TOSHIBA

High-performance Drive

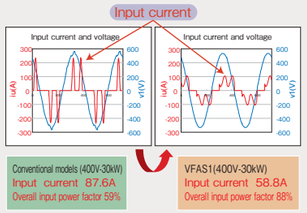
TOSVERT™ VF-AS1

For your electronic products that might interfere with peripheral devices.

The integrated noise filter*1 and reactor*1 drastically reduce high-frequency noise and harmonics generated by the inverter to improve the power factor.
This makes the inverter ideal for your electronic applications such as washing machines, treadmill, showcase refrigerators for stores and medical equipment, where attention must be paid to peripheral devices.

*1. Refer to Standard specifications.

The effect of built-in reactor



For simple machinery need only few parameters setting.

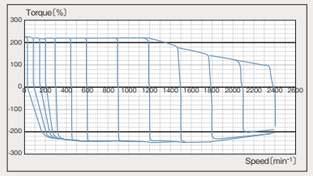
In the Quick mode, pressing the EASY key displays only eight basic parameters, thus facilitating parameter selection and setup.
In addition, you can customize and display maximum of 32 target from all kinds of parameters to suit your specific setup requirements.
This makes the inverter ideal for simple operations such as drilling machines, handling machines, conveyors, semiconductor production equipment, cutting machines, and woodworking machinery.

Quick mode (EASY)	
Title	Function
AU4	Parameter setting macro function
Pt	V/F control mode selection
FH	Maximum frequency
ACC	Accelertion time 1
dEC	Deceleration time 1
tHr	Motor overload protection level 1
FM	FM terminal meter adjustment
PSEL	Parameter display selection

For machinery need high torque and large capacity.

This inverter accelerates instantly from low speeds at a starting torque of 0.3 Hz - 200%*2
Excellent performance of the regenerative mode as well as that of the power running mode has been achieved by applying the smart vector control technology developed by Toshiba originally.
Wide capacity range up to 500kW for a 400V class and 630kW for a 690V class inverters.
This makes it ideals for cranes, mining machinery, refrigerator, presses, compressers, crushing machine and other machinery that require a high torque and large capacity.

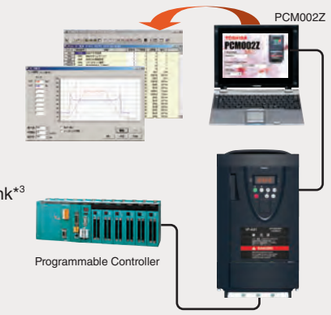
Example of torque characteristics



*2. When a TOSHIBA standard 3-phase, 200 V - 2.2 kW 4-pole motor is driven, (Note, however, that torque differs according to voltage and capacity.)

For system devices requiring flexibility.

The My function allows you to program logic operations and internal data operations as you desire so that you can customize the inverter to match your system or machine.
This also achieves high-precision, high-speed torque control with or without sensors.
RS485 (TOSHIBA/Modbus protocol) communications is equipped as standard, and DeviceNet*3, Profibus and CC-Link*3 fieldbuses are also supported as options.
The PCM002Z communications software allows you to edit, monitor, and trace parameter data on a PC easily.
This makes inverter ideal for paper and film lines, printing machines, presses, coilers/uncoilers and other systems that require flexibility.



*3. DeviceNet is a registered trademarks of ODVA (Open DeviceNet Vendor Association).
CC-LInk is a registered tradmark of Mitsubishi Electric Corporation.

*4. Photos of machinery are for illustrative purposes only.

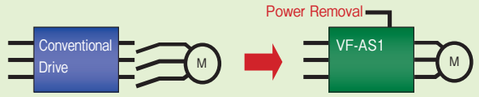
Compatible with the World's Main Standards
(CE marking, UL, CSA, RCM)

* UL and CSA compliancy conditions partially differ from the standard specifications. Consult us separately for details.

- Built-in thermal protection function which complies with NEC® 2005
- Comply with SEMI F47
  (Semiconductor Equipment and Materials International)

Renewal:"Power Removal"safety function*

Built-in Power Removal safety function which complies with EN954-1 category 3 and IEC/EN61508-1 SIL2.
It saves the installation of a line side or motor side contactor.

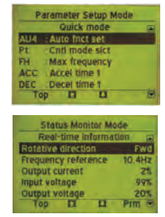


* The units with the type-WN1 or WP1 have Power Removal safety function.

For machinery need more expansion. Outstanding Lineup of Options.

LCD Extension Panel Option

This panel is an 23-character x 8-line display, and can be used for simple setup and monitoring by selection of parameters using the jog dial. The display language can be switched between English, German and Japanese.
(Portuguese will be available soon.)
Type: RKP004Z

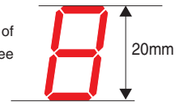


* The photograph shows a screen currently in development.

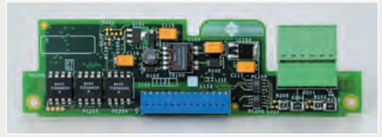
Expanded Terminal Block Option Fieldbus Option

LED Extension Panel Option

This panel uses 20 mm LEDs, the largest in its class in the market, to ensure outstanding visibility.
It has also been designed to be fitted into panels for use as an extension panel or display.
In addition, it can be used as a parameter copy and is capable of storing parameters for up to three models.
Type: RKP002Z



Encoder Feedback Option



Standard specifications

Item		Specification																														
Applicable motor(kW)		0.4	0.75	1.5	2.2	3.0	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	220	250	280	315	355	400	500	630
Type Form	Type	VFAS1–																														
	3-phase 200V class	2004PL	2007PL	2015PL	2022PL	–	2037PL	2055PL	2075PL	2110PM	2150PM	2185PM	2220PM	2300PM	2370PM	2450PM	2550P	2750P	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3-phase 400V class	–	4007PL	4015PL	4022PL	–	4037PL	4055PL	4075PL	4110PL	4150PL	4185PL	4220PL	4300PL	4370PL	4450PL	4550PL	4750PL	4900PC	4110KPC	4132KPC	4160KPC	4200KPC	4220KPC	–	4280KPC	–	4355KPC	4400KPC	4500KPC	–
	3-phase 690V class	–	–	–	6022PL	6030PL	–	6055PL	6075PL	6110PL	6150PL	6185PL	6220PL	6300PL	6370PL	6450PL	6550PL	6750PL	6900PL	6110KPC	6132KPC	6160KPC	6200KPC	–	6250KPC	–	6315KPC	–	6400KPC	6500KPC	6630KPC
Ratin	Capacity (kVA) Note1) 200V class	1.1	1.8	3.0	4.2	–	6.7	10	13	21	25	29	34	46	55	67	84	109	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	400V class	–	1.8	3.1	4.4	–	8.0	11	13	21	25	31	37	50	60	72	88	122	136	164	197	239	295	325	–	419	–	511	578	717	–
	690V class	–	–	–	4.8	5.4	–	9.0	12	17	23	29	35	42	57	71	82	102	125	150	180	215	263	–	347	–	424	–	502	649	806
	Output current (A) Note2) 200V class	3	4.8	8	11	–	17.5	27.5	33	54	66	75	88	120	144	176	221	285	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	400V class	–	2.3	4.1	5.8	–	10.5	14.3	17.6	27.7	33	41	48	66	79	94	116	160	179	215	259	314	387	427	–	550	–	671	759	941	–
	690V class	–	–	–	4	4.5	–	7.5	10	13.5	18.5	24	29	35	47	59	68	85	104	125	150	180	220	–	290	–	355	–	420	543	675
Power supply	Voltage / frequenc	200V class : 3-phase 200 to 240V-50/60Hz 400V class 0.75 to 90kW : 3-phase 380 to 480V-50/60Hz 400V class 110 to 500kW : 3-phase 380 to 440V-50Hz, 380 to 480V-60Hz 690V class : 3-phase 500 to 690V-50/60Hz																														
	Allowable ¨ uctuation	Voltage +10%, -15% (±10% when the inverter is used continuously (load of 100%)), Flequency ±5%																														
Rated output voltage		3-phase 200 to 240V : 200V class, 3-phase 380 to 480V : 400V class, 3-phase 500 to 690V : 690V class (The maximum output voltage is same as the input source voltage.)																														
Output frquency range		0.01 to 500Hz (Default setting 0.01 to 60.0/50.0Hz)																														
Overload current rating		150%-60seconds, 165%-2seconds (Inverse time-lag characteristic)																														
Dynamic breaking circuit		Built-in dynamic breaking circuit : 0.4 to 160kW, External option: 200kW or more																														
Dynamic breaking resistor		External option																														
Main functions		Parameter setup quick mode, learning function, programmable I/O terminal block, multi-PID control, hoisting function, break sequence function, My function																														
Ambient temperature		-10 to 60°C (Remove the upper cover when over 40°C. Current decrease when over 50°C) : 200V class 0.4 to 45kW, 400V class 0.75 to 75kW, 690V class 2.2 to 90kW -10 to 60°C (Current decrease when over 50°C) : 200V class 55 to 75kW, 400V class 90 to 500kW, 690V class 110 to 630kW																														
Relative humidity		5 to 95% (free from condensation and vapor)																														
Protected method		IP20: 200V class 0.4 to 15kW, 400V class 0.75 to 18.5kW, 690V class 2.2 to 90kW IP00: 200V class 18.5 to 75kW, 400V class 22 to 500kW, 690V class 110 to 630kW																														
Cooling method		Forced air cooling																														
Built-in ÿlter		EN55011 classA, EN61800-3 category C2 compliant (built-in EMI noise ÿlter) : 200V class 0.4 to 1.5kW, 400V class 0.75 to 4.0kW EN55011 classA, EN61800-3 category C3 compliant (built-in EMI noise ÿlter) : 200V class 2.2 to 7.5kW, 400V class 5.5 to 500kW, 690V class 2.2 to 630kW Basic ÿlter (Not complies EMC standard) : 200V class 11 to 45kW																														
Built-in reactor		Built-in DC reactor : 200V class 11 to 45kW, 400V class 18.5 to 75kW, 690V class 2.2 to 90kW Attached DC reactor : 200V class 55 to 75kW, 400V class 90 to 500kW AC reactor : 690V class 110 to 630kW																														

Note1) Capacity is calculated at 220V for the 200V class, at 440V for the 400V class and at 690V for the 690V class.
Note2) Rated output current when the PWM carrier frequency (parameter CF) is following. 200V/400V class : 4kHz or less , 690V class : 2.5kHz

Voltage Class	Applicable Motor Output (kW)
	0.4 0.75 1.5 2.2 3.0 4.0 5.5 7.5 11 15 18.5 22 30 37 45 55 75 90 110 132 160 200 220 250 280 315 355 400 500 630
3-phase 200 V	
3-phase 400 V	
3-phase 690 V	

Up to 5.5kW,3-phase 200V class can be applied to 1-phase input power supply by using 1 size-up rating.

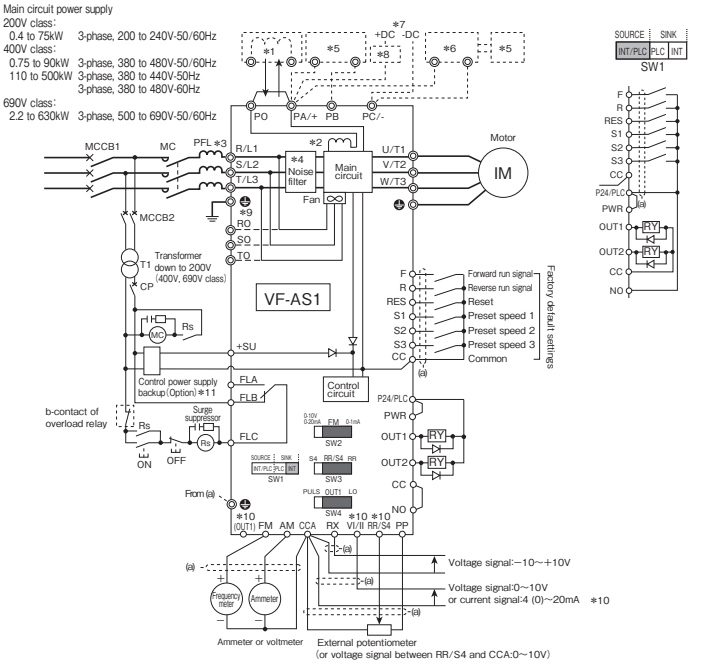
■ External dimensions and weight

Input voltage Class	Applicable motor (kW)	Inverter type	Dimensions (mm) Note)			Approximate Weight (kg) Note)
			Width	Height	Depth	
3-phase 200 V	0.4	VFAS1-2004PL	130	230	152	3
	0.75	VFAS1-2007PL	130	230	152	3
	1.5	VFAS1-2015PL	130	230	152	3
	2.2	VFAS1-2022PL	155	260	164	4
	4.0	VFAS1-2037PL	155	260	164	4
	5.5	VFAS1-2055PL	175	295	164	5.5
	7.5	VFAS1-2075PL	210	295	191	7.5
	11	VFAS1-2110PM	230	400	191	14
	15	VFAS1-2150PM	230	400	191	14
	18.5	VFAS1-2185PM	240	420	212	21
	22	VFAS1-2220PM	240	420	212	21
	30	VFAS1-2300PM	320	550	242	41
	37	VFAS1-2370PM	320	550	242	41
	45	VFAS1-2450PM	320	550	242	41
	55	VFAS1-2550P	310	680(920)	370	59(87)
	75	VFAS1-2750P	350	782(1022)	370	72(103)
3-phase 400 V	0.75	VFAS1-4007PL	130	230	152	3
	1.5	VFAS1-4015PL	130	230	152	3
	2.2	VFAS1-4022PL	130	230	152	3
	4.0	VFAS1-4037PL	155	260	164	4
	5.5	VFAS1-4055PL	175	295	164	5.5
	7.5	VFAS1-4075PL	175	295	164	5.5
	11	VFAS1-4110PL	210	295	191	8
	15	VFAS1-4150PL	230	400	191	13
	18.5	VFAS1-4185PL	230	400	191	16
	22	VFAS1-4220PL	240	420	212	21
	30	VFAS1-4300PL	240	550	242	29
	37	VFAS1-4370PL	240	550	242	29
	45	VFAS1-4450PL	320	630	290	48
	55	VFAS1-4550PL	320	630	290	48
	75	VFAS1-4750PL	320	630	290	48
	90	VFAS1-4900PC	310	680(920)	370	59(89)
	110	VFAS1-4110KPC	350	782(1022)	370	74(108)
	132	VFAS1-4132KPC	330	950(1190)	370	82(118)
	160	VFAS1-4160KPC	430	950(1190)	370	104(161)
	200	VFAS1-4200KPC	585	950(1190)	370	134(194)
	220	VFAS1-4220KPC	585	950(1190)	370	136(204)
	280	VFAS1-4280KPC	585	950(1190)	370	136(204)
	355	VFAS1-4355KPC	880	1150(1390)	370	225(330)
	400	VFAS1-4400KPC	880	1150(1390)	370	225(330)
	500	VFAS1-4500KPC	1108	1150(1390)	370	330(462)
3-phase 690 V	2.2	VFAS1-6022PL	240	420	212	21
	3.0	VFAS1-6030PL				
	5.5	VFAS1-6055PL				
	7.5	VFAS1-6075PL				
	11	VFAS1-6110PL				
	15	VFAS1-6150PL				
	18.5	VFAS1-6185PL				
	22	VFAS1-6220PL				
	30	VFAS1-6300PL				
	37	VFAS1-6370PL	320	630	290	48
	45	VFAS1-6450PL				
	55	VFAS1-6550PL				
	75	VFAS1-6750PL				
	90	VFAS1-6900PL				
	110	VFAS1-6110KPC	330	950(1190)	370	82(110)
	132	VFAS1-6132KPC				
	160	VFAS1-6160KPC				
	200	VFAS1-6200KPC	585	950(1190)	370	134(190)
	250	VFAS1-6250KPC				
	315	VFAS1-6315KPC				
	400	VFAS1-6400KPC	1108	1150(1390)	370	330(400)
	500	VFAS1-6500KPC				
	630	VFAS1-6630KPC				

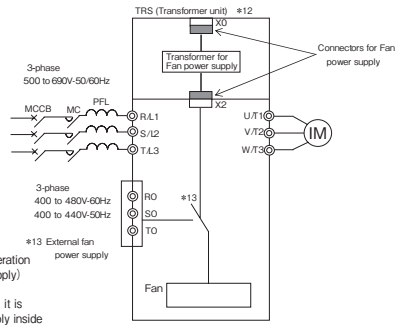
Note): Value in ( ) includes attached DC reactor for the 200V/400V class and attached TRS(Transformer) for the 690V class.

■ Standard connection diagram : Sink logic (common : CC)

■ Standard connection diagram : Source logic (common : P24)



∗1 : The inverter is shipped with the terminals PO and PA/+ shorted with a bar (200V-45kW or less, 400V-75kW or less and 690V-90kW or less). Remove this shorting bar when installing a DC reactor (DCL). For 200 V - 55 kW or more, and 400 V - 90 kW or more models, be sure to install the DC reactor.
∗2 : The DC reactor is built in for models 200V-11kW～45kW, 400V-18.5kW～75kW and 690V-3.0～90kW.
∗3 : For 690V-110kW or more, be sure to install the AC reactor(option).
∗4 : The noise filter is built in for models 200V-45kW or less, all of 400V and all of 690V.
∗5 : External braking resistor (option). Dynamic braking drive circuit built-in (GTR7) as standard for models 160kW or less.
∗6 : Power generation braking Unit (option). When the external braking resistor (option) is used on 200 kW or more models, the separate power braking unit (option) is required.
∗7 : To supply a DC power, connect the cables to the PA/+ and PC/- terminals(Except 690V models).
∗8 : If you want to use a DC power supply to operate the inverter (200V: 18.5kW or more, 400V: 22kW or more), be sure to contact your supplier customer support center, because an inrush current limiting circuit is required in such a case.
∗9 : For models 200V-75kW and 400V-110kW or more, three-phase power input is necessary to drive the fan if you want to use a DC power supply.
∗10 :The functions assigned to terminals OUT1, VI/II and RR/S4 can be switched by changing parameter settings. The internal impedance between VI/II terminal and CCA is high when the inverter control power cut off. Please put a resistor (1/2W-470 ohms) between VI/II and CCA to avoid mis-detecting the current input signal error.
∗11 :To supply control power from an external power supply for backing up the control power supplied from the inverter, an optional control power backup device (CPS002Z) is required. In such a case, the backup device is used at the same time with the internal power supply of the inverter. The optional control power backup unit can convert 200V～480Vac to 24Vdc.



∗12 :690V−110kW or more models are necessary to supply operation power for cooling fans, TRS(Transformer for fan power supply) connect to cooling fans as follows .
∗13 :In case of using external fan power supply instead of TRS, it is necessary to change the connection of the fan power supply inside of the inverter.

For users of the products : Our variable speed drives are designed to control the speeds of three-phase motors for general industry.

⚠ Precautions

* Please read the instruction manual before installing or operating the drive unit.
* 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, tra˜ic, 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 our headquarters, branch, or local o˜ices printed on the front and back covers of this catalogue.
* When exporting Toshiba variable speed drive separately or combined with your equipment, please be sure to satisfy the objective conditions and inform conditions listed in the export control policies, so called Catch All restrictions, which are set by the Ministry of Economy, Trade and Industry of Japan, and the appropriate export procedures must also be taken.
* 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 motors.
* None of Toshiba, its subsidiaries, a˜iliates or agents, shall be liable for any physical damages, including, without limitation, malfunction, anomaly, breakdown or any other problem that may occur to any apparatus in which the Toshiba variable speed drive is incorporated or to any equipment that is used in combination with the Toshiba variable speed drive. Nor shall Toshiba, its subsidiaries, a˜iliates or agents be liable for any compensatory damages resulting from such utilization, including compensation for special, indirect, incidental, consequential, punitive or exemplary damages, or for loss of profit, income or data, even if the user has been advised or apprised of the likelihood of the occurrence of such loss or damages.

For further information, please contact your nearest Toshiba Representative or International Operations-Producer Goods.
The information in this brochure is subject to change without notice.

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