFS11S-2022CZ

TOSVERT VF-S15 한국 KC 마크 대응에 대해서

도시바산업용 인버터 TOSVERT VF-S15 은, 한국 전파법에 적합한 기기입니다.
한국에서 본제품을 사용하게될 경우, 아래내용에 주의하여 주십시오.

A 급 기기 (업무용 방송통신기자재)

이 기기는 업무용(A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

본제품은, 다음의 EMC대책을 마련하는것을 조건으로하여 한국 전파법 준하고 있습니다. 올바른 EMC대책을 준비하신후 사용하여 주십시오.

① 인버터 입력측에 EMC필터를 삽입하여 주십시오.

EMC 필터는 아래의 표에 포함되어 있는 제품을 사용하여 주십시오. 전도 노이즈의 적합성 평가는 이 조합으로 진행되고 있습니다. 일부기종에서는 EMC 필터를 내장하고 있으나, 동력선이 길 경우와 노이즈 억제 효과를 높이고 싶을 경우는, EMC 필터를 삽입해 주십시오.

② 인버터 출력 케이블등의 차폐 전원 케이블과 차폐 제어 케이블을 사용하십시오. 그리고 케이블과 전선을 잘 배선하여 길이를 가능한 짧게하여 주십시오. 전원 케이블과 제어 케이블 사이 및 전원 케이블의 입력 전선과 출력 전선 사이에 공간을 두고, 나란히 배선하거나 함께 묶지 않도록 주의하여 주십시오. 만약 필요하실 경우 직각교차형태로 사용하여 주십시오.

③ 인버터를 철재 제어반안에 설치할 경우 방사노이즈를 제한하는데 더 효과적입니다. 가능한 두껍고 짧은 전선을 사용하여, 접지 케이블과 전원 케이블 사이에 공간을 둔 상태로 금속판과 제어판을 확실하게 접지시켜주십시오.

④ 가능한 입력 전선과 출력 전선을 따로 배선하십시오.

⑤ 케이블의 방사노이즈를 억제하려면 노이즈 차단판으로 모든 차폐 케이블을 접지시키십시오. 인버터와 조작반사이의 공간(서로 반경 10cm 이내)에 차폐 케이블을 접지시키는 것이 효과적입니다. 차폐 케이블에 페라이트 코어를 삽입하면 방사 노이즈를 제한하는데 더욱 효과적입니다.

⑥ 인버터 출력선에 영상(零相)리액터를 삽입하고, 금속판과 제어반의 접지 케이블에 페라이트 코어를 삽입하면 더욱 효과적인 방사노이즈가 가능합니다.

표 인버터와 EMC 필터 결합

3 상 240V 급

인버터 타입	인버터와 필터의 결합	
	5m 이하의 모터 배선 길이	
VFS15-2002PM	EMFS11-2007AZ	
VFS15-2004PM	EMFS11-2007AZ	
VFS15-2007PM	EMFS11-2007AZ	
VFS15-2015PM	EMFS11-4015BZ	
VFS15-2022PM	EMFS11-4015BZ	
VFS15-2037PM	EMFS11-4025CZ	
VFS15-2055PM	EMFS11-4047DZ	
VFS15-2075PM	EMFS11-4047DZ	
VFS15-2110PM	EMFS11-2083EZ	
VFS15-2150PM	EMFS11-2083EZ	

3 상 500V 급

인버터 타입	인버터와 필터의 결합	
	5m 이하의 모터 배선 길이	50m 이하의 모터 배선 길이
VFS15-4004PL	내장형 필터	EMFS11-4015BZ
VFS15-4007PL	내장형 필터	EMFS11-4015BZ
VFS15-4015PL	내장형 필터	EMFS11-4015BZ
VFS15-4022PL	내장형 필터	EMFS11-4025CZ
VFS15-4037PL	내장형 필터	EMFS11-4025CZ
VFS15-4055PL	내장형 필터	EMFS11-4047DZ
VFS15-4075PL	내장형 필터	EMFS11-4047DZ
VFS15-4110PL	내장형 필터	EMFS11-4049EZ
VFS15-4150PL	내장형 필터	EMFS11-4049EZ

단상 240V 급

인버터 타입	인버터와 필터의 결합	
	5m 이하의 모터 배선 길이	50m 이하의 모터 배선 길이
VFS15S-2002PL	내장형 필터	EMFS11S-2009AZ
VFS15S-2004PL	내장형 필터	EMFS11S-2009AZ
VFS15S-2007PL	내장형 필터	EMFS11S-2009AZ
VFS15S-2015PL	내장형 필터	EMFS11S-2016BZ
VFS15S-2022PL	내장형 필터	EMFS11S-2022CZ

Additional sheet

The VF-S15 models that conform to the UL Standard and CSA Standard have the UL/CSA mark on the nameplate. This additional sheet is correction and additional information of as appendix for section 9.2 in E6581610 (E6581612) and E6581926.

1. General

The following steps must be performed before wiring and servicing.

(1) Turn off all input power.

(2) Wait at least fifteen minutes and check to make sure that the charge lamp is no longer lit.

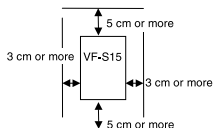
(3) Use a tester that can measure DC voltage (800VDC or more), and check to make sure that the voltage to the DC main circuits (across PA/+ and PC/+) is 45V or less.

If these steps are not properly performed, the wiring will cause electric shock.

2. Compliance with Installation

A UL certificate was granted on the assumption that the inverter would be installed in an enclosure. Therefore, install the inverter in an enclosure and if necessary, take measures to maintain the inverter ambient temperature (temperature in the enclosure) within the specified temperature range.

Standard installation



Environments

Location of use	Indoors; not exposed to direct sunlight, corrosive gas, explosive gas, flammable gas, oil mist, or dust; and vibration of less than 5.9m/s^2 (10 to 55Hz).
Elevation	1000 m or less
Ambient temperature	-10 to +40°C (50°C) Maximum Surrounding Air Temperature 40 °C (with the protective label on the top of the inverter) 50 °C (without the protective label on the top of the inverter, except 0.75 kW or less in 200/240 V class)
Storage temperature	-25 to +70°C
Relative humidity	5 to 95% (free from condensation and vapor).

Current reduction

According to the carrier frequency F_{300} setting, you may need to reduce the inverter's continuous output current. Reduction rates vary depending on the capacity of the inverter.

[Single-phase/Three-phase 200/240V class]

VF-S15- VF-S15S-	Ambient temperature	Input voltage 200V to 240V PWM carrier frequency	
		2.0k to 4.0kHz	4.1k to 12.0kHz
2002PM 2002PL	40°C or less	1.5 A	
2004PM 2004PL	40°C or less	3.3 A	
2007PM 2007PL	40°C or less	4.8 A	
2015PM 2015PL	40°C or less	8.0 A	7.9 A
	Above 40 to 50°C	8.0 A	
2022PM 2022PL	40°C or less	11.0 A	10.0 A
	Above 40 to 50°C	11.0 A	

[Three-phase 200/240V class]

VFS15-	Ambient temperature	Input voltage 200V to 240V	
		PWM carrier frequency	
		2.0k to 4.0kHz	4.1k to 12.0kHz
2037PM	40°C or less	17.5 A	16.4 A
	Above 40 to 50°C	17.5 A	
2055PM	40°C or less	27.5 A	25.0 A
	Above 40 to 50°C	27.5 A	
2075PM	40°C or less	33.0 A	33.0 A
	Above 40 to 50°C	33.0 A	
2110PM	40°C or less	54.0 A	49.0 A
	Above 40 to 50°C	54.0 A	
2150PM	40°C or less	66.0 A	60.0 A
	Above 40 to 50°C	66.0 A	

[Three-phase 400/500V class]

VFS15-	Ambient temperature	Input voltage 380V to 480V		Input voltage Above 480V to 500V	
		PWM carrier frequency		PWM carrier frequency	
		2.0k to 4.0kHz	4.1k to 12.0kHz	2.0k to 4.0kHz	4.1k to 12.0kHz
4004 PL	40°C or less	1.5 A	1.5 A	1.5 A	1.5 A
	Above 40 to 50°C	1.5 A		1.5 A	
4007 PL	40°C or less	2.3 A	2.1 A	2.1 A	1.9 A
	Above 40 to 50°C	2.3 A		2.1 A	
4015 PL	40°C or less	4.1 A	3.7 A	3.8 A	3.4 A
	Above 40 to 50°C	4.1 A		3.8 A	
4022 PL	40°C or less	5.5 A	5.0 A	5.1 A	4.6 A
	Above 40 to 50°C	5.5 A		5.1 A	
4037 PL	40°C or less	9.5 A	8.6 A	8.7 A	7.9 A
	Above 40 to 50°C	9.5 A		8.7 A	
4055 PL	40°C or less	14.3 A	13.0 A	13.2 A	12.0 A
	Above 40 to 50°C	14.3 A		13.2 A	
4075 PL	40°C or less	17.0 A	17.0 A	15.6 A	14.2 A
	Above 40 to 50°C	17.0 A		15.6 A	
4110 PL	40°C or less	27.7 A	25.0 A	25.5 A	23.0 A
	Above 40 to 50°C	27.7 A		25.5 A	
4150 PL	40°C or less	33.0 A	30.0 A	30.4 A	27.6 A
	Above 40 to 50°C	33.0 A		30.4 A	

Note) For 0.75 kW or less in 200/240 V class, maintain the ambient temperature of 40°C or less for the compliance with UL standard. For "Above 40°C to 50°C" of the ambient temperature except 0.75 kW or less in 200/240 V class, remove the protective label on the top of the inverter for the compliance with UL standard.

3. Compliance with Connection

Use the UL conformed cables (Rating 75 °C or more, Use the copper conductors only,) to the main circuit terminals (R/L1, S/L2, T/L3, U/T1, V/T2, W/T3).

- ⇒ For recommended tightening torque, see Table 1.
- ⇒ Use the ring terminal for the earth cables, see Table 2.
- ⇒ For recommended electric wire sizes, see Table 3.4.
- ⇒ Use the electric wire of Class1 for the control circuits.

For instruction in the United States, Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

For instruction in the Canada, Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the Canadian Electrical Code and any additional local codes.

Table 1 Tighten the screws to specified torque

Recommended tightening torque for screws on the terminal board		
	N·m	lb·in
M3.5	1.0	8.9
M4	1.4	12.4
M5	2.4	20.8
M6	4.5	40.0
M4 (grounding terminal)	1.4	12.4
M5 (grounding terminal)	2.8	24.8

Table 2 Ring terminal sizes for earth cables

Earth Cable Sizes	M4 (grounding terminal)	M5 (grounding terminal)
AWG14	R2-4 [JIS standard]	R2-5 [JIS standard]
AWG12	R5.5-4 [JIS standard]	R5.5-5 [JIS standard]
AWG10	R5.5-4 [JIS standard]	R5.5-5 [JIS standard]

AIC, Fuse and Wire sizes

Use the UL listed fuses at connecting to power supply.

Short circuit test is performed under the condition of the power supply short-circuit currents in below.

These interrupting capacities and fuse rating currents depend on the applicable motor capacities.

Table 3 AIC, Fuses and Wire sizes

Inverter model	Voltage (V)	Input withstand rating (kA)	Output Interrupt rating (kA)	Branch circuit protection	Rating (A)	Cable sizes of power circuit	Earth Cable
Marking	Y	(1)	X (2)	Z1	Z2	-	-
VFS15-2002PM	240	5	5	Class CC	7	AWG 14	AWG 14
VFS15-2004PM	240	5	5	Class CC	7	AWG 14	AWG 14
VFS15-2007PM	240	5	5	Class J	15	AWG 14	AWG 14
VFS15-2015PM	240	5	5	Class J	25	AWG 14	AWG 14
VFS15-2022PM	240	5	5	Class J	25	AWG 12	AWG 14
VFS15-2037PM	240	5	5	Class J	45	AWG 10	AWG 10
VFS15-2055PM	240	22	5	Class J	60	AWG 8	AWG 10
VFS15-2075PM	240	22	5	Class J	70	AWG 6	AWG 10
VFS15-2110PM	240	22	5	Class J	100	AWG 6*2	AWG 8
VFS15-2150PM	240	22	5	Class J	110	AWG 6*2	AWG 8
VFS15S-2002PL	240	1	5	Class CC	7	AWG 14	AWG 14
VFS15S-2004PL	240	1	5	Class J	15	AWG 14	AWG 14
VFS15S-2007PL	240	1	5	Class J	25	AWG 14	AWG 14
VFS15S-2015PL	240	1	5	Class J	40	AWG 10	AWG 12
VFS15S-2022PL	240	1	5	Class J	45	AWG 10	AWG 10
VFS15-4004PL	500	5	5	Class CC	6	AWG 14	AWG 14
VFS15-4007PL	500	5	5	Class CC	6	AWG 14	AWG 14
VFS15-4015PL	500	5	5	Class CC	12	AWG 14	AWG 14
VFS15-4022PL	500	5	5	Class J	15	AWG 14	AWG 14
VFS15-4037PL	500	5	5	Class J	25	AWG 12	AWG 14
VFS15-4055PL	500	22	5	Class J	40	AWG 10	AWG 10
VFS15-4075PL	500	22	5	Class J	40	AWG 8	AWG 10
VFS15-4110PL	500	22	5	Class J	60	AWG 8	AWG 10
VFS15-4150PL	500	22	5	Class J	70	AWG 6	AWG 10

Suitable for use on a circuit capable of delivering not more than ___X___rms symmetrical kilo Amperes, ___Y___ Volts maximum, when protected by ___Z1___ with a maximum rating of ___Z2___.

- (1) Input withstand rating is that for which the product has been designed thermally. Installation on a supply greater than this level will require additional inductance to satisfy this level.
- (2) Output interrupt rating relies on Integral solid state short circuit protection. This does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes. This is dependant on the type of installation.

In case of using with a higher AIC capability up to 100kA(*1), the Short Circuit Current Ratings (SCCR) become 100kA(*1) by installing with the circuit breakers(GV3P) or the fuses listed in Table 4.

Table 4 AIC 100kA, Fuses, Circuit breakers and Wire sizes

Inverter model	Voltage (V)	Branch circuit protection				Cable sizes of power circuit	Earth Cable
		With Fuses		With circuit breakers			
		Class (*2)	Rating (A)	Type-Form (*3)	Setting (A)		
VFS15-2002PM	240	Class J	10	GV3P13	9	AWG 14	AWG 14
VFS15-2004PM	240	Class J	10	GV3P13	9	AWG 14	AWG 14
VFS15-2007PM	240	Class J	15	GV3P13	9	AWG 14	AWG 14
VFS15-2015PM	240	Class J	25	GV3P13	10	AWG 14	AWG 14
VFS15-2022PM	240	Class J	25	GV3P18	18	AWG 12	AWG 14
VFS15-2037PM	240	Class J	45	GV3P25	25	AWG 10	AWG 10
VFS15-2055PM	240	Class J	60	GV3P40	40	AWG 8	AWG 10
VFS15-2075PM	240	Class J	70	GV3P50	50	AWG 6	AWG 10
VFS15-2110PM	240	Class J	100	GV3P65	65	AWG 6*2	AWG 8
VFS15-2150PM	240	Class J	110			AWG 6*2	AWG 8
VFS15S-2002PL	240	Class J	10	GV3P13	9	AWG 14	AWG 14
VFS15S-2004PL	240	Class J	15	GV3P13	9	AWG 14	AWG 14
VFS15S-2007PL	240	Class J	25	GV3P13	13	AWG 14	AWG 14
VFS15S-2015PL	240	Class J	40	GV3P25	25	AWG 10	AWG 12
VFS15S-2022PL	240	Class J	45	GV3P32	32	AWG 10	AWG 10
VFS15-4004PL	480	Class J	6	GV3P13	9	AWG 14	AWG 14
VFS15-4007PL	480	Class J	6	GV3P13	9	AWG 14	AWG 14
VFS15-4015PL	480	Class J	15	GV3P13	9	AWG 14	AWG 14
VFS15-4022PL	480	Class J	15	GV3P13	10	AWG 14	AWG 14
VFS15-4037PL	480	Class J	25	GV3P13	13	AWG 12	AWG 14
VFS15-4055PL	480	Class J	40	GV3P18	18	AWG 10	AWG 10
VFS15-4075PL	480	Class J	40	GV3P25	25	AWG 8	AWG 10
VFS15-4110PL	480	Class J	60	GV3P32	32	AWG 8	AWG 10
VFS15-4150PL	480	Class J	70	GV3P40 (*1)	40	AWG 6	AWG 10

(*1) In case VFS15-4150PL with the circuit breaker, the Short Circuit Current Ratings (SCCR) is 65kA.

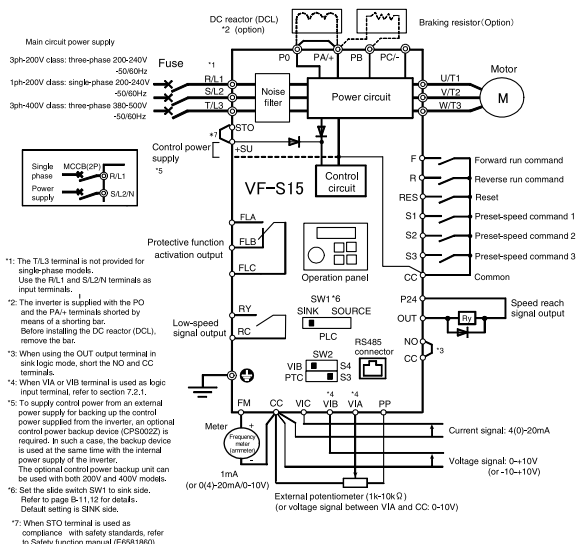
(*2) The manufacturer of the fuses should be "Cooper Bussmann" or "Mersen" (formerly, "Ferraz Shawmut") for the compliance of UL standard.

(*3) The manufacturer of the listed circuit breaker is "Schneider Electric".

Main and control circuit terminals

This diagram shows an example of wiring of the main and control circuit (in case of sink logic).

Standard connection diagram - SINK (Negative) (common:CC)

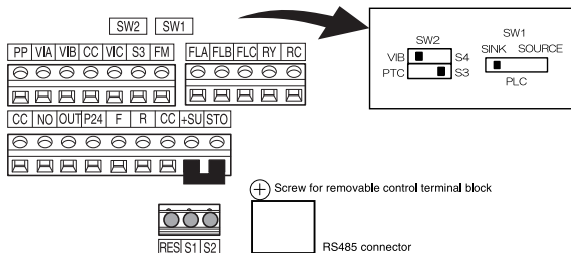
**Main circuit terminals**

Terminal symbol	Terminal function
	Grounding terminal for connecting inverter. There are 3 terminals in cooling fin or mounting part of EMC plate.
R/L1, S/L2, T/L3	200/240 V class : Three-phase 200 to 240V-50/60Hz : Single-phase 200 to 240V-50/60Hz 400/500 V class : Three-phase 380 to 500V-50/60Hz * Single-phase inputs are R/L1 and S/L2/N terminals.
U/T1, V/T2, W/T3	Connect to three-phase motor.
PA+, PB	Connect to braking resistors.
PA+	This is a positive potential terminal in the internal DC main circuit. DC common power can be input between PA/+ terminal and PC/- terminal.
PC/-	This is a negative potential terminal in the internal DC main circuit. DC common power can be input between PC/- terminal and PA/+ terminal.
PO, PA/+	Terminals for connecting a DC reactor (DCL: optional external device). Shorted by a shorting bar when shipped from the factory. Before installing DCL, remove the shorting bar.

The arrangements of power circuit terminals are different from each range.

Control circuit terminals

The control circuit terminal block is common to all equipment.



Screw size	Recommended tightening torque
M3 screw	0.5 N·m 4.4 lb·in

Stripping length: 6 (mm)
Screwdriver: Small-sized flat-blade screwdriver
(Blade thickness: 0.5 mm, blade width: 3.5 mm)

Terminal symbol	Input / output	Function	Electrical specifications
F	Input	Shorting across F-CC or P24-F causes forward rotation; open causes deceleration stop. (When Standby ST is always ON) 3 different functions can be assigned.	No voltage logic input 24Vdc-5mA or less
R	Input	Shorting across R-CC or P24-R causes reverse rotation; open causes deceleration stop. (When Standby ST is always ON) 3 different functions can be assigned.	Sink/Source and PLC selectable using slide switch SW1 (Default setting is Sink side)
RES	Input	This inverter protective function is reset if RES-CC or P24-RES is connected. Shorting RES-CC or P24-RES has no effect when the inverter is in a normal condition. 2 different functions can be assigned.	Pulse train input (S2 terminal) Pulse frequency range: 10pps-2kpps Duty: 50±10%
S1	Input	Shorting across S1-CC or P24-S1 causes preset speed operation. 2 different functions can be assigned.	PTC input (S3 terminal)
S2	Input	Shorting across S2-CC or P24-S2 causes preset speed operation. By changing parameter F145 setting, this terminal can also be used as a pulse train input terminal.	
S3	Input	Shorting across S3-CC or P24-S3 causes preset speed operation. By changing slide switch SW2 and parameter F147 setting, this terminal can also be used as a PTC input terminal.	
CC	Common to Input / output	Control circuit's equipotential terminal (3 terminals)	-
PP	Output	Analog power supply output	10Vdc (permissible load current: 10mA)
VIA (Note 1)	Input	Multifunction programmable analog input. Default setting: 0-10Vdc (1/1000 resolution) and 0-60Hz (0-50Hz) frequency input. By changing parameter F159, this terminal can also be used as a multifunction programmable logic input terminal.	10Vdc (internal impedance: 30kΩ)

Terminal symbol	Input / output	Function	Electrical specifications
V I B Note 1)	Input	Multifunction programmable analog input. Default setting: 0-10Vdc (1/1000 resolution) and 0-60Hz (0-50Hz) frequency input. The function can be changed to -10~+10V input (1/2000 resolution) by parameter $F107=1$ setting. By switching slide switch SW2 and changing parameter $F109$ setting, this terminal can also be used as a multifunction programmable logic input terminal.	10Vdc (internal impedance: 30k Ω)
V I C	Input	Multifunction programmable analog input. 4-20mA (0-20mA) input.	4-20mA (internal impedance: 250 Ω)
FM	Output	Multifunction programmable analog output. Default setting: output frequency. The function can be changed to meter option (0-1mA), 0-10Vdc voltage or 0-20mAdc (4-20mA) current output by parameter $F581$ setting. Resolution Max. 1/1000.	1mAdc full-scale ammeter or QS60T(option) 0-20mA (4-20mA) DC ammeter Permissible load resistance: 600 Ω or less 0-10V DC volt meter Permissible load resistance: 1k Ω or more
P24	Output	24Vdc power output	24Vdc-100mA
	Input	This terminal can be used as a common terminal when an external power supply is used by changing SW1 to PLC side.	-
+SU	Input	DC power input terminal for operating the control circuit. Connect a control power backup device (option or 24Vdc power supply) between +SU and CC.	Voltage: 24Vdc $\pm$ 10% Current: 1A or more
	Output	It is used with STO for safety function. +SU and STO terminals are short-circuited by metal bar and the inverter is put into a standby state at default setting. When the circuit between them is opened, the motor is coasting stop.	-
STO Note 2)	Input	When +SU and STO are short-circuited, the inverter is put into a standby state. (Default setting) And when the circuit between them is opened, the motor is coasting stop. These terminals can be used for inter lock. This terminal is not a multifunction programmable input terminal. It is a terminal with the safety function that complies with SIL II of the safety standard IEC61508.	Independently of SW1 ON: DC17V or more OFF: DC12V or less (OFF: Coast stop)
OUT NO	Output	Multifunction programmable open collector output. Default setting detect and output speed reach signal. Multifunction output terminals to which two different functions can be assigned. The NO terminal is an equipotential terminal. It is isolated from the CC terminal. By changing parameter $F559$ settings, these terminals can also be used as multifunction programmable pulse train output terminals.	Open collector output 24Vdc-100mA To output pulse trains, a current of 10mA or more needs to be passed. Pulse frequency range: 10-2kpps

Terminal symbol	Input / output	Function	Electrical specifications
FLA FLB FLC Note 3)	Output	Multifunction programmable relay contact output. Detects the operation of the inverter's protection function. Contact across FLA-FLC is closed and FLB-FLC is opened during protection function operation.	Max. switching capacity 250Vac-2A, 30Vdc-2A (cosφ=1) : at resistive load
RY RC Note 3)	Output	Multifunction programmable relay contact output. Default settings detect and output low-speed signal output frequencies. Multifunction output terminals to which two different functions can be assigned.	250Vac-1A (cosφ=0.4) 30Vdc-1A (L/R=7ms) Min. permissible load 5Vdc-100mA 24Vdc-5mA

Note 1) When VIA terminal is used as logic input terminal, be sure to connect a resistor between P24 and VIA in case of sink logic, between VIA and CC in case of source logic. (Recommended resistance: 4.7kΩ-1/2W)

It is not needed for VIB terminal.

Note 2) When STO terminal is used as the safety function, refer to E6581860 "VF-S15 Safety function manual".

Note 3) A chattering (momentary ON/OFF of contact) is generated by external factors of the vibration and the impact, etc. In particular, please set the filter of 10ms or more, or timer for measures when connecting it directly with input unit terminal of programmable controller. Please use the OUT terminal as much as possible when the programmable controller is connected.

4. Overload protection

VF-S15 has overload protection.

Over current rating: 150%-1min, 200%-0.5sec.

Refer to the nameplate for the rated current.

5. Motor thermal protection

The devices VF-S15 are provided with integral overload and over-speed protection for the motor after activation of this function by setting.

Protection at 100% of the full load motor current.

The motor thermal protection current (I_{Hr}) must be set to the rated current indicated on the motor nameplate.

VF-S15 has the motor thermal protection.

Select the electronic thermal protection characteristics that fit with the ratings and characteristics of the motor. In case of multi motor operation with one inverter, thermal relay should be connected to each motor.

I_{Hr} : Motor electronic-thermal protection level 1

α_{Hr} : Electronic-thermal protection characteristic selection

F_{173} : Motor electronic-thermal protection level 2

F_{601} : Motor 150% overload detection time

F_{631} : Inverter overload detection method

F_{632} : Electronic-thermal memory

F_{651} : Overload alarm level

• Function

This parameter allows selection of the appropriate electronic thermal protection characteristics according to the particular rating and characteristics of the motor.

[Parameter setting]

Title	Function	Adjustment range				Default setting
$\mathcal{E}Hr$	Motor electronic-thermal protection level 1	10 – 100 (%)				100
$\mathcal{O}Ln$	Electronic-thermal protection characteristic selection	Setting value		Overload protection	Overload stall	0
		0	Standard motor	valid	invalid	
		1		valid	valid	
		2		invalid	invalid	
		3		invalid	valid	
		4	VF motor (special motor)	valid	invalid	
		5		valid	valid	
		6		invalid	invalid	
		7		invalid	valid	
$F173$	Motor electronic-thermal protection level 2	10 – 100 (%) / (A) *1				100
$F607$	Motor 150% overload detection time	10 – 2400 (s)				300
$F631$	Inverter overload detection method	0: 150%-60s 1: Temperature estimation				0
$F632$	Electronic-thermal memory	0: Disabled ($\mathcal{E}Hr$, $F173$) 1: Enabled ($\mathcal{E}Hr$, $F173$) 2: Disabled ($\mathcal{E}Hr$) 3: Enabled ($\mathcal{E}Hr$)				0
$F657$	Overload alarm level	10-100				50

(Note) (Only for World model)

 RUL should be set to default setting ($RUL = 1$) for the compliance with UL standard.

1) Setting the electronic thermal protection characteristics selection ($\mathcal{O}Ln$) and motor electronic thermal protection level 1 ($\mathcal{E}Hr$, 2($F173$))

The electronic thermal protection characteristics selection ($\mathcal{O}Ln$) is used to enable or disable the motor overload trip function ($\mathcal{O}L2$) and the overload stall function.

While the inverter overload trip ($\mathcal{O}L1$) will be in constantly detective operation, the motor overload trip ($\mathcal{O}L2$) can be selected using the parameter $\mathcal{O}Ln$.

Explanation of terms

Overload stall: This is an optimum function for equipment such as fans, pumps and blowers with variable torque characteristics that the load current decreases as the operating speed decreases.

When the inverter detects an overload, this function automatically lowers the output frequency before the motor overload trip ($\mathcal{O}L2$) is activated. With this function, operation can be continued, without tripping, by operating using a frequency balanced by load current.

Note: Do not use the overload stall function with loads having constant torque characteristics (such as conveyor belts in which load current is fixed with no relation to speed).

[Using standard motors (other than motors intended for use with inverters)]

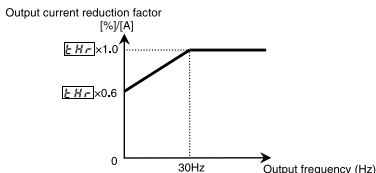
When a motor is used in the lower frequency range than the rated frequency, that will decrease the cooling effects for the motor. This speeds up the start of overload detection operations when a standard motor is used in order to prevent overheating.

■ Setting of electronic thermal protection characteristics selection ($\mathcal{O}Ln$)

Setting value	Overload protection	Overload stall
0	valid	invalid
1	valid	valid
2	invalid	invalid
3	invalid	valid

■ Setting of motor electronic thermal protection level 1 ($\mathcal{E}Hr$) (Same as $F173$)

When the capacity of the motor in use is smaller than the capacity of the inverter, or the rated current of the motor is smaller than the rated current of the inverter, adjust thermal protection level 1 ($\mathcal{E}Hr$) for the motor in accordance with the motor's rated current.



Note: The motor overload protection start level is fixed at 30Hz.

[Using a VF motor (motor for use with inverter)]

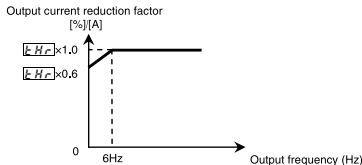
- Setting of electronic thermal protection characteristics selection $\frac{OL}{I}$

Setting value	Overload protection	Overload stall
4	valid	invalid
5	valid	valid
6	invalid	invalid
7	invalid	valid

VF motors (motors designed for use with inverters) can be used in frequency ranges lower than those for standard motors, but their cooling efficiency decreases at frequencies below 6Hz.

- Setting of motor electronic thermal protection level 1 $\frac{I_H}{I_R}$ (Same as $\frac{F173}{I}$)

If the capacity of the motor is smaller than the capacity of the inverter, or the rated current of the motor is smaller than the rated current of the inverter, adjust the electronic thermal protection level 1 $\frac{I_H}{I_R}$ so that it fits the motor's rated current.



Note) The start level for motor overload reduction is fixed at 6 Hz.

2) Motor 150%-overload detection time $\frac{F607}{I}$

Parameter $F607$ is used to set the time elapsed before the motor trips under a load of 150% (overload trip $\frac{OL2}{I}$) within a range of 10 to 2400 seconds.

3) Inverter overload detection method $\frac{F631}{I}$

As this function is set to protect the inverter unit, this function cannot be turned off by parameter setting. The inverter overload detection method can be selected using parameter $F631$ (Inverter overload detection method). If the inverter overload trip function ($\frac{OL1}{I}$) is activated frequently, this can be improved by adjusting the stall operation level $F601$ downward or increasing the acceleration time $\frac{RCC}{I}$ or deceleration time $\frac{dEC}{I}$.

- $F631 = 0$ (150%-60s)

Protection is given uniformly regardless of temperature by the 150%-60 sec overload curve.

- $F631 = 1$ (Temperature estimation)

This parameter adjusts automatically overload protection, predicting the inverter internal temperature rise.

4) Electronic thermal memory $\frac{F632}{I}$

When the power is OFF, it is possible to reset or maintain the overload totaling level.

This parameter's settings are applied both to the motor's electronic thermal memory and the electronic thermal memory for inverter protection.

5) Overload alarm level $\frac{F651}{I}$

When the motor overload level reaches to $F651$ setting value (%) of overload trip ($\frac{OL2}{I}$) level, "L" will be displayed on the left side digit and the "L" and output frequency monitor will be blinking alternately on overload alarm status. Overload alarm signal can be output from output terminal.

6. Motor PTC thermal protection

Set a parameter **F 147** and lower slide switch of SW2 to PTC side, when S3 terminal is used as PTC input terminal.

F 147: Logic input / PTC input selection (S3)

F 545: PTC thermal selection

F 546: Resistor value for PTC detection

- Function
This function is used to protect motor from overheating using the signal of PTC built-in motor.
The trip display is "E - 32".

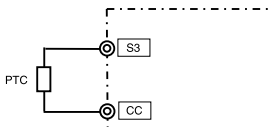
[Parameter setting]

Title	Function	Adjustment range	Default setting
F 147	Logic input / PTC input selection (S3)	0: Logic input 1: PTC input	0
F 545	PTC thermal selection	1: Tripping 2: Alarm only	1
F 546	PTC detection resistor value	100-9999 (Ω)	3000

Note: Protecting PTC thermal, set **F 147** = 1 (PTC input) and slide switch SW2 to PTC side.

- Tripping level is defined by **F 545** setting. Alarm level is defined by 60% of **F 546** setting.
- Connect the PTC between S3 and CC terminals. Detection temperature can be set by **F 546** setting.

[Connection]



- Output of PTC input alarm signal
The PTC input alarm is assigned to the output terminal by setting the parameter of the output terminal selection function to 150 or 151.

7. Other

Please contact where you purchase the inverter, your Toshiba sales representative, if you need the hard copy (paper) of CD-ROM. Or please contact to phone number of back cover in E6581610 (E6581612) and E6581926.

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