Excellent Motor Control

The VF-nC3 brings out the best performance for kinds of different machine by various motor control modes suitable for its load characteristics.

If you just want to change the motor speed

First, select the default Constant V/f mode. If the default does not offer enough torque or you want to save more energy than the default provides, then you can select V/f Control mode to modify its parameters.

If you need higher torque for heavy-duty machines

Application examples: Conveyers; food mixers and slicers; exercise treadmills; car washing machines; applications for moving heavy or viscous materials; applications that require quick acceleration, etc.

The VF-nC3 supports sensorless vector control mode to generate stable, high-torque power from motor startup to a predefined, desired motor operating speed.
It is easy to set up motor parameters to achieve optimal vector control. You can do this simply by setting in the values on the name plate of a motor and selecting Auto-Tuning. The Auto-Guidance feature further simplifies setup by showing you necessary parameters once at a time interactively.
The factory defaults are set to values of the Toshiba standard motor (same capacity, 4-pole, 200 V, 60 Hz).

To save energy

Application examples: Fans; pumps; machines with small load variations that do not require high motor torque

The VF-nC3 offers Automatic Energy-Saving mode suitable for fans and pumps, which produces optimal current according to the load level.(You need to set up the motor parameters.)

Long Lifetime

Designed for 10 years of operation

The main-circuit capacitor, cooling fan and control board capacitors are designed for 10 years lifetime design.
(Conditions: Average annual ambient temperature = 40°C; output current = 80% of the rated current ; 24 hours / 365 days. The designed lifetime is calculated value, not guaranteed one.)

The cooling fan is automatically turned on and off to further prolong the total lifetime.
Additionally, the VF-nC3 provides a capability to turn on and off cooling fans automatically in order to further prolong their lifetimes. This leads to energy-saving because cooling fans can be stopped while the VF-nC3 is idle.

Monitor informs when to replace major parts

The VF-nC3 tells you when to replace major parts and keeps track of the cumulative operation time. Since the VF-nC3 can generate warning, you can prevent a problem before it occurs.

Eco Design

Compliant with the European RoHS Directive

Built-in noise filters to suppress electromagnetic noise

The single-phase 240V model have built-in EMC noise filter comply with the European EMC Directive to reduce radio-frequency noise from the inverter.
This saves space and wiring, compared to using an external noise filter.

Single-phase 240V model: European EMC Directive
IEC/EN 61800-3 1st Environment, C1

Wide Variety of Applications

The VF-nC3 supports a wide range of machines, operating conditions and meets the needs of different geographical areas.

① Sink/source control logic

The VF-nC3 can be configured for both sink and source logic according to the target machine and the location where it is used.

② Power supplies: three-phase 240 V, single-phase 240 V and single-phase 120 V

The VF-nC3 can be used for a wide variety of applications from industrial machines to everyday equipment.

Note: For single-phase 240V and 120V inputs, the VF-nC3 provides a three-phase 240V output.

③ Maximum ambient temperature: 60°C

In many cases, the temperature in a cabinet gets higher than the ambient temperature. The VF-nC3 can be used at higher ambient temperatures*1.

④ Maximum altitude: 3000 meters

The VF-nC3 can be used at high altitudes*1.

⑤ Operating frequency range: 0.1 Hz to 400 Hz

The VF-nC3 supports a wide range of speed from low speed machines to high speed motors.

⑥ Programmable input and output terminals

The functions of the input and output terminals are programmable to meet the requirements for external circuitries and applications. Each terminal can be configured into a multi-functional terminal, and make it possible to simplify external circuitry.

Safety Features

Protects the setting parameters

The VF-nC3 provides protection for the setting parameters. For enhanced security, you can use a four-digit password.
The VF-nC3 has a feature for saving and restoring a set of parameters.

The Monitor mode shows the load conditions.

① Monitoring the operating conditions

The front panel shows the operating conditions such as output current, rotational direction, input and output power, and so on. This feature is useful for checking the load conditions and adjusting parameters.

② Checking the trip status*2.

In the event of a protection trip, you can check the output current, input voltage and the like on a monitor to identify the cause of the problem and take countermeasures. The VF-nC3 remembers information about the last four trips even after you power it off.

Global Compliance

The VF-nC3 is compliant with major international standards.

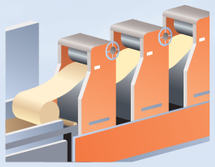
EC directive (CE marking), UL, CSA

*1: The maximum output current may be limited or the label at the top of the unit need be removed, depending on the operating conditions.
*2 You can use the Monitor mode through RS485 communication.

Application Examples

Food Processing Machinery

Bakery equipment, confectionary equipment, tea-making machines, noodle-making machines, candy-wrapping machines, rice/barley milling machines, flour milling machines, food mixers, food slicers, fruit sorting machines, etc.



Food Processing Machine
(Noodle-Making Machine)

- **You can set the operating frequency according to the required work rate.**
  1. You can fine-tune the operating frequency via an external contact inputs, depending on the conditions that workpiece materials and processes to be performed.
  2. The frequency is selectable in up to 15 steps through external contact inputs.
  3. The frequency is linearly adjustable via an analog input in the range 0 (4) to 20 mA, 0 to10 V or 0 to 5 V.(an external potentiometer)
  4. The VF-nC3 can be programmed for smooth inching motion for final finishing work.

  ··· Frequency up/down input control
  ··· Preset speed operation
  ··· Jog run
- **RUN and STOP keys**
  The VF-nC3 can be programmed to generate one-shot pulses. Thus, operators can use a pedal switch to start and stop a machine.
- **Ensures safety in the event of an instantaneous power failure.**
  Even when an instantaneous power failure occurs, the VF-nC3 can use regenerative energy from motor to bring the machine to a halt. The VF-nC3 ensures safety by preventing the machine to continue running by sheer inertia.

  ··· 3-wire control mode
  ··· Deceleration stop in case of power failure
- **Low noise**
  The VF-nC3 helps reduce acoustic noise from motors to the level that commercial power supply drive generates.

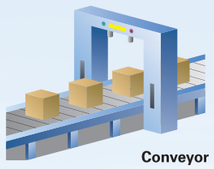
  ··· PWM carrier frequency setting
- **Controls a machine with multiple inverters.**
  1. VF-nC3 can be controlled simultaneously through RS485 communication.
  2. Each inverter can switch among multiple motors if their operations do not overlap in the course of a work process. The VF-nC3 can toggle between the basic settings for two motors.
  3. VF-nC3 units can be installed side by side to save control panel space.

  ··· Switching to No.2 motor setting
- **Maximum ambient temperature: 60°C**
  The VF-nC3 can be used in high-temperature environments*.
  * Depending on the operating conditions, the maximum output current may be limited or the label at the top of the unit may need to be removed.
- **Protects the setting parameters.**
  The VF-nC3 provides password protection for parameters to prevent them from being altered inadvertently.

  ··· Password lock
- **High torque from startup to the rated speed**
  The VF-nC3 offers vector control and automatic torque boost control modes to achieve strong, stable torque from the start of a motor to the rated rotation speed.
  The VF-nC3 can control the motor to work persistently even when mixing viscous materials or cutting hard stuff.

Conveyance Machinery

Conveyors, automatic warehousing systems, etc.



Conveyor

- **Prevents the collapse of cargo on the conveyor.**
  The VF-nC3 allows you to mitigate the shocks caused in starting and stopping a conveyor and change the acceleration/deceleration rates according to the conveyor characteristics and its applications.

  ··· S-curve acceleration/deceleration, second acceleration/deceleration times
- **Improves the braking performance.**
  The VF-nC3 can slow down a high-inertia machine in a short period of time without causing an overvoltage trip by increasing the energy consumed by the motor.

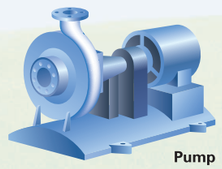
  ··· Quick deceleration control
- **Provides an operating status signal to the brake motor.**
  The VF-nC3 can turn on and off the braking circuitry in accordance with the inverter operating status.

  ··· Low-speed detection output signal
- **Shows the conveyor speed.**
  You can keep track of the operating status of a machine by displaying the conveyor speed on the inverter panel. If you use an optional remote panel, you can check the conveyor speed near the machine.
  * The speed indication on the VF-nC3 is a value calculated from the operating frequency, may differ from the actual conveyor speed.

  ··· Free unit selection
- **The VF-nC3 provides smooth start up by high output torque.**
  The VF-nC3 offers vector control and automatic torque boost control modes to achieve strong, stable torque from the start of a motor to the rated speed.
  Additionally, the VF-nC3 responds quickly to abrupt load changes to keep a constant speed.

Fans & Pumps

Built-in fans and pumps in industrial machines; water supply and sewage systems; driers, etc.



Pump

- **Energy-saving mode**
  The Variable Torque and Automatic Energy-Saving modes help saving energy by passing optimal current in accordance with the load.
- **Automatic process control**
  The VF-nC3 can be programmed to control temperatures, pressures and flow rates automatically. For temperature control, the PID control polarity is selectable via an input signal according to the selection of heating or cooling; this helps simplify system.

  ··· PID control
- **Allows a motor to keep running and accelerate smoothly upon the recovery of power even in the event of an instantaneous power failure*.**
  Upon instantaneous power failure, the VF-nC3 utilizes regenerative energy from a motor to keep a machinerunning*. After power recovery, the VF-nC3 senses the motor's rotation speed and accelerates it smoothly to the programmed frequency.
  * The running period varies with the mechanical characteristics and load conditions. The motor might free-run.

  ··· Regenerative power ride-through control
  ··· Auto restart control
- **Enables an uninterrupted operation without causing a trip**
  The VF-nC3 automatically lowers the operating frequency in the event of an overloaded condition. This prevents an overload trip for fans and pumps in which current decreases in proportion to the frequency. Also, if you decelerate a high-inertia apparatus like a fan at a quick rate, an overvoltage trip tends to occur due to regenerative energy. To avoid an overvoltage trip, the VF-nC3 allows you to adjust the braking period.

  ··· Overload stall
  ··· Overvoltage limit operation

Health, medical and nursing care equipment

Treadmill

- Stair lifts
- Nursing beds
- Bubble baths
- Health care equipment (Treadmills)
- Medical equipment (X-ray machines) etc.

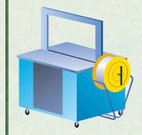
Environment and daily-life-related machinery

Commercial ironing board

Car washing machine

- Commercial ironing boards
- Car washing machines
- Garbage disposers
- Dust collectors
- Driers etc.

Packing machinery



Band tightener

- Inner packaging machines
- Packing machines
- Outer packaging machines
- Membrane packing machines etc.