

TOSHIBA

S9 Series Adjustable Speed Drive



BUILT4XTREMES

TOSHIBA S9

POWERFUL... VERSATILE... SIMPLE...

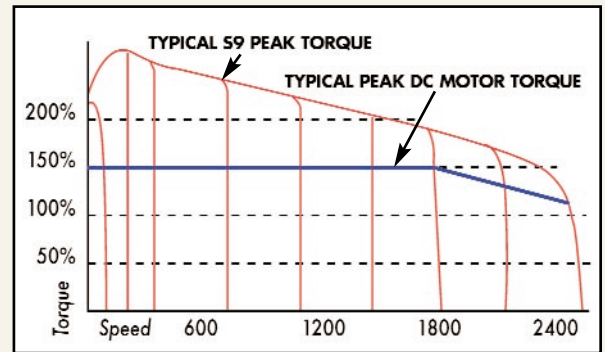
Toshiba's **S9** Adjustable Speed Drive is the new standard by which all micro drives will be measured. Power, versatility and simplicity are the defining characteristics of this world class product.

POWERFUL

True Torque Control (TTC)™

Once again Toshiba has set the standard. Our next generation TTC™ combines maximum starting torque with precise speed control to make the S9 the perfect replacement for high maintenance equipment such as DC drives, reversing starters and clutches.

- Up to 250% Torque at 1.0 Hz
- Speed Regulation of 0.5% Over a 60:1 Speed Range
- One Step Automatic Motor Tuning
- All of This Without an Encoder!



Peak Torque vs Speed (4 Pole Motor)

Built to Extremes

Toshiba has built its reputation by designing and manufacturing the most reliable and highest quality adjustable speed drives for industry's toughest applications. The S9 takes this to the next level!

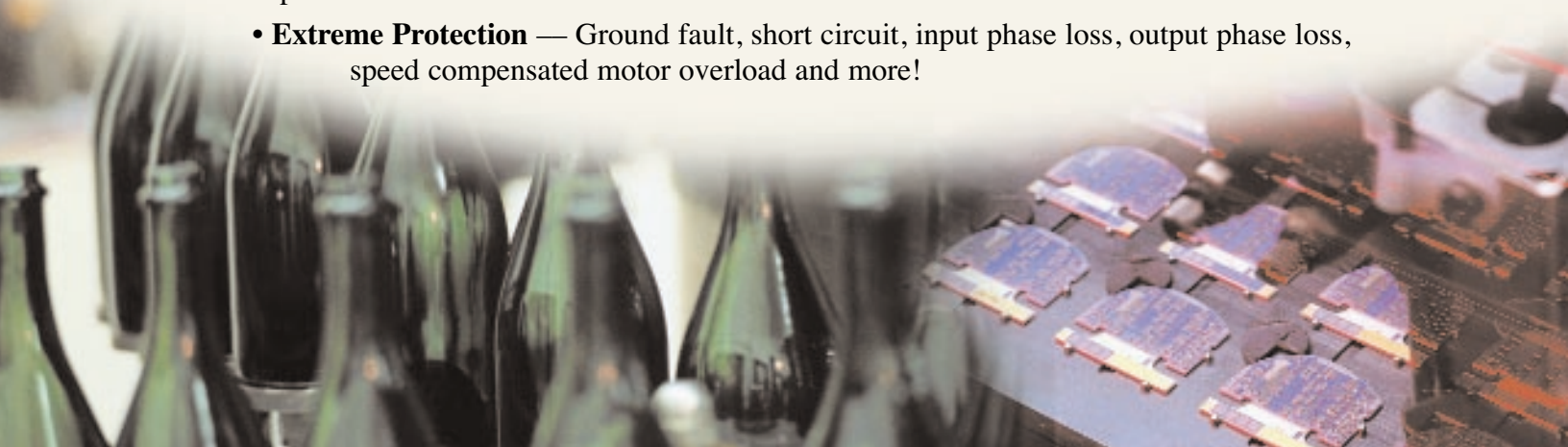
- **Extreme Continuous Operating Voltage** — With automatic voltage regulation for those constantly changing power lines.

	480V Class	230V Class
Maximum Nominal Voltage	500vac +10%	230vac +10%
Minimum Nominal Voltage	380vac -15%	200vac -15%



Toshiba Transistor Package

- **Extreme Operating Temperature Range** — 14°F to 122°F (-10°C to 50°C)
- **Noise Suppression** — Every S9 includes an internal RF/EMI filter to minimize electro-magnetic interference with other equipment.
- **Extreme Approvals** — Every S9 complies with the CE low voltage directive. In addition, units with an 'L' in the part number meet the CE-EMC directive without an additional filter.
 - **Extreme Protection** — Ground fault, short circuit, input phase loss, output phase loss, speed compensated motor overload and more!



VERSATILE

The S9 is the most versatile ASD product on the market. It has the features you need for your most difficult applications.

Hardware

- **Product Range** — 1 to 20hp at 460vac, and 1/2 to 20hp at 230vac
- **Single Phase Input / Three Phase Output** — 1/2 to 3Hp at 230vac
- **Zero Side Clearance** — The S9's superior thermal design allows easy, zero side clearance mounting. This can simplify retrofits, reduce cabinet space, and lower system costs.
- **DC Bus Power Terminals** — A direct connection to the DC Bus makes Common DC Bus applications easier to configure than ever before.



Side by side mounting with 0" side clearance required

Software

- **Programmable Digital Inputs** — Each input terminal can be configured to any of 51 different functions.
- **Programmable Digital Outputs** — The discrete outputs can be configured to any of 29 different functions. These outputs include a Form C contact, a Form A contact, and an open collector output.
- **Analog Input** — (2) 4-20mA/0-10v DC inputs for trim or PI control.
- **Analog Output** — (1) 4-20mA/0-1ma/0-7.5vdc output can be configured to any of 16 different functions.
- **Process Set Point Control (PI)** — For easy flow or level control.
- **Anti-Windmilling Control** — Simplify your HVAC applications by eliminating nuisance trips.
- **Three Wire Stop/Start operation** — Simplify your retrofits. Adjust one parameter to configure your S9 for three wire control
- **Motor Operated Potentiometer (MOP)** — Discrete inputs for speed up and down at multiple stations are easily configured with one parameter adjustment.
- **Palm Pilot** — All the flexibility of our Palm Pilot to ASD interface will soon be available for your S9!



Easy Start-up and Monitoring with the Palm Pilot

SIMPLY POWERFUL

SIMPLE

The S9 is the result of Toshiba's many years of designing drives with our customer's needs in mind. From the front mounted, easy to use speed pot to the one button programming macros, it is evident that your ease of use was our primary focus.

- **Automatic Acceleration and Deceleration Rate** — With one programming step, the S9 will optimize these parameters for your application.



Easy to use interface

- **True Torque Control** — One step tuning will maximize your motor performance. Maximum breakaway torque, immunity to load torque fluctuations, and incredible speed regulation – all without an encoder!

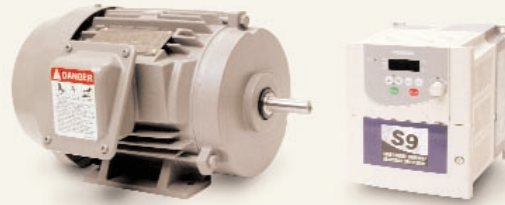
- **Sink/Source Selectable Control Logic** — A jumper selection allows you to easily integrate the S9 into your existing control scheme.

- **Din Rail Mounting** — Save time and space with this convenient assembly option available for 1/2 & 1 HP, 230vac models.

- **System Solutions** —

When you couple your S9 to a Toshiba motor you get a total system solution. Application assistance, single source responsibility, and premium performance are just a few of the benefits you will receive.

- **Motor Speed Search** — The S9 can automatically detect the speed of your free-wheeling motor and output a matching frequency to make your start-up “bump” free.



Toshiba ASDs and motors designed for the world

*It's simple, with just three wires in and three wires out,
the S9 is a cost effective solution. Be it a troublesome
starter, an overheating clutch or a high maintenance DC
drive that is taking too much of your time, you'll agree
the S9 has the power to simplify your life!*



S9 STANDARD SPECIFICATIONS

Item	Specification									
Input Voltage	3 Phase 230 vac, 3 Phase 480 vac, Single Phase 230 vac									
Applicable Motor HP	0.5	1	2	3	5	7.5	10	15	20	
MODEL										
Input Voltage	Type	VI 58 / VI 58S								
3 Phase 230V	VF3A-	2004PM-WN	2007PM-WN	2010PM-WN	2022PM-WN	2037PM-WN	2000PL-WN	2070PL-WN	2110PM-WN	2100PM-WN
3 Phase 480V	VF3B	-	4007PL-WN	4015PL-WN	4022PL-WN	4037PL-WN	4055PL-WN	4075PL-WN	4110PL-WN	4150PL-WN
1 phase 230V	VF30S-	2000PM-WN	2003PM-WN	2015PM-WN	2022PM-WN	-	-	-	-	-
RATING										
Capacity (KVA)		1.3	1.8	3.1	4.7	8.7 / 7.2	10.1 / 11	13	21	25
Rated Output Current - Amps	3 ph 230v	3.3	4.8	7.8	11	17.5	27.5	33	54	68
	3 ph 480V	-	7.3	4.1	5.5	9.5	14.3	17	27.7	33
	1 ph 230v	3.3	4.0	7.0	11					
VOLTS										
Voltage - Frequency	3 Phase 200 to 230vac, 3 Phase 380 to 500vac, Single Phase 200 to 240vac, 50 / 60 Hz									
Tolerance	Voltage: + 10%, 10% continuous operation, Frequency +/- 5%									
CONTROL SYSTEM										
Control System	Sine Wave PWM System									
Output Voltage	Adjustable within 100% to 120% of corrected input voltage.									
Output Frequency	0.1 to 400 Hz									
Frequency Adjustability	0.1 Hz, operation panel, 0.2 Hz, analog input									
Frequency Accuracy	Digital Setting, within +/- 0.01% of the max frequency (-10 to 50C), Analog Setting, within +/- 0.5% of the max frequency (25 C +/- 10 C)									
V/F Control	Open Loop Vector, Constant Torque, Variable Torque, Auto Torque Boost, Manual Torque Boost, Base Frequency									
Overload Rating	150% FLA for 60 seconds.									
Frequency Setting Signal	Panel potentiometer, remote potentiometer (1 to 10k ohms), 0 to 10Vdc (input impedance >VA=30.35k Ohms), 4-20mAdc (input impedance >100 ohms), Preset Speeds via contact closure, and Digital Operator.									
OPERATION										
Start Up Frequency	Adjustable within a range of 0 to 10 Hz									
Jump Frequencies	Three user selected frequencies and associated bandwidths.									
Carrier Frequency	Adjustable from 2kHz to 16 kHz (10kHz setting ok, 12kHz)									
Acceleration / Deceleration	0.1 to 3600 seconds, switchable between acceleration/deceleration times 1 or 2, selectable from S-pattern 1 or 2.									
Retry Operation	Auto reset of certain faults after a main circuit check, programmable up to 10 times.									
Dynamic Braking	Dynamic braking circuit is built in, optional external braking resistor required.									
DC Linking	Linking start frequency: 0 - max frequency, Braking amp: 0 - 100%, Braking time: 1 - 20 seconds.									
Input Terminal Functions	Programmable to: Forward run, reverse run, stop, standby, preset speeds, reset, 3 wire control, etc.									
Output Terminal Functions	Programmable to: Upper limit, lower limit, low speed detection, speed search, running, etc. Relay and open collector outputs available.									
Peak Currents	Form C contact, 250vac, 2 wires.									
Analog Output	0 to 1 mA, 4 to 20 mA, 0 - 7.5 VDC									
PROTECTION										
Protective Functions	Over protection, current limit, over current, output short circuit, over voltage, over voltage limit, undervoltage, ground fault, input and output single phase overload, overload protection by electronic thermal protection, motor overload, over torque, pre-alarm, dynamic braking resistor overload, auto tuning error, over heat, external trip, emergency stop.									
Power Failure Protection	Motor speed search after power failure for non stop operation, regeneration ride through, auto reset after a power failure.									
Motor Protection	Programmable electronic thermal protection, adjustable from 10% - 100%. Standard motor and variable frequency motor overload curve selections. Adjustable stall level to limit the output current.									
KEYPAD										
Seven segment, four digit L.E.D.	Displays inverter output frequency, running and fault status, and programming parameters and adjustments.									
L.E.D. Indicators	Indication of inverter status: RUN lamp, MON (monitor) lamp, PROG (program) lamp, VLIC (vector control) lamp, LNC (energy savings mode) lamp, speed potentiometer lamp, UP / DOWN arrow lamps, and a CHARGE (dc bus) lamp.									
ENVIRONMENT										
Installation	Indoor, 3300 feet maximum altitude, no direct sunlight, protect from corrosive gases, explosive gases, vibration in excess of 0.5G.									
Ambient	Temperature: -10 to 50 Degrees Celsius, 14 to 122 F. Humidity: 90% non condensing.									

Approximate Dimensions H x W x D (inches)											
Single Phase Models					3 Phase Models						
2004-2007	2015	2022	2004-2007	2015	2022-2037	2035-2075	2110-2150	400-4075	4022-4037	4055-4075	4110-4150
5.1 x 4.1 x 5.5	5.0 x 5.1 x 5.0	7.7 x 5.5 x 8.4	5.1 x 4.1 x 5.1	5.0 x 4.1 x 5.1	7.7 x 5.5 x 5.5	10.8 x 7.0 x 6.7	13.0 x 9.8 x 7.7	5.0 x 5.1 x 5.0	7.7 x 5.5 x 8.4	10.8 x 7.0 x 6.7	13.0 x 9.8 x 7.7

SIMPLY POWERFUL



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Adjustable Speed Drives

The past 25 years have brought growth and change to Toshiba's Adjustable Speed Drives (ASD). From the very beginning, we set the standard in the industry with the design of our Insulated Gate Bipolar Transistor (IGBT). We introduced this technology and quickly gained a reputation for high quality, reliability and product innovation.

Building on our reputation as an industry leader, Toshiba began U.S. production of the G1 series constant torque ASD in 1987. Toshiba combined the rigorous testing and stringent requirements of the Quality Circles of Japan with the innovative style of American management. Uncompromised commitment to design excellence, quality manufacturing and responsive customer support, has given us the foundation on which all else is built. In July of 1995, we celebrated the U.S. production of our 100,000th ASD. Our Houston factory proudly supports Toshiba's US, Canadian, Mexican, South American and European operations.

Toshiba's ASD manufacturing operation consists of assembly lines for small, medium, and large capacity models. All units are produced one-at-a-time, and are checked and rechecked at every stage of the production process. We even go a step further and 100% load test every unit to ensure exceptional reliability and performance.

At Toshiba, we go the extra mile because we take our reputation and our commitment to our customers seriously.

BUILT XTREMES

Toshiba International Corporation's Industrial Division, a leading edge world manufacturer, is ISO 9001 certified. From raw material to finished product, customers are assured of exacting quality, engineering excellence and stringent testing to meet international performance standards.

Product Warranty

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

Customer Support Services

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

Need to Know More?

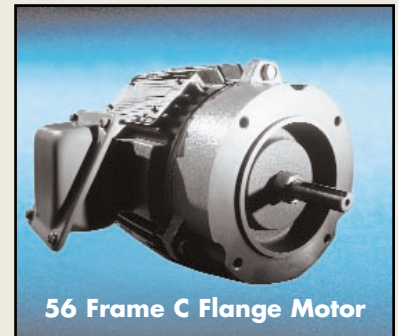
With more than a half a million square feet under one roof, Toshiba's facility in Houston, Texas is one of the largest drive and motor manufacturing facilities in the U.S. From this facility, Toshiba offers solutions which include integrated motor drive packages, turnkey bypass assemblies and custom jobs built to your specification. Be sure to visit our web site located at www.tic.toshiba.com for the latest information on Toshiba products.



S9 Micro Drive



Turn Key Extender Boxes



56 Frame C Flange Motor



1200 HP 460V ASD

ADJUSTABLE SPEED DRIVES MOTORS CONTROLS UPS INSTRUMENTATION PLC

TOSHIBA

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