

Winders [Textile machines]

Features of winders

Winders in textile machines use inverters for winding and un-winding processes in preparation for textile production.

The textile quality depends on how thread is being treated.

Textile machines sometimes have over 10 units.

Merits of inverter drives

Winders with inverters have the following merits:

- **Stable speed control for high textile quality**

Inverters can provide stable motor control.

Therefore winders can avoid uneven winding.

If you use the vector control with sensor, you can control a motor with an accuracy of 1:1000.

- **Electromagnetic noise reduction by built-in noise filter**

Many of TOSHIBA's inverters have built-in noise filters.

Therefore, you can reduce electromagnetic noise without optional devices.

VF-AS1 series:

200V input class

Models up to 7.5kW have built-in EMC noise filters.

Models over 11kW have capacitive noise filters.

400V input class

All of our products have built-in EMC noise filters.

VF-S15 series:

200V input class

All of our products have capacitive noise filters.

400V input class

All of our products have built-in EMC noise filters.

- **Multiple control through original communication protocol**

In almost all cases, textile machines have many winders which have to work together smoothly.

Toshiba inverters have an original communication method.

This communication method can support proportional control of all inverters by single frequency reference.

Notices regarding the use of inverter drives

- Avoiding "Lint"

Usually, winders 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 VF-S11.

- 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 installing 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, the inverter capacity should be larger than the motor capacity.

Please confirm your motor's rated current.

$[\text{Motor's rated current}] \times 1.05 < [\text{Inverter's rated current}]$



When you connect several motors to one inverter, please confirm the following:
 $[\text{Total motor's rated current}] \times 1.1 < [\text{Inverter's rated current}]$

In this case, the electric thermal function in the inverter can't protect all motors.
Please install an external thermal relay for each motor.

Application samples

Winders usually use the following operating methods:

- Frequency setting through RS485 communication (Inter-drive communication)

Master drive: Input RUN/STOP operation and frequency setting.

Slave drives: Receive frequency reference from a master drive.

- Emergency stop signal input

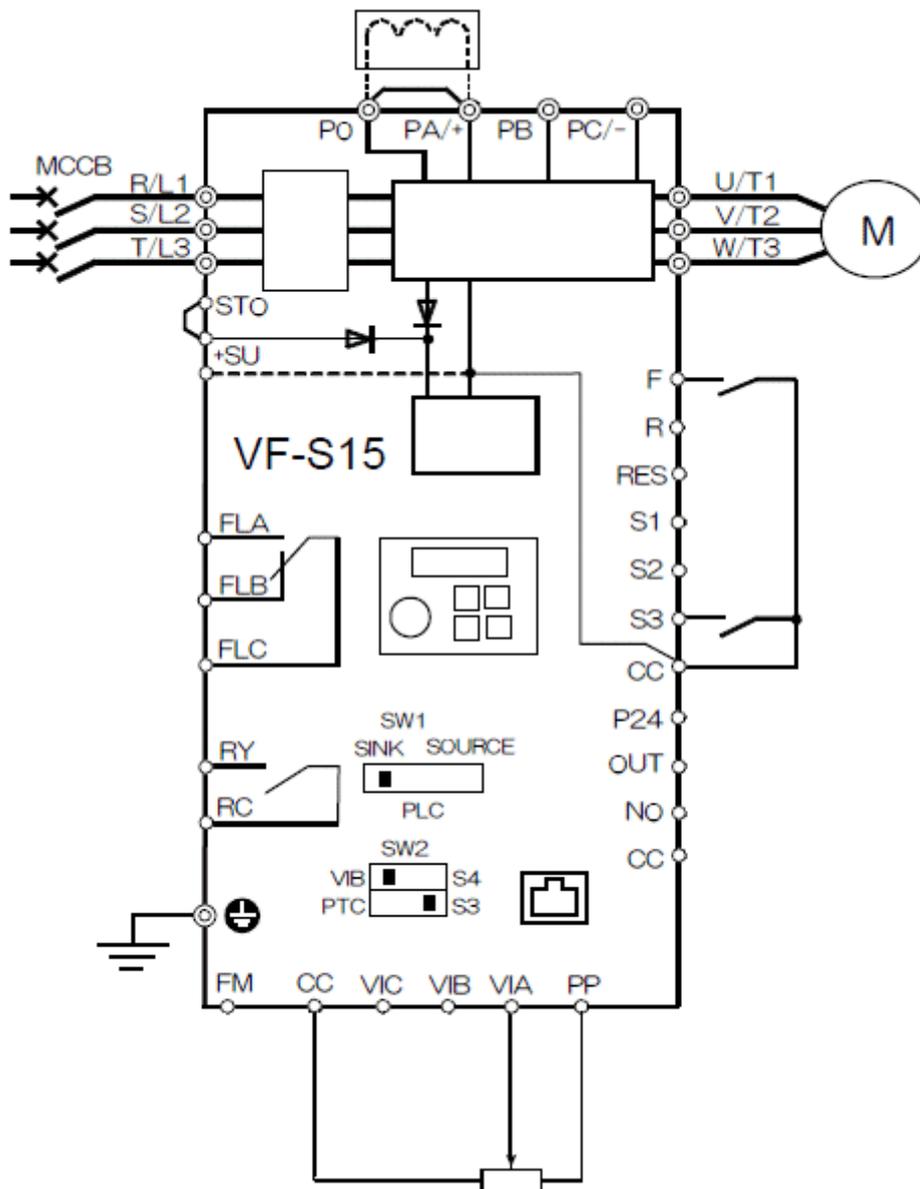
- Regenerative power ride through control (deceleration stop)

Connection diagram of inverters (VF-S15: Master drive)

Frequency settings for each inverter use the following methods:

Master drive: External potentiometer

Slave drives: Inter-drive communication



Setting table for inverters (VF-S15)

- Master drive

The master drive sends frequency reference to slave drives.

Title	Function	Setting range	Recommended setting
<i>C00d</i>	Command mode selection	0 to 4	0
<i>F00d</i>	Frequency setting mode selection 1	0 to 14	1 (VIA)
<i>F116</i>	Input terminal selection 6 (S3)	0 to 203	20
<i>F302</i>	Regenerative power ride through control (Deceleration stop)	0 to 4	2
<i>F806</i>	Setting of master and slaves for communication between inverters	0 to 4	3

- Slave drives

Slave drives receive frequency reference from the master drive.

The communication error trip time is useful in case a communication cable becomes disconnected or is accidentally cut.

When the master drive trips occur, you can stop all slave drives using the F806 function.

Title	Function	Setting range	Recommended setting
<i>C00d</i>	Command mode selection	0 to 4	0
<i>F00d</i>	Frequency setting mode selection 1	0 to 14	4 (RS485)
<i>F116</i>	Input terminal selection 6 (S3)	0 to 203	20
<i>F302</i>	Regenerative power ride through control (Deceleration stop)	0 to 4	2
<i>F803</i>	Communication error trip time	0: Disabled, 1 to 100 sec	1
<i>F806</i>	Setting of master and slave for communication between inverters	0 to 4	2

Special functions for textile machines

The VF-S15 and the VF-AS1 series have special functions for textile machines.

1. Synchronized deceleration time
(time elapsed between start of deceleration to stop)
2. Traverse function