TOSHIBA

ADJUSTABLE SPEED DRIVES

VF-S11

Reliability *in motion*™

The Next Generation of Micro Inverters is Here.

The S11 provides maximum torque with precise speed control. It features an easy-to-use, quiet and compact design. In addition, its advanced technology allows for versatile communications. No other micro inverter delivers such reliable performance and extensive capabilities at such a competitive price.

Powerful True Torque Control

- 250% Torque at 1.0 Hz
- One-Step Motor Auto Tuning
- 0.1% Speed Regulation on 60:1 Speed Range

High Torque

Initial torque surpasses 1 Hz - 200%* at start up instantly from low speed. Smooth operation in the regeneration area and in the motoring area is possible through proprietary power vector control. Equipped with an energy savings mode, applications reach a higher level of efficiency. In addition, you can activate auto tuning and auto torque boost in a single step.

**When running a standard Toshiba 4-pole motor. (depends on the voltage and rating)*

Capability

- Drooping–Configurable Bipolar Drooping with Adjustable Bandwidth
- Volts / Hz–Constant Torque, Variable Torque, Automatic Torque Boost, Sensorless Vector, Automatic Energy Savings and Permanent-Magnet Motor Control
- Start / Stop–Three-wire Control, Digital Input, Local Panel and Communications
- Frequency Setting–Built-in Potentiometer, 4-20 mA, 0-10 V, Motor-operated Pot, Serial Communication and Jog Mode
- Bidirectional Speed Searchable to Detect a Spinning Motor and Start at that Speed Regardless of Direction
- PID Control with Built-in 24 VDC Power Supply for Process Transducer
- Dynamic Brake Chopper Transistor Standard on All Models

Efficient Design, Advanced Technology

Easy Maintenance

A warning signal is output to the display panel when the electrolytic capacitors on the main circuit, the cooling fan or the control board reach the replacement period. This is a valuable indicator, which can be used as a maintenance guideline. The cooling fan is replaced easily, and the automatic on/off function provides extended product life. Furthermore, this is a long-life inverter. Its main circuit capacitors are designed with a 10-year lifetime.* It is designed to be used in ambient temperatures up to 60˚C for maximum environmental resistance (with minimum current derating required).

**Ambient temperature: average yearly temperature of 40˚C. Output current: operating 24 hours per day for 365 days at 80% of the current rating.*

Easy-to-Use

The S11's design gives you the ability to apply power, connect a motor and run right out of the box. It has an easy-to-use customer terminal strip for integration into complicated applications, and its small footprint and side-by-side mounting capabilities make it an excellent OEM product.

Built-In EMI Noise Filter

The S11 is the best in its class when it comes to environmental considerations. All S11 units are equipped with a high attenuation EMI/RF noise filter. Single phase and 500 class devices include filters that bring the drive into compliance with Class A group 1 to satisfy the CE EMC directive.*

** Dependent upon motor cable length*

Compact

The S11 saves space with its reduced dimension compact design. Multiple units can be mounted side-by-side for high-density installation. The compact design does not hinder its capabilities. The high level of functionality and user-friendly features of the S11 make it a top-class inverter.

Communications

External communication modules are available with functionality for multiple drive connectivity. Available protocols are Ethernet TCP/IP, Ethernet IP, DeviceNet, Modbus Plus, Modbus RTU, Metasys, Landis and Staefa and Profibus DP. These interfaces are already used extensively on 7-Series and 9-Series Toshiba inverters.

Easy-to-Use Operation Panel
Names and Functions

Full-scale

Charge lamp
Indicates that high voltage is still present within the inverter. Do not open the cover while this is lit.

Display
Displays the operating frequency, parameter information, a monitored item, the cause of a failure, and so on.

Percent (%) lamp
Lights when a numeric value is displayed in %.

Hertz (Hz) lamp
Lights when a numeric value is displayed in Hz.

Run lamp
Lights when an ON command is issued but no frequency signal is sent out. It blinks when operation is started.

Built-in potentiometer lamp
Operating frequency can be changed when on.

Program lamp
Lights when the inverter is in parameter setting mode. This lamp blinks when the parameter "AUH" or "Gr.U" is selected.

Mode key
Displays operating frequencies, parameter, and error messages.

Monitor lamp
Lights when the inverter is in monitor mode. This lamp blinks when a detailed past-trip record is displayed.

Enter key

Built-in potentiometer

Up key

Front panel locking screw
Allows easy front panel lock and unlock.
Turn the screw 90° counterclockwise to unlock, or turn it 90° clockwise to lock the front panel.

Up/Down key lamp
Pressing the up or down key when lamp is on allows the operating frequency to be seen.

Run key lamp
Lights when the RUN key is enabled.

Run key
Pressing this key while the RUN key lamp is lighted starts operation.

Stop key
Pressing of this key while the RUN key lamp is on will cause a slowdown-stop.

Down key

S11 Standard Specifications

Standard Specification				
Model Range- KW/HP	1 Phase 240 V .4-2.2 KW .5-3 HP	3 Phase 240 V .4-15 KW .5-20 HP	3 Phase 460 V .75-15 KW 1-20 HP	3 Phase 575 V 1.5-15 KW 2-20 HP
Voltage Rating	200-240 V	200-240 V	380-500 V	525-600 V
Input Voltage Tolerance	-10% / +10%	-10% / +10%	-10% / +10%	-10% / +10%
Voltage Regulation	Adjustable within the range of 50-600 V by correcting the supply voltage (not adjustable above the input voltage)			
PWM Carrier Frequency	Adjustable between 2.0-16 KHz. (default 12 KHz/current derate applies above 4 KHz}			
Control System	Sine Wave PWM System			
V/Hz Pattern	Open Loop Vector, Constant Torque, Variable Torque, Auto Torque Boost, Manual Torque Boost, Automatic Energy Saving, Dynamic Automatic Energy Saving, PM Motor Control, Auto Tuning, Base Frequency 25-500 Hz, Torque Boost 0-30%; Start Frequency .5-10 Hz			
Overload Rating	150% for 60 seconds, 200% for .5 second			
Frequency Setting	Potentiometer and Digital Input on Front Panel, Remote Potentiometer (1-10 KOhms), 0-10 Vdc (input impedance VIA/VIB=30 KOhm), 4-20 mAdc (input impedance 250 Ohm, 15 preset speeds by contact closure)			
Frequency Precision	Analog Input ± 0.5% of the Maximum Output Frequency, Digital Input ± 0.01% of the Maximum Output Frequency			
Frequency Command Resolution	0.01 Hz Operation Panel, 0.1 Hz Analog Input			
Output Frequency Range	0.5-500 Hz (default 0.5-80 Hz, Maximum Frequency 30-500 Hz)			
Frequency Jump	Three Frequencies with Adjustable Range			
PID Control	Proportional Gain, Integral Gain and Differential Gain Settings and Control Wait Time			
Upper and Lower Limit Frequencies	Upper Limit Frequency: 0 to Max Frequency, Lower Limit Frequency: 0 to Upper Limit Frequency			
Input Terminals	Eight Input Terminals Programmable to 65 Functions, Logic Selectable Between Sink and Source			
Analog Inputs	One 4-20 mA, One 0-10 V or 1-10 KOhm Potentiometer Connections			
Output Contacts	One Open Collector and One Relay Contact Programmable to 58 Functions			
Analog Output	1 mA / 7.5 Vdc or Switch Selectable to 0-20 mA (4-20 mA), Programmable to 19 Functions			
Power Terminals	Input (L1, L2, L3), Output (T1, T2, T3), DCL (PO, PA), DBR (PA, PB), DC BUS (PA, PC)			
Protective Functions	Stall Prevention, Current Limitation, Output Short Circuit, Overvoltage, Overvoltage Limitation, Undervoltage, Ground Fault, Power Supply Phase Failure, Output Phase Failure, Overload Protection, Overcurrent at Startup, Overtorque, Undercurrent, Overheat, Cumulative Operation Time, Life Alarm, Emergency Stop, Braking Resistor Overload, Various Pre-alarms			
Retry	ASD can clear fault upon trip automatically. Programmable to 10 times with wait time up to 10 seconds between retry.			
Restart	ASD will catch a freewheeling motor smoothly.			
Ambient	Temperature: -10-50°C, 14-122°F. Humidity 93% Non-Condensing			
Installation	NEMA 1/IP20 (enclosed type)			
LED Indications	Run, Monitor Mode, Program Mode, % and Hz Indication, Frequency Setting Mode by Potentiometer or Up/Down Keys, DC Bus Capacitors Charged			
Monitoring	Operation Frequency, Operation Frequency Command, Forward/Reverse Run, Output Current, Voltage in DC Section, Output Voltage, Torque, Torque Current, Drive Load , DBR Load, Input Power, Output Power, Monitor of Input and Output Terminals, CPU and Memory Versions, PID Feedback and Frequency Command, Rated Current, Past Trips 1-4, Parts Replacement Alarm, Cumulative Run Time			
Selectable Display Units	Current and voltage display selectable between Amps/Volts or % along with scaling factor multiplier			

Model FLA & Approximate Dimensions (inches) / Weight (lbs)							
VOLTAGE	HP	MODEL NUMBER	FLA	HEIGHT	WIDTH	DEPTH	WEIGHT
240 V 1 Phase	.5 HP	VFS11S-2004PL-WN	3.3	5.1	2.8	5.5	2.9
	1 HP	VFS11S-2007PL-WN	4.8	5.1	2.8	5.5	2.9
	2 HP	VFS11S-2015PL-WN	8.0	5.1	4.1	5.9	4.0
	3 HP	VFS11S-2022PL-WN	11.0	6.7	5.5	5.9	6.2
240 V 3 Phase	.5 HP	VFS11-2004PM-WN	3.3	5.1	2.8	4.7	2.6
	1 HP	VFS11-2007PM-WN	4.8	5.1	2.8	5.1	2.6
	2 HP	VFS11-2015PM-WN	8.0	5.1	4.1	5.1	2.6
	3 HP	VFS11-2022PM-WN	11.0	5.1	4.1	5.9	3.1
	5 HP	VFS11-2037PM-WN	17.5	6.7	5.5	5.9	5.1
	7.5 HP	VFS11-2055PM-WN	27.5	8.7	7.1	6.7	5.5
	10 HP	VFS11-2075PM-WN	33.0	8.7	7.1	6.7	13.6
	15 HP	VFS11-2110PM-WN	54.0	12.2	9.6	7.5	21.6
	20 HP	VFS11-2150PM-WN	66.0	12.2	9.6	7.5	21.8
460 V 3 Phase	1 HP	VFS11-4007PL-WN	2.3	5.1	4.1	5.9	4.0
	2 HP	VFS11-4015PL-WN	4.1	5.1	4.1	5.9	4.2
	3 HP	VFS11-4022PL-WN	5.5	6.7	5.5	5.9	5.9
	5 HP	VFS11-4037PL-WN	9.5	6.7	5.5	5.9	6.4
	7.5 HP	VFS11-4055PL-WN	14.3	8.7	7.1	6.7	13.9
	10 HP	VFS11-4075PL-WN	17.0	8.7	7.1	6.7	13.9
	15 HP	VFS11-4110PL-WN	27.7	12.2	9.6	7.5	21.6
	20 HP	VFS11-4150PL-WN	33.0	12.2	9.6	7.5	21.6
575 V 3 Phase	2 HP	VFS11-6015P-WN	2.7	5.1	4.1	5.9	4.2
	3 HP	VFS11-6022P-WN	3.9	6.7	5.5	5.9	5.9
	5 HP	VFS11-6037P-WN	6.1	6.7	5.5	5.9	6.4
	7.5 HP	VFS11-6055P-WN	9.0	8.7	7.1	6.7	13.9
	10 HP	VFS11-6075P-WN	11.0	8.7	7.1	6.7	13.9
	15 HP	VFS11-6110P-WN	17.0	12.2	9.6	7.5	21.6
	20 HP	VFS11-6150P-WN	22.0	12.2	9.6	7.5	21.6