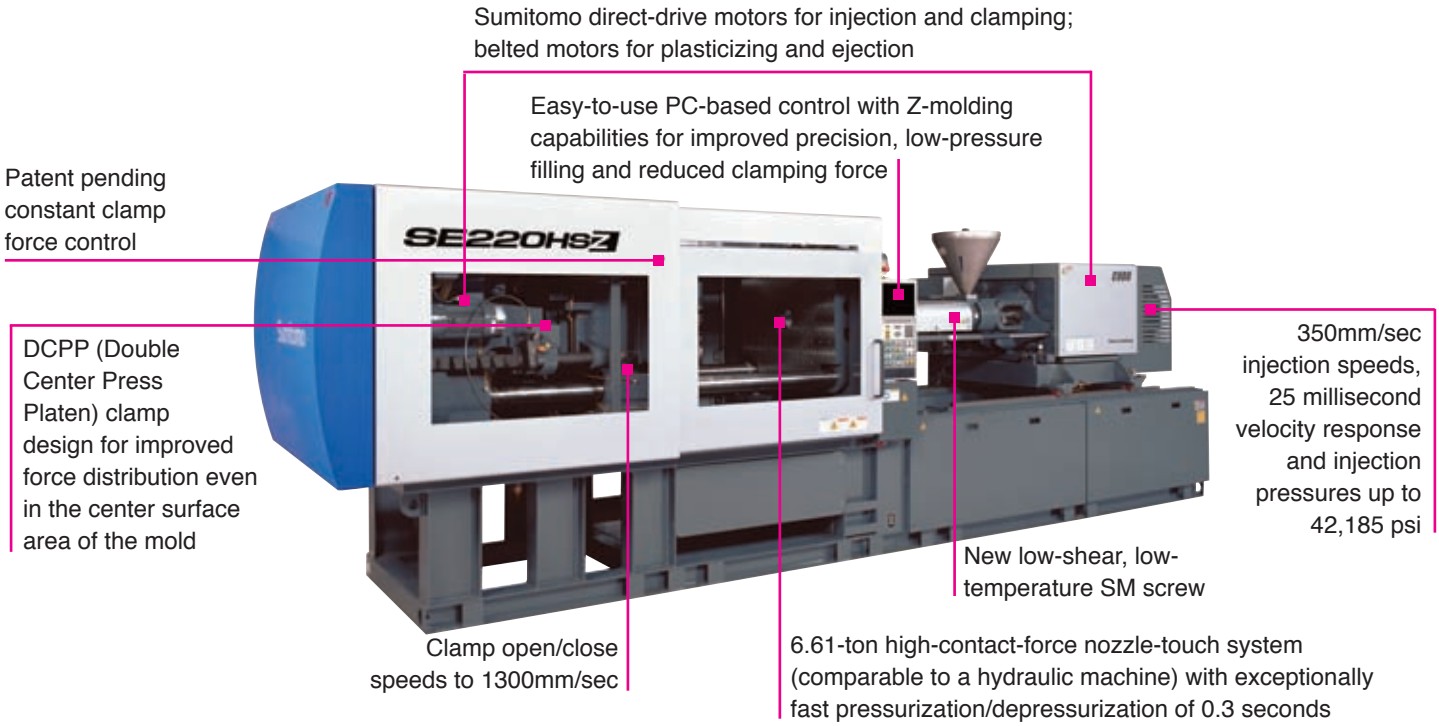
Sumitomo SHI DEMAG

SE-HSZ High-Speed All-Electric Series

SE-HSZ Series Mid-Sized High-Speed All-Electrics



The SE-HSZ Series (242 to 385 US tons) brings the advantages of Sumitomo's direct-drive motors to mid-tonnage range applications including parts with a cycle time less than 15 seconds, thin-wall parts (including high cavitation) and other applications requiring high-speed injection.

With the SE-HSZ, these types of applications can get the energy efficiency, cleaner molding environment and precision benefits of an all-electric combined with the higher speeds and pressures typically found only on high-performance hybrids and hydraulics.

The direct-drive motors for injection and clamping on the SE-HSZ have a lighter, more compact, low-inertia/high-torque design that draws power only as it is needed, is easier and faster to stop and start, and is exceptionally precise. The resulting performance specs speak for themselves:

- Higher injection speeds of 13.8 in/sec (350mm/sec)
- Velocity response of 25 milliseconds
- Injection pressures up to 42,185 psi
- Mold open/close speed of 51.2 in/sec (1300mm/sec)

At the heart of the SE-HDZ is a powerful PC-based control with Z-molding capabilities (See page at far right). Z-molding's three innovative systems help molders avoid errors, reduce costs, optimize machine performance and improve overall productivity.

The Injection Unit

The SE-HSZ injection unit uses two Sumitomo-built AC servo motors with full closed-loop control and digital sensors. The direct-drive (beltless) motor for injection delivers significant advantages:

- Higher injection power (torque) and velocity — With injection speeds of 13.8 in/sec (350mm/sec), and injection pressures up to 42,185 psi (2950 kgf/cm2), the SE-HSZ provides the performance capabilities for the most demanding applications.
- Faster velocity response, unaffected by belt elasticity — Well-suited for thin-wall parts, the high-speed injection combined with a velocity response of 25 milliseconds avoids temperature differences that can cause part deformation or warping
- Unerring velocity control from .01 mm/sec to the maximum for superior precision and repeatability

Sumitomo's extensive experience in designing and manufacturing electric motors ensures that each machine configuration has the absolute best combination of motors to ensure superior performance (the right amount of torque) while keeping the machine reasonably sized and priced.

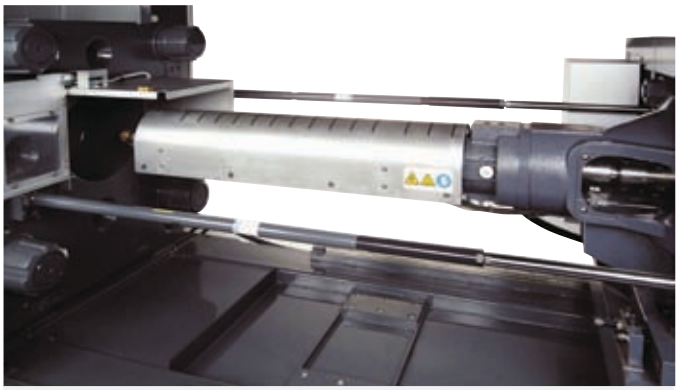
For example, the C900L injection unit employs a single axis direct-drive motor, whereas the C1250 and C1700 motors have two, large-load capacity ball screws (dual axis) to ensure efficient power transmission and durability while keeping the size compact.

Other injection unit features include:

- 10 modes or ramps of filling speed and hold pressure response that allow the operator to precisely set the plasticizing acceleration/deceleration response for improved precision
- Programmable switchover from velocity to hold — selectable by position or pressure
- Programmable hold pressure is settable and accurate to within 1kgf/cm^2 from 0 to the maximum
- Flash Speed Mode for fast response control before and after V/P switchover, to prevent short shots and warp from over-packing
- Synchronized Plasticizing Mode, for resins with low viscosity or uneven pellet size, that optimizes control of screw position and backpressure
- PID temperature control system with 2-second sampling and 0.1°C settable barrel zones
- Optional internal resin temperature monitor and an inline, needle-type nozzle shut-off for optimum control of the melt and high-precision shot control

Patent Pending SM Screw

The SM screw (standard) provides low shear plasticizing and thorough mixing at low temperatures, avoiding burning and black spot. Due to the lower temperature and reduced cooling time, the SM screw can help reduce cycle times. Various wear resistance grades and plating are available as options.

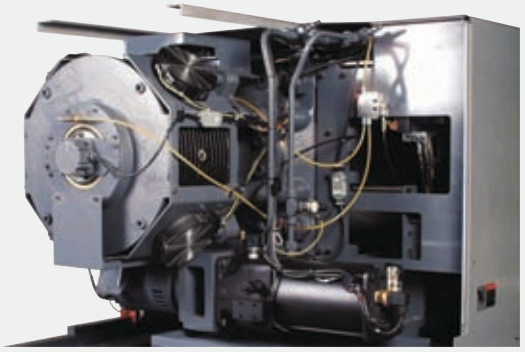


High-Contact-Force (Nozzle Touch) System

The SE-HSZ's twin-cylinder, high-contact-force system provides significant advantages over lower contact-force systems:

- High force (6.61 tons) comparable to that of a hydraulic clamp machine for high-precision control under high injection pressures
- Dual pull-in rods design for protection of molds and sprue bushings
- Exceptionally fast pressurization/depressurization of 0.3 seconds for faster cycle times. (Typical times range from 0.6 to 1.0 seconds and thus this feature can reduce cycle time by up to 1.4 seconds.)

Additionally, the nozzle touch can be remotely preset to 4.4, 5.5 or 6.6 tons to ensure compatibility with cold runners, hot runners and floating sprue bushings.



Sealed HST System

To achieve the high nozzle contact force and fast pressurization/depressurization, the SE-HSZ is equipped with a proprietary, sealed Hydrostatic Transmission (HST) system.

Z-Molding

Its precision puts the Z in amaZing.

The SE-HSZ is equipped with an easy-to-use PC-based control with Z-molding capabilities. Z-molding provides exceptional molding precision with low-pressure filling and reduced clamp force. By shifting the focus to low-pressure filling and reduced clamp force, molders can achieve combined benefits in precision, part cost and overall productivity.

Designed to help molders achieve zero-defect molding and optimum machine performance, Z-molding combines three unique systems.

Patent Pending Flow Front Control (FFC) System

In high-speed thin-wall and high-cavitation molding, the ability to balance the fill across the cavities is essential. The Z-molding Flow Front Control (FFC) System provides precision control of screw position and takes advantage of the viscoelastic properties of the resin — visco (creep) and elasticity (recovery or pull back). By optimizing the flow front, this system:

- Allows the resin to decompress (lower stress in parts)
- Prevents flash
- Allows gases to be released, preventing short shots

Precision restriction of screw position can lower the pressure inside the cavities by up to 50% and allow clamp force to be reduced.

Minimum Clamping Molding (MCM) System

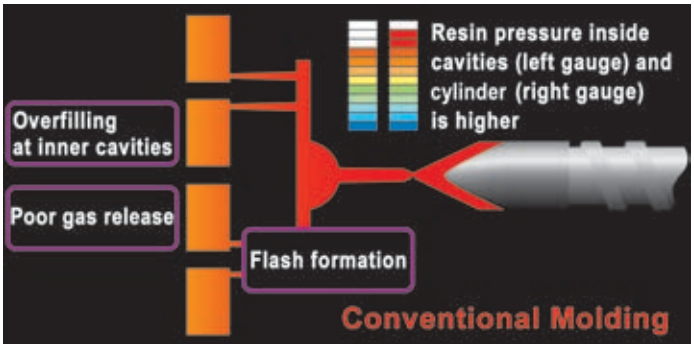
Precision clamp force detection and the feedback control capabilities of the MCM System determine the minimum force required at mold touch. The MCM also works together with the Clamp Force Correcting System to compensate for the thermal expansion of the mold.

Benefits of the MCM System include: avoidance of burn spots and short shots; less trapped gases reduces mold maintenance; and lower clamp force can also reduce power consumption, improve cycle time and in some cases allow molds to be run on lower tonnage machines.

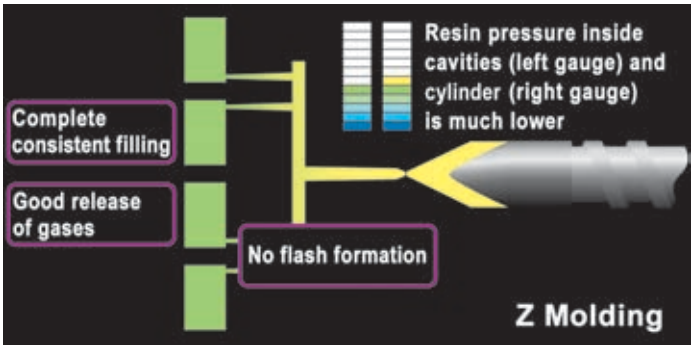
Simple Process Setting (SPS) System

The Simple Process Setting (SPS) System allows easy setup and operation while helping the operator avoid oversights and mistakes. Advantages include:

- One Process = One Screen and settings are arranged by process from operator's point of view
- Reduces screen switching for mold setup and purging by 68%
- Avoiding operator error reduces costly part quality problems, mold damage and scrap



In conventional molding, by fully charging resin into the mold cavities, overfilling and compression occur at inner cavities and gasses are trapped.



With the Z Control, the FFC System restricts the screw position to keep the resin from compressing, optimizing the flow front. In high cavitation molds, this minimizes the stress molded into the parts (prevents warp) and balances the fill across the cavities.

The Clamping Unit

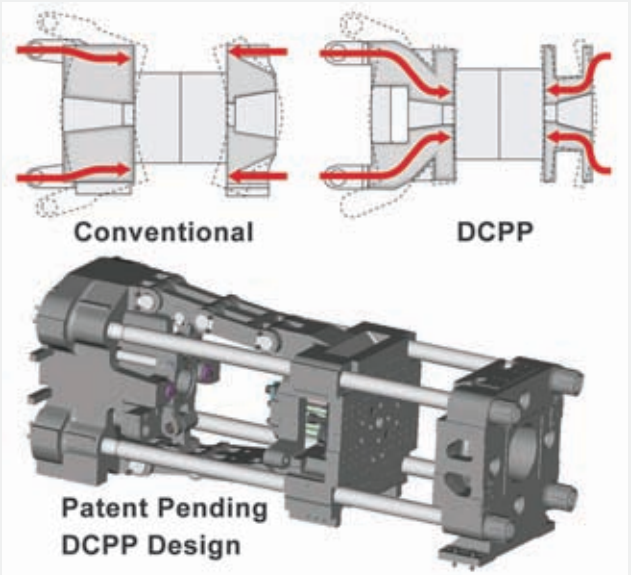
For clamping, the SE-HSZ provides the high-performance combination of Sumitomo's advanced servo motor technology with the company's field-proven, double toggle clamp design. The result is mold open/close operation that's remarkably fast, smooth, precise and energy efficient. Added to that is the Z-molding Minimum Clamping Molding (MCM) System (inside right hand page) which helps avoid flash, burn spots and shorts shots, and can reduce mold wear, cycle time and power consumption.

The motors used for clamping and ejection on the SE-HSZ are digitally controlled AC servo motors. Precision clamping is assured by full, closed-loop control of mold open/close velocity and position.

To enable fast cycling, mold open/close speeds are 51.2 in/sec (1300 mm/sec) for all model sizes of the SE-HSZ Series.

Five-stage mold open/close speed control and ramping allow optimization of mold open/close profiles for fast cycles with shock-free movement plus reduced cycles for 3-plate and slide-core molds.

Precision mold height adjustment is provided by a highly precise rotary encoder. Other features supporting mold changeovers include: increased distance between tie bars, digital-remote clamp force adjustment, increased space for tie-in of ejector rods and a selectable nozzle position for purging.



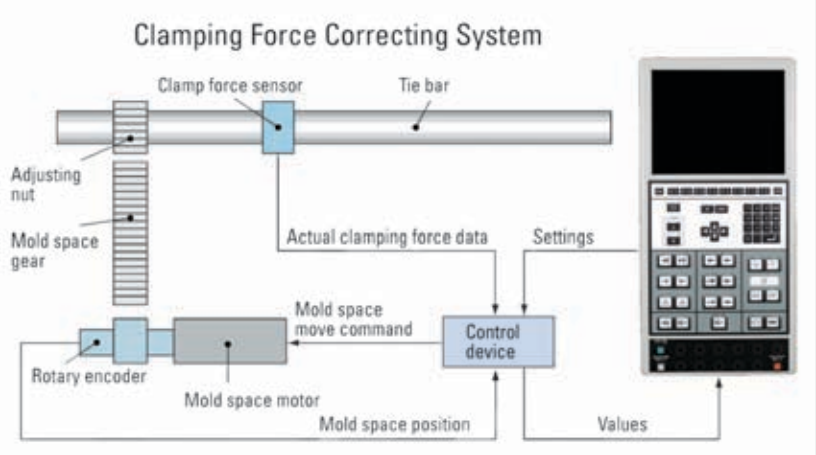
Double Center Press Platen (DCPP)

The DCCP design combines high rigidity with uniform distribution of clamping force, ensuring superior surface pressure balance. Benefits include: reduction of platen deflection, prevention of flash and short shots, improved protection of core pins and extended service life of molds.

Additionally, due to the even surface force distribution, clamping force required can be reduced by up to 20%. This feature, combined with the extra wide platens, can in many cases allow molds to be run on smaller machines.

The Sumitomo (SHI) Demag Difference

- Sumitomo's advanced motor technology and the company's ability to design and build specialized motors for injection molding machines, ensuring the best combination of motors for the machine type, function and size
- Over 20 years of R&D on all-electric injection molding machines
- A successful track record of breakthrough technologies that improve precision and productivity
- Z-molding capabilities which ensure ease of use, optimize machine performance and redefine precision
- A standard-setting warranty program and highly rated training, service, support and parts availability



Patent Pending Feedback System for Clamp Force Control

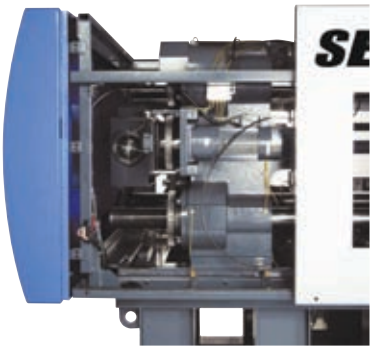
The SE-HSZ is equipped with a unique clamp force correcting system that uses a sensor on the tie bar (strain gauge) that measures actual clamp tonnage.

Unlike systems that rely solely on measurement of the mold space, this system compensates for thermal expansion of the mold. Working together with a control device and high precision rotary encoder, this patent pending system keeps clamping force constantly stable.

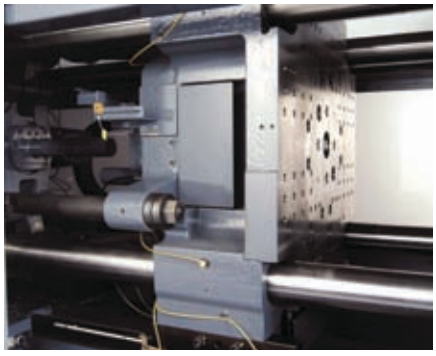
Multi-toggle clamp force control, a standard feature of the SE-HSZ, offers two modes:

- A high-cycle mode in which filling begins during clamping for improved cycle time
- A gas-release mode in which filling begins during low-pressure clamping for improved part quality

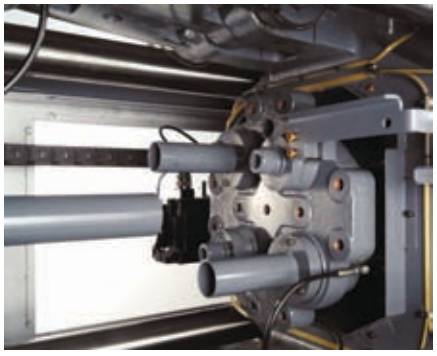
For optimum life of the ball screws, toggle pins and tie bar bushings, the SE-HSZ is equipped with a highly reliable, automatic grease supply through a valve-type progressive distribution system. This system uses an externally mounted pump unit with convenient and easy-to-load grease cartridges that can be changed without interrupting machine operation. Additionally, the grease level is monitored via sensor, and the machine shuts down automatically if the grease level becomes too low.



Sliding clamp gate



Shoe-type moving platen supports



Easy access for ejector rod tie-in

For additional information on the SE-HSZ Series, including complete specifications, please consult your Sumitomo (SHI) Demag Sales Representative or visit our website at the address below.

Sumitomo SHI DEMAG

www.sumitomo-shi-demag.us

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