

TOSVERT VF-S11

Explanation of Load reduction

**Load reduction at use condition
and ambient temperature, and installation method**

Toshiba Inverter Corporation

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1. About VFS11's temperature environment and load reduction

VFS11 has variety use environment, but some environment are needed load reduction (output current reduction).

2. VFS11's rated current

VFS11's rated current means following condition.

Carrier frequency: 4kHz or below

Ambient temperature: 40 degree C or below

When carrier frequency or input voltage condition are following, you need reduction of VFS11's output current (refer the table1.1 and 1.2).

1. Carrier frequency

2.0kHz~4kHz: Rated current

4.1kHz~12kHz: Needed load reduction

12.1kHz~16.0kHz: Needed load reduction

2. Input voltage (400V input class only)

380Vac~480Vac: Rated current

480Vac~500Vac: Needed load reduction

Note: Inverter's current monitor and internal operation processing (monitor and parameter setting value) are always 100%=Rated current (Carrier frequency: 4kHz, ambient temperature: 40 degree C).

Table 1.1 Load reduction by carrier frequency setting (200V input class)

Input power supply	Type-Form	Inverter's capacity [kW]	200Vac~240Vac		
			~4kHz	~12kHz	~16kHz
Single phase 200V	VFS11S-2002PL	0.2	1.5	1.5	1.5
	VFS11S-2004PL	0.4	3.3	3.3	3.3
	VFS11S-2007PL	0.75	4.8	4.4	4.2
	VFS11S-2015PL	1.5	8.0	7.9	7.1
	VFS11S-2022PL	2.2	11.0	10.0	9.1
3 phase 200V	VFS11-2002PM	0.2	1.5	1.5	1.5
	VFS11-2004PM	0.4	3.3	3.3	3.3
	VFS11-2005PM	0.55	3.7	3.3	3.2
	VFS11-2007PM	0.75	4.8	4.4	4.2
	VFS11-2015PM	1.5	8.0	7.9	7.1
	VFS11-2022PM	2.2	11.0	10.0	9.1
	VFS11-2037PM	3.7	17.5	16.4	14.6
	VFS11-2055PM	5.5	27.5	25.0	25.0
	VFS11-2075PM	7.5	33.0	33.0	29.8
	VFS11-2110PM	11	54.0	49.0	49.0
VFS11-2150PM	15	66.0	60.0	54.0	

Rated current

Unit: [A]

Table1.2 Load reduction by carrier frequency setting and input voltage level
(400V input class)

Input power supply	Type-Form	Inverter's capacity [kW]	380Vac~480Vac			481Vac~500Vac		
			~4kHz	~12kHz	~16kHz	~4kHz	~12kHz	~16kHz
3 phase 400V	VFS11-4004PL	0.4	1.5	1.5	1.5	1.5	1.5	1.2
	VFS11-4007PL	0.75	2.3	2.1	2.1	2.1	1.9	1.9
	VFS11-4015PL	1.5	4.1	3.7	3.3	3.8	3.4	3.1
	VFS11-4022PL	2.2	5.5	5.0	4.5	5.1	4.6	4.2
	VFS11-4037PL	3.7	9.5	8.6	7.5	8.7	7.9	6.9
	VFS11-4055PL	5.5	14.3	13.0	13.0	13.2	12.0	12.0
	VFS11-4075PL	7.5	17.0	17.0	14.8	15.6	14.2	12.4
	VFS11-4110PL	11	27.7	25.0	25.0	25.5	23.0	23.0
	VFS11-4150PL	15	33.0	30.0	26.0	30.4	27.6	24.0

Rated current

Unit: [A]

3. VFS11's ambient temperature environment

VFS11's ambient temperature environment is $-10\sim+60$ degree C, but VFS11 has some use condition.

Condition 1: Installation

1. Individual mounting
2. Side by side mounting without top seal label
3. Individual mounting without top seal label
4. DIN rail mounting without top seal label
5. DIN rail and Side by side mounting without top seal label
6. Separate inside & outside
7. External EMC filter(Foot mount)
8. External EMC filter(Side mount)
9. UL NEMA Type 1

Condition2: Ambient temperature

~ 40 degree C, ~ 50 degree C, ~ 60 degree C

Condition3: Carrier frequency setting

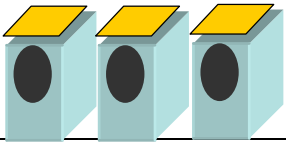
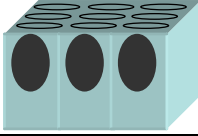

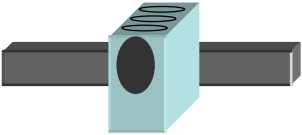
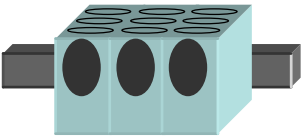
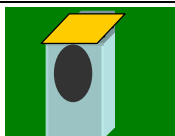
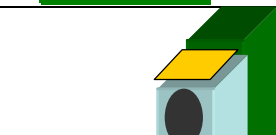
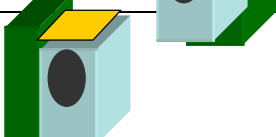

~ 4 kHz, ~ 12.0 kHz

Condition4: Cooling model

Self cooling model

Forced air-cooled model

Table 2.1 De-rating percentage of each installed condition

No.	Mounting conditions	Top seal label	Figure	Ambient temperature (Degree C)	Sheet metal			
					Self cooling model		Forced air-cooled model	
					4 kHz	12 kHz	4 kHz	12 kHz
1	Individual	With		40	100%	100%	100%	100%
				50	100%	80%	100%	100%
				60				
2	Side by side	Without		40	100%	100%	100%	100%
				50	70%	55%	100%	95%
				60	35%		70%	65%
3	Individual	Without		40	100%	100%	100%	100%
				50	100%	100%	100%	100%
				60	80%	75%	95%	80%
4	DIN rail mounting 1	Without		40	100%	75%	100%	100%
				50	80%	55%	95%	95%
				60	55%	35%	80%	75%
5	DIN rail mounting 2	Without		40	100%	75%	100%	100%
				50	60%		95%	90%
				60			60%	50%
6	Separate inside & outside	With		40	100%	100%	65%	55%
				50	100%	80%	40%	
				60				
7	External EMC filter (Foot mount)	With		40	100%	100%	100%	100%
				50	95%	75%	100%	95%
				60				
8	External EMC filter (Side mount)	With		40	100%	100%	100%	100%
				50	100%	85%	100%	95%
				60				
9	UL NEMA Type 1	With		40	100%	100%	100%	100%
				50	100%	80%	100%	100%
				60				