A range of brushless servo drives with optional controllers

SV-S and SVHX-S Series intelligent servo drives combine advanced microprocessor control with established analogue servo technology. With the benefits of automated tuning and programmability, they offer a cost-effective solution in a wide range of applications requiring continuous powers up to 8.5kVA. As well as standard analogue-input drives, the range includes versions with powerful built-in position controllers.

All SV-S and SVHX-S Series drives are designed to operate in conjunction with three-phase brushless servo motors using sinusoidal commutation and resolver feedback. A range of compatible motors is available offering continuous torques up to 13Nm and speeds up to 5000 rpm. Additional motors are available to special order to suit the needs of individual applications.

The SV-S servo drive family offers a choice of three power ratings - 2.5, 4.5 and 8.5kVA continuous. The SVHX-S combined controller-drive is available in two ratings, 4.5 and 8.5kVA. The higher power units have a wide input voltage range (380 to 480VAC) to permit operation from all standard supplies worldwide; the 2.5kVA drive operates from 230V single or three phase. All models have a built-in dynamic braking circuit to dissipate regenerated power during deceleration, the 2.5kVA version using an external ballast resistor. The IGBT power stages are fully protected against overheating, short circuits, earth faults and power supply failure.

Compatibility with European Directives

SV-S and SVHX-S drives comply fully with the requirements of the European Low Voltage Directive. They are housed in a rugged industrial casing providing a high degree of protection as well as effective electromagnetic shielding. Suitable AC input filters are available to achieve compliance with the EMC Directive.

Application areas

Standard SV-S drive units are appropriate in any application requiring a traditional style analogue-input servo drive. The unit may be configured either as a velocity or torque amplifier to suit the requirements of the controller. Typical applications include production and packaging machines, materials handling systems and machine tools.

The SVHX-S combined controller-drive may be used in similar application areas, but in particular its stored-program facility is especially useful in systems controlled by a PLC. This feature allows up to 64 complete motion programs to be saved within the controller's non-volatile memory. The programs are subsequently selected by digital signals from the PLC.

The complete SV-S and SVHX-S range has been designed to meet the needs of the most demanding industrial applications, offering a combination of advanced technology and outstanding flexibility in a reliable, versatile and user-friendly package.

Features of the SV-S and SVHX-S

- Velocity/torque mode servo drive or integrated controller-drive package
- Suitable for 3-phase sinusoidal brushless motors
- Power ratings up to 8.5kVA continuous
- Fully protected IGBT power stage
- Direct-on-line power input (no transformer required)
- Compatible with a range of proprietary resolvers
- Programmable motor brake control
- Fully opto-isolated I/O circuits using PLC-compatible 24V signal levels
- Separate control voltage input (24V DC) to maintain communication & diagnostics if main power fails
- Rugged industrial housing
- Integral power dump circuit to dissipate excessive regenerated power
- Range of compatible motors available
- Compliant with European EMC Directive using external filter units
- SVHX-S controller-drive version features stored program operation and advanced motion control

A powerful combination of analogue & digital technology

SV-S Series servo drives bring the benefits of microprocessor control to the classic analogue servo amplifier. They combine the automated tuning and programmability of digital technology with the unequalled speed and response of analogue circuitry. The SV-S offers a cost-effective solution in a wide range of velocity and torque control applications.

The SV-S servo drive family offers a choice of three power ratings - 2.5, 4.5 and 8.5kVA continuous. Each model has a built-in dynamic braking circuit to dissipate regenerated power during deceleration. The 2.5kVA version uses an external ballast resistor.

All SV-S Series drives are designed to operate in conjunction with three-phase brushless servo motors using sinusoidal commutation and resolver feedback. A range of compatible motors is available offering continuous torques up to 13Nm and speeds up to 5000 rpm. The IGBT power stage is fully protected against overheating, short circuits, earth faults and power supply failure.

Built-in communications interface

An RS232 serial interface provides complete configuration and diagnostic facilities using an external computer or terminal. Parameter editing and storage software is available with the drive. A particularly useful feature is the provision for storing two complete sets of parameters for rapid configuration switching. Set-up and tuning values may also be adjusted using the front panel controls on the drive. The simple three-button configuration system combined with a 7-segment LED display also permits monitoring of important system parameters for diagnostic purposes.

All configuration data required for standard motors is pre-loaded at the factory and may be recalled using a 3-digit code, minimising the setup time for standard motors. Motor types having a compatible resolver, but not preset in memory, may be freely configured using a comprehensive range of parameters. By simply entering the maximum and minimum values for the external load inertia, the drive will automatically calculate optimum tuning values to ensure stable operation from power-up.

SV-S features

- Velocity or torque mode servo drive for three-phase sinusoidal brushless motors
- Three ratings up to 8.5kVA continuous shaft power
- Direct-on-line power input (no transformer required)
- Externally-switchable between velocity and torque mode operation
- Dual parameter sets for rapid configuration switching
- Automatic tuning adjustment from given load data
- Simple control loop optimisation using only two parameters
- Programmable control functions include motor brake control and automatic offset adjustment
- Fully opto-isolated I/O circuits using PLC-compatible 24V signal levels
- Separate control voltage input (24V DC) maintains communication & diagnostics if main power fails

Parameter	*Value*		
Main drive ratings	SV2500S	SV4500S	SV8500S
Continuous output current, Arms	6.3	6.5	12.5
Peak output current (<5s), Arms	12.6	13	25
Continuous power, kVA	2.5	4.5	8.5
AC supply voltage range, V	100-230 (1 or 3ϕ)	380 - 480 (3ϕ)	380-480 (3ϕ)
Supply voltage tolerance	+10% -15%	+5% -10%	+5% -10%
AC supply frequency, Hz	45-65	45-65	45-65
DC Control voltage, V	+24, external only	+24, built-in or external	+24, built-in or external
DC Brake supply	External	2A at 24V built-in	2A at 24V built-in
Dynamic braking resistor	1kW, external	300W, internal	300W, internal
DC bus capacitance, µF	1000	330	500
Storable energy at nom. AC in, Ws	27	52	80
Max. power dissipation, W	80	170	170
Cooling	Convection	Fan	Fan
Weight, kg	4.2	5.2	5.2
Control features			
Operating mode	Velocity or torque		
Velocity accuracy	0.1% at rated speed		
Parameter setting	Front-panel pushbuttons or RS232 interface		
Main servo parameters	Automatically calculated from load data		
Optimisation parameters	Stiffness & damping (independent)		
Status indication	3-digit LED display, or via RS232 interface		
Internal monitoring	DC bus voltage, control voltage, jammed motor, motor brake, short-circuit/overcurrent, output stage temperature, motor temperature		
Motor compatibility			
Motor type	Sinusoidal synchronous, up to 5000 rpm		
Supported resolvers	Litton JSSBH-15-E5 & JSSBH-21-P4, RE-21-1-A05 & RE-15-1-B04 Tamagawa 2018N321 E64		
Inputs & outputs			
Analogue inputs 1 & 2	Voltage range ±10V differential, impedance 20KΩ, attenuation 1:1 or 1:10 (input 2 only)		
Programmable control inputs	Four, optically isolated; logic low level 0-7.5V, logic high level 14-32V, input current 10mA		
Programmable control output	Optically-isolated PNP transistor, rating 24V/100mA, short-circuit protected. Active state high (transistor on)		
Diagnostic outputs	DC bus voltage, torque reference, tach. voltage, (10V at nominal speed), setpoint 1& 2, motor current, resolver position		
Encoder simulation			
Channels	A, B, Z with complement		
Resolution	512 or 1024 pulses/rev		
Z pulse location	Programmable (1.4° steps)		
Output levels	5V (RS485)		
Supply required	5V at 100mA		
RS232 interface			
Baudrate	4800 or 9600		
Format	8-bits, 1 start bit, 1 stop bit		
Handshaking	Hardware & software (XON/XOFF supported)		
Physical			
Dimensions	See diagrams		
Screw terminal connections	Motor, power input, analogue & digital I/O		
D-type plug connections	Resolver cable, RS232, encoder simulation		
Ambient temperature range	0° - 45°C		
Enclosure rating	IP20		
Humidity	0-95% non-condensing		
Standard shipment	Drive, mating screw-terminal connectors		

A complete servo drive, power supply and position controller

The SVHX servo drive combines a high-power servo amplifier with a versatile position controller to create an impressive system package. Designed for operation directly from standard 3-phase mains supplies, this drive offers a cost-effective solution in a wide range of applications.

There are two versions of the SVHX offering continuous power ratings of 4.5kVA and 8.5kVA. The drive utilises the same power stage as the equivalent SV-S unit and has identical electrical characteristics. The same range of motors may be used offering continuous torques up to 13Nm and speeds up to 5000 rpm.

SVHX drives are housed in a rugged metal casing providing a high degree of protection as well as effective electromagnetic shielding.

Powerful built-in controller

The proven X150 positioner card incorporated in the SVHX offers a wide range of functions to suit all application types. Once programmed via an external computer or terminal, the SVHX can execute internally-stored motion programs, follow motion from an external encoder or accept streamed commands via RS232C or RS485. In many applications the serial link is not needed after initial configuration and program storage.

The controller has extremely flexible input and output facilities to ensure that integration into a PLC-controlled system is straightforward. Inputs may be active-high or active-low, source or sink and operate at 24V levels. Both PNP and NPN output drivers are incorporated and are selected by software.

Flexible communications

An RS232 serial interface provides complete programming and diagnostic facilities using an external computer or terminal. Editing and terminal emulation software is provided with the drive. RS485 serial communication is available as an option. In addition, the drive may be fitted with an RS485 Fieldbus card allowing communication in ASCII or binary format. Interbus-S and Profibus communication options will be made available later.

Simple programming language

Parker's user-friendly X-Code programming language is simple and straightforward to use, yet powerful enough to satisfy the needs of complex applications. Basic motion commands are easy to learn and remember as in the following examples:

V10	Set velocity to 10 revs/sec
A120	Set acceleration rate to 120 revs/sec^2
D2000	Set distance to 2000 motor steps
L10	Loop 10 times
G	Go (make a move)
T2	Time delay of 2 seconds
N	End of loop
S	Stop motion

SVHX features

- Fully integrated servo drive, position controller and power supply
- Two power ratings - 4.5kVA and 8.5kVA continuous
- Comprehensively-protected IGBT power stage
- Three-phase power input, direct-on-line (no separate transformer required)
- Wide supply voltage range (380V to 480V) for worldwide application
- Compatible with a range of proprietary resolvers
- Fully EMC compliant using external filter
- Opto-isolated I/O circuits using PLC-compatible 24V signal levels
- Built-in 24V DC supply for control circuits and motor brake
- Provision for external 24V DC supply to maintain communication & diagnostics during shutdown
- Position controller with wide range of advanced motion control functions including maths, variables, registration, following & motion profiling
- Up to 64 motion programs may be stored in non-volatile memory
- Automatic servo tuning facility
- 7-segment diagnostic display
- RS485 and Fieldbus communications options

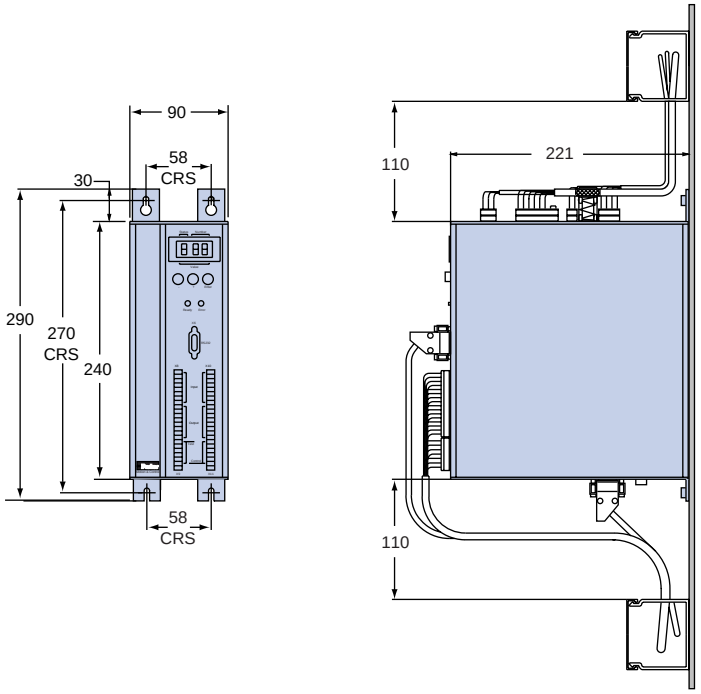
Main drive ratings-

Parameter	*Value*	
Main drive ratings	SVHX4500S	SVHX8500S
Continuous output current	6.5A	12.5A
Peak output current	13A	25A
Continuous power	4.5kVA	8.5kVA
DC bus capacitance	330µF	500µF
Storable energy (400V AC in)	52Ws	80Ws
AC supply voltage	380 - 480V AC 3-phase, +5% -10%	
AC supply frequency	50 - 60Hz	
Control voltage	+24V DC from built-in or external supply	
DC Brake supply	2A at 24V from built-in supply	
Motor brake control	Programmable in software	
Motor type	Sinusoidal synchronous, up to 5000 rpm	
Braking resistor	300W continuous rating, operates at 800V DC	
Status indication	7-segment LED display, or via RS232 interface	

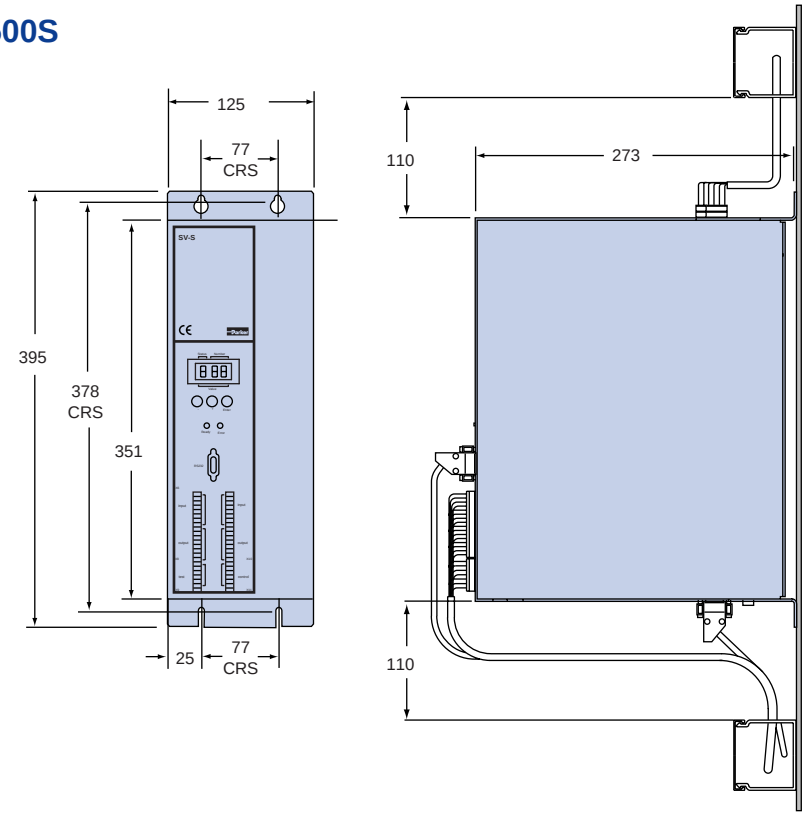
X150 position controller

Parameter	*Value*
Operating ranges	
Position	±1 to 268,435,455 steps
Velocity	0.0001 rev/sec up to maximum motor speed
Acceleration	0.06 to 999,999 revs/sec^2
Maximum encoder frequency	100kHz (lines/sec before multiplication)
User resolution range	1 to 32,767 steps/rev
Co-ordinate system	Incremental or absolute
Operating modes	Preset, preset with speed change, continuous, scaled following, preset following, registration
Position loop update time	2 milliseconds
Digital servo loop	
Update time	500 microseconds
Servo tuning	PIVF or PID with digital filter, self-tuning facility
Serial communication	
Type	RS232C: 3-wire (Tx, Rx, Gnd). RS485: 2-wire (single-ended) or 4-wire (differential)
Data format	9600 baud, 8 data bits, 1 stop bit, no parity
Configuration	Up to 32 positioners may be controlled via a single RS232C or RS485 port.
Motion program storage	
Memory type	Battery-backed RAM, 8000 characters total
Number of programs	64, variable in length up to memory limit
Program selection	a) via RS232C/RS485 b) automatic execution at power up c) binary address on 'sequence select' inputs
Optically-isolated inputs	Home, end-of-travel limits, aux (registration), stop; 10 user-definable inputs (also used for motion program selection). Selectable pull-up or pull-down, 24V switching levels, active high or active low
Optically-isolated outputs	6 user-definable; can also be assigned as watchdog, in-position and fault outputs. PNP or NPN open-collector. 24V source for PNP outputs. Maximum OFF voltage 30V, maximum ON current 300mA per output. Maximum total current from internal supply (PNP mode) 160mA. Use external supply for higher currents, up to 1A maximum
Fieldbus option	
Type	RS485 ASCII/binary (Interbus-S and Profibus options available later)
Baud rate	Up to 345.6kb
Configuration	Maximum 31 devices
Physical	
Weight	5.3kg
Dimensions	See diagrams
Ambient temperature range	0 - 45°C
Power dissipation	170W max.
Cooling	Fan-assisted
Humidity	0 - 95% non-condensing
Enclosure protection class	IP20
Screw terminal connections	Motor, power input, digital I/O
D-type plug connections	Resolver cable, RS232, external encoder, Fieldbus in/out (optional)

Dimensions (mm)
SV2500S



Dimensions (mm)
SV4500S, SV8500S
SVHX4500S, SVHX8500S



Ordering codes

SVHX4500S/232	4.5kVA controller/drive, RS232
SVHX4500S/485	4.5kVA controller/drive, RS485
SVHX8500S/232	8.5kVA controller/drive, RS232
SVHX8500S/485	8.5kVA controller/drive, RS485

SV2500S	2.5kVA analogue-input drive
SV4500S	4.5kVA analogue-input drive
SV8500S	8.5kVA analogue-input drive