TOSHIBA

E6582485

Instruction manual for driving Toshiba Three-phase synchronous reluctance motor

TOSVERT™ VF-S15 Y-A4/W4

＜At first, Please read this instruction manual.＞

Toshiba Industrial Products and Systems Corporation

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.
3. All information contained in this manual will be changed without notice. Please visit our website for the latest information.

Safety precautions

This instruction manual provides additional information in the instruction manual when using a Toshiba three-phase synchronous reluctance motor (SynRM) with the VF-S15.
Please also refer to the safety precautions, labels, diagrams and symbols described in the inverter instruction manual E6582175 (for Y-W4) or E6581926 (for Y-A4). Please visit our website for the latest information.

The contents described in the instruction manual, on the inverter itself and this instruction manual 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.

Explanation of markings

Marking	Meaning of marking
⚠ WARNING	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates information considered important but not hazard-related. It is used to address practices not related to physical injury

Meanings of symbols

Symbol	Meaning of symbol
	Indicates a prohibition (Do not do it). Detailed information on the prohibition is described in illustration and text in or near the symbol.
	Indicates a mandatory action that must be followed. Detailed information on the mandatory action is described in illustration and text in or near the symbol.
	Indicates a warning or caution. Detailed information on the warning or caution is described in illustration and text in or near the symbol.

The following provides additional safety precautions for using the Toshiba Three-phase Synchronous Reluctance Motor Inverter VF-S15 Y-W4/A4.

WARNING	
	• Read this instruction manual and VF-S15 instruction manual E6582175 (for Y-W4) or E6581926 (for Y-A4) before installing or operating the inverter unit. Otherwise, it will result in electric shock, fire and other injuries.

■ **Limits in purpose**

This inverter is designed to control the speeds of Toshiba three-phase synchronous reluctance motors and Three-phase induction motor exclusively.

Safety precautions

▼Do not use the product for any loads other than Toshiba three-phase synchronous reluctance motors, and Three-phase induction motors for general industrial usage. Our inverter cannot drive a single-phase motor.

■ Transportation & installation

WARNING	
 Mandatory action	• Install an appropriate short circuit protection device (MCCB, ELCB, fuse, and so on) between the power supply and the inverter (primary side). If the appropriate short circuit protection device is not installed, the short circuit current cannot be interrupted only with the inverter, it can result in fire.

CAUTION	
 Mandatory action	• Do not carry heavy objects by hand. It can result in injury. Ensure operator safety and prevent any damage to the product by handling it with the utmost care.

NOTICE	
 Prohibition	• Do not install a Motor-end surge voltage suppression filter (MSF, MSL), or other options on the inverter output side. It can cause unstable motor control, and result in step-out or motor failure.

■ Wiring

WARNING	
Prohibition	• Do not insert a braking resistor between DC terminals [PA/+] and [PC/-] or [PO] and [PC/-]. This will result in fire. Connect the braking resistor in accordance with the section “Connecting an external braking resistor (optional)” provided in the instruction manual. • Do not connect anything other than the specified Toshiba three-phase synchronous reluctance motor and Three-phase induction motor to the output (motor-side) terminals. Do not connect multiple motors, even with the specified Toshiba three-phase synchronous reluctance motor, It will result in the inverter damaged or malfunction.

■ Operations

WARNING	
Prohibition	• Stand clear of the motors or the machines. It may cause unexpected injury. Since the auto-restart after momentary stop function [F301: Auto-restart]= “4: At startup” is set for the Toshiba three-phase synchronous reluctance motor drive, the motors and machines that have stopped due to a momentary power failure will restart suddenly after power is restored. Attach caution labels indicating functions programmed for Auto restart on inverters, motors and machines to prevent accidents. • Stand clear of the motors or the machines that have stopped temporarily due to tripping stop, when the retry function is selected. The motors and machines will restart suddenly, and this will result in injury. Design the system to ensure the safety even if the motor restarts, for example by installing a protective cover on the motor.

CAUTION	
Mandatory action	• Use an inverter that matches the specifications of both the operating Toshiba three-phase synchronous reluctance motor and the power supply. Using an unsuitable inverter will lead not only preventing the correct motor operating but also serious accidents such as overheating or fire. • Set the parameter values for driving Toshiba three-phase synchronous reluctance motors into the inverter correctly. Incorrect parameter settings can cause inverter and motor improper operation and it can result in injury. • When driving a three-phase induction motor, set [Pt: V/F Control Mode Selection] to “0 ~ 2”. If a value intended for driving a Toshiba three-phase synchronous reluctance motor is set for [Pt: V/F Control Mode Selection], the motor will operate incorrectly, and it can result in injury or motor failure. [Pt: V/F Control Mode Selection] = “3 ~ 8” control mode cannot be used with the Y-A4/W4 model. The control mode for [Pt] set to “3 ~ 8” is equivalent to the [Pt] = “0” setting.
Prohibition	• Do not set functions listed as “Unavailable Functions” on VF-S15 Y-A4/W4. It can result in injury, due to no operation of function or the unexpected operation of the inverter and the motor. • Do not copy parameter settings between VF-S15 Y-A4/W4 (for Toshiba three-phase synchronous reluctance motor drive) and standard VF-S15 by using the parameter writer or Inverter Maintenance Communication Application. It can result in injury, due to no operation of function or the unexpected operation of the inverter and the motor by the failure to copy the intended parameters correctly.

I. Introduction

This product is an inverter designed for driving Toshiba three-phase synchronous reluctance motors(SynRM).
The differences from the standard VF-S15 series are the type-form, the implementation of software (parameters) for driving three-phase synchronous reluctance motors, and the terminal functions of the control circuit terminal block.

This manual focuses on above differences. For other operating instructions, refer to the model comparison table in Section 2 and check by the “VF-S15 Instruction Manual - Detailed Version” (E6582175 for Y-W4, E6581926 for Y-A4)
When driving three-phase synchronous reluctance motors by VF-S15 Y-A4/W4, be sure to use only in combination with Toshiba three-phase synchronous reluctance motors.

The following instruction manual and information are available via the internet at

"https://www.toshiba-tips.co.jp/en/products/inverter/standard.html".

A hard copy of this information may be ordered to Toshiba sales representative or the contact address shown below.

Instruction manual
E6582175: VF-S15 Instruction manual <Detailed manual> for Y-W4.
E6581926: VF-S15 Instruction manual <Detailed manual> for Y-A4.

Compliance with safety standards
E6581860: VF-S15 Safety function manual (Original instructions).

Compliance with ATEX
E6581861: ATEX Guide.

Low Voltage Directive 2014/35/EU
E6582444: Additional manual.

Declaration of Conformity

Ecodesign: technical data
For technical data of ecodesign requirement, access the following website,

"https://www.toshiba-tips.co.jp/en/products/inverter/"

Refer to the technical data of standard model for this product.

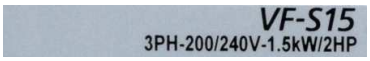
- **Contact address**

Toshiba Industrial Products and Systems Corporation
72-34, Horikawa-cho, Saiwai-Ku, Kawasaki, Kanagawa 212-8585, Japan
TEL : +81-44-520-0828

1. Check product purchase

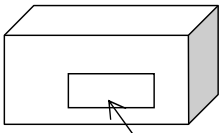
Before using the product you have purchased, check to make sure that it is exactly what you ordered.

Rating label



Model
Power supply
Motor capacity

Carton box

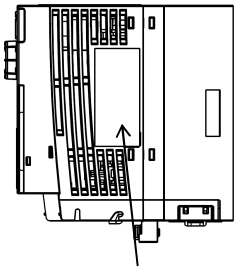


Type indication label

Inverter main unit

Rating label

Danger label



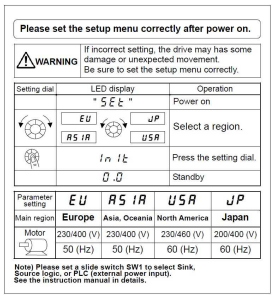
Name plate

Name plate

Inverter Type
Inverter rated Output capacity
Power supply
Rated input current
Rated output current

TOSHIBA TRANSISTOR INVERTER		
VFS15-2015PMY-W4		
1.5kW-3.0kVA-2HP		(0)
	INPUT	OUTPUT
U(V)	3PH 200...240	3PH 200...240
F(Hz)	50/60	0.1...500
I(A)	11.1	8.0
Loss	2.5 % (90, 100), Level IE2	
SCCR : for rating and protection refer to Manual E6582383		
Serial No. 8547 18214307 0001 (2) IP20 Made in Indonesia 2025		
Motor Overload Protection Class 20		

Setup sheet



Please set the setup menu correctly after power on.

WARNING: If incorrect setting, the drive may has some damage or unexpected movement. Be sure to set the setup menu correctly.

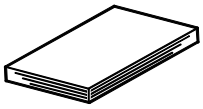
Setting dial	LED display	Operation
	"SEt"	Power on
	EU / JP / ASIA / USA	Select a region.
	In it	Press the setting dial.
	0.0	Standby

Parameter setting	EU	ASIA	USA	JP
Main region	Europe	Asia, Oceania	North America	Japan
Motor	230/400 (V) 50 (Hz)	230/400 (V) 50 (Hz)	230/460 (V) 60 (Hz)	200/400 (V) 60 (Hz)

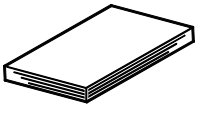
Note) Please set a slide switch SW1 to select Sink, Source logic, or PLC (external power input). See the instruction manual in details.

Danger label

Quick start manual



VF-S15 Y-W4/A4 Important Information Before Use



Danger label kit

Danger labels for sticking in 6 languages.

- English / French
- German / English / French
- Italian / English / French
- Spanish / English / French
- Chinese / English / French

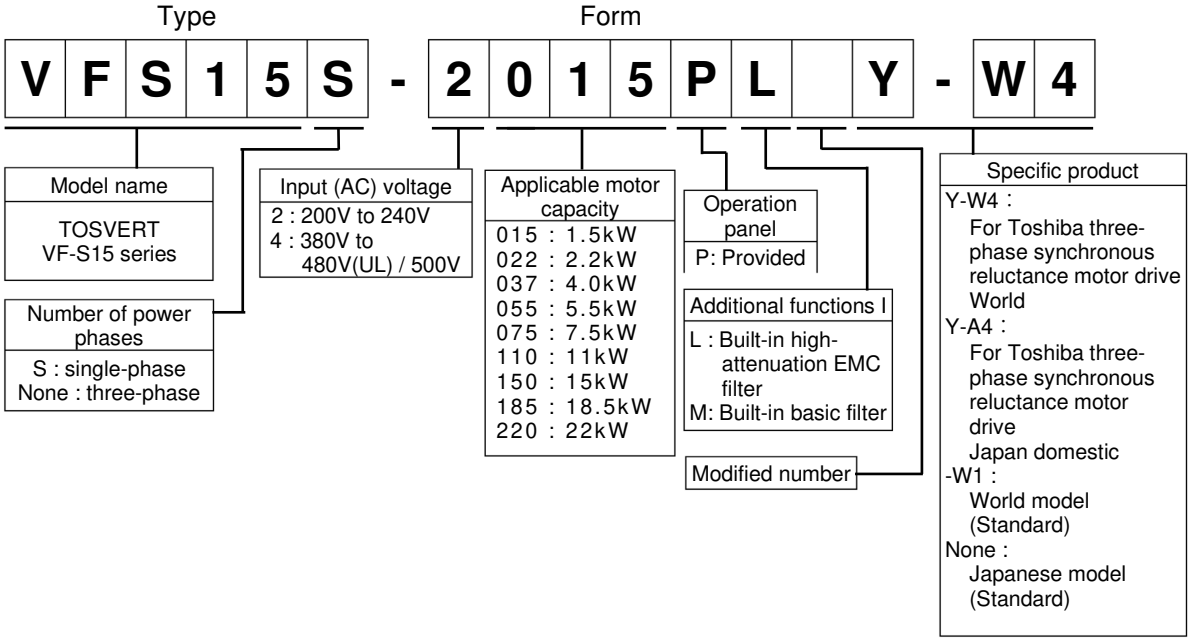
2. Type - form

The lineup for the VF-S15 Y-A4/W4 designed for driving Toshiba three-phase synchronous reluctance motors are as follows.

Line up

3-phase 240V class 1.5 to 15 kW
1-phase 240V class 1.5 to 2.2 kW
3-phase 500V class 1.5 to 22 kW (18.5ｋW and 22kW are for only Y-W4 model.)

The Type-form of the standard VF-S15 series and the VF-S15 for driving Toshiba three-phase synchronous reluctance motors Y-A4/W4 correspond as shown below.



* 18.5kW and 22kW in 500V class are for only Y-W4 model.

3. Parameter settings for driving Toshiba three-phase synchronous reluctance motors

CAUTION	
Mandatory action	• Set the parameter values for driving Toshiba three-phase synchronous reluctance motors into the inverter correctly. Incorrect parameter settings can cause inverter and motor improper operation and it can result in injury.

Set the parameter values from the “Parameter List” for driving Toshiba three-phase synchronous reluctance motors into the inverter.

***3** indicates that the parameter value must be set according to the “Parameter List” and must not be changed.

Incorrect parameter settings can cause inverter and motor failure or improper operation.

The “parameter list” is supplied either with the motor or from the sales office.

If you do not have the “Parameter List” on hand, please contact the sales office where you purchased the Toshiba three-phase synchronous reluctance motor.

(1) Parameters to be set for driving Toshiba three-phase synchronous reluctance motor.

Title	Communication No.	Function	Unit	Minimum setting unit Panel/Communication	Default setting	User setting	Min. Value	Max. Value
FH	0011	Maximum frequency	Hz	0.1/0.01	80.0	***3**	30.0	500.0
UL	0012	Upper limit frequency	Hz	0.1/0.01	60.0 *1	***3**	0.5	FH
vL	0014	Base frequency 1	Hz	0.1/0.01	60.0 *1	***3**	20.0	500.0
vLv	0409	Base frequency voltage 1	V	1/0.1	200 (400) *1 *2 *4	***3**	50	330 (660)*4
Pt	0015	V/F control mode selection	-	-	2 *1	***3**	0	9
F300	0300	PWM carrier frequency	kHz	0.1/0.1	12 or 4 *2	***5**	2.0	16.0
F301	0301	Auto-restart control selection	-	-	0	***3**	0	4
F310	0310	SRM specific coefficient 1	sec	0.1/0.1	0.0	***3**	0.0	320.0
F316	0316	PWM carrier frequency control mode selection	-	-	1 (5) *2 *4	***3**	0	5

*1: Default setting values vary depending on the setup menu setting. Refer to “VF-S15 Instruction manual”.

*2: Default setting values vary depending on the capacity. Refer to “VF-S15 Instruction manual” E6582175 for Y-W4 or E6581926 for Y-A4.

***3: Set the parameters by the “Parameter list” value. Do not change from the set value.**

*4: The parentheses “()” shows the value of 500V class.

***5: Refer to the “Parameter List” for setting.**
The adjustable range is 3.0 to 3.5 kHz for the recommended value: 3.3 kHz, and 6.0 to 7.0 kHz for the recommended value: 6.6 kHz. Settings outside of these ranges cannot be used.

Title	Communication No.	Function	Unit	Minimum setting unit Panel/Communication	Default setting	User setting	Min. Value	Max. Value
F401	0401	SRM specific coefficient 2	%	1/1	70	***3**	0	250
F402	0402	Automatic torque boost value	%	0.1/0.1	*2	***3**	0.1	30.0
F405	0405	Motor rated capacity	kW	0.01/0.01	*2	***3**	0.01	22.00
F412	0412	SRM specific coefficient 3	%	0.1/0.1	5.0	***3**	0.0	25.0
F415	0415	Motor rated current	A	0.01/0.01	*2	***3**	0.10	100.0
F417	0417	Motor rated speed	min^{-1}	1/1	*1 *2	***3**	100	64000
F419	0419	SRM specific coefficient 4	%	1/1	100	***3**	0	1000
F420	0420	SRM specific coefficient 5	mH	0.01/0.01	10.00	***3**	0.01	650.0
F421	0421	SRM specific coefficient 6	mH	0.01/0.01	10.00	***3**	0.01	650.0
F422	0422	SRM specific coefficient 7	mH	0.01/0.01	10.00	***3**	0.01	650.0
F423	0423	SRM specific coefficient 8	mH	0.01/0.01	10.00	***3**	0.01	650.0
F424	0424	SRM specific coefficient 9	%	1/1	100	***3**	1	150
F425	0425	SRM specific coefficient 10	-	0.1/0.1	150.0	***3**	135.0	179.0
F426	0426	SRM specific coefficient 11	-	0.1/0.1	170.0	***3**	135.0	179.0
F427	0427	SRM specific coefficient 12	-	1/1	5242	***3**	0	32767
F428	0428	SRM specific coefficient 13	-	1/1	80	***3**	0	4096
F429	0429	SRM specific coefficient 14	-	0.01/0.01	1.00	***3**	0.50	1.50
F430	0430	SRM specific coefficient 15	-	0.1/0.1	2.0	***3**	0.1	10.0
F431	0431	SRM specific coefficient 16	-	1/1	1	***3**	1	50
F432	0432	SRM specific coefficient 17	-	1/1	1	***3**	1	10
F433	0433	SRM specific coefficient 18	-	0.1/0.1	0.0	***3**	-10.0	10.0
F434	0434	SRM specific coefficient 19	-	0.1/0.1	0.0	***3**	-10.0	10.0
F435	0435	SRM specific coefficient 20	-	1/1	0	***3**	0	250

*1: Default setting values vary depending on the setup menu setting. Refer to “VF-S15 Instruction manual”.
*2: Default setting values vary depending on the capacity. Refer to “VF-S15 Instruction manual” E6582175 for Y-W4 or E6581926 for Y-A4.
***3: Set the parameters by the “Parameter list” value. Do not change from the set value.**

Title	Communication No.	Function	Unit	Minimum setting unit Panel/Communication	Default setting	User setting	Min. Value	Max. Value
F436	0436	SRM specific coefficient 21	%	1/1	20	***3**	1	100
F437	0437	SRM specific coefficient 22	-	1/1	15	***3**	1	100
F438	0438	SRM specific coefficient 23	-	0.1/0.1	1.5	***3**	0.1	100.0
F439	0439	SRM specific coefficient 24	%	1/1	40	***3**	0	100
F440	0440	SRM specific coefficient 25	-	0.1/0.1	1.0	***3**	1.0	10.0
F441	0441	Power running torque limit 1 level	%	1/1	250	***3**	0	250
F443	0443	Regenerative braking torque limit 1 level	%	1/1	250	***3**	0	250
F444	0444	Power running torque limit 2 level	%	1/1	250	***3**	0	250
F445	0445	Regenerative braking torque limit 2 level	%	1/1	250	***3**	0	250
F446	0446	SRM specific coefficient 26	%	1/1	8	***3**	0	50
F447	0447	SRM specific coefficient 27	-	1/1	15	***3**	5	100
F448	0448	SRM specific coefficient 28	%	1/1	50	***3**	5	200
F458	0458	SRM specific coefficient 29	-	1/1	101	***3**	0	101
F459	0459	Load inertia moment ratio	-	0.1/0.1	1.5	***3**	0.1	100.0
F460	0460	SRM specific coefficient 30	-	0.1/0.1	0.0	***3**	0.0	25.0
F461	0461	SRM specific coefficient 31	-	0.01/0.01	1.00	***3**	0.50	2.50
F462	0462	Speed reference filter coefficient	-	1/1	35	***3**	0	100
F468	0468	SRM specific coefficient 32	-	0.01/0.01	1.00	***3**	0.01	1.50
F487	0487	SRM specific coefficient 33	-	1/1	0	***3**	0	255
F488	0488	SRM specific coefficient 34	-	1/1	0	***3**	0	150
F494	0494	SRM specific coefficient 35	-	1/1	100	***3**	100	600
F495	0495	SRM specific coefficient 36	%	1/1	104	***3**	90	120
F497	0497	SRM specific coefficient 37	-	1/1	0	***3**	0	65535
F498	0498	SRM specific coefficient 38	-	1/1	0	***3**	0	65535
F909	0909	SRM specific coefficient 39	%	1/1	0	***3**	0	100

***3: Set the parameters by the "Parameter list" value. Do not change from the set value.**

Title	Communication No.	Function	Unit	Minimum setting unit Panel/Communication	Default setting	User setting	Min. Value	Max. Value
F910	0910	Step-out detection current level	%	1/0.01	100	***3**	1	150
F911	0911	Step-out detection time	sec	0.01/0.01	0.00	***3**	0.00	2.55
F912	0912	SRM specific coefficient 40	mH	0.01/0.01	10.00	***3**	0.01	650.0
F913	0913	SRM specific coefficient 41	mH	0.01/0.01	10.00	***3**	0.01	650.0
F916	0916	SRM specific coefficient 42	%	1/1	25	***3**	0	100
F922	0922	SRM specific coefficient 43	Hz	1/1	15	***3**	5	80
F923	0923	SRM specific coefficient 44	%	1/1	25	***3**	5	100
F924	0924	SRM specific coefficient 45	Hz	1/1	30	***3**	1	80
F925	0925	SRM specific coefficient 46	-	0.01/0.01	1.00	***3**	0.50	2.50

***3: Set the parameters by the "Parameter list" value. Do not change from the set value.**

(2) Default settings by inverter rating -1

Inverter type	Torque boost value	PWM carrier frequency	Dynamic braking resistance	Dynamic braking resistor capacity	Automatic torque boost value	Motor rated capacity
	Vb(%) F172(%)	F300(kHz)	F308(Ω)	F309(kW)	F402(%)	F405(kW)
VFS15-2015PM	4.8	12.0	75.0	0.12	4.4	1.50
VFS15-2022PM	3.1	12.0	75.0	0.12	2.9	2.20
VFS15-2037PM	3.1	12.0	40.0	0.12	2.8	3.70
VFS15-2055PM	2.5	12.0	15.0	0.44	2.3	5.50
VFS15-2075PM	2.3	12.0	15.0	0.44	2.0	7.50
VFS15-2110PM	1.8	12.0	7.5	0.88	1.6	11.00
VFS15-2150PM	1.6	12.0	7.5	0.88	1.5	15.00
VFS15S-2015PL	4.8	12.0	75.0	0.12	4.4	1.50
VFS15S-2022PL	3.1	12.0	75.0	0.12	2.9	2.20
VFS15-4015PL1	4.8	12.0	200.0	0.12	4.4	1.50
VFS15-4022PL1	3.1	12.0	200.0	0.12	2.9	2.20
VFS15-4037PL1	3.1	12.0	160.0	0.12	2.8	3.70
VFS15-4055PL	2.5	12.0	60.0	0.44	2.3	5.50
VFS15-4075PL	2.3	12.0	60.0	0.44	2.0	7.50
VFS15-4110PL	1.8	12.0	30.0	0.88	1.6	11.00
VFS15-4150PL	1.6	12.0	30.0	0.88	1.5	15.00
VFS15-4185PL	1.5	4.0	30.0	0.88	1.4	18.50
VFS15-4220PL	1.7	4.0	15.0	1.76	1.6	22.00

(3) Default settings by inverter rating -2

Inverter type	Motor rated current	Motor no-load	Motor rated speed		Over-voltage stall protection level	Integrating wattmeter display unit selection
	F415(A)	F416(%)	F417 (JP,USA) (min^{-1})	F417 (ASIA,EU) (min^{-1})	F626(%)	F749
VFS15-2015PM	6.40	42	1740	1445	136	0
VFS15-2022PM	9.40	50	1755	1460	136	0
VFS15-2037PM	14.60	38	1755	1460	136	1
VFS15-2055PM	21.40	41	1760	1465	136	1
VFS15-2075PM	28.60	38	1755	1460	136	1
VFS15-2110PM	42.00	38	1770	1475	136	1
VFS15-2150PM	55.60	33	1760	1470	136	1
VFS15S-2015PL	6.40	42	1740	1445	136	0
VFS15S-2022PL	9.40	50	1755	1460	136	0
VFS15-4015PL1	3.20	42	1740	1445	141	0
VFS15-4022PL1	4.70	50	1755	1460	141	0
VFS15-4037PL1	7.30	38	1755	1460	141	1
VFS15-4055PL	10.70	41	1760	1465	141	1
VFS15-4075PL	14.30	38	1755	1460	141	1
VFS15-4110PL	21.00	38	1770	1475	141	1
VFS15-4150PL	27.80	33	1760	1470	141	1
VFS15-4185PL	34.50	37	1770	1475	141	1
VFS15-4220PL	40.00	32	1760	1470	141	1

4. Precautions for application of driving Toshiba three-phase synchronous reluctance motors

CAUTION	
Mandatory action	• Set the parameter values for driving Toshiba three-phase synchronous reluctance motors into the inverter correctly. Incorrect parameter settings can cause inverter and motor improper operation and it can result in injury. • When driving a three-phase induction motor, set [Pt: V/F Control Mode Selection] to “0 ~ 2”. If a value intended for driving a Toshiba three-phase synchronous reluctance motor is set for [Pt: V/F Control Mode Selection], the motor will operate incorrectly, and it can result in injury or motor failure. [Pt: V/F Control Mode Selection] = “3 ~ 8” control mode cannot be used with the Y-A4/W4 model. The control mode for [Pt] set to “3 ~ 8” is equivalent to the [Pt] = “0” setting.

1) Operating Frequency Range

It varies depending on the operating motor specifications.

1. [vL: Base frequency] : For 60 Hz specifications, operate at 80 Hz or below.
2. [vL: Base frequency] : For 125 Hz specifications, operate at 144 Hz or below.

2) Overload Conditions

When “OL3” occurs due to over-torque at low speed (mainly below 15 Hz), Increase the inverter and motor rating.

3) Acceleration and Deceleration Rate

The acceleration and deceleration time settings must be adjusted and verified according to the load.

Set the acceleration and deceleration times so that the torque during acceleration and deceleration does not exceed the parameter values specified in the “parameter List”:

[F441: Power running torque limit level 1]

[F443: Regenerative braking torque limit 1 level]

[F444: Power running torque limit level 2]

[F445: Regenerative braking torque limit 2 level]

4) Load inertia moment ratio

[F459: The load inertia moment ratio] must be adjusted and verified according to the load inertia.

Set the ratio as (Load Inertia + Motor Inertia) / Motor Inertia.

5) Magnetic Noise of the Motor

Magnetic noise can be audible from the motor when operating in the range from 0 Hz up to approximately 30% of [vL: base frequency]. This is a normal phenomenon due to control characteristics and does not indicate any malfunction.

6) [F300: PWM carrier frequency]

Be sure to refer to section 4 and set [F300: PWM carrier frequency] for driving the Toshiba three-phase synchronous reluctance motor.

7) [Pt: V/F control mode selection]

When driving a Toshiba three-phase synchronous reluctance motor, be sure to set [Pt: V/F control mode selection] correctly.

Do not use the Pt value specified for Toshiba three-phase synchronous reluctance motor drive with any other type of motor.

5. Functions Not Available

CAUTION	
Prohibition	• Do not set functions listed as “Unavailable Functions” on VF-S15 Y-A4/W4. It can result in injury, due to no operation of function or the unexpected operation of the inverter and the motor.

The following functions cannot be used on VF-S15 Y-A4/W4.
Regardless of [Pt: V/F control mode selection] setting, these functions are not available.
In addition, setting these functions via terminal input or communication commands is also prohibited.

1) List of Unavailable Functions

No.	Function
1	[Pt: V/F control mode selection] = 3 ~ 8 control mode (The control mode for [Pt] set to “3 ~ 8” is equivalent to the [Pt] = “0” setting.)
2	[AU2: Torque boost setting macro function]
3	[F312: Random mode]
4	[F400: Auto-tuning] = 1 ~ 5 setting
5	Brake sequence operation function Brake release (Output terminal functions 68, 69)
6	[F262: Panel jog run operation mode] Jog run mode (Input terminal function number 18, 19) In jogging operation (Output terminal function number 52, 53)
7	Drooping control function
8	Servo lock
9	[F454: Constant output zone torque limit selection]
10	2nd V/F control mode switching (Input terminal function number 28, 29 and related parameters)
11	No.2 motor switching (Input terminal function number 152, 153 and related parameters)
12	DC braking function

2) Changed Parameter Settings for Unavailable Functions

The following parameters have set to 0 for all of their upper limit, lower limit and default setting value.
These parameters cannot be changed.

Title	Function	Default setting
AU2	Torque boost setting macro function	Fixed at 0
F257	Factory specific coefficient 2B	Fixed at 0
F258	Factory specific coefficient 2C	Fixed at 0
F262	Panel jog run mode	Fixed at 0
F312	Random mode	Fixed at 0
F320	Droop gain	Fixed at 0
F341	Braking mode selection	Fixed at 0
F400	Auto-tuning	Fixed at 0
F454	Constant output zone torque limit selection	Fixed at 0

3) List of Parameters prohibiting change for Unavailable Functions

Do not change the following parameters from their default values

Title	Function	Default setting
F250	DC braking starting frequency	0 (Do not change)
F254	Motor shaft fixing control	0 (Do not change)

4) List of parameters for conditionally available

These parameter setting can be changed only to [F605] = “3” and [F302] = “1” or “2”.

Title	Function	Default setting
F605	Output phase failure detection selection (Available only 3: During operation)	0 (available only 3)
F302	Regenerative power ride-through control (Available only 1: Regenerative power ride-through Control or 2: Deceleration stop during power failure)	0 (Available only 1 or 2)

6. About copying parameters

CAUTION	
Prohibition	• Do not copy parameter settings between VF-S15 Y-A4/W4 (for Toshiba three-phase synchronous reluctance motor drive) and standard VF-S15 by using the parameter writer. It can result in injury, due to no operation of function or the unexpected operation of the inverter and the motor by the failure to copy the intended parameters correctly.

It is possible to copy parameter data from VF-S15 (Y-A4/W4) to another VF-S15 (Y-A4/W4) by using a parameter writer (RKP002Z, PWU003Z).
However, the intended parameter data can not be copied correctly among the standard VF-S15, because the available parameters differ significantly for the difference of “SRM specific coefficient” parameters in section 3 and “Functions Not Available” described in section 5.

When using the maintenance communication software (PCM002Z) and handling parameter data whose CPU1 version is different from that of the connected unit, ensure to disable “Check the Inverter Type-Form” option setting in the “Environment Options” menu before initiating any configuration or data-transfer procedures.

7. Optional external devices

NOTICE	
Prohibition	• Do not install a Motor-end surge voltage suppression filter (MSF, MSL), or other options on the inverter output side. It can cause unstable motor control, and result in step-out or motor failure.

For the Optional external devices selection, refer to section 10.4: Optional external devices in VF-S15 Instruction Manual (E6582175 for Y-W4 or E6581926 for Y-A4).

However, the Motor-end surge voltage suppression filter (MSF, MSL) and other options that use at the inverter output cannot be used because they cause influencing voltage drop at the inverter output.
“Zero-phase reactor core-type radio noise reduction filter” can be used on the inverter output.

8. Models and their standard specifications

1) Standard specifications
Refer to section 12 in VF-S15 Instruction Manual (E6582175 for Y-W4, E6581926 for Y-A4).

2) Common specification
Refer to section 12 in VF-S15 Instruction Manual (E6582175 for Y-W4, E6581926 for Y-A4).
The different part are listed below.

Item		Specification
Principal control functions	Output frequency range	0.1 to 500.0Hz, **Set the maximum frequency shown in the "Parameter list".**
	Voltage/frequency characteristics	V/f constant, variable torque, **Synchronous reluctance motor,** Base frequency (20-500Hz) adjusting, torque boost (0-30%), adjusting frequency at start (0.1-10Hz)
	PWM carrier frequency	**Set the maximum frequency shown in the "Parameter list".**
Operation specifications	DC braking	**Not available for use.**
	Input terminal function (programmable)	Possible to select from among about 110 functions, such as forward/reverse run signal input, jog run signal input, operation base signal input and reset signal input, to assign to 8 input terminals. Logic selectable between sink and source. **(However, the functions listed in section 5 (Functions Not Available) cannot be used.)**
	Output terminal functions (programmable)	Possible to select from among about 150 functions, such as upper/lower limit frequency signal output, low speed detection signal output, specified speed reach signal output and failure signal output, to assign to FL relay output, open collector output terminal, and RY output terminals. **(However, the functions listed in section 5 (Functions Not Available) cannot be used.)**
	Jog run	**Not available for use.**
	Regenerative power ride through control	Possible to keep the motor running using its regenerative energy in case of a momentary power failure (default: OFF).
Protective function	**Electronic thermal characteristic**	Switching between standard motor and constant-torque VF motor, setting of overload trip time, adjustment of stall prevention levels 1 & 2, selection of overload stall
Protective function	Location of use	Indoors; not exposed to direct sunlight, corrosive gas, explosive gas, flammable gas, oil mist, dust, or metal powder ; and vibration of less than 5.9m/s2 (10 to 55Hz). / **Non-hazardous location**

9. Restriction only for Y-W4 model

[AUL] must be set to default setting ("1: Constant torque characteristic")