TOSHIBA

TOSVERT **VF-A7** 2.2-15kW

HIGH PERFORMANCE VARIABLE SPEED DRIVE

Flexibility for a wide variety of drive applications

The global standard inverter

The VF-A7 meets major global standards: UL/CUL, CE and Australian C-tick (class A)

Wide acceptable input voltage range

- Three-phase 400V class: from 380V to 460V

Switchable interface logic

The VF-A7 has a switchable control logic interface; source logic (European type) or a sink logic (US/Japan type). It offers programmable terminal functions for assigning suitable functions to each terminal.

Internal EMI noise filter

The VF-A7 series, 2.2-15kW include EMI noise filters as standard to meet EMC directive.

VF-A7 enhances the dynamic performance of motors

More than 200% torque even at 0.5Hz

The VF-A7 significantly increases the starting torque of the motor; VF-A7 produces more than 200% torque even at extremely low speeds. With the speed control range widened to 1:150, the VF-A7 can be used for higher performance machines.

Online automatic-tuning function

The VF-A7 has an online automatic-tuning function to automatically correct the motor constants for sensorless vector control even during operation. With this function, the VF-A7 enables the motor to accurately run and produce stable torque without being affected by motor temperature.

Torque control(*1)

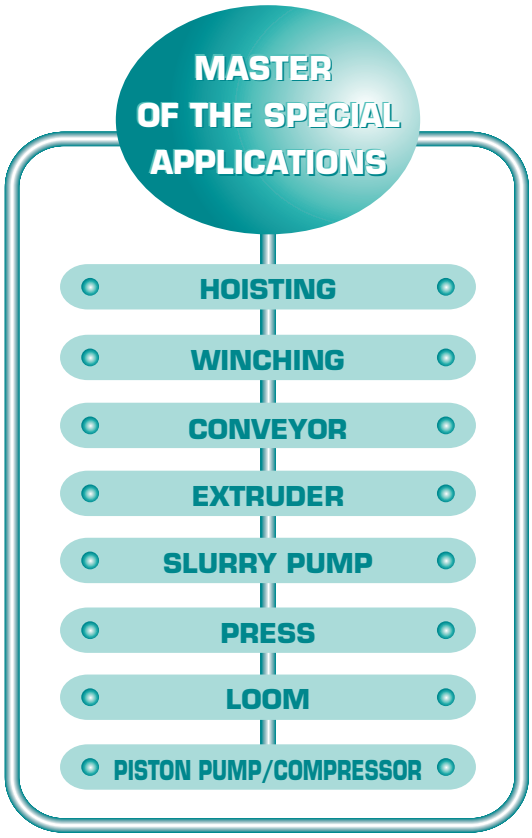
In addition to speed control by frequency reference signals, the VF-A7 can control motor torque by torque reference signals. Suitable for use in winding applications, etc.

Torque limit

To prevent the machine from being damaged by excessive torque or the VF-A7 itself from tripping, the VF-A7 has the function of limiting the output torque of the motor.

Over-run control

When used for a conveyor application for instance, the VF-A7 limits the torque produced by the motor should the load over-run a limit switch and hit a mechanical stop.



CE c UL us

N1971
GROUP 1 CLASS A

*1: In sensorless vector control mode, torque control cannot be used for low-load, low speed area. Use torque control with sensor when more accurate control is required.

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TOSVERT **VF-A7**

VF-A7 optimally controls any type of machine

• Industrial machinery in general distribution and conveyor systems… crane, hoist, automated warehouse, textile machines… chemical fibre dyeing, finishing and spinning machines, machining and machine tools… lathes
• Fan, blower and pump
• Automatic service apparatus: Fitness apparatus, medical apparatus, washing machine
• High-tech systems and high-performance machines: Paper and film transfer/printing systems
• Simple positioning application: Elevator, extruding machine, injection moulding machine, printing machine.

VF-A7 can be applied to a wide range of applications, from simple speed control to system application

Automatic setting function

For simple speed control at initial startup, connect a motor and a power source; the VF-A7 does not require cumbersome parameter setting to start operation.

1) Automatic adjustment of acceleration/deceleration times – The VF-A7 can automatically adjust the acceleration/deceleration times according to the load applied. (The acceleration and deceleration times are changed constantly.)

2) Automatic V/f mode setting – Sensorless vector control and on-line automatic tuning are set simultaneously. If you want to increase the starting torque and suppress the speed variance, this is easily achieved.

Flexible and expandable for system applications

• Capable of high speed operation at low load which improves the efficiency of operation, especially when the VF-A7 is used for crane/hoist applications.
• Vector control with sensor, which enables control of torque, speed and position of a motor with a higher degree of accuracy.
• Drooping control function ensuring optimum load sharing.
• Override function useful for fine adjustment of line speed.
• Sink/source and input/ouput logic switchable, which is convenient when the VF-A7 is used in combination with a programmable controller.
• Commercial power/inverter switching function which sufficiently backs up commercial power.
• Input phase failure protective function which protects the capacitors in the main circuit.
• Various communication functions can enable the VF-A7 to be applied to system applications.

VF-A7 has a wide range of options for a wide range of applications

• Extended panel/Parameter writer
• Communication (Standard) (RS485)
• Communication (optional) RS232C, RS485, TOSLINE-F10M, TOSLINE-S20, DeviceNet[1] ProfiBus[1]

• Add-on module options for vector control with sensor (speed feedback, positioning control, torque control)
• Extended terminal board add-on cassette options
  1)12/16 bit binary, 3/4 digit BCD input
  2) Extended input terminal (8 contacts)
  3) Programmable analogue output terminal (current/voltage output)
  4) Programmable relay output terminal (2 circuits)
• Control power supply unit
• Flange mounting kit.[2]

Easy communication with inverters

The communication options make it easier to set and operate the VF-A7.

Extended panel

This operating panel is designed to set and operate the VF-A7 remotely.

Parameter writer

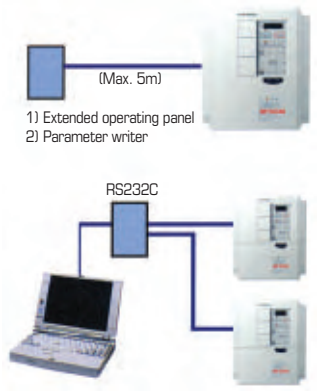
Designed for reading, copying and writing preset parameters by a single operation, to easily set the same parameters for two or more inverters of the same capacity. this unit can store parameters of up to three inverters at a time.

RS232C conversion unit

This unit allows you to easily set parameters, store or write data, or communicate with a personal computer

*(1) Soon to be released *(2) Planned

via an interface cable.
This RS232C unit is a very useful communication tool which can be connected with two inverters simultaneously.
- monitoring function
- command function
- parameter setting function
- additional functions.

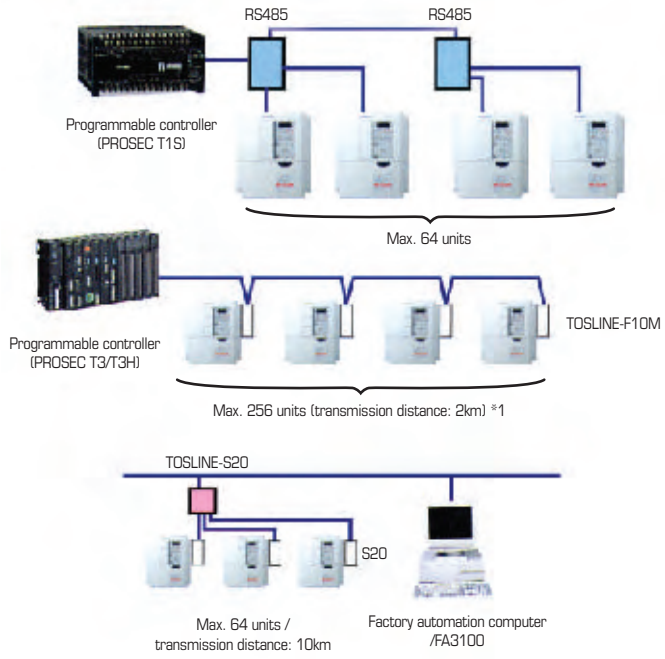


Centralized control of inverters by a communication system

A number of inverters can be easily controlled by means of a communication system. Communication can be from a personal computer, a programmable controller or a higher order network.

RS485 conversion unit

• ***Computer link*** – with this unit you can establish a network for data communication between a host computer and inverters.



• Communication ***with up to 64 inverters*** – with or without a frequency data communication network to carry out proportional operation of two or more inverters.

TOSLINE-F10M

Designed for communication with a programmable controller over a field network. Bus-type data transfer unit which uses shielded twisted pair cables and is designed specifically for TOSHIBA's industrial use motor drives.

TOSLINE-S20

Designed for communication with a programmable controller over a field network. This unit uses optical-fibre cables for high-speed data transfer (2Mbps).

Three in one – Inverter playing three different roles

Sensorless vector control mode

If you use a standard motor (irrespective of its manufacturer) and;
- if you need larger starting torque
- smooth and stable operation even at extremely low speeds.
- if you want to reduce load fluctuations due to slip of the motor, or
- if you want to keep large torque at extremely low speeds, you can use the sensorless vector control functions, just by setting on-line automatic-tuning.(*)

Torque control mode with/without a sensor

Use this mode, for example, if you want to keep even tension in a winding application, etc.
- Motor torque can be controlled by combining a motor with sensor and the VF-A7 with PG feed back option unit.
- Motor torque can be controlled by analogue signals. (The rotating speed of a motor is determined by the relationship between the load torque and the motor output torque.)
- The torque reference can be selected from 0 to +/-10 V or 4 to 20 mA and 12/16-bit binary (option) and BCD input (option).

Speed/positioning control mode with a sensor

- Combining a motor with a sensor and the VF-A7 with PG feed back option makes it possible to control the speed and position with greater accuracy.
- In the positioning mode, the displacement and speed are adjusted using pulse reference. In this mode, the machine returns to its original position even if it is displaced because of external force.
- For injection moulding machines, etc, this combination can be used as an unsophisticated servo.

*(1) It is necessary to install repeaters at 500m intervals (*) On-line automatic tuning can be done with the motor kept in operation.

TOSVERT **VF-A7** 2.2-15kW

Standard specifications

Item			Specifications					
Applicable motor (Output) (kW)			2.2	3.7	5.5	7.5	11	15
Rating	Type		VF-A7					
	Model		4022PL	4037PL	4055PL	4075PL	4110PL	4150PL
	Capacity (kVA)*1		4.0	6.5	9.5	13	19	25
	Rated output current (A)		5.0	8.5	13	17	25	33
	Rated output voltage		3 phase 380 to 460V (The max. output voltage is the same as the input source voltage)					
	Overload current rating		2 minutes at 150%, 0.5 seconds at 215%					
Electrical braking	Dynamic braking circuit		Dynamic braking circuit installed					
	Dynamic braking resistor		Rating: 120W-150Ω					
			Max. braking 100% allowable duty cycle 3% ED	Braking resistor or external braking unit (optional)				
Input power	Voltage/ Frequency	Main circuit	3 phase 380 to 460V – 50/60Hz					
		Control circuit	External circuit (optional)					
	Tolerance		Voltage +10/-15% *4, Frequency +/-5%					
Protective method			Sealed Structure (JEM1030) IP20 *3					
Cooling method			Forced air cooling					
Colour			Munsell 5Y-8/0.5					
EMI filter			Installed					

Notes)
*1: Capacity is calculated at 440V.
*2: An option is required for the 15kW and smaller models in order to use separate control power supply (RO or SO).
*3: Each model has three through-holes for wiring of the main input circuit, main output circuit and control circuit. Seal them properly after wiring.
*4: +/-10% when the inverter is used continuously (load of 100%).

External dimensions and weight

Voltage class	Motor capacity (kW)	Type form	Dimensions (mm)			Weight
			(W)	(H)	(D)	(kg)
400V	2.2	VFA7-4022PL	185	215	155	3.9
	3.7	VFA7-4037PL				4.1
	5.5	VFA7-4055PL	210	300	173	7.0
	7.5	VFA7-4075PL				7.1
	11	VFA7-4110PL	245	390	190	11
	15	VFA7-4150PL				11

For further information, please contact your nearest Toshiba Representative

NOTES

*1: CONTROL POWER INPUT TERMINAL OPTIONAL.
CONTROL POWER INPUT TERMINALS ARE PROVIDED BUT THEY ARE NOT CONNECTED INSIDE.

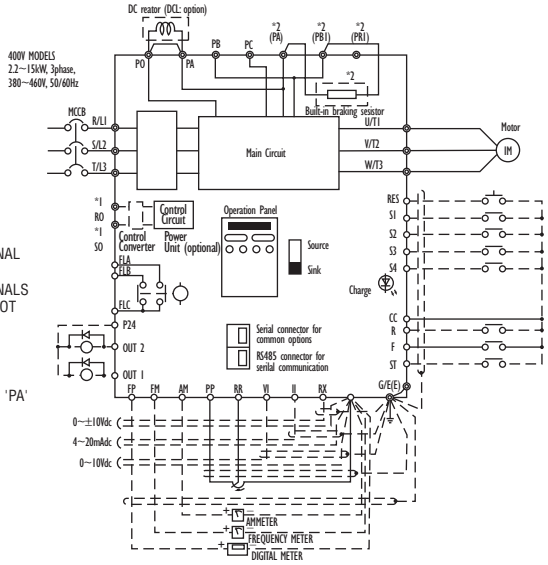
*2: 37kW OR LESS

*5: THE CIRCUIT BETWEEN 'PO' AND 'PA' IS SHORTED BY DEFAULT.
REMOVE THE SHORTING LINK BEFORE INSERTING DC LINK REACTOR (DCL)

LEGEND

◎ MAIN CIRCUIT TERMINAL
○ CONTROL TERMINAL

Standard connection diagram



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