

Planning

Totally enclosed box type for IP54/UL type 12



Line-up

Voltage class	Applicable Motor Output (kW)																
	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
3-phase 400V class (IP54)	[Bar chart showing applicable motor output range for each voltage class]																

point 1 Totally enclosed box type for IP54/UL type 12

- IP54 protection for direct mounting on a wall

point 2 High-frequency noise reduction

- IP54 product with EN 55011 class A or class B (IEC/EN 61800-3) built-in EMC filters

point 3 Harmonics reduction

- New types of compact and space-saving DC reactor is built-in for all models

point 4 LCD keypad as standard

- Possible for palm top operation

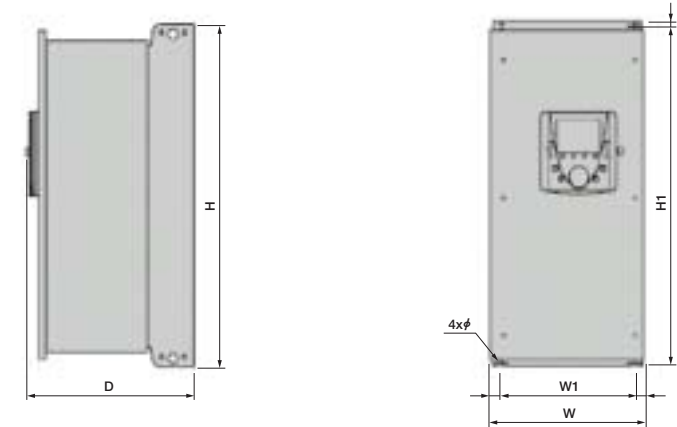
Standard specifications

Item	Specification
Applicable motor (kW)	0.75 1.5 2.2 3.7 5.5 7.5 11 15 18.5 22 30 37 45 55 75 90
Model	Type: VFPS1
	Form: 4007PLE, 4015PLE, 4022PLE, 4037PLE, 4055PLE, 4075PLE, 4110PLE, 4150PLE, 4185PLE, 4220PLE, 4300PLE, 4370PLE, 4450PLE, 4550PLE, 4750PLE, 4900PLE
Rating	Capacity(KVA)Note 1: 1.8, 3.1, 3.9, 6.9, 9.1, 12.0, 17.0, 23.0, 28.0, 33.0, 45.0, 54.0, 65.0, 78.0, 104.0, 124.0
	Output current(A) Note 2: 2.3, 4.1, 5.1, 9.1, 12, 16, 22.5, 30.5, 37, 43.5, 58.5, 71.5, 85, 103, 137, 163
Power supply	Voltage/frequency: 3-phase 380 to 480V, 50/60 Hz
	Tolerance: Voltage +10%, -15% (±10% during continuous 100% load) Frequency ±5%
Rated output voltage	3 phase 380 to 480V : 400V class (The maximum output voltage is same as the input source voltage)
Output frequency range	0.01 to 500 Hz (Default setting 0.01 to 80.0 Hz)
Overload current rating	110%-60 seconds (Anti-time limit characteristic)
Dynamic breaking circuit	Built-in dynamic breaking circuit
Dynamic breaking resistor	External option
Main functions	Parameter setup quick mode, Local/remote operation, Automatic energy saving mode, programmable I/O terminal block, multi-PID control, Fire control enables forced operation, My function"
Ambient temperature /Relative humidity	-10 to 50°C (current decreases when over 40°C)/5 to 95% (no condensation or steam allowed)
Protective method	IP54/UL type 12
Cooling method	Forced air cooling
Built-in filter	EN55011 class A, EN61800-3 category C2 or C3 compliant (built-in EMI noise filter) :PLE type EN55011 class B, EN61800-3 category C1 compliant (built-in EMI noise filter) :PDE type "
Reactor	Built-in DC reactor

Note 1) Capacity is calculated at 440V

Note 2) Rated output current when the PWM carrier frequency(parameter CF) is 8kHz or less.

External dimensions



Input voltage Class	Applicable motor (kW)	Inverter model Note 1	Dimensions (mm)							Approximate Weight(kg) Note 1
			W	H	D	W1	H1	H2	ø	
3-phase 400 V	0.75	VFPS1-4007PLE(PDE)	240	490	272	200	476	6	6	12(14)
	1.5	VFPS1-4015PLE(PDE)								
	2.2	VFPS1-4022PLE(PDE)								
	3.7	VFPS1-4037PLE(PDE)	240	490	286	200	476	6	6	13(15)
	5.5	VFPS1-4055PLE(PDE)								
	7.5	VFPS1-4075PLE(PDE)	260	525	286	220	511	6	6	16(19)
	11	VFPS1-4110PLE(PDE)								
	15	VFPS1-4150PLE(PDE)	295	560	315	250	544	8	6	21(25)
	18.5	VFPS1-4185PLE(PDE)								
	22	VFPS1-4220PLE(PDE)	315	665	315	270	647	10	6	31(36)
	30	VFPS1-4300PLE(PDE)								
	37	VFPS1-4370PLE(PDE)	285	720	315	245	700	10	7	34(39)
	45	VFPS1-4450PLE(PDE)								
	55	VFPS1-4550PLE(PDE)	285	880	343	245	860	10	7	43(49)
75	VFPS1-4750PLE(PDE)									
90	VFPS1-4900PLE(PDE)	362	1000	364	300	975	10	9	69(80)	

Note 1) The values in parentheses refer to PDE type,

VFPS1-****PLE:Built-in class A EMC filter, VFPS1-****PDE:Built-in class B EMC filter

Selection peripheral and wiring sizes devices

Voltage Class	Applicable motor (kW)	Inverter model	Input current[A]	Molded-case circuit breaker (MCCB) Note 1),2) Rated current [A]	Magnetic contactor (MC) Note 1),3),4),5) Operational current(A) AC1	Wire size Note 6),7)					
						Main circuit				Ground lead	
						Input terminal (R, S, T)		Output terminal (U, V, W)		AWG	mm ²
400 V class	0.75	VFPS1-4007PLE(PDE)	1.	4	25	14	1.5	14	1.5	14	2.5
	1.5	VFPS1-4015PLE(PDE)	3.5	6.3	25	14	1.5	14	1.5	14	2.5
	2.2	VFPS1-4022PLE(PDE)	5	10	25	14	1.5	14	1.5	14	2.5
	3.7	VFPS1-4037PLE(PDE)	8.8	14	25	12	1.5	12	1.5	14	2.5
	5.5	VFPS1-4055PLE(PDE)	11.4	25	25	10	2.5	10	2.5	12	2.5
	7.5	VFPS1-4075PLE(PDE)	15.8	25	25	10	4	10	4	12	4
	11	VFPS1-4110PLE(PDE)	21.9	30	32	8	6	8	6	10	6
	15	VFPS1-4150PLE(PDE)	30.5	40	40	6	10	6	10	10	10
	18.5	VFPS1-4185PLE(PDE)	37.5	60	50	6	10	6	10	10	10
	22	VFPS1-4220PLE(PDE)	43.6	60	50	6	10	6	10	10	8
	30	VFPS1-4300PLE(PDE)	56.7	100	80	4	16	4	16	10	16
	37	VFPS1-4370PLE(PDE)	69.5	100	125	3	25	3	25	8	16
	45	VFPS1-4450PLE(PDE)	85.1	125	125	1	35	1	35	8	16
	55	VFPS1-4550PLE(PDE)	104.8	150	125	1/0	50	1/0	50	6	25
75	VFPS1-4750PLE(PDE)	140.3	200	250	3/0	70	3/0	70	6	35	
90	VFPS1-4900PLE(PDE)	171.8	200	250	250MCM	120	250MCM	120	2	70	

Note 1) Selections for use of the Toshiba 4-pole standard motor with power supply voltage of 400V-50Hz.

Note 2) Choose the MCCB according to the power supply capacity.

For comply with UL and CSA standard, use the fuse certified by UL and CSA.

Note 3) When the motor is driven by commercial power supply switching, for example, use an electromagnetic contactor that is matched to AC-3 class motor rated current.

Note 4) Attach surge killers to the magnetic contactor and exciting coil of the relay.

Note 5) In the case the magnetic contactor (MC) with 2a-type auxiliary contacts is used for the control circuit, raise the reliability of the contact by using 2a-type contacts in parallel connection.

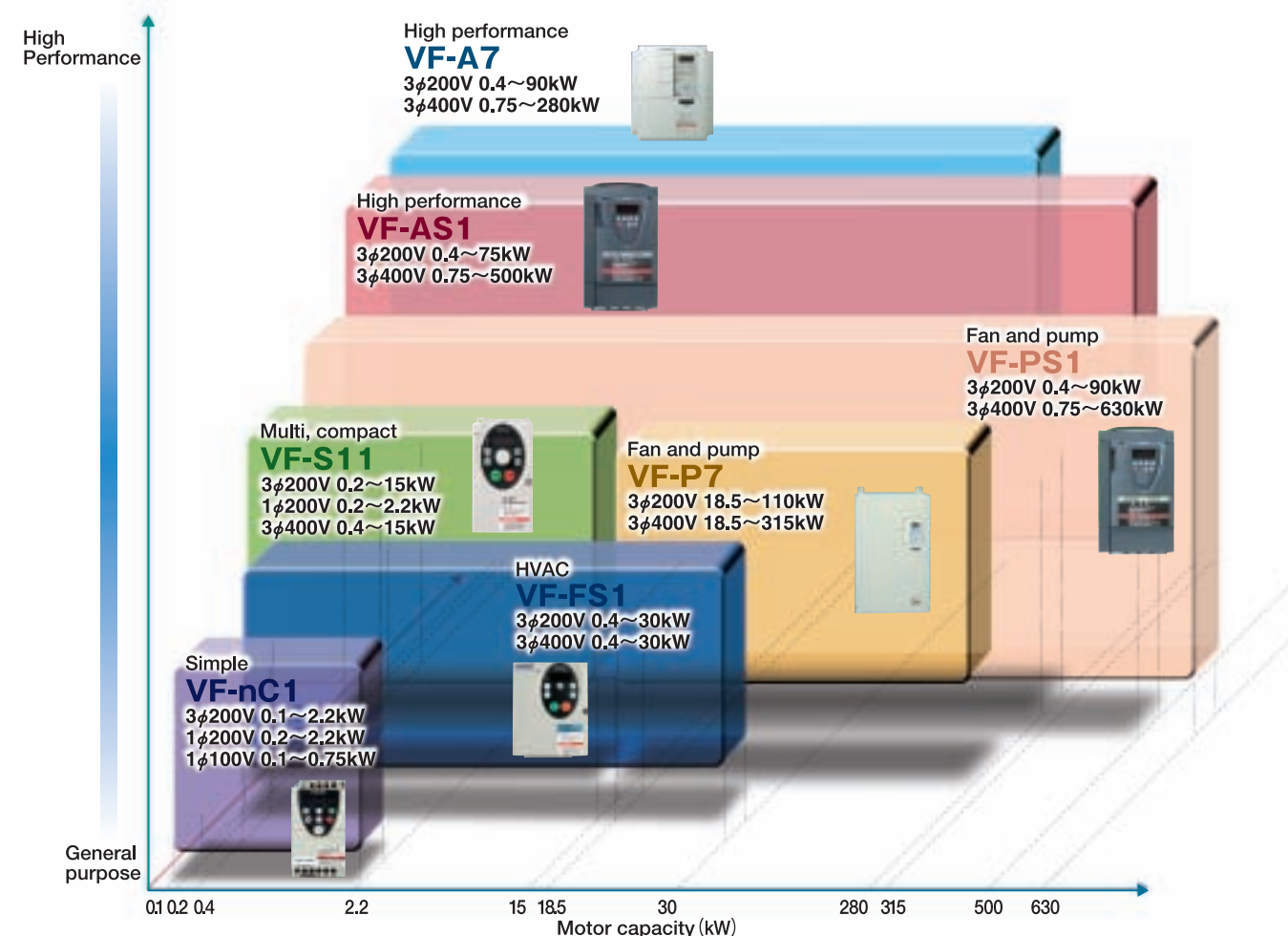
Note 6) The recommended cable size is that of the cable (e.g. 600V class, HIV cable) with continuous maximum permissible temperature of 75°C. Ambient temperature is 40°C or less and the wiring distance is 30m or less.

Note 7) For the control circuit, use shielded wires whose size (cross-section) is 0.75 mm² or more.

Note 8) The screw size of the control terminals is M3.

TOSHIBA Inverter lineup

The abundant variations of simple variable speed to vector control



Functions of lineup

Model	Voltage class	Applicable motor	Overload current rating	Automatic functions		Control specifications					Functions					
				Automatic acceleration / deceleration	Automatic torque boost	V/F constant	Automatic torque boost control	Energy-saving	Sensorless vector control	PG feedback vector control	Torque limit	Torque control	Positioning	Local/Remote	Fire control enables forced operation	LCD keypad option
VF-nC1	3φ200V	0.1 to 2.2kW	150%-1 minute	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No
	1φ200V	0.2 to 2.2kW														
	1φ100V	0.1 to 0.75kW														
VF-S11	3φ200V	0.2 to 15kW	150%-1 minute	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No
	1φ200V	0.2 to 2.2kW														
	3φ400V	0.4 to 15kW														
VF-AS1	3φ200V	0.4 to 75kW	150%-1 minute	Yes	Yes	Yes	Yes	No	Yes	Yes Note 1)	Yes	Yes	No	No	No	Yes Note 1)
	3φ400V	0.75 to 500kW														
VF-A7	3φ200V	0.4 to 90kW	150%-2 minute Note 2)	Yes	Yes	Yes	Yes	Yes	Yes	Yes Note 1)	Yes	Yes	Yes Note 1)	No	No	No
	3φ400V	0.75 to 280kW														
VF-FS1	3φ200V	0.4 to 30kW	110%-1 minute	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No
	3φ400V	0.4 to 30kW														
VF-PS1	3φ200V	0.4 to 90kW	120%-1 minute	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes Note 1)
	3φ400V	0.75 to 630kW														
VF-P7	3φ200V	0.4 to 110kW	120%-1 minute	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
	3φ400V	0.75 to 315kW														

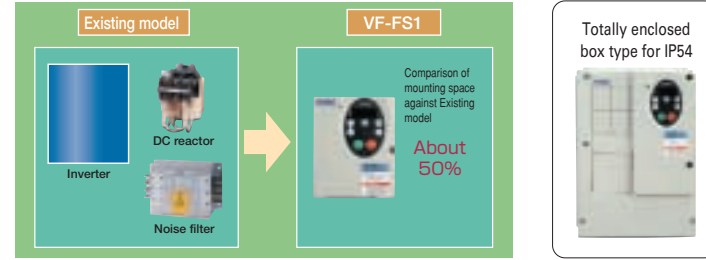
Note 1) Option

Note 2) For 200V-75kW or more and 400V-110kW or more, 150%-1 minute overload current rating

Inverter dedicated to fan and pump for HVAC

VF-FS1

- Applications:
- AHUs
 - Ventilation fans
 - Chillers
 - Water pumps etc.



Totally enclosed box type for IP54



- POINT 1** Half installation space and less wiring
Reduce 50% of installation space, Built-in filter
- POINT 2** Reactor-less harmonic reduction
Toshiba unique technologies suppress harmonics Power factor improvement
- POINT 3** Long life and easy maintenance
15 years life designed main capacitors
- POINT 4** Special softwares for fan and pump application are built-in
Local/ Remote key, Fire control enables forced operation
- POINT 5** More energy saving and easier operation
The advanced energy-saving mode, Quick setting wizard

Optional filed buses for LONWORKS®, BACnet®, Metasys® N2 and APOGEE® FLN as built in option.

Standard specifications

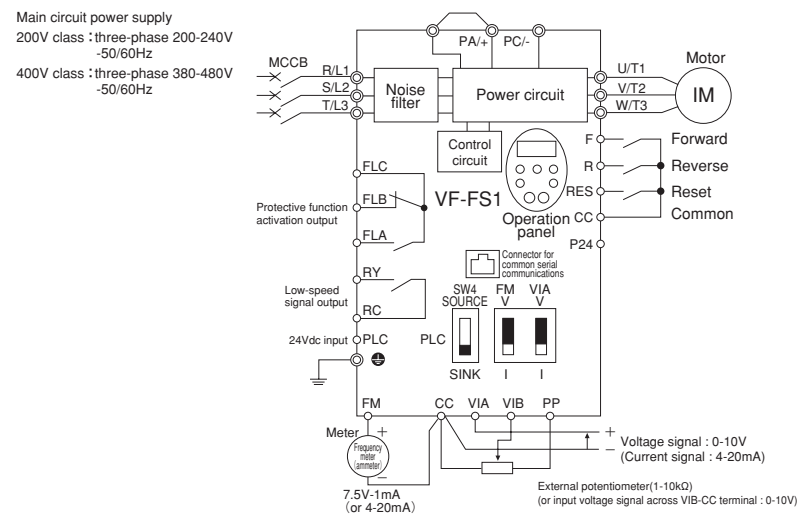
Item		Specification											
Applicable motor (kW)		0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30
Machine type	Input voltage class	VF-FS1											
	Model	2004PM	2007PM	2015PM	2022PM	2037PM	2055PM	2075PM	2110PM	2150PM	2185PM	2220PM	2300PM
Rating	Capacity (kVA) 200V class/400V class	1.1	1.8/1.6	2.9/2.8	4.0/3.9	6.7/6.9	9.2/9.1	12.2	17.6/17.1	23.2	28.5/28.2	33.5/33.2	44.6
	Output current (A)	2.8	4.6	7.5	10.6	17.5	24.2	32	46.2	61	74.8(67.3)	88(79.2)	117.0(105.3)
Power supply	Voltage/frequency	200V class: 200V to 240V - 50/60Hz, 400V class: 3-phase 380 to 480V - 50/60Hz											
	Tolerance	Voltage +10%, -15% (±10% when the inverter is used continuously (load of 100%))											
Output voltage adjustment		Adjustable within a range of the corrected supply voltage 50 to 660V (Unadjustable to any voltage higher than the input voltage).											
Output frequency range		0.5 to 200.0Hz (default setting 0.5 to 80.0Hz)											
Voltage/frequency characteristics		V/f constant, variable torque, automatic torque boost, vector control, automatic energy conservation, PM motor control, auto-tuning function											
Overload current rating		60 seconds at 110%, 2 seconds at 180% (Anti-time limit characteristic)											
Main functions		Wizard, Local/Remote change-over, Bumpless operation, Forced fire-speed control, PTC thermal protection, Programmable I/O terminal block, Auto-restart											
Ambient temperature/Relative humidity		-10 to 60°C (Current decrease when over 40°C) /20 to 93% free from condensation and vapor											
Protective method		0.4 to 18.5kW : IP20 enclosed type(JEM1030), 22kW and over : IP00 type(JEM1030)											
Cooling method		Forced air cooling											
Built-in filter		3-phase 200V class: basic noise filter, 400V class:EMI noise filter (IEC/EN61800-3, 1st Environment,C2 or IEC/EN61800-3, 2nd Environment,C3)											

The rated output current in the parenthesis is at 12kHz of PWM carrier frequency(F300)setting.

Exterior dimensions and weight

Input voltage Class	Applicable motor(kW)	Inverter model	Dimensions(mm)			Approximate weight(kg)
			Width	Height	Depth	
3-phase 200V (IP20/IP00)	0.4	VFFS1-2004PM	107	130	150	1.2
	0.75	VFFS1-2007PM	107	130	150	1.2
	1.5	VFFS1-2015PM	107	130	150	1.2
	2.2	VFFS1-2022PM	107	130	150	1.2
	3.7	VFFS1-2037PM	142	170	150	2.1
	5.5	VFFS1-2055PM	180	220	170	4.3
	7.5	VFFS1-2075PM	180	220	170	4.3
	11	VFFS1-2110PM	245	310	190	8.6
	15	VFFS1-2150PM	245	310	190	8.6
	18.5	VFFS1-2185PM	245	310	190	8.9
3-phase 400V (IP20/IP00)	22	VFFS1-2220PM	240	420	214	16.4
	30	VFFS1-2300PM	320	630	290	38
	0.4	VFFS1-4004PL	107	130	150	1.4
	0.75	VFFS1-4007PL	107	130	150	1.4
	1.5	VFFS1-4015PL	107	130	150	1.4
	2.2	VFFS1-4022PL	107	130	150	1.4
	3.7	VFFS1-4037PL	142	170	150	2.4
	5.5	VFFS1-4055PL	142	170	150	2.4
	7.5	VFFS1-4075PL	180	220	170	4.7
	11	VFFS1-4110PL	180	220	170	4.7
15	VFFS1-4150PL	245	310	190	9	
18.5	VFFS1-4185PL	245	310	190	9	
22	VFFS1-4220PL	240	420	214	15.4	
30	VFFS1-4300PL	240	420	214	15.4	

Standard connection diagram : Sink logic(common : cc)



Standard connection diagram : Source logic(common : P24)

