

## SEEV-A<sup>HD</sup> High-Duty, Advanced All-Electric Series

8 model sizes from 247 to 562 U.S. tons



# SEEV-A<sup>HD</sup> Series Advanced, High-Duty All-Electrics

8 model sizes from 247 to 562 U.S. tons

**SEEV-A**  
An SEEV-A Platform machine.



With the new SEEV-A<sup>HD</sup>, advanced technologies and new, robust specifications let you runner bigger, heavier molds in a smaller and more efficient machine.

## The Sumitomo (SHI) Demag Difference

- **Over 20 years** of R&D on all-electric injection molding machines, with thousands of AE machines sold annually around the world
- 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
- An ongoing, successful track record of breakthrough technologies that improve speed, precision and production efficiency
- The three integrated systems of our unique Z-Molding technology that ensure ease of use and reduce defects, losses and faults as close to zero as possible
- Exceptional, field-proven AE machine reliability that ensures years of trouble-free operation
- Our standard-setting warranty program and highly rated training, service, technical support and U.S.-stocked spare parts availability

The SEEV-A<sup>HD</sup>, with 8 model sizes ranging from 247 to 562 U.S. tons (2200 to 5000 kN), combines significantly increased specifications with advanced technologies resulting in a substantially different mid-sized machine series that:

- Brings the precision, productivity and profitability benefits of all-electric injection molding machine technology to applications with larger, heavier and more complex molds
- Efficiently handles higher injection requirements that would typically have been run on a hybrid or hydraulic machine
- Allows bigger parts to run on smaller machines
- "Meets or beats" specifications of other competitors' next model size up all-electrics

Plus, with the SEEV-A<sup>HD</sup>, you can count on a rapid return on investment resulting from:

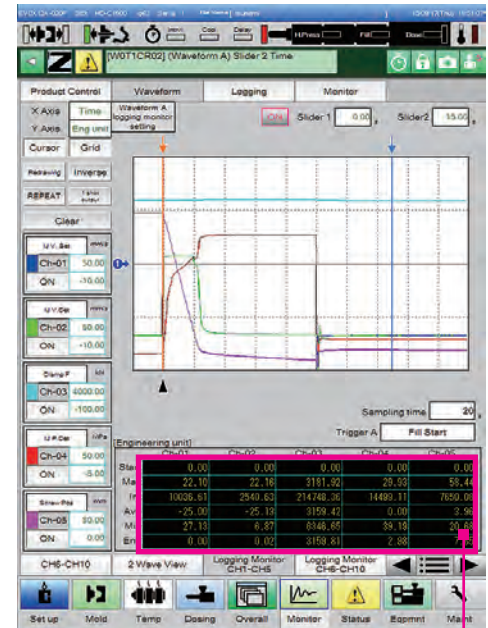
- Significant energy savings due to exceptionally energy-efficient, low-inertia motors and low-friction design improvements
- Reduced water and grease use
- Faster start-up
- Faster cycle times
- Reduced scrap
- Reduced downtime
- Quick color, resin and mold changeovers
- Minimized preventive maintenance
- The ability for unmanned and lights-out operation

## New NC-10 Control

As an SEEV-A Platform machine, the SEEV-A<sup>HD</sup> is equipped with the updated, PC-based NC-10 Control that is both easy to use and helps prevent molding mistakes.

In addition to the advantages of the Z-Molding Simple Process Setting System described below and the new QC features shown on the right, the NC-10 includes:

- The 15.1-inch, energy-efficient LED backlit screen has been updated with a high-sensitivity/fast response touchscreen that ensures accurate entry of settings with less pressure
- The screen unit is both swivel mounted and has a wider viewing angle for enhanced visibility
- Exceptionally fast processor speeds
- Key-lock codes to manage access to molding conditions
- Operating system support for 15 languages to meet global production requirements
- Ability to customize content
- Extensive graphing capabilities
- Excellent configurability for cores and other sequences
- Multiple USB ports for storage and peripheral devices



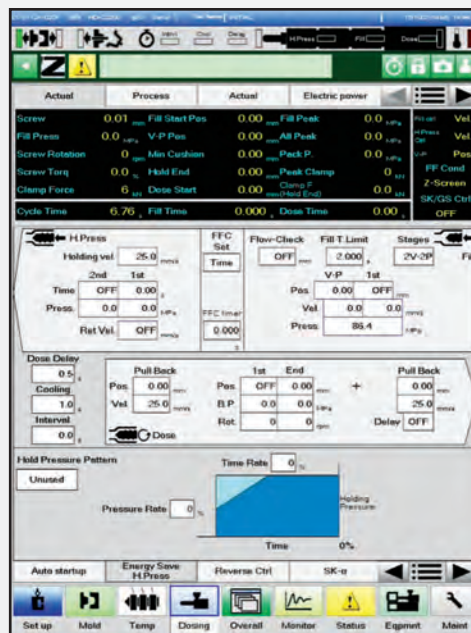
Waveform logging and statistical data calculations are other new features of the NC-10. This data can also be viewed on the logging window and used as added parameters for Quality Control monitoring and part quality assessments.

## Z-Molding

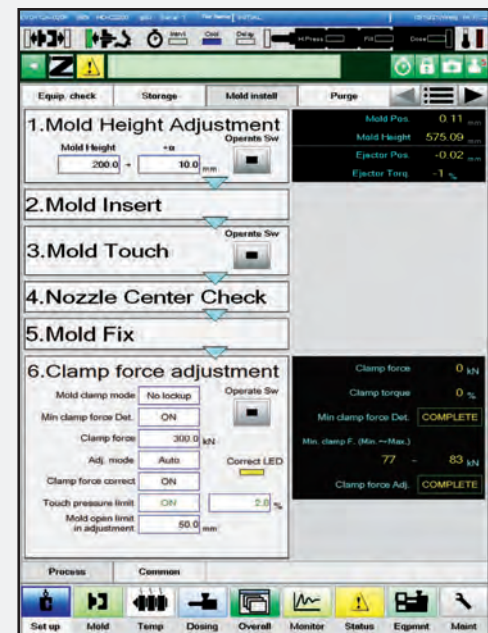
### Simple Process Setting (SPS) System

SPS allows easy setup and operation and helps the operator avoid oversights and mistakes that can cause part quality problems, scrap and mold damage. With SPS, there are about half the settings of earlier systems and the basic settings area for each process is always shown on the screen. Detailed settings can be made on easy-to-locate sub menus that are selected by using tabs, eliminating the need to page up or down.

SPS also ties together Z-Molding's MCM & FFC systems, allowing the clamp and injection to perform as a complete system.



The SPS control design provides for seamless setup of new molding processes with minimal screen changes and entries.



SPS provides a simple, one-page, step-by-step guide for mold installation.



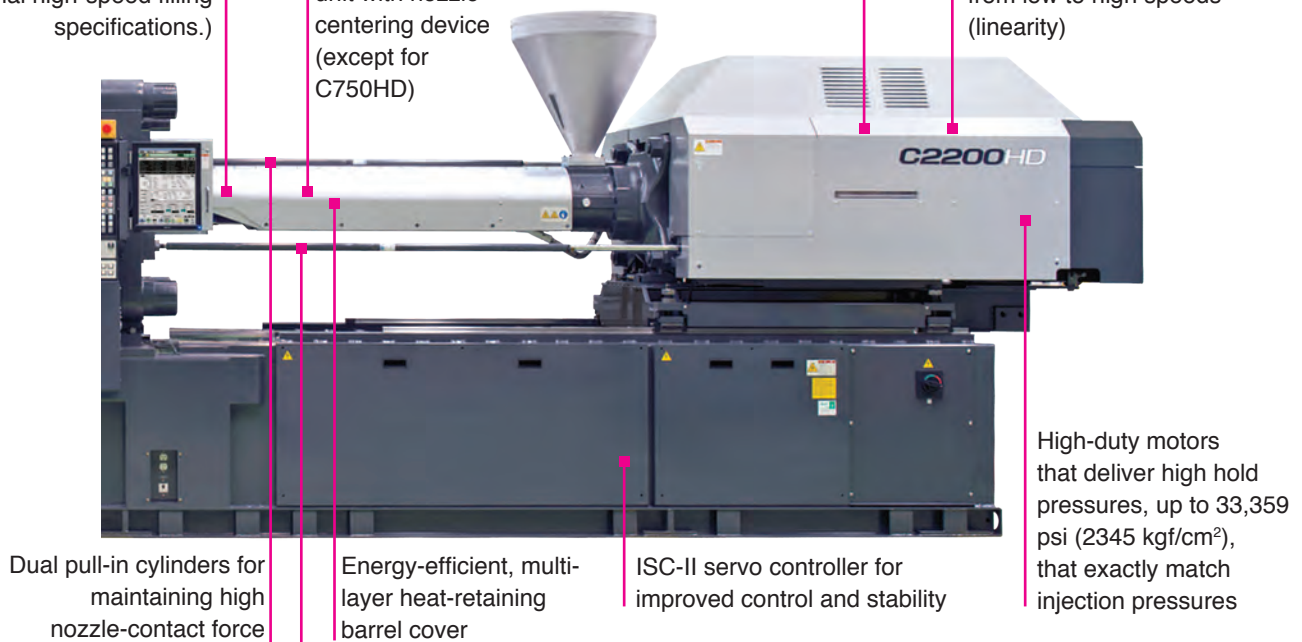
# SEEV-A<sup>HD</sup> Injection Unit Features

Maximum injection speeds of 6.2 in/s (160 mm/s) are standard. (See below for optional high-speed filling specifications.)

Swivel injection unit with nozzle centering device (except for C750HD)

High-resolution injection pressure, screw speed and position detection

Low-inertia, high-response servomotors for improved injection speed response from low to high speeds (linearity)



Dual pull-in cylinders for maintaining high nozzle-contact force

Energy-efficient, multi-layer heat-retaining barrel cover

ISC-II servo controller for improved control and stability

High-duty motors that deliver high hold pressures, up to 33,359 psi (2345 kgf/cm<sup>2</sup>), that exactly match injection pressures

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

The SEEV-A<sup>HD</sup> injection unit uses two Sumitomo servomotors with full closed-loop control and digital sensors.

Developed for high-duty applications, the injection motor provides the ability to consistently maintain high hold pressure for an extended period of time (up to 40% or in some cases a higher percentage of the cycle) — an important factor for avoiding sink marks and improving dimensional stability of thick-wall parts. This servomotor uses a load cell to provide feedback that dictates the speed and torque required for precision injection, hold pressure and back pressure.

The high-duty screw drive motor enables plasticizing at a lower temperature, preventing problems such as material burning and black spots and improving cycle time through decreased cooling time. The high torque of this motor is a major advantage for high-viscosity resins. And, compared with hydraulic machines, the SEEV-A<sup>HD</sup> requires fewer control devices because there are no pumps, proportional or directional valves.

The 8 model sizes of the SEEV-A<sup>HD</sup> are offered with a wide choice of injection units and screw diameters including large diameter screws up to 90 mm (dependent on injection unit size).



The field-proven SD screw, supplied as standard, is designed to ensure the stability of the melt, contributing to consistent quality and improved yield. For applications with specialized requirements, a diverse range of optional screw types is available.

For added application flexibility, high-speed filling specifications for thin-wall products are offered that raise the maximum injection speed to:

- 280 mm/s on C750HD through C2200HD
- 220 mm/s for the C3000HD

Some of the SEEV-A<sup>HD</sup>'s other injection unit features include:

- Designed for quick change of screw or complete assembly
- Synchro-plast control mode, for resins with low viscosity or uneven pellet size, that optimizes screw position and back pressure
- Density correction mode for consistent cycle-to-cycle part weights
- Automatic purging mode for fast color/material change that allows multiple purge settings to be preset for different materials and purging compounds all in the same cycle

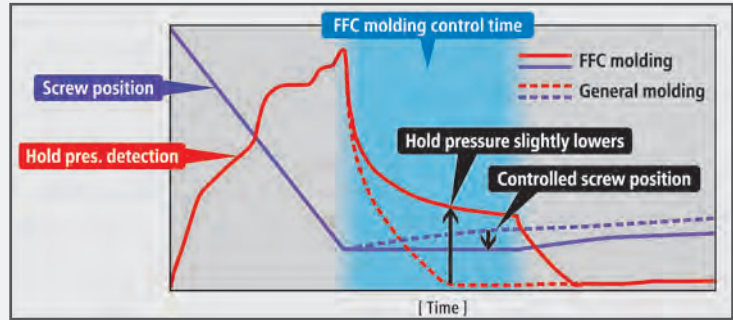
## Z-Molding

### Flow Front Control (FFC) System

FFC, working together with the ISC II (Intelligent Servo Control) and the injection servomotor, achieves complete and balanced filling with **reduced injection pressure**. The system takes advantage of the energy and viscoelastic properties in the flow front of the resin to complete filling in an even fashion as opposed to forcing material into open areas and thus flashing the areas that are already filled.

Advantages provided by FFC include:

- Precision control of screw position to ensure consistent filling
- In addition to preventing flash, maintaining low internal pressures in the cavities allows venting of gases to prevent short shots
- Improved cavity balance and consistent part weight across high cavity molds or difficult-to-fill unbalanced/family molds

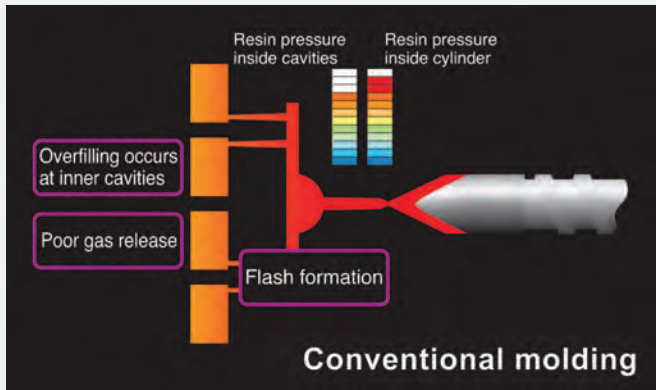


Fast response control of speed and pressure before and after VP switchover allows complete filling with low pressure.

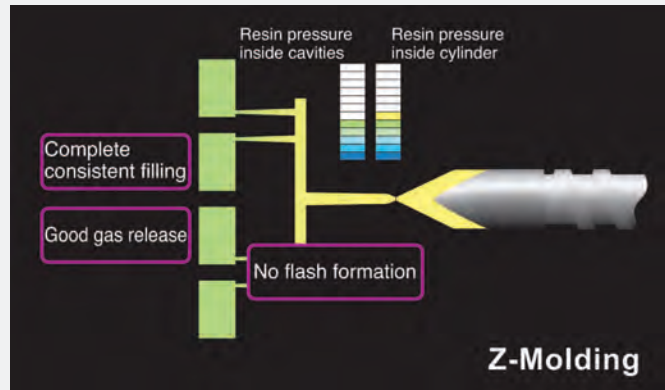
### Filling Comparison of 15-inch PC + ABS Wheel Cap



Left photo shows what happens in normal molding when trying to prevent flash; right photo shows complete filling with no flash using FFC **at the same injection pressure**.



In conventional molding, by forcing resin into the mold cavities, overfilling and compression occur at the inner cavities and gases are trapped.



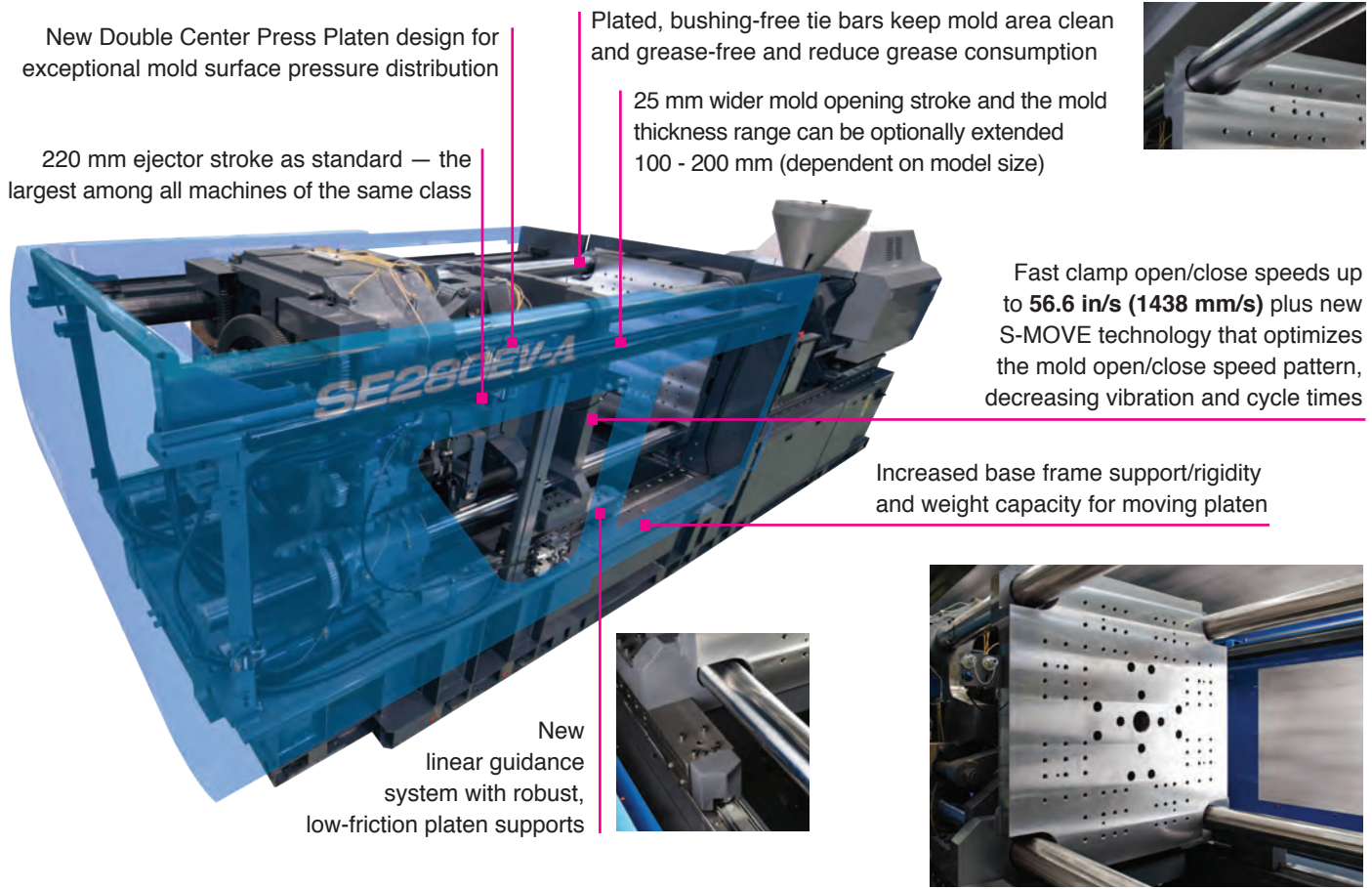
FFC precisely controls screw position at VP switchover to balance fill speed and pressure across all cavities. Problems associated with overfilling and trapped gases do not occur.

The SEEV-A<sup>HD</sup>'s high-contact-force (nozzle touch) system, driven by a sealed Hydrostatic Transmission (HST) system, provides significant advantages over lower contact-force systems:

- High force is comparable to that of a hybrid or hydraulic clamp machine for high-precision control under high injection pressures
- Selectable force settings, up to 6.5 tons (4.5 tons for the C750HD), ensures compatibility with various mold types (hot runner, cold runner, floating sprue bushings, etc.)
- Dual pull-in cylinder design for mold protection and even pressure on the sprue bushing
- Rapid pressurization/depressurization for faster cycle times



# SEEV-A<sup>HD</sup> Clamping Unit Features



New Double Center Press Platen design for exceptional mold surface pressure distribution

220 mm ejector stroke as standard — the largest among all machines of the same class

Plated, bushing-free tie bars keep mold area clean and grease-free and reduce grease consumption

25 mm wider mold opening stroke and the mold thickness range can be optionally extended 100 - 200 mm (dependent on model size)

Fast clamp open/close speeds up to **56.6 in/s (1438 mm/s)** plus new S-MOVE technology that optimizes the mold open/close speed pattern, decreasing vibration and cycle times

Increased base frame support/rigidity and weight capacity for moving platen

New linear guidance system with robust, low-friction platen supports

For clamping, the SEEV-A<sup>HD</sup> combines new, robust specifications, advanced servomotor technology for clamping and ejection, a rugged and field-proven, double-toggle clamp design and our unique Minimum Clamping Molding (MCM) System (next page) which helps avoid flash, burn spots and shorts shots, and can reduce mold wear, cycle time and power consumption.

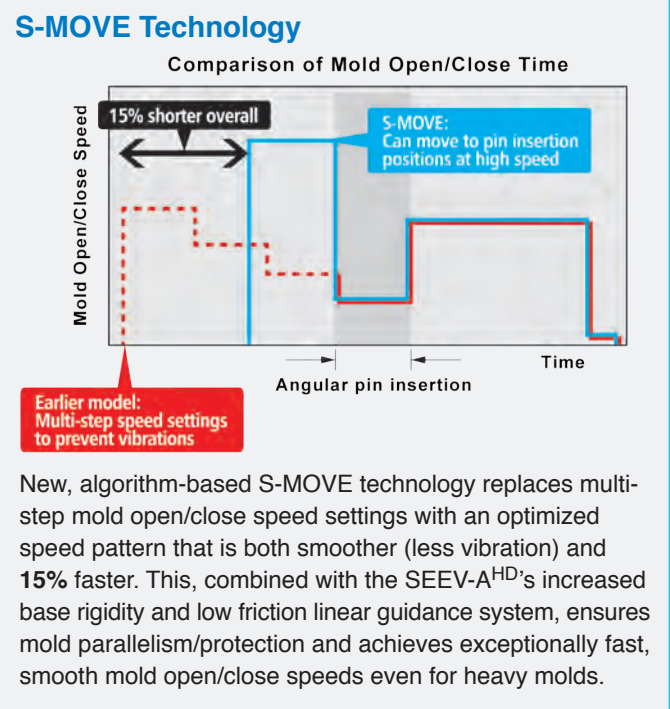
Tie bar spacing was increased an average of **8%** in the horizontal direction and **15%** in the vertical direction compared with the predecessor SE-HDZ Series, and is the highest among machines of the same class. The square configuration of the tie bar spacing also allows molds to be loaded from the side.

A stronger, more rigid frame construction has increased the allowable maximum mold weight by an average of **22%** compared with the SE-HDZ. This, together with the new, low-friction linear guidance system and plated, bushing-free tie bars, ensures that even heavy molds open and close smoothly and parallelism is maintained.

Multi-toggle clamp force control, a standard feature that can be used to reduce cycle times, 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

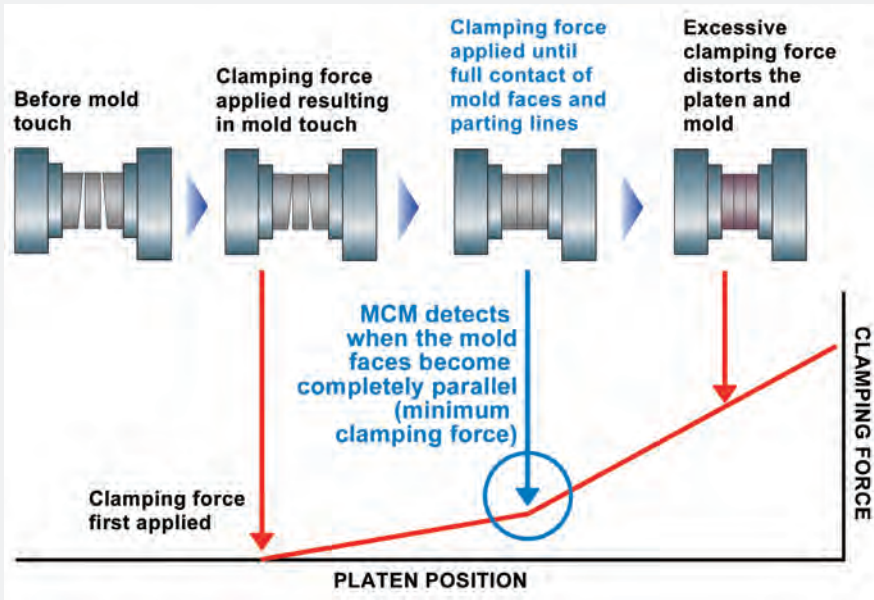
Precision mold height and tonnage adjustment is provided by a highly precise servo-driven gear system. Other features supporting fast mold changeovers include: increased distance between tie bars, digital-remote clamp force adjustment, increased space for tie-in of ejector rods and a selectable nozzle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



New, algorithm-based S-MOVE technology replaces multi-step mold open/close speed settings with an optimized speed pattern that is both smoother (less vibration) and **15% faster**. This, combined with the SEEV-A<sup>HD</sup>'s increased base rigidity and low friction linear guidance system, ensures mold parallelism/protection and achieves exceptionally fast, smooth mold open/close speeds even for heavy molds.



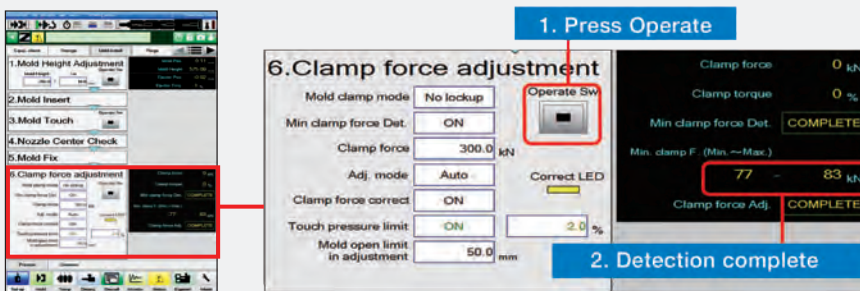
## Z-Molding Minimum Clamping Molding (MCM) System



Z-Molding's Minimum Clamping Molding (MCM) system helps molders improve part quality while **reducing clamp force requirements**. When the MCM system is switched on, the machine automatically detects the minimum point at which the mold halves are completely parallel and surface pressure is evenly distributed across the mold faces.

MCM System benefits include:

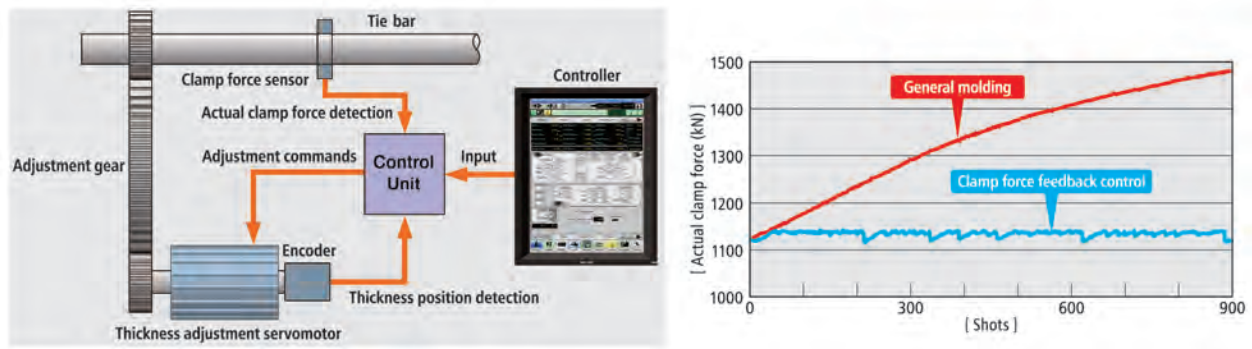
- Avoidance of burn spots and short shots
- Less trapped gases reduce mold wear/maintenance and downtime
- Lower clamp force can reduce machine wear and power consumption and improve cycle times



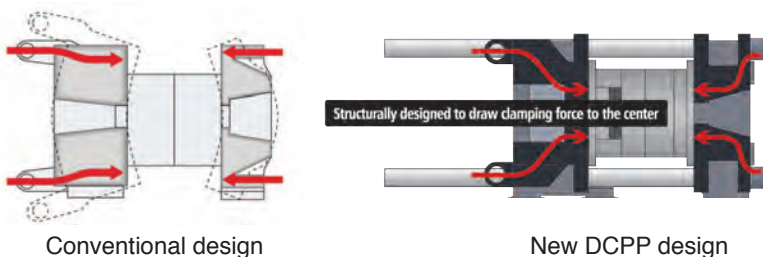
Auto MCM is selected on the one-page Mold Setup screen. Using the detected MCM values and knowledge of the molding process, the desired clamp tonnage is entered.

MCM works together with the SEEV-A<sup>HD</sup>'s Clamp Force Feedback Control System (below). This system continually monitors clamp tonnage using a sensor on the tie bar to measure actual clamp tonnage. Unlike systems that rely solely on measurement of the mold space, this system works together with a control device, encoder and a high-performance servomotor, automatically compensating for thermal expansion of the mold and keeping clamping force constantly stable.

### Clamp Force Feedback Control System



### Improved Double Center Press Platen (DCPP) Design



Improved Double Center Press Platen design, a standard feature of the SEEV-A<sup>HD</sup>, draws force from both the moving and stationary platens to the center of the mold ensuring superior surface pressure distribution. Other benefits include: reduction of platen deflection, prevention of flash and short shots, improved protection of core pins and extended service life of molds.

## Energy Efficiency and Grease Use Improvements

In addition to Sumitomo's advanced servomotor technology with reduced motor friction and rotational resistance, the SEEV-A<sup>HD</sup> has a wide range of other features that ensure energy-efficient operation and reduced grease use:

- Multi-layer heat retaining barrel cover
- New, selectable energy-saving control mode that gradually reduces holding pressure
- Reduced motor friction and rotational resistance
- Reduced sliding friction for mold open/close via use of linear guides and bush-less tie bars for the clamp
- Toggle link design (lock-up design) that eliminates power consumption during clamp hold
- Flexible purge sequences reduce color/material changeover time, saving power and material
- No grease on tie bars
- Optimized grease supply system
- Self-contained lubrication on linear rails
- Monitored distribution block that ensures proper amount of lubrication to each point



The SEEV-A<sup>HD</sup>'s new, optimized grease supply system reduces the number of grease cartridges required, saving maintenance time and grease cost/use/disposal.



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