

A powerful combination of analogue & digital technology

The SV-M servo drive brings the benefits of microprocessor control to the classic analogue servo amplifier. It combines the automated tuning and programmability of digital technology with the unequalled speed and response of analogue circuitry. The SV offers a cost-effective solution in a wide range of velocity and torque control applications having continuous power requirements up to 15kW.

The drive is 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 60Nm and speeds up to 5000 rpm. The IGBT power stage is fully protected against overheating, short circuits, earth faults and power supply failure.

There is a choice of four drive power ratings and two central power supply modules, both of which operate from three-phase AC inputs up to 460V. The power supplies have a built-in dynamic braking circuit to dissipate regenerated power during deceleration.

SV drives are housed in a rugged, fully-enclosed metal casing providing a high degree of protection as well as effective electromagnetic shielding. The rear-mounted heat sink allows the higher-power units to be mounted through a cutout in the panel, minimising the heat dissipation within the equipment cabinet.

Flexible communications

An RS232 serial interface provides complete configuration and diagnostic facilities using an external computer or terminal. Parameter editing and storage software is provided 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.

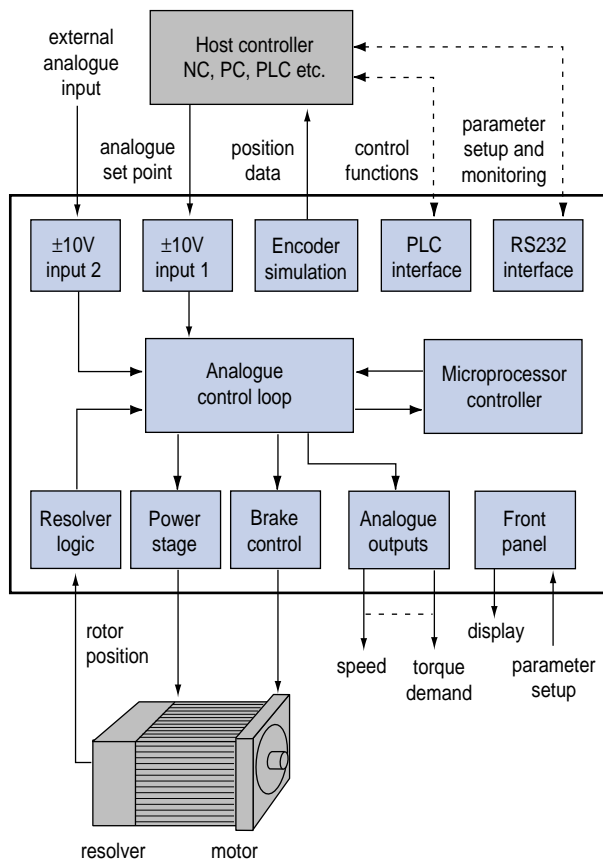
The SV has been designed to meet the needs of the most demanding industrial applications, offering a combination of advanced technology and outstanding flexibility in a reliable, versatile and user-friendly package.



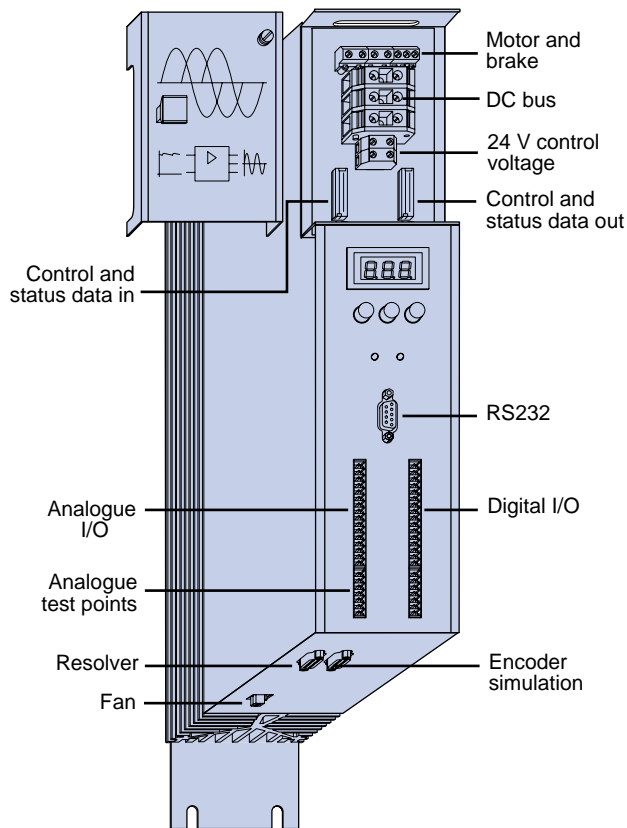
SV-M features

- Velocity or torque mode servo drive for three-phase sinusoidal brushless motors
- Four power ratings up to 15kW continuous
- Fully protected IGBT power stage
- Three-phase power input, direct on line (no transformer required)
- Separate power module allows shared supply in multi-axis systems
- Compatible with a range of proprietary resolvers
- Completely enclosed metal casing for total protection and electromagnetic shielding
- 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

SV-M block diagram



Connector locations



Digital control technology for fast, simplified commissioning

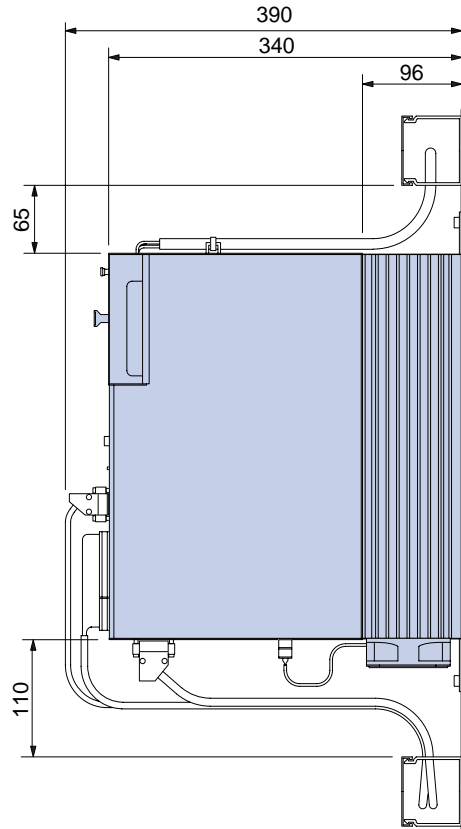
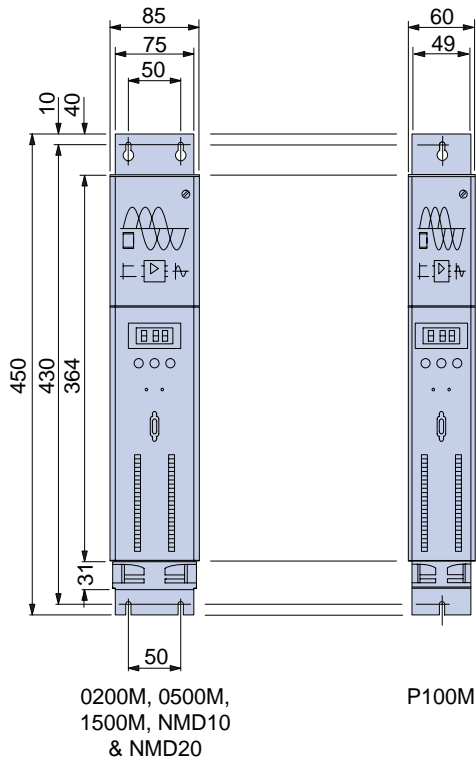
The SV drive has been designed with the aim of achieving the shortest possible commissioning time by making use of the drive's built-in intelligence. In addition to storing preset configurations for all standard motors, the drive will automatically calculate the optimum servo parameters for a specified load inertia range. This ensures that when the system is powered up, all servo loops will be set up for fast and stable operation.

Optimisation of the drive to meet specific system requirements involves the adjustment of only two parameters - stiffness and damping. The automated servo loop setup ensures that these two variables act entirely independently of each other, avoiding the problems associated with interactive adjustments.

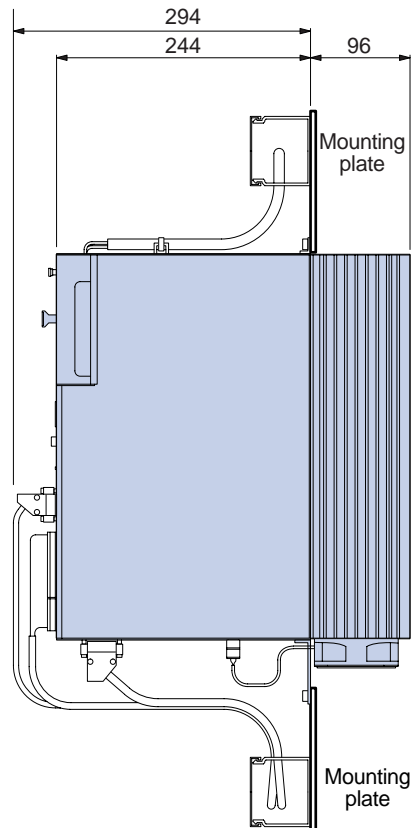
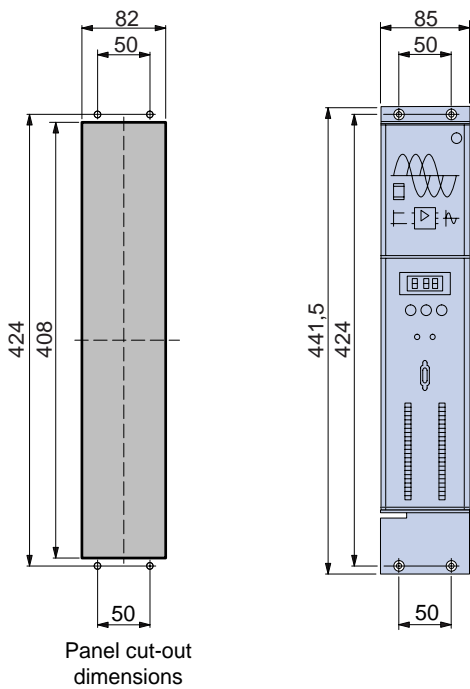
The memory used to retain all drive settings is large enough to hold two complete sets of parameters. Many applications only require the drive to operate in one configuration, but the dual parameter set is useful when the drive must switch operating modes. A drive can be pre-configured for two alternative axes, or can act as a backup to a second unit. The second parameter set may be selected using one of the digital inputs, the RS232 interface or the front panel.

SV drives come complete with parameter editing software which allows the complete configuration to be uploaded, edited and downloaded back to the drive. The parameter set may also be saved and retrieved from disk and printed as hard copy.

Dimensions and mounting details for direct panel mounting



Mounting details for through-panel mounting (not applicable to P100)



All backplate & bracket fixings accept M6 screws. For through-panel mounting, use brackets type MTS2/01

Output current & power ratings

Model no.	Cont. current	Peak (<5s) current	DC bus voltage	Cont. power	Power dissipation
P100M	5.5A	8.5A	560V	3.3kVA	140W
0200M	6.5A	8.5A	560V	3.8kVA	120W
0500M	11.5A	17.0A	560V	6.8kVA	250W
1500M	25.0A	50.0A	560V	15.0kVA	250W

Drive characteristics

DC bus voltage range	100V - 560V DC (from NMD power supply module)
Operating mode	Velocity or torque
Motor type	Sinusoidal synchronous, up to 5000 rpm
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
Diagnostic outputs	DC bus voltage, torque reference, tach. voltage, (10V at nominal speed), setpoint 1 & 2, motor current, resolver position
Internal monitoring	DC bus voltage, control voltage, jammed motor, motor brake, short-circuit/overcurrent, output stage temperature, motor temperature
Screw terminal connections	Motor, power input, analogue & digital I/O
D-type plug connections	Resolver cable, RS232, encoder simulation

Supported resolvers

Litton	JSSBH-15-E5
	JSSBH-21-P4
	RE-21-1-A05
	RE-15-1-B04
Tamagawa	2018N321 E64

Analogue inputs 1 & 2

Voltage range	±10V differential
Input impedance	20KΩ
Attenuation	1:1 or 1:10 (input 2 only)

Opto-isolated control inputs

Number of inputs	4
Logic low level	0 - 7.5V
Logic high level	14 - 32V
Input current	10mA
Functions	Programmable

Opto-isolated control output

Output type	PNP transistor
Voltage rating	24V (from external supply)
Current rating	100mA
Active state	High (transistor on)
Protection	Short-circuit protected
Function	Programmable

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)

Housing & environmental

Enclosure rating	IP20
Isolation	VDE0160
Ambient temp.	0° - 45°C
Mounting	Direct or through-panel (P100M direct only)
Weights:	
P100M	5.1kg
0200M	6.9kg
0500M, 1500M	7.1kg
NMD10	7.6kg
NMD20	8.1kg
Humidity	0-95% non-condensing

Standard shipment

Drive, mating screw-terminal connectors, parameter editor software

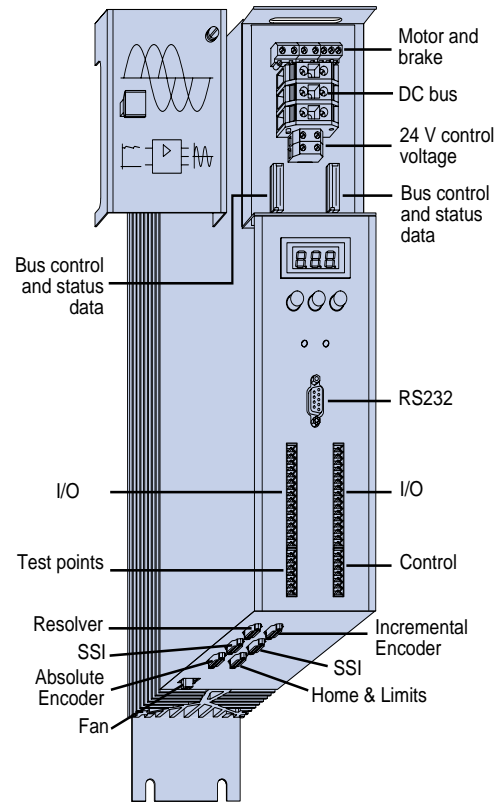
Three-phase direct on line power supplies

Two central power modules are available to power SV-M or Compax-M drives, with continuous ratings of 10kW (NMD10) and 20kW (NMD20). These supplies operate from a 3-phase AC input up to 460V. The DC output is connected to one or more servo drives by jumper cables fitted behind a removable front plate. A separate 24V DC supply is required to power the control circuits, permitting communication and diagnostic facilities to be retained should the main power supply fail.

Energy regenerated during deceleration will be stored in the power supply capacitors unless the DC bus voltage exceeds a preset level, in which case a ballast resistor is automatically switched in to dissipate the surplus energy. The high-power NMD20 module may be used in conjunction with an external ballast resistor to handle high regenerated energy levels. The separate power supply module is not required with the Compax 3500M

Power supply characteristics

AC supply voltage	460V +10% -15%
Supply frequency	50-60Hz
Safety specification	VDE0160
Control voltage	+24V DC ±10%, ripple <1V p-p
Control current	See ratings
Standby contact rating	0.5A, 60V, 30W
Overheating protection	Heatsink temperature >85°C
Overvoltage protection	Braking resistor switched in at preset level



Power supply ratings

Model no.	Cont. power	Peak (<3s) power	AC supply voltage†	DC output voltage	AC supply protection*
NMD10	10kW	20kW	460V 3Ø	650V	16A (20A with current)
NMD20	20kW	40kW	460V 3Ø	650V	35A

*External cutout or equivalent cartridge fuse, supplied by customer † Maximum voltage for CE compliance 400V

Power supply braking & ballast ratings

Model no.	Cont. power dissipation	Intermittent ratings:			DC bus capacity	Storable energy
		power	duration	cooling time		
NMD10	120W*	4.0kW 17kW	<1s <50ms	>50s >10s	1100µF	173 Ws
NMD20	120W*	2.5kW 9.5kW	<1s <50ms	>50s >10s	1100µF	173 Ws
BMR4/1†	570W	37kW	<0.4s	>120s	-	-
BMR4/2†	740W	37kW	<0.6s	>120s	-	-
BMR4/3†	1.5kW	37kW	<1.2s	>120s	-	-

*Increased to 250W with fan option † External ballast used with NMD20