

TOSHIBA

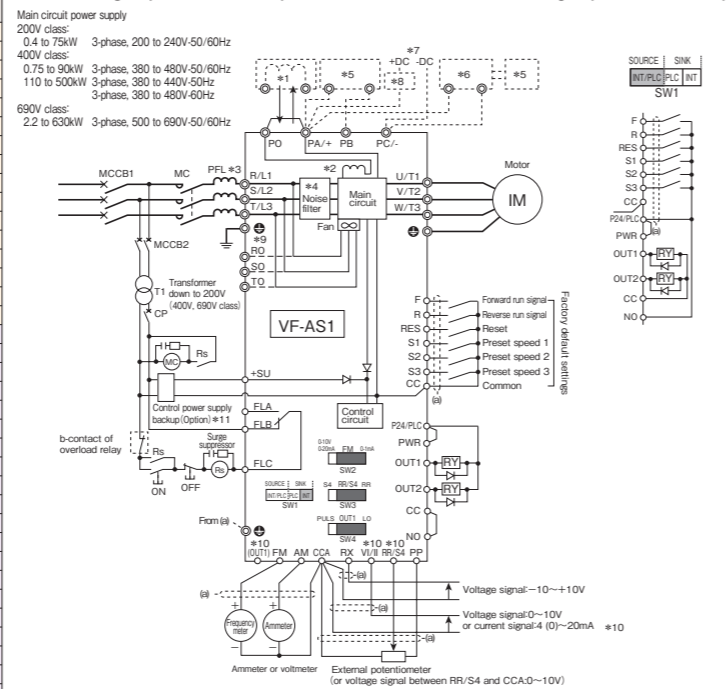
Transistor Inverter

External dimensions and weight

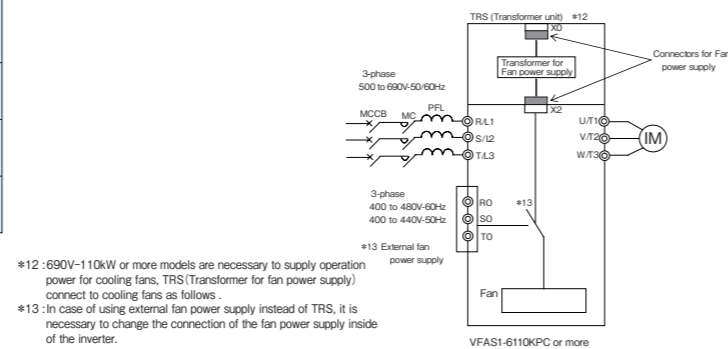
Input voltage Class	Applicable motor (kW)	Inverter type	Dimensions (mm) Note			Approximate Weight (kg) Note
			Width	Height	Depth	
3-phase 200 V	0.4	VFAS1-2004PL	130	230	152	3
	0.75	VFAS1-2007PL	130	230	152	3
	1.5	VFAS1-2015PL	130	230	152	3
	2.2	VFAS1-2022PL	155	260	164	4
	4.0	VFAS1-2037PL	155	260	164	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				
	3.0	VFAS1-6030PL				
	5.5	VFAS1-6055PL				
	7.5	VFAS1-6075PL				
	11	VFAS1-6110PL	240	420	212	21
	15	VFAS1-6150PL				
	18.5	VFAS1-6185PL				
	22	VFAS1-6220PL				
	30	VFAS1-6300PL				
	37	VFAS1-6370PL				
	45	VFAS1-6450PL				
55	VFAS1-6550PL	320	630	290	48	
75	VFAS1-6750PL					
90	VFAS1-6900PL					
110	VFAS1-6110KPC					
132	VFAS1-6132KPC	330	950(1190)	370	82(110)	
160	VFAS1-6160KPC					
200	VFAS1-6200KPC					
250	VFAS1-6250KPC	585	950(1190)	370	134(190)	
315	VFAS1-6315KPC					
400	VFAS1-6400KPC					
500	VFAS1-6500KPC	1108	1150(1390)	370	330(400)	
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)



- *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, V/I/I and RR/S4 can be switched by changing parameter settings.
The internal impedance between V/I/I terminal and CCA is high when the inverter control power cut off.
Please put a resistor (1.2W-470 ohm) between V/I/I 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 (CPS0022) 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.

To users : This inverter is designed to control the speeds of three-phase induction motors for general industry.

Precautions

- * Read the instruction manual before installing or operating the inverter unit and store it in a safe place for reference.
- * When using our inverters for equipment such as nuclear power control, aviation and space flight control, traffic, and safety, and there is a risk that any failure or malfunction of the inverter could directly endanger human life or cause injury, please contact our headquarters, branch, or office printed on the front and back covers of this catalogue. Special precautions must be taken and such applications must be studied carefully.
- * When using our inverters for critical equipment, even though the inverters are manufactured under strict quality control always fit your equipment with safety devices to prevent serious accident or loss should the inverter fail (such as issuing an inverter failure signal).
- * Do not use our inverters for any load other than three-phase induction motors.
- * None of Toshiba, its subsidiaries, affiliates 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 inverter is incorporated or to any equipment that is used in combination with the Toshiba inverter. Nor shall Toshiba, its subsidiaries, affiliates 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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High-performance Inverter TOSVERT™

VF-AS1

3-phase 200V class 0.4kW to 75kW
3-phase 400V class 0.75kW to 500kW
3-phase 690V class 2.2kW to 630kW

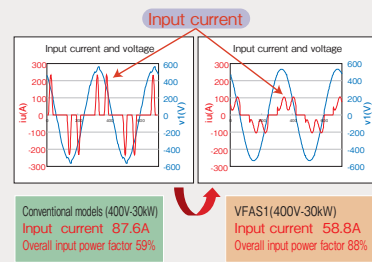


For your electronic products that might interfere with peripheral devices.

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.

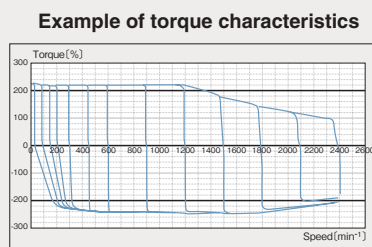
In the Quick mode, pressing the EASY key displays only eight basic parameters, thus facilitating parameter selection and setup. In addition, you can customize and display maximum of 32 target from all kinds of parameters to suit your specific setup requirements. This makes the inverter ideal for simple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

Quick mode (EASY)	
Title	Function
R U Y	Parameter setting macro function
P L	V/F control mode selection
F H	Maximum frequency
A C C	Acceleration time 1
d E C	Deceleration time 1
t H r	Motor overload protection level 1
F R	FM terminal meter adjustment
P S E L	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.

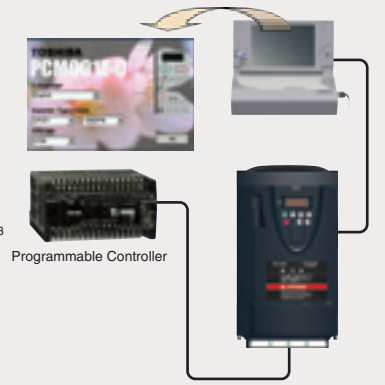


*2. When a TOSHIBA standard 3-phase, 200 V - 2.2 kW 4-pole motor is driven, (Note, however, that torque differs according to voltage and capacity.)



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 PCM001Z 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, coils/uncoilers and other systems that require flexibility.



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

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



Compatible with the World's Main Standards (CE marking, UL, GSA, C-tick)

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



ISO-9001 Certification Acquired. This product is designed and manufactured in factories that have acquired certification of "ISO-9001," the international quality assurance standard.

U.K.A.S. CERTIFICATION 001

ISO-14001 Certification Acquired. The factories manufacturing this product are ISO-14001, environmental management system, registered factories.

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

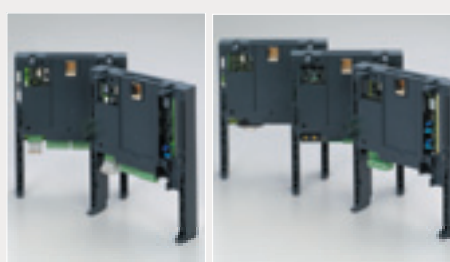


This panel is an 23-character x 8-line display, and can be used for simple setup and monitoring by selection of parameters using the jog dial. The display language can be switched between English, German and Japanese. (Portuguese will be available soon.)
Type: RKP004Z



*The photograph shows a screen currently in development.

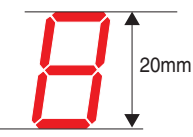
Expanded Terminal Block Option



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 2110PL 2150PL 2185PL 2220PL 2300PL 2370PL 2450PL 2550PL 2750PL - - - - - 3-phase 400V class - 4007PL 4015PL 4022PL - 4037PL 4055PL 4075PL 4110PL 4150PL 4185PL 4220PL 4300PL 4370PL 4450PL 4550PL 4750PL 4900PL 4110KPC 4132KPC 4180KPC 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 6180KPC 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 fl uctuation Voltage +10%, -15% (±10% when the inverter is used continuously (load of 100%)), Frequency ±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 frequency 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 filter	EN55011 classA, EN61800-3 category C2 compliant (built-in EMI noise filter) : 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 filter) : 200V class 2.2 to 7.5kW, 400V class 5.5 to 500kW, 690V class 2.2 to 630kW Basic filter (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
3-phase 200 V	[Bar chart showing applicable motor output for 3-phase 200V]																												
3-phase 400 V	[Bar chart showing applicable motor output for 3-phase 400V]																												
3-phase 690 V	[Bar chart showing applicable motor output for 3-phase 690V]																												

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