The SSt-1000 is a high bandwidth, digital vector servo drive. The seamless integration of position, velocity, and torque loops enables this drive to provide surprising performance enhancements.

For years, Teknic has proven the benefits of tightly integrating servo compensation with torque control under the control of a dedicated DSP per axis. Borrowing technology from the very latest in a line of high performance drives called the SSt-U series, the highly cost-effective SSt-1000 advances the state of the art by utilizing this topology in such a way to allow all information to be shared in real time so all system functions cooperate in any situation. For example, if the torque loop senses voltage saturation, that is instantly passed upstream to the servo compensator and the system delivers a coordinated response, maintaining elegant load control. The result is performance superior to steppers, other digital servo drives or analog torque amplifiers. OEMs will realize tighter tracking, immediate settling, and smooth motion - all of which yields superior machine throughput and reliability.

The SSt-1000 has an open control interface and will work with almost any servo controller or indexer with little to no software change. Moreover, it will elegantly control rotary servomotors from virtually any manufacturer.

CUTTING EDGE SERVO CONTROL

The SSt-1000-J's servo performance capitalizes on two decades of algorithm refinement and truly unique design architecture.

Superior Tracking Accuracy

Multi-derivative, state feedforward gains significantly improve tracking performance and do not create the audible noise and torque chatter of traditional implementations.

Zero Settling Time

For demanding point to point applications, the advanced technology of the SSt-1000-J provides zero settling time.[1]

Ultra Smooth Motion

Teknic's proprietary Regressive AutoSpline™ (RAS) technology produces ultra-smooth trajectories. The profiles are jerk and jerk-derivative limited, which reduces shock, vibration, noise, and wear.

Adaptive Tuning

The SSt utilizes an adaptive control algorithm (IMT) based on neural fuzzy logic. The IMT virtually eliminates the concern of inertia matching and allows for loads of large and varying inertia.

Anti-Hunt™

The SSt-1000-J uses small-signal, sliding-mode, automatic gain modulation to eliminate hunting even with extreme gains. Axes will be perfectly still and have no loss of accuracy.

Ease of Performance

Some systems are high performance and others easy to use. Few are both. The SSt's cascading PIV control structure provides cutting edge performance *with* ease of use. Even the sophisticated RAS, IMT, and Anti-Hunt are easy to set up.

[1] **≤1 msec (assuming mechanical system bandwidth ≥ required move bandwidth)**

FLEXIBLE, LOW EFFORT INTEGRATION

The SSt has OEM friendly features designed to make upgrading performance quick & painless.

Drop-in Controller Compatibility

The SSt-1000-J series drive accepts a digital trajectory command that is compatible with most indexers and servo controllers and requires little to no software change. This provides a performance upgrade for servos and allows for drop-in stepper replacement.

Development/Assembly Feature Examples

- Robust PIV compensator eliminates production tuning.
- Compatible with QuickSet™, the SSt-1000 provides diagnostics to production-qualify mechanical systems and allows for quick trouble shooting.
- Logic Power Backup, Encoder Power Backup and Position Recovery modes allow recovery from power-down situations with any controller/indexer.
- QuietDesign™ EMI reduction system eliminates shield clamps, ferrite slugs, etc. required to meet CE.
- Built-in systems detect faulty cables and sensors (including intermittent problem capture).
- OEM friendly cabling is robust, mass producible & testable. And with Teknic's motor CAD drawings available at no charge, economical to build.
- Daisy chain power avoids star pattern complexity.

HIGH VALUE

While all SSt drives are the value leaders in their respective power classes, the SSt-1000 is especially cost effective. In annual volumes of 320 pieces, this feature-rich digital servo drive is under $300.

ADDITIONAL SSt-1000-J CAPABILITIES...

Open Rotary Motor Interface
The SSt-1000-J controls most brush or brushless rotary servomotors with little electrical restrictions.

Low Total Servo Phase Delay
The total time from the moment the position feedback is read to the time torque is updated at the motor is fully deterministic and the fastest in the industry (35µs).

Extremely Fast Torque Response Time
Sinewave commutation with vector feed-forward and DQ decoupling provides near-zero torque response time *at any speed.*

Anti-Resonance Torque Loop
In Expert Mode, the digital torque loop is accessible for excellent resonance control. This provides optimal performance with axes that suffer from in-band resonances.

SmartSaturation™
Dynamic algorithm maintains elegant axis control in the event of voltage and/or current saturation.

Hardstop & Limit Homing
The SSt-1000 can accurately detect a hardstop and then automatically capture its position and ramp down torque. This can be used as a safety function or to initialize axes without using home sensors.

Torque Foldback & Clamping
Provides precise control for apps such as part insertion. Combined with customizable motion profiles and vector torque feedback, allows for effective contact force control.

Elimination of Motor Burn-out
Motor burn-out is eliminated using true RMS limiting without added wiring or sensors. It is much more effective than I^2t or thermostats.

Logic Power Backup
With main power removed, DSP logic will remain active. This mode allows for graceful recovery of machine position after e-stop events.

Power Loss Position Recovery
For indexers without feedback, this user-definable feature returns the axis to the last physical encoder position just prior to drive power being removed.

SPECIFICATIONS

GENERAL	Dimensions, in (mm):	7.31 (185) x 4.876 (124) x 1.156 (29).
	Weight, oz (g):	20 (576).
ENVIRONMENTAL	Temperature:	0-40 Degrees C.
	Humidity:	0-95%, non-condensing.
COMPLIANCE	Electrical safety:	EN 61010, UL508C.
	EMI:	EN 50081-2, EN 50082-2.
	Machine safety:	EN 954-1, with proper power control.
OUTPUT POWER	Current:	20 Amps Peak (3 seconds). 6 Amps RMS (global power limited)
	PWM ripple frequency:	28kHz, center balance vector type.
COMPENSATOR	TSPD (total servo phase delay):	35µS.
	Position/Velocity control:	Enhanced PIV with Inertia Matching Technology, AntiHunt™, acceleration feedforward, etc. Expert modes onboard. Fixed velocity estimator.
	Torque control:	Synchronous vector torque control with automatic dq decoupling, Smart Saturation™, and automatic current sensor calibration.
ENCODER	Interface:	Single-ended or differential, user selectable.
	Max count rate:	220 kHz.
	Features:	Bad sequence detection, digital filtering.
MOTOR COMPATIBILITY	Requirements:	PM rotary brush or brushless, ≥ 0.9 ohms, 8192 counts per rev (or less), ≥ 4 poles.
LIMIT INPUTS	Interface:	TTL with 2kΩ pull-up, digitally filtered.
HALL SENSOR INPUTS	Specifications:	Optically isolated; 475Ω pull-up to +5V.
	Features:	Digitally filtered; used for setting torque vector upon initialization only; *drive can run in hall-less mode.*
DEDICATED INTERFACE INPUTS/OUTPUTS	Outputs:	Drive ready; move done, in tracking range, or all systems go; encoder & limit pass-through, +5V power.
	Inputs:	Enable power stage; Mode (engage/ disengage drive features, such as torque foldback, hardstop homing, etc.); Digital Pulse and Direction, encoder, limits.
REAL-TIME MONITOR PORT	Features:	Configurable filtering, sync pulse at move start, non-volatile.
	Output variables:	Position error, actual velocity, commanded velocity, velocity error, commanded torque, actual torque, SNG velocity, SGN position, measured position, commanded jerk, acceleration commanded, max phase voltage.
PROTECTION & SAFETY FUNCTIONS	SSt-1000 protection:	Short circuit (phases-to-phase, phase-to-ground), over temp, over voltage, over current, protected for open windings, fuse.
	Motor protection:	True RMS torque limiting, automatic speed limit, motor jam detection, over temp.
	Mechanical safeguards:	Hardstop detection, limit switch servoing, adjustable tracking error limits and shutdown, adjustable torque limit and adjustable speed limit.
INPUT SUPPLY	Input voltage:	24-75 VDC.
	Input current:	Up to 3A RMS, 10A Peak (app dependant).
COUNTRY OF ORIGIN	Manufactured in:	USA.