

Extruders [Molding machines]

Features of Extruders

"Extruders" have the following mechanics:

1. Screw conveyers send and compress materials.
2. Materials are pushed out from guide holes.

This animation is a extruder that molds polyvinyl chloride from powder to granule.

Merits of inverter drives

Extruders with inverters have the following merits:

- Stable speed operations at any speed

It is important for extruders to keep pushing out speed because pressing percentages and shapes depend on those speeds.

- Stable speed operations by the "PG feedback vector control"

The "PG feedback vector control" has a good performance and a high accuracy.

- Constant torque operations

The torque control in "PG feedback vector control" can keep output torque constantly.

Notices regarding the use of inverter drives

- Starting torque

Extruders often require large starting torque.

If extruders need over 200% starting torque, the inverter capacity should be larger than the motor capacity.

- Low speed operation

Motors need to reduce their output torque under 30Hz operation.

The cooling method of motors are their fans on shafts. At low speed, their speed are decreasing, and their cooling efficiency are also decreasing.

Special motors for inverter drives are not necessary to reduce their output torque between 6 to 60Hz.

- 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.

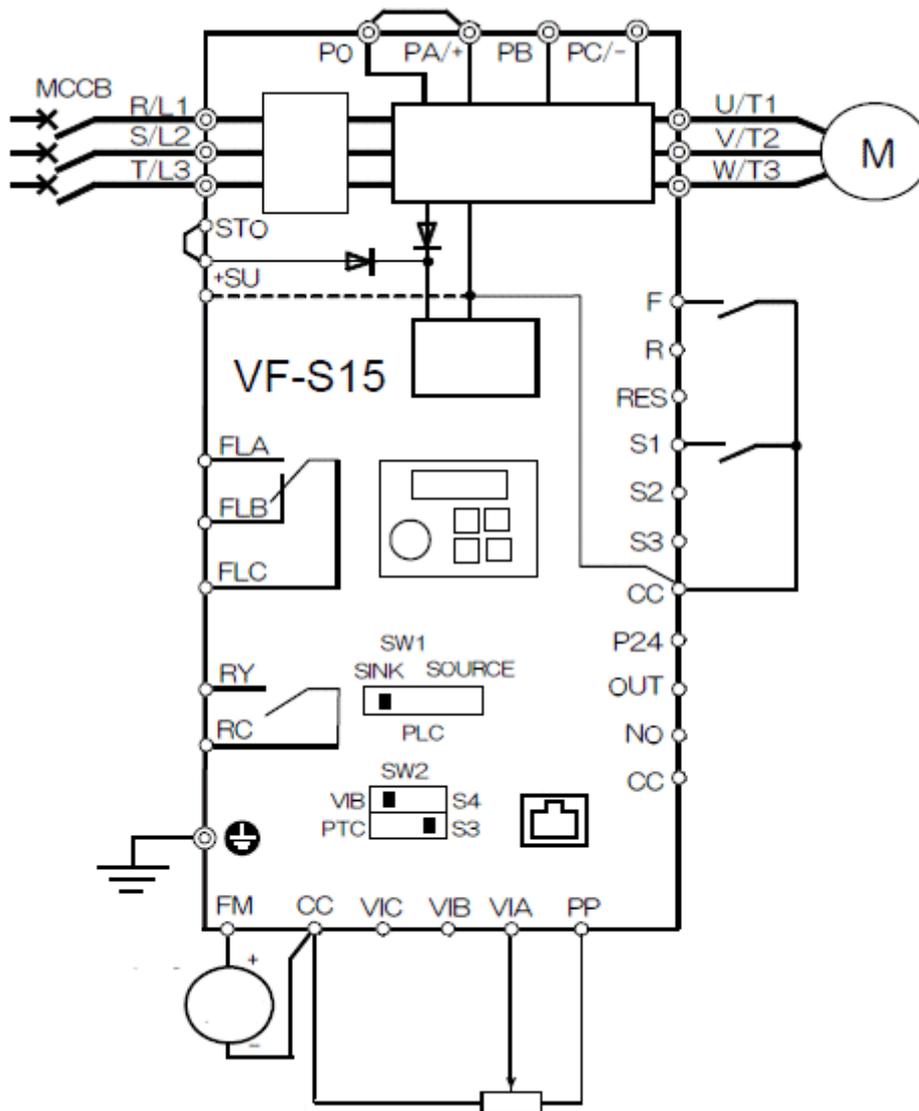
Application samples

In case of Extruders, motors can be controlled by the inverter using the following methods:

- Speed adjustment and run/stop operation by an external controller
- Torque monitoring
- Emergency stop signal input

You can select a stop method from the "coast stop", the "slowdown stop" and the "emergency DC braking".

Connection of inverters (VF-S15)



Setting table for inverters (VF-S15)

Title	Function	Setting range	Recommended setting
	Command mode selection	0: Remote, 1: Local, etc.	0
	Frequency setting mode selection	0: Built-in potentiometer, 1: VIA, 2: VIB, etc.	1
	V/F control mode selection	0: V/F constant ~ 3, Vector control, etc.	3
	Selection of analog output function	0: Output frequency, 1: Output current ~ 7: Output torque, etc.	7
	Acceleration time 1	0.0 ~ 3600	Depends on the system
	Deceleration time 1	0.0 ~ 3600	Depends on the system
	Input terminal selection 6 (S3)	0 ~ 203	20 (Emergency stop)
	Emergency stop selection	0: Coast stop, 1: Slowdown stop, 2: Emergency DC braking	2
	Emergency DC braking time	0.0 ~ 20.0	Depends on the system