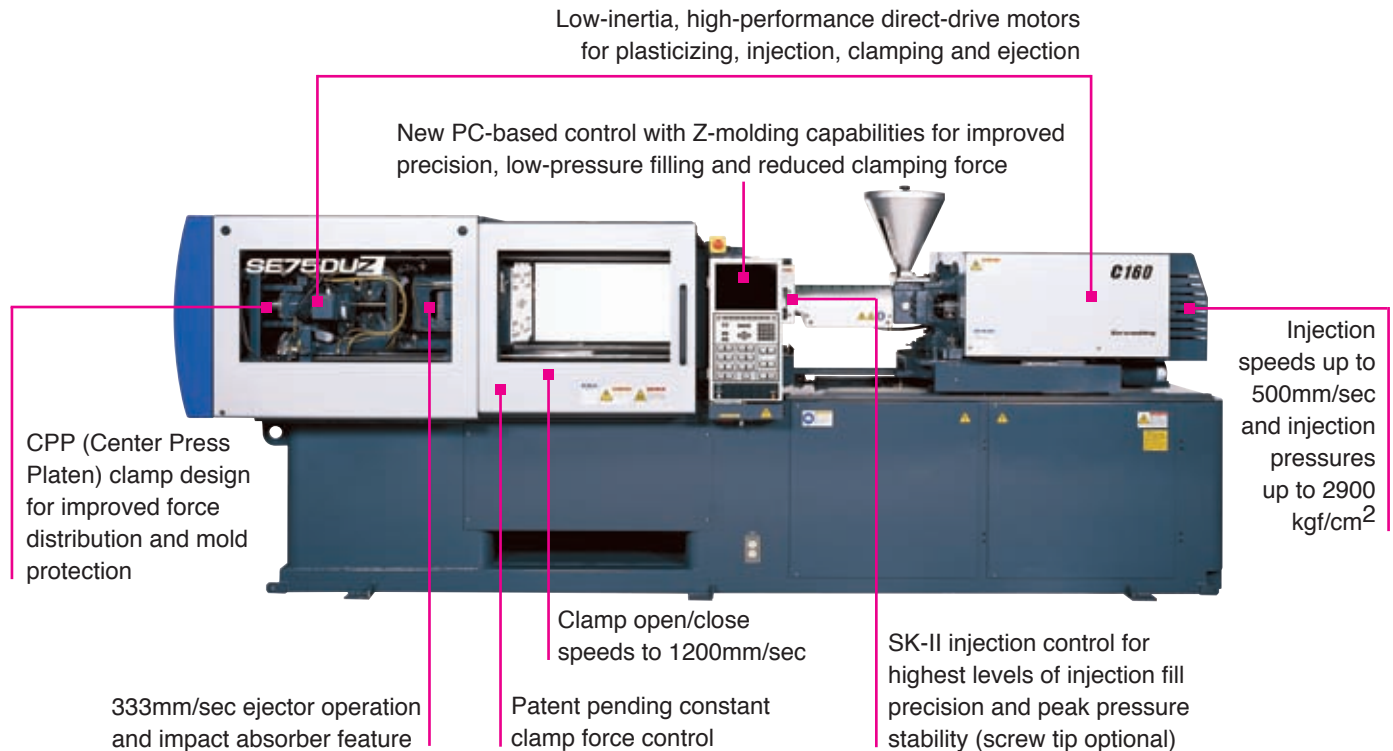


SE-DUZ Direct-Drive All-Electric Series



SE-DUZ Series Direct-Drive All-Electrics



The SE-DUZ (20 - 33 U.S. tons*) features four direct-drive, Sumitomo AC servo motors (plasticizing, injection, clamping and ejection) with full closed-loop control and digital sensors. Each motion except plasticizing uses a ball screw and all four motors are beltless, providing superior mechanical efficiency, repeatability and durability, and avoiding belt dust problems.

The advanced motor technology uses a lighter, compact, low-inertia design with the best mechanical configuration for each motion. The result is a low inertia system that:

- Provides the speeds, pressures and torque for the most demanding applications
- Draws power only as needed
- Is easier and faster to stop/start
- Provides exceptional precision and repeatability

Raising the bar for injection molding machine control, the SE-DUZ is equipped with Sumitomo (SHI) Demag's Z-molding capabilities that provide a new level of injection molding precision with low-pressure filling and reduced clamp force.

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

*The SE-DUZ is now offered in 20 and 33 U.S. ton models only. The 55 to 198 U.S. ton models have been replaced by the new SE-EV Series all-electric.

The Injection Unit

The SE-DUZ's wide choice of injection units combined with the advanced, low inertia design of the direct-drive motors provide:

- Higher injection power (torque) and velocity — with injection speeds up to 500mm/sec, and injection pressures up to 2900 kgf/cm²
- Unerring velocity control from .01 mm/sec to the maximum for improved precision on a wide range of applications
- Faster velocity response, unaffected by belt elasticity, for parts with extremely tight tolerances

The high torque of the screw drive motor is a major advantage for high-viscosity resins. And compared with hydraulic machines, the SE-DUZ requires fewer control devices because there are no proportional and directional valves.

Other SE-DUZ injection unit features include:

- Programmable switchover from velocity to hold selectable by position or pressure
- Hold pressure settable and accurate to 1kgf/cm² from 0 to 2320kgf/cm² depending on machine size
- Flash speed mode, for injection speeds of 300mm/sec and higher, that provides fast response control of velocity and pressure, before/after V/P switchover
- Synchro-plast control mode for resins with low viscosity or uneven pellet size. In this mode, control of screw position and backpressure are optimized.
- PID temperature control system that optimizes melt conditions with 2-second sampling and 0.1°C settable barrel zones

Additional temperature control features include: nozzle temperature control as standard, a double-shield barrel cover, heater burnout monitor, synchronized heat-up, and a water cooling jacket temperature control device.

SK-II Control



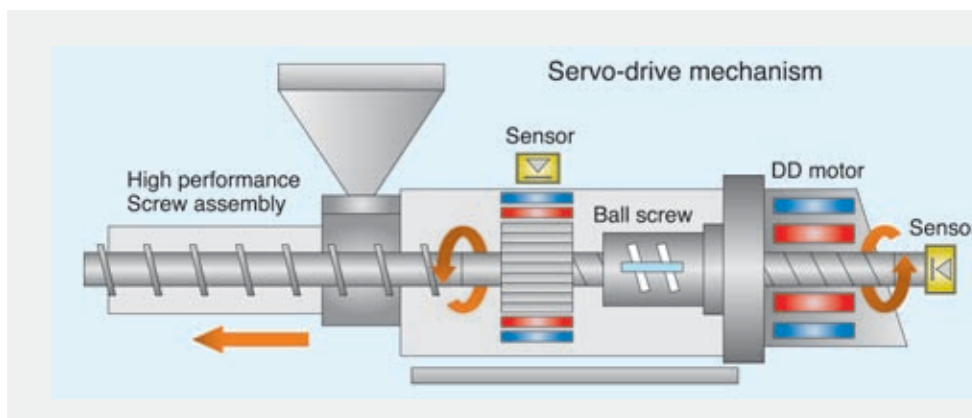
The SK-II Control uses a specially designed screw tip assembly (optional) and control software (standard) to:

- Eliminate back flow during screw pull back
- Improve shot density control by pre-set pressure and forward screw speed, automatically compensating for any changes in resin properties
- Achieve new levels of injection fill precision (shot weight and density) and peak pressure stability

On completion of recovery, the check ring is mechanically sealed, completely shutting off material flow (or back flow). Pressure is then put on the screw prior to injection. When the preset pressure is reached, the machine control calculates the required density correction for the next shot to achieve the correct shot weight. The pressure and speed at which the forward motion occurs are set on the Injection control screen for the SK-II.



The field-proven SD screw (standard) is designed to ensure the stability of the melt, contributing to consistent quality and improved yield. (SF barrier-flight mixing screw, various wear resistance grades and plating are available as options.)



This diagram shows the compact, low-inertia, direct-drive configuration of the SE-DUZ injection unit. The motor for injection uses a load cell to provide feedback that dictates the speed and torque required for precision injection pressure. The screw drive motor works together with a position transducer.



The SE-DUZ 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.

Simple Process Setting (SPS) System

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

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

Patent Pending Flow Front Control System

The Flow Front Control (FFC) System optimizes the flow front, further allowing control of low internal pressures inside the cavities. This system:

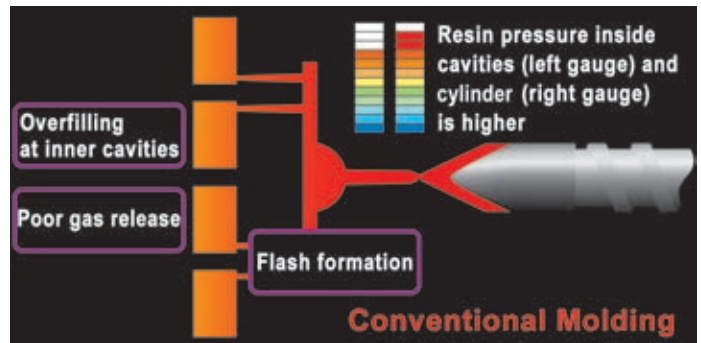
- Takes advantage of the viscoelastic properties of the resin and allows complete filling without flash
- Provides precision control of screw position to ensure consistent filling
- Avoids overfilling, allowing gases to be released and preventing short shots

Minimum Clamping Molding (MCM) System

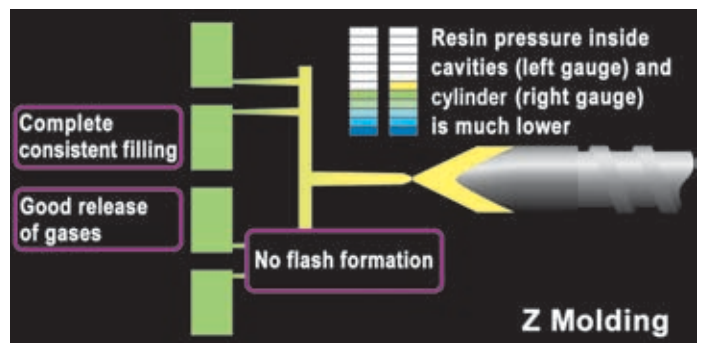
Precision clamp force detection and the feedback control capabilities of the MCM System determine the minimum force required at mold touch. The MCM also works together with the Clamp Force Correcting System to compensate for the thermal expansion of the mold.

Benefits of the MCM System include:

- Avoidance of burn spots and short shots
- Less trapped gases reduces mold maintenance
- Lower clamp force can also reduce power consumption, improve cycle time and in some cases allow molds to be run on lower tonnage machines



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



In Z-molding, the FFC System restricts screw position to optimize the flow front.

The Clamping Unit

The SE-DUZ ensures the highest levels of clamping performance with:

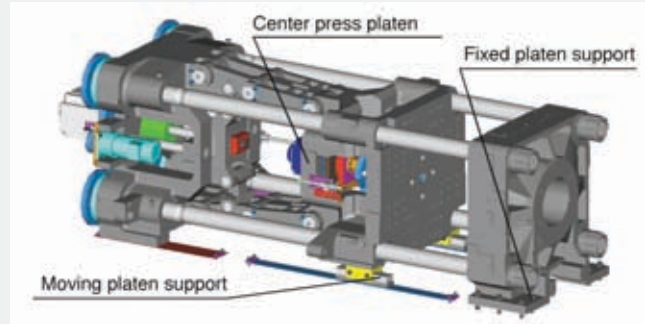
- Low inertia, high-performance direct-drive motors for clamping and ejection with a new high-response servo system
- The Z-molding Minimum Clamping Molding (MCM) System that determines the minimum force required at mold touch (See previous page)
- Clamp open/close speeds to 1200mm/sec, and low vibration, for improved cycle times and smooth, quiet operation
- CPP (Center Press Platen) clamp design (See top right)
- A unique clamping force correcting system (See middle right)
- High-speed ejector operation (333mm/sec)
- Ejector impact absorber feature that prevents parts from sticking to the ejector pins
- Moving platen supports (standard) with a larger shoe for added support area

To help molders meet a wide range of applications requirements, the SE-DUZ also offers:

- Multi-stage mold open/close speed control that can be used to tailor machine operation to specific mold requirements
- Excellent clamp force linearity, from low to high tonnage, enables optimum setting of clamp force to suit parts with different projected areas
- Selectable auto-ramping modes can be used to optimize clamp open and close profiles for fast cycling with shock-free movement

Mold protection is never an issue with the SE-DUZ. With low pressure mold protection settable to 0.1mm, and mold open/close positions settable to 0.01mm, precision mold protection is ensured and there's no banging — even at high speeds.

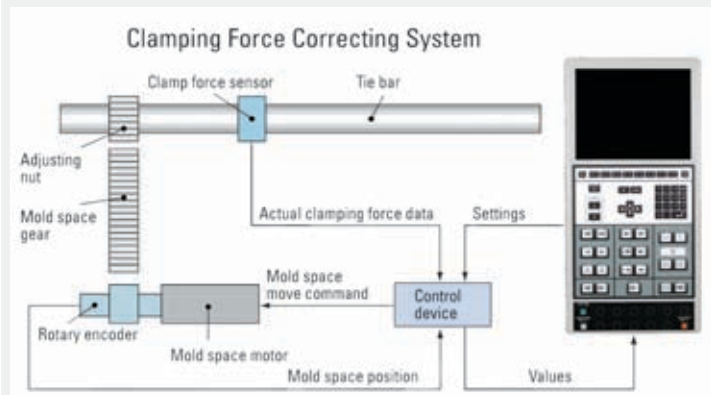
Mold open stop position accuracy of 20 microns, an important factor for take-out robots and 3-plate molds, is ensured with monitoring by precise optical encoders and full closed-loop control.



Center Press Platen

The CPP (Center Press Platen) clamp design, combined with the SE-DUZ's superior platen rigidity, provides improved force distribution, elimination of short shot and flash problems and improved mold protection.

Patent Pending Feedback System for Clamp Force Control



The SE-DUZ 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 the thermal expansion of the mold. Working together with a control device and high precision rotary encoder, this patent pending system keeps clamping force stable.

Features supporting fast, easy mold changeovers include:

- Extended horizontal clearance between tie bars
- Simple (digital remote) clamp force adjustment
- Increased space for tie-in of ejector rods

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

- A high-cycle mode in which filling can begin during clamping for improved cycle time
- And a gas-release mode in which filling can begin during low-pressure clamping for improved part quality

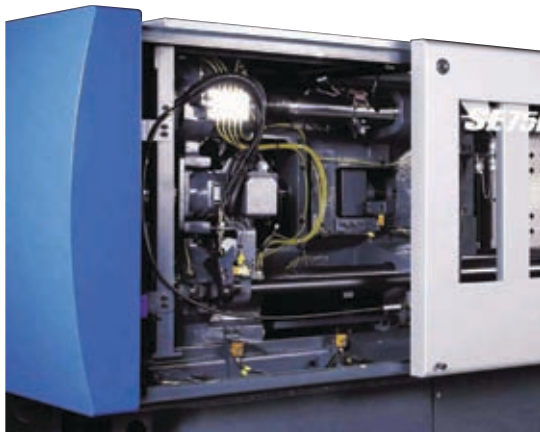
For optimum life of the ball screws, toggle pins and tie bar bushings, the SE-DUZ is equipped with a highly reliable, automatic grease supply through a valve-type progressive distribution system. This system uses an externally mounted pump unit with easy-to-load grease cartridges that can be changed 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.



Automatic grease supply system



The increased width between tie bars on the SE-DUZ allows installation of large mold bases and increases the work space for mold setup.



Sliding clamp gate (NA on 20-33 ton models)



Easy access for ejector rod tie-in

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



www.sumitomo-shi-demag.us

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