

Mixers [Chemical machines]

Features of mixers

Mixers in chemical machines are used in many kinds of plants for mixing/dispersing of material.

Merits of inverter drives

Mixers with inverters have the following merits:

- Variable speed control to match each material
- Stable speed for even mixing
- Tact time reduction due to high speed
- High starting torque due to vector control without sensor

Notices regarding the use of inverter drives

- Starting torque

Mixers often require high starting torque.

If mixers need over 200% starting torque, you have to increase the inverter capacity.

- Avoiding "mixing dust"

Usually, mixers are used in a dusty environment.

If this is the case, you have to install the inverter in a cabinet, or please select the IP54 model of VFS11.

- Maximum motor speed

The maximum motor speed depends on the motor specifications.
Please confirm the specifications of the manufacturer of your motor.
The specifications of TOSHIBA motors are as follows:

Capacity [kW]	Allowable frequency [Hz]		
	2 poles	4 poles	6 poles
0.4	60	120	120
0.75			
1.5			
2.2			
3.7			
5.5			
7.5		90	90
11			
15			
18.5			
22			
30	60	60	
37			
45			

- Electromagnetic noise

The inverter is generating "electromagnetic noise".

If there are some high accuracy sensors or other sensitive equipment near the inverter drive, the inverter's noise may cause some trouble or a malfunction.

Electromagnetic noise can be avoided by installing an external noise filter or using a different wiring method.

- Harmonics

The inverter is generating "harmonics".

These harmonics sometimes cause a malfunction in other control equipment that is connected to the same power source.

Harmonics can be avoided by installing an external "reactor".

To decrease "harmonics", we recommend to install DC reactors in all our inverter models.
(NOTE: 100V input models require AC reactors.)

● Selection

In almost all cases, the capacity of the inverter is the same as the motor capacity. However if you have a fixed acceleration/deceleration time or over 200% starting torque, the inverter capacity should be larger than the motor capacity.

Point Conditions that require an inverter capacity increase

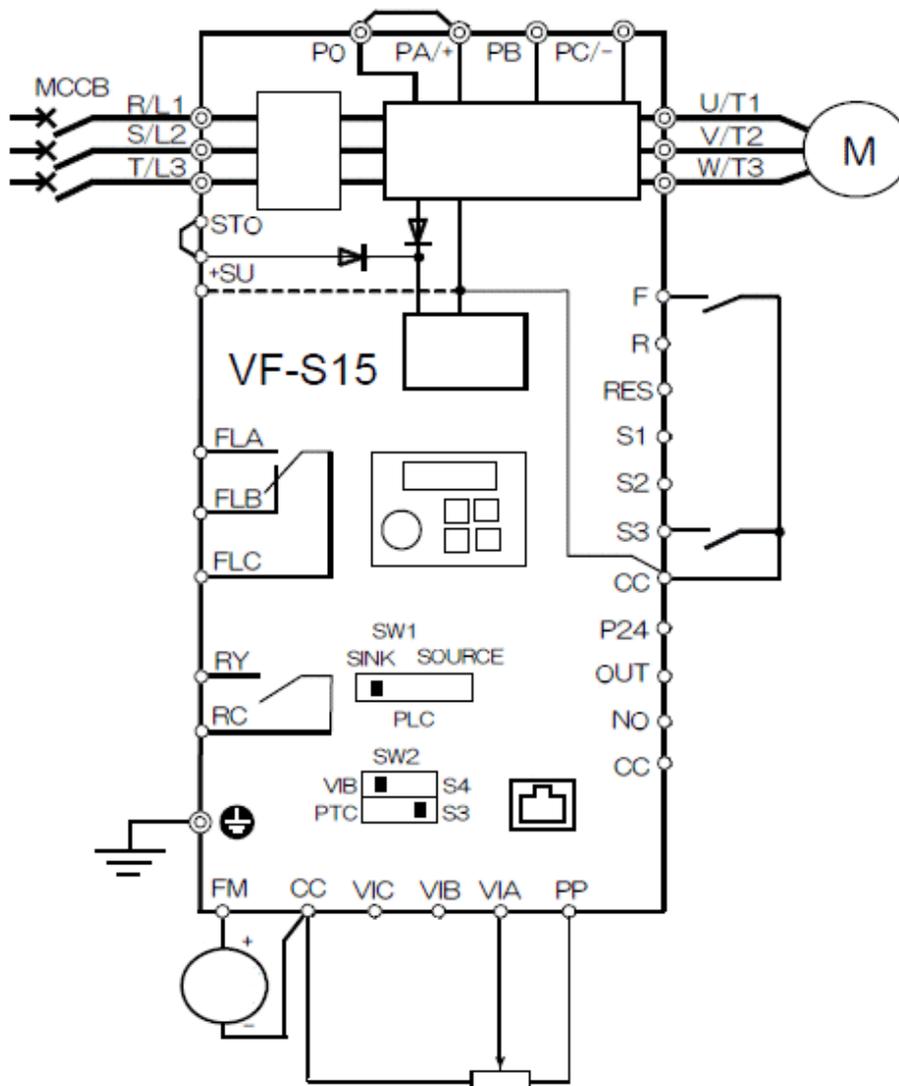
- Large starting torque over 200%.
- Short acceleration/deceleration time settings.

● Application samples

Mixers usually use the following operating methods:

- RUN and STOP operations by remote control
- Frequency setting by external analog input
- Vector control without sensor
- Emergency stop signal input
- Analog output for frequency meter

● Connection diagram of inverters (VF-S15)



Setting table for inverters (VF-S15)

Title	Function	Setting range	Recommended setting
<i>AV2</i>	Automatic torque boost	0 to 3	2
<i>CNOd</i>	Command mode selection	0 to 4	0
<i>FN</i>	Frequency setting mode selection 1	0 to 6	1 (VIA)
<i>FN0d</i>	Meter adjustment	-	-
<i>uL</i>	Base frequency 1	25 to 500Hz	Depends on the motor
<i>uLv</i>	Base frequency voltage 1	50-330 (240V class) 50-660 (500/600V class)	Depends on the motor
<i>F115</i>	Input terminal selection 6 (S3)	0 to 203	20
<i>F405</i>	Motor rated capacity	0.01 to 22kW	Depends on the motor
<i>F415</i>	Motor rated current	0.1 to 100A	Depends on the motor
<i>F417</i>	Motor rated speed	100 to 64000 ⁻¹	Depends on the motor

Note

After setting these parameters, please perform the following steps:

- (1) Connect the motor wiring.
- (2) Turn on the start signal.