TOSHIBA
Leading Innovation
Frequency Inverter
**Frequency inverters overview**

Frequency inverters of TOSHIBA convince plant manufacturers and machine operators worldwide due to high reliability in operation and flexibility in application. With their wide product range, the practice oriented functions and the various interface options are those TOSHIBA frequency inverters the first choice for demanding as well as standard applications.

**Protection class IP54/55**

The models VF-PS1, VF-FS1 and VF-S11 are also available in IP54/55 at different power ratings.
VF-nC3 Nanodrive - The compact class

• Machine tools
• Building automation
• Conveyors
• Compact machines

The VF-nC3 excels at its compactness, simple installation and easy start-up. Settings are easily done with the convenient jog dial. Due to its integrated high attenuation EMC filters it can be operated in any environment. Its sensorless vector control ensures an excellent efficiency of your drive and makes it suitable also for dynamic applications. The tolerance of the reaction time to external signals is constant and as low as ±1 ms – the VF-nC3 controls the drive with high efficiency and repeat accuracy.

VF-MB1 - The Innovative

• Packaging machines and machine tools
• Pumps and fans
• Conveyors
• Lifting and crane applications

The VF-MB1 is the first choice for drive solutions with high demands on the control characteristics and the integrated functions for applications in machine building industry, material handling or for pumps and fans. The integrated PLC (Logic Sequence) allow the integration of control functions in the drive. Through the extensive field bus modules available as plug-in design, as well as the standard Modbus® RTU, CANopen® interface can be the VF-MB1 integrated in nearly every production environment.
VF-S11 - The all-rounder

- Industrial applications
- Machine and plant building
- Conveyors
- Lifting and crane applications

VF-FS1 - The HVAC specialist

- Building automation
- Pumps and fans
- Heating, ventilation and aircondition

With its broad range of functions the VF-S11 can be used in many different applications. Braking unit and EMC filter are integrated as a standard. A great variety of fieldbus interfaces can be integrated into the inverter via the exchangeable terminal block. The sensor-less vector control with diverse energy saving functions, automatic slip compensation and a high overload capability guarantee outstanding performance and high torque over the full range of output frequencies up to 500 Hz. For power ratings up to 4 kW the VF-S11 is also available with protection class IP54/55.

The VF-FS1 features a proven technology to reduce input current harmonics. Although its extremely compact dimensions it complies with the specifications defined in IEC61000-3-12 without the use of additional components. Long-life main capacitors, automatic service messages, and easy maintenance allow an extraordinary economic and efficient system design and operation. Over the complete power range up to 75 kW these inverters are also available with protection class IP54/55. Integrated special functions for pumps and fans as well as energy saving functions are further features. Its high overload capability for short-time ensures robustness. The exchangeable terminal block allows the integration of a great variety of fieldbus interfaces especially for building automation (BACnet®, Metasys® N2, APOGEE® FLN, LonWorks®) into the inverter.
VF-PS1 - The multi-purpose drive

• Complex machines and plants
• Pumps and fans
• Conveyors
• Centrifugals

Its powerful vector control (closed-loop as option) makes the VF-PS1 the perfect choice for demanding applications. The newest technologies for energy saving as well as a high percentage (88%) of recyclable materials ensure an economic use of resources. Due to its wide power range, numerous integration possibilities, internal fieldbus options, and great functionality – for example STO/SS1 according to IEC/EN61800-5-2, integrated PLC (Logic Sequence), emergency operation (FORCE/FIRE modes) – the VF-PS1 is suitable for many applications not only for pumps and fans.

For power ratings up to 90 kW the VF-PS1 is also available with protection class IP54/55.

VF-AS1 - The top class

• Complex machines and plants
• Lifting and crane applications
• Textile machines
• Pattern sequence control

Performance, precision, and easy configuration make the VF-AS1 the top model of the Toshiba frequency inverters. Outstanding dynamic, powerful vector control, high starting torque and high overload capability as well as its vast functionality make it the first choice for highly demanding applications. Typical PLC tasks can be integrated into the drive by means of Logic Sequence functions. Further features are: Safety Stop, special functions for lifting applications and textile machines, torque reference and tension control, programmable pattern sequence control, simple positioning, teaching modes, internal fieldbus options and many more.
### Specifications

<table>
<thead>
<tr>
<th>Option</th>
<th>VF-nC3</th>
<th>VF-MB1</th>
<th>VF-S11</th>
<th>VF-FS1</th>
<th>VF-PS1</th>
<th>VF-AS1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main power supply 1)</td>
<td>1-ph. 100...115 V</td>
<td>1-ph. 200...240 V</td>
<td>3-ph. 200...240 V</td>
<td>3-ph. 380...480 V</td>
<td>3-ph. 380...500 V</td>
<td>3-ph. 525...600 V</td>
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<tr>
<td>Voltage tolerance 2)</td>
<td>0.1...0.75 kW</td>
<td>0.2...2.2 kW</td>
<td>0.4...10 kW</td>
<td>0.2...15 kW</td>
<td>0.4...18.5 kW</td>
<td>0.7...15 kW</td>
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<tr>
<td>Maximum output frequency 3)</td>
<td>400 Hz</td>
<td>500 Hz</td>
<td>500 Hz</td>
<td>200 Hz</td>
<td>500/1000 Hz</td>
<td>500/1000 Hz</td>
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<tr>
<td>Overload capability 4)</td>
<td>150% (0.5 s)</td>
<td>200% (0.5 s)</td>
<td>150% (0.5 s)</td>
<td>150% (2 s)</td>
<td>120% (2 s)</td>
<td>150% (2 s)</td>
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<tr>
<td>Maximum ambient temperature 5)</td>
<td>-10...50/60 °C</td>
<td>-10...50/60 °C</td>
<td>-10...50/60 °C</td>
<td>-10...50/60 °C</td>
<td>-10...50/60 °C</td>
<td>-10...50/60 °C</td>
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<tr>
<td>Integrated EMC filter 6)</td>
<td>C1</td>
<td>C2</td>
<td>C2</td>
<td>C1/C2</td>
<td>C1/C2/C3</td>
<td>C1/C2/C3</td>
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<tr>
<td>Protection class IP65 7)</td>
<td>IEC61803-3 category EN50511 class</td>
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<td>Integrated DC reactor 8)</td>
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<td>Integrated braking unit 9)</td>
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<td>Terminal block exchangeable 10)</td>
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<td>Vf control methods</td>
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<td>Function examples</td>
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<tr>
<td>1) Voltage tolerance -15...+10 %</td>
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<tr>
<td>2) Models VF-AS1 4xxx PLY-A2 and VF-PS1 4xxx PLY-A2 up to 37 kW; maximum output frequency 1000 Hz</td>
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<td>3) Depending on inverter rated capacity and protection class as well as selected PWM switching frequency and installation, refer to the manual</td>
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<td>4) VF-FS1 and VF-PS1 supplied in protection class IP54/IP65 have integrated EMC filters category C1, class A, group 1</td>
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<tr>
<td>5) VF-FS1 and VF-PS1 in the power range 0.75...4 kW (400 V class) have EMC filters category C2, class A group 1; in the power range 5...630 kW (400 V class) EMC filters category C3, class A group 2.</td>
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<tr>
<td>6) VF-FS1, VF-PS1, VF-AS1 with power rating greater 22 kW in metal housing: IP20 with optional terminal cover</td>
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<tr>
<td>7) Integretable options ETB003Z and ETB004Z each with 4 additional inputs, please refer to the list of options on the next page</td>
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<td>8) Dual rating function at reduced overload capacity</td>
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</tbody>
</table>
#### Communication software PCM001Z-0 (Option)

The PCM001Z communication software allows you to edit, monitor and trace parameter data on a computer, also operation conditions can be analyzed by the monitoring function. Inverter can be managed by easy data setting. The graphical representation of all operating data on five channels (with trigger function) can be stored in various file formats. These data can be imported by other applications such as for example EXCEL® for analysis and further processing.
# Toshiba frequency inverter product family

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Power Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>VF-nC3</td>
<td>The compact class</td>
<td>0.2 ... 2.2 kW</td>
</tr>
<tr>
<td>VF-MB1</td>
<td>The innovative</td>
<td>0.25 ... 18.5 kW</td>
</tr>
<tr>
<td>VF-S11</td>
<td>The allrounder</td>
<td>0.25 ... 15 kW</td>
</tr>
<tr>
<td>VF-FS1</td>
<td>The HVAC specialist</td>
<td>0.4 ... 75 kW</td>
</tr>
<tr>
<td>VF-PS1</td>
<td>The multi-purpose</td>
<td>0.75 ... 630 kW</td>
</tr>
<tr>
<td>VF-AS1</td>
<td>The top class</td>
<td>0.75 ... 500 kW</td>
</tr>
</tbody>
</table>

- **VF-nC3**
  - Machine tools
  - Building automation
  - Conveyors
  - Compact machines

- **VF-MB1**
  - Packaging machines and machine tools
  - Pumps and fans
  - Conveyors
  - Lifting and crane applications

- **VF-S11**
  - Industrial applications
  - Machine and plant building
  - Conveyors
  - Lifting and crane applications

- **VF-FS1**
  - Building automation
  - Pumps and fans
  - Heating, ventilation and aircondition

- **VF-PS1**
  - Complex machines and plants
  - Pumps and fans
  - Conveyors
  - Centrifugals

- **VF-AS1**
  - Complex machines and plants
  - Lifting and crane applications
  - Textile machines
  - Pattern sequence control

Additional features:
- Alternative protection class IP54 / 55
- Torque controlled drives
- PLC functions integrated
- Conveyors

Applications:
- Machine and plant building
- Building automation HVAC
- Pumps and fans
- Machine and plant building
- Crane applications