

**ADJUSTABLE SPEED DRIVES**



**VF-S11**

**G**



# Next Generation Micro-Drive



The S11 adjustable speed drive provides maximum torque with precise speed control. It features an easy-to-use, quiet, and compact design. In addition, the S11's advanced technology allows for versatile communication. No other micro-drive 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 through 200%\* instantly at startup 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 automatic torque-boost in a single step.

*\*When Running Standard Toshiba 4-Pole Motor (Depending on Voltage and Rating)*

## Capability

- Drooping: Configurable Bipolar Drooping with Adjustable Bandwidth
- Volts/Hz: Constant Torque, Variable Torque, Automatic Torque-Boost, Sensorless Vector Control, 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 to 20 mA, 0 to 10 V, Motor-Operated Potentiometer, 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 sent to the display panel when the electrolytic capacitors on the main circuit, the cooling fan, or the control board reach the replacement period. This valuable indicator can be used as a maintenance guideline. The cooling fan is replaced easily, and the automatic on/off function provides extended product life. The S11 is a long-life drive and its main circuit capacitors are designed to have 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).

## User-Friendly

The S11's design allows the user to connect a motor, apply power, connect a motor, and run the drive 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 RF/EMI 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.\*

*\*Depending On 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 S11's high functionality and user-friendly features make it a top-class drive.

## 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 drives.



# Easy-to-Use Operation Panel

## Names & Functions

### Full-Scale



# S11 Standard Specifications

Standard Specifications				
Model Range (KW/HP)	Single-Phase 240 V 0.4 to 2.2 KW 0.5 to 3 HP	Three-Phase 240 V 0.4 to 15 KW 0.5 to 20 HP	Three-Phase 460 V 0.75 to 15 KW 1 to 20 HP	Three-Phase 575 V 1.5 to 15 KW 2 to 20 HP
Voltage Rating	200-240 V	200 to 240 V	380-500 V	525-600 V
Input Voltage Tolerance	-10/+10%	-10/+10%	-10/+10%	-10/+10%
Voltage Regulation	Adjustable Between 50 to 600 V by Correcting Supply Voltage (Not Adjustable Above Input Voltage)			
PWM Carrier Frequency	Adjustable Between 2.0 to 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, Auto-Energy-Saving, Dynamic Auto-Energy-Saving, PM Motor Control, Auto-Tuning, Base Frequency 25 to 500 Hz, Torque Boost 0 to 30%, Start Frequency 0.5 to 10 Hz			
Overload Rating	150% for 60 seconds, 200% for .5 second			
Frequency Setting	Potentiometer and Digital Input on Front Panel, Remote Potentiometer (1 to 10 K $\Omega$ ), 0 to 10 VDC (Input Impedance VIA/VIB=30 K $\Omega$ ), 4 to 20 mA $\Delta$ c (Input Impedance 250 $\Omega$ , 15 Preset Speeds by Contact Closure)			
Frequency Precision	Analog Input $\pm$ 0.5% of Maximum Output Frequency, Digital Input $\pm$ 0.01% of Maximum Output Frequency			
Frequency Command Resolution	0.01 Hz Operation Panel, 0.1 Hz Analog Input			
Output Frequency Range	0.5 to 500 Hz (Default 0.5 to 80 Hz, Maximum Frequency 3 to 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 Maximum 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 to 20 mA, One 0 to 10 V or 1 to 10 K $\Omega$ 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 to 20 mA (4 to 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 Automatically Clear Fault Upon Trip; Programmable to 10 Tries with Up to 10 Seconds Between Retry			
Restart	ASD Will Smoothly Catch Spinning Motor			
Ambient	Temperature: -10 to 50°C (14 to 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
460 V 3 Phase	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
	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
575 V 3 Phase	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
	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
575 V 3 Phase	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

# TOSHIBA INTERNATIONAL CORPORATION



North America Headquarters & Manufacturing Facilities (Houston, TX)



## **TOSHIBA – Quality by Design**

Toshiba's culture and history are strongly rooted in quality. Our designs are technologically innovative, and our products are manufactured from start to end using only the highest quality domestic and foreign parts.

## **Product Warranty**

Toshiba offers a comprehensive warranty program on its full line of industrial products. Consult your salesperson or the factory for specific information.

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## **Customer Support Services**

Toshiba offers 24-hour service nationwide. For assistance of any type call: 1-800-231-1412.

**ADJUSTABLE SPEED DRIVES   MOTORS   CONTROLS   UPS   INSTRUMENTATION   PLC**

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