N9 Control with Z-Molding

N9/Z-MOLDING

Helping Molders Achieve
Optimum Machine Performance
and Zero-Defect Molding

Sumitomo SHI DEMAG

N9 Control with Z-Molding

Its precision puts the Z in amaZing.

The N9 Control with Z-molding capabilities is an easy-to-use PC-based control that provides exceptional molding precision with low-pressure filling and reduced clamp force. It combines the advantages of the N-Series controls with new systems and capabilities to help molders achieve zero-defect molding and optimum machine performance.

By shifting the focus to low-pressure filling and reduced clamp force, Z-molding helps molders realize substantial benefits in precision, part cost and overall productivity.

New systems and capabilities of Z-molding include:

- Flow Front Control (FFC) System that optimizes the flow front allowing control of low internal pressures inside the cavities. This provides exceptional precision to eliminate flash and short shots by effectively controlling gases under filling.
- Minimum Clamping Molding (MCM) System which helps avoid flash, burn spots and shorts shots, and can reduce mold wear, cycle time and power consumption
- Simple Process Setting (SPS) System which allows easy setup and operation while helping the operator avoid oversights and mistakes

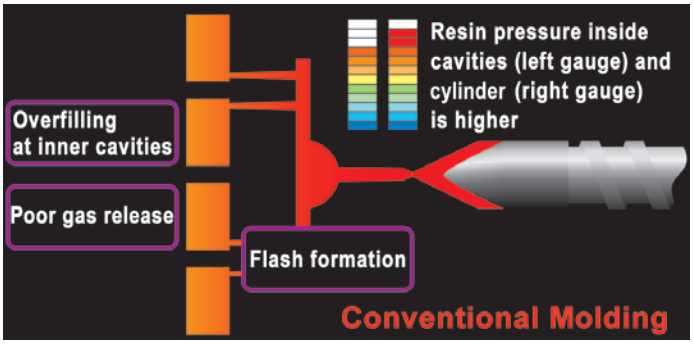
Features

- 12.1-inch, full-color, TFT flat display with touch-screen capability
- Fast, one-touch access to the most commonly used screens
- Screen-prompted setup assistance and auto-programming of initial molding conditions
- Password-protected lockout capabilities
- Storage of data on 100,000 shots for downloading
- Display of the last 500 shots and various charting capabilities including histograms and dispersion diagrams
- For visual trending over time, the capability to store and view molding profiles for the last 1000 shots
- Extensive SPC and QC capabilities designed to help refine the process and monitor and document quality
- Machine optimization capabilities, such as easy ramping programs, assist molders in decreasing cycle times and increasing productivity
- Change Log Screen that logs and stores the last 200 changes
- 8 parameters (selectable from 20) can be graphically displayed on a single screen
- PC-based system with USB port that can be used for print screen function and to download molding process, logging, analysis, and history data
- Serial port, parallel port and five independent machine status signals (selectable from 24 possible signals) that are available for output
- Convenient data storage capability in the control unit for 200 mold setups
- An external storage system for mold setups that uses optional memory cards
- Highly reliable keys that ensure fast, accurate data entry
- Metric or English units available by selection

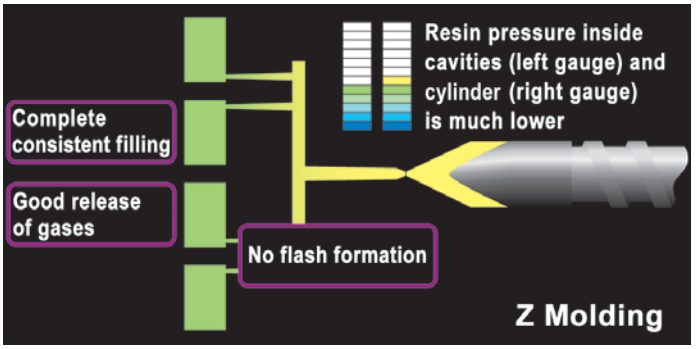
Patent Pending Flow Front Control (FFC) System

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 — visco (creep) and elasticity (recovery or pull back) — 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

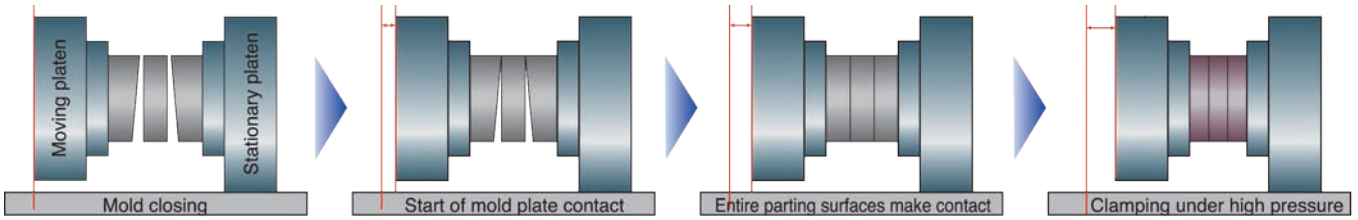


In conventional molding, by fully charging resin into the mold cavities, overfilling and compression occur at the inner cavities and gases are trapped.



In Z-molding, the FFC System restricts screw position to optimize the flow front. Problems associated with overfilling and trapped gases do not occur.

Minimum Clamping Molding (MCM) System



Clamp force detection at mold touch

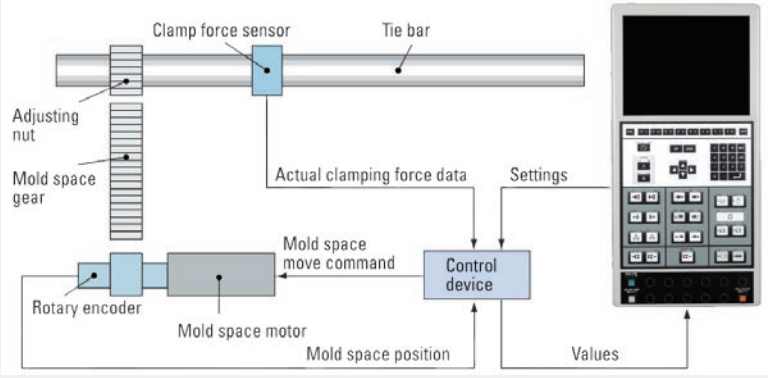
Excessive clamp force deforms the mold

Precision clamp force detection (using a tie-bar-mounted strain gauge sensor) and the feedback control capabilities of the Minimum Clamping Molding (MCM) System determine the minimum force required at mold touch. Using this system can avoid excessive clamp force which can result in mold deformation and poor release of gases.

Precision clamp force detection and the feedback control capabilities of the MCM System determine the minimum clamp force required at mold touch.

MCM + Clamp Force Correcting System

The MCM System also works together with the machine's Clamp Force Correcting System to compensate for the thermal expansion of the mold. Using a high precision rotary encoder and the tie-bar mounted strain gauge sensor, this feedback system keeps clamping force constantly stable, even at low clamp force settings.

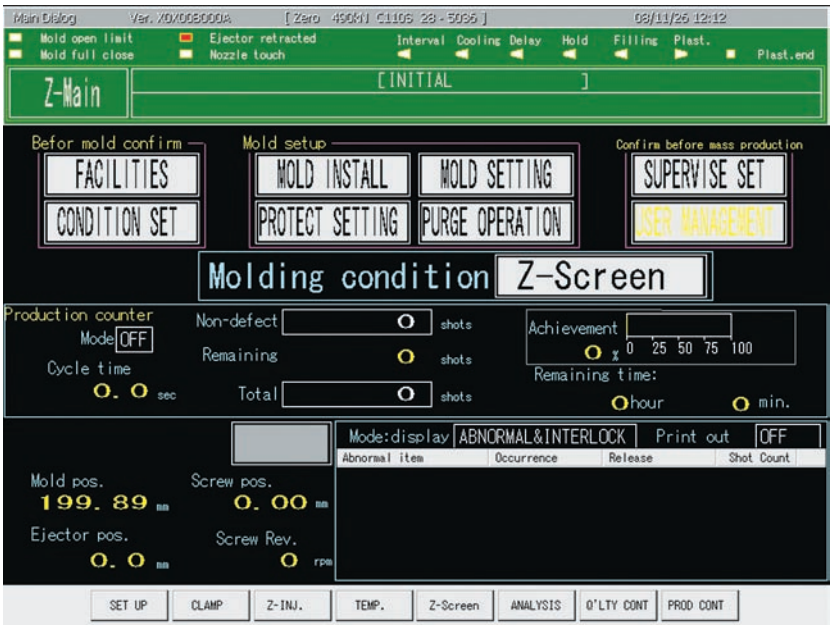


Simple Process Setting (SPS) System

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



The Z-Main Screen allows the operator to easily move to set screens. In addition to One Process = One Screen, the flow of condition setting can be easily followed without referring to the manual.

More Good Parts at Less Cost

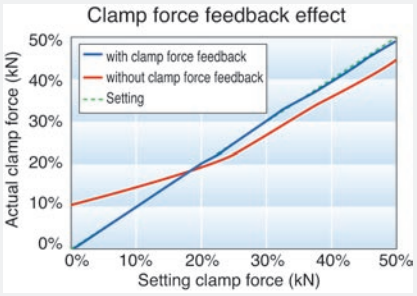
Flow Front Control (FFC) System

- No overfilling = less resin = less cost
- Lower pressure = less power consumption = less cost
- Lower pressure = less mold maintenance/wear = less cost
- No flash or short shots = zero defects = less resin = less cost

In testing on this connector application, the FFC capability allowed pressure inside the cavities to be reduced by nearly 50% plus a significant reduction in the clamping force.

Minimum Clamping Molding (MCM) System

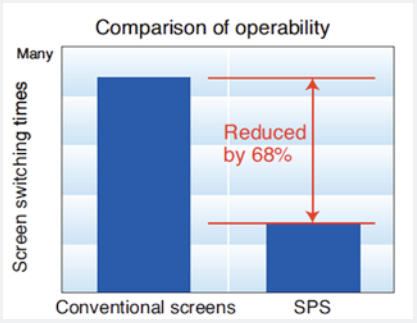
- No burn spots/short shots = zero defects = less resin = less cost
- Less mold maintenance = less downtime/labor = less cost
- Less power consumption = less cost
- Improved cycle time = more good parts at less cost
- Running molds on lower tonnage machines = less cost



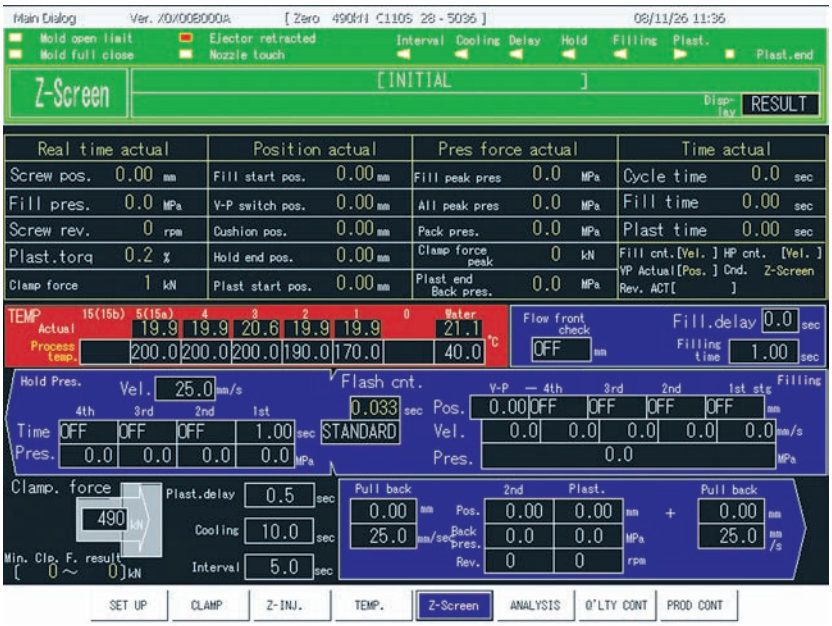
The MCM System working together with the Clamp Force Correcting System achieves exceptional stability even at low clamp force settings.

Simple Process Setting (SPS) System

- Less operator error = less scrap = less cost
- Less setup time = less cost



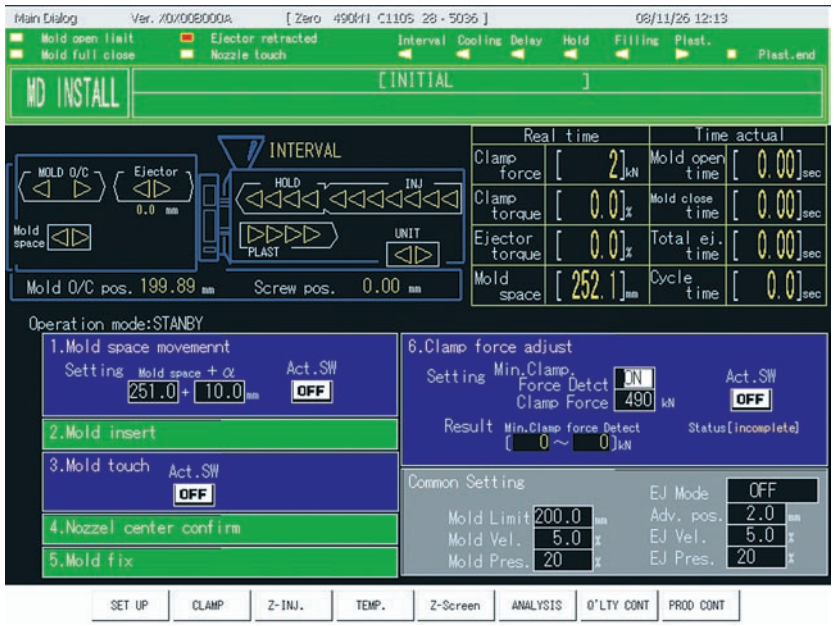
The SPS System has been shown to reduce screen switching time by 68%.



Z Screen

With the all-in-one Z Screen, a wide range of actual values are displayed and principle conditions nessary to make product are consolidated on one screen. This includes: temperature, injection program, hold pressure program, plasticizing program, clamp force setting, injection/plasticizing delay time, and stages (2V2P or 5V4P).

Flash control can be set from this screen, selectable for injection time, thick wall or hold pressure standard modes. Clamping force also can be changed during molding from this screen.

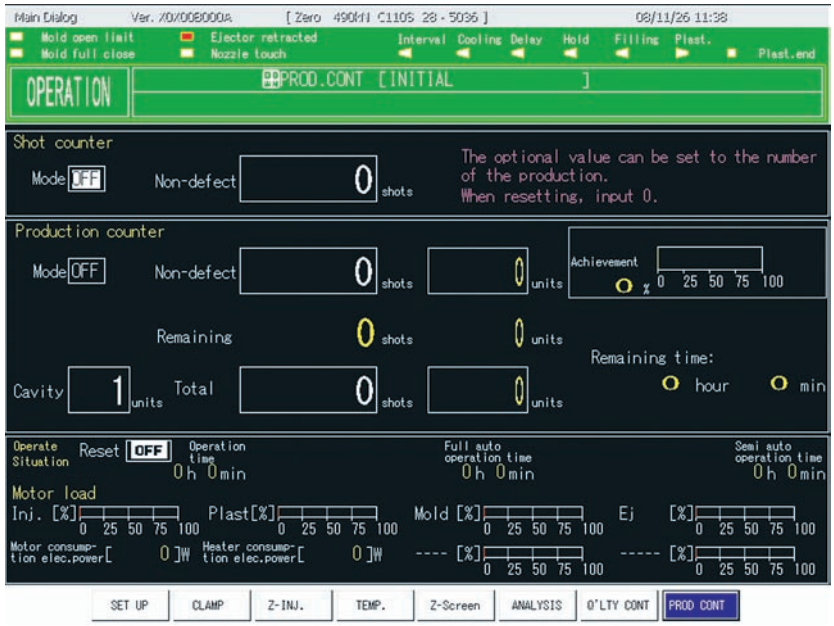


Mold Install Screen

To save screen switching, the Mold Install Screen combines set up, mold open/close and standby information on a single screen.

As part of the Minimum Clamping Molding (MCM) System, minimum clamp force at mold touch is displayed on this screen.

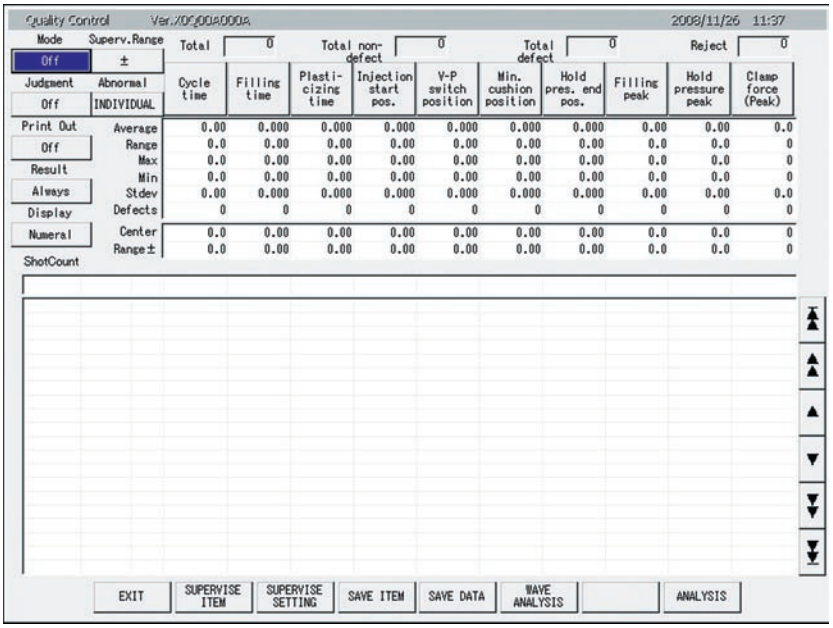
Mold open limit and ejector position can also be set on this screen. After the mold is installed, the operator can adjust robot position immediately and fine tune it from this screen.



Operation Screen

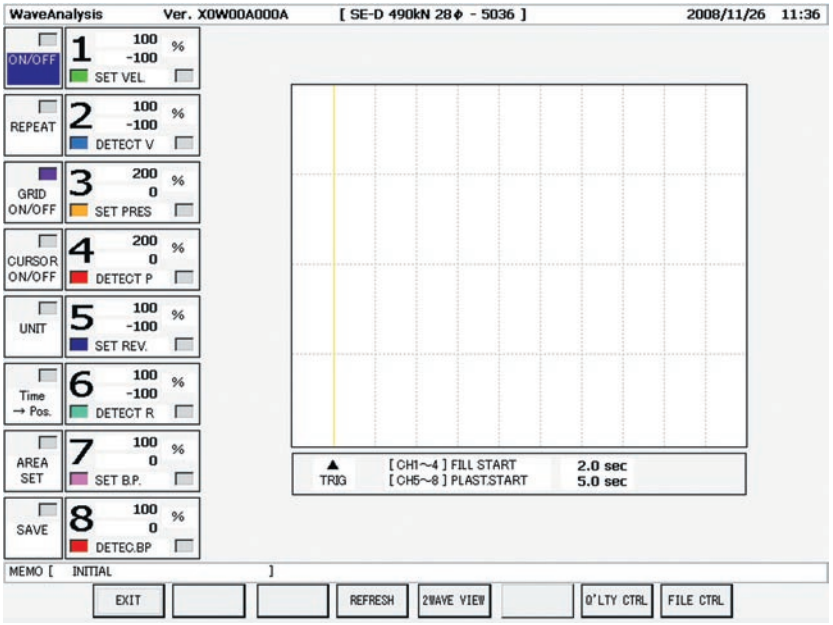
In addition to the shot counter and production counter (with cavity specification and calculation), the Operation Screen displays actual motor load information.

A separate Energy Saving Screen allows the hold pressure to be gradually decompressed and easily adjusted by the time or pressure ratio. Measurements of energy use (kW-h) for motors and heaters can be displayed for 5, 10 or 15 minute periods.



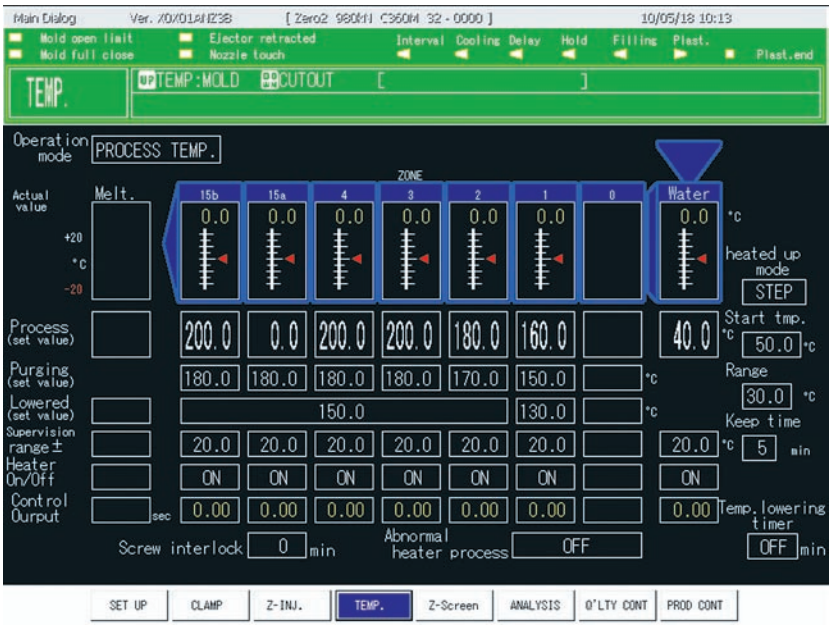
Quality Control Screen

The Quality Control Screen displays 10 parameters (selectable from 20). Average values for the last 500 shots are displayed across the top; actual values can be viewed using the scroll bar. Using the Display button, actual values can be viewed in a graph. QC data logging can be performed for 20 parameters (selectable from 50). Logged information can also be selected for display in a dispersion diagram, histogram, or correlation data format for analysis.



Analysis Screen

The Analysis Screen can be used to analyze initial molding conditions and changes made in process parameters. It can also be used to assist in Quality Control. Up to 8 parameters can be selected (from a list of 20 possible parameters), or using wave display by process will automatically select the parameters.



Temperature Screen

The Temperature Screen provides easy temperature setup and monitoring for multiple barrel zones to ensure optimum melt conditions. Normal and step rise are changed on the right side. Ensuring uniform temperature rise prevents resin burning.

For additional information please consult your Sumitomo (SHI) Demag Sales Representative.

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