SUMITOMO ALL-ELECTRIC INJECTION MOLDING MACHINE

CL7000

Compact machine for large works
By consolidating the latest molding technologies of all-electric machines, Sumitomo has condensed a plethora of advanced features and larger mold mounting performance into a compact machine frame, to deliver a "compact large class electric machine." Even the molded products at right - and larger versions as well - that previously were produced on 8500 kN class machines can be made without defects, stress or waste using the CL7000 and its actual molding clamping force of 4420 kN.

The Double Center Press Platen has greatly changed the concept of clamping force. Center Press Platens of extremely low flexing are provided on both the stationary and mobile sides. By evenly distributing surface pressure applied to the mold, the platens simultaneously eliminate center-lying burrs and short shots along the periphery, and enable molding at lower clamping forces than before.

The CL7000 incorporates a new plasticizing system that employs the latest technology to eliminate stress and waste in plasticizing operations. Because of this new system, the full machine length has been greatly shortened.

**Accurate, stable clamping force maintained**

Clamping force fluctuations are minimized by detecting actual clamping force with a sensor and feeding those readings back. Molding is stable and consistent because the prescribed clamping force is maintained without being affected by mold rigidity or thermal expansion. Because the set clamping force is applied to the mold, it is unnecessary to set a margin on clamping force, which helps to reduce the required clamping force.

**Wide platen and expanded mold opening stroke**

Both complicated and large-sized modes are accommodated owing to a wide tie-bar spacing and ample opening stroke.

**Large molds accommodated on a small frame**

Both complicated and large-sized modes are accommodated owing to a wide tie-bar spacing and ample opening stroke.

**Compact machine size enabled by the latest plasticizing technology**

New plasticizing system

**Comparison of actual clamping force and mold parting**

Molds same product without flash

<table>
<thead>
<tr>
<th>Tie-bar</th>
<th>Clamping force sensor</th>
<th>Data of actual clamping force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoder</td>
<td>Mold thickness adjustment gear</td>
<td>Data of Mold Thickness</td>
</tr>
<tr>
<td>Controller</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**System chart**

**Comparison of surface pressure distribution**

<table>
<thead>
<tr>
<th>Tie-bar</th>
<th>Clamping force sensor</th>
<th>Data of actual clamping force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoder</td>
<td>Mold thickness adjustment gear</td>
<td>Data of Mold Thickness</td>
</tr>
<tr>
<td>Controller</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comparison of actual clamping force and mold parting**

Molds same product without flash

<table>
<thead>
<tr>
<th>Tie-bar</th>
<th>Clamping force sensor</th>
<th>Data of actual clamping force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoder</td>
<td>Mold thickness adjustment gear</td>
<td>Data of Mold Thickness</td>
</tr>
<tr>
<td>Controller</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conventional model**

<table>
<thead>
<tr>
<th>Tie-bar</th>
<th>Clamping force sensor</th>
<th>Data of actual clamping force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoder</td>
<td>Mold thickness adjustment gear</td>
<td>Data of Mold Thickness</td>
</tr>
<tr>
<td>Controller</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conventional model**

**Conventional model**

**Double Center Press Platen**

The Double Center Press Platen is a high-speed type press that is equipped with a high-speed injection system. The press is designed to be compact and easy to maintain, with a high degree of automation and excellent performance. It is ideal for producing high-quality plastic parts in a wide range of industries, including automotive, electronics, and household appliances. The press is equipped with a variety of features, including a high-speed injection system, a high-precision clamping system, and a user-friendly control panel. It is also equipped with advanced maintenance functions, such as automatic lubrication and cleaning systems. The press is designed to be environmentally friendly, with low emissions and energy consumption. It is also equipped with a range of safety features, including a fail-safe system and a high-precision safety monitor.
Numerous high-tech features can be operated comfortably and safely. Moreover, advances in energy-saving technology help to reduce energy costs and protect the global environment.

High performance nozzle touch system

High precision, high power nozzle touch and nozzle touch control

The CL7000 adopts a 2-axis arm supporting structure that is symmetrically positioned with nozzles. The highly accurate, high output nozzle touch mechanism does not tilt the stationary platen. And, control capabilities are provided to remotely set nozzle touch force according to the type of mold.

- Comparison of nozzle touch systems
  - Conventional system: The high power nozzle touch causes a tilt of the stationary platen. High clamping force is needed to compensate the tilting and maintain accuracy.

- 2-axis arm nozzle touch system of the CL7000: Despite the high power, mold clamping accuracy is maintained without tilting of the stationary platen.

Heavy duty motors for injection and plasticizing

Heavy duty injection motor for retaining pressure over longer periods of time.

- Because of the performance limitations of motors, existing electric machines could not retain high pressures for long periods of time.
- The SE7L comes standard with a high-torque injection motor and can retain 3x the pressure loads of existing electric machines. For example, molding is possible without problems under the below harsh conditions:
  - Retains maximum injection pressure for 10 sec. (60-sec cycle)
  - Retains 75% of the maximum injection pressure for 18 sec. (60-sec cycle)
  - Retains 50% of the maximum injection pressure for 40 sec. (60-sec cycle)

- All figures above are theoretical.

Heavy duty plasticizing motor that can plasticize high viscosity resins over long periods of time.

- With earlier electric machines, motor speed had to be reduced and cycles extended to mold high viscosity engineering plastics resin because of insufficient motor capacity. The CL7000 comes standard with a heavy duty plasticizing motor that supports stable molding of high viscosity resins.

Improved setup performance

Mold thickness remote control

Mold thickness can be quickly and accurately set by one-touch operation from the controller display. This effectively improves setup performance by shorting mold changeover time.

Safe operation

Enhanced safety

In response to user demands, the CL7000 make a diversity of high-end features safer and easier to use. The machine is fully compliant with JIMS K-1001 (Safety Standard of Japan Society of Industrial Machinery Manufacturers).

Far greater energy-saving performance than earlier all-electric machines

Low energy consuming, low running costs

The energy reducing effect is obvious when compared against hydraulic machines of the same class. Furthermore, technological progress has greatly reduced power consumption compared to earlier all-electric machines. Users can take full advantage of the sophisticated features at low running costs.
Zero-molding by FFC (Injection system)

Stable sound quality products via smooth filling

FFC (Flow Front Control) optimizes the flow front by restricting screw movement to match flash control. This enables molding at low internal pressures inside cavities, which, besides preventing flash, eliminates short shots by effectively releasing gases when filling.

Example improvement in cavity balance

With conventional molding, flash forms because of complete filling. FFC molding offers good cavity balance, therefore complete filling can be done without raising peak pressure, hence preventing flash from forming.

Example clamping force reduction by FFC

In tests conducted by Sumitomo, a table disc was molded with a clamping force of 70 kN by FFC molding, whereas 1100 kN were required in conventional molding.

Clamping force reduced by 90%!

Product: Table disc  Resin: PC

Zero-molding by SPS (Setting system)

Simple operation without mistakes and oversights

SPS (Simple Process Setting) arranges settings by process from the operator’s position. A series of setting operations can be completed on a single screen.

Example of improved operability

SPS reduces screen switching for mold preparations and purging by 68%

Comparison of screen operation 1
(Mold preparations and purging)

Comparison of screen operation 2
(Mass-production setup)

SPS (Screens arranged by process)

Conventional operation (Screens arranged by function)

Whereas the conventional screens that were arranged by function required frequent switching between screens, SPS reduces operations to a minimum by arranging setting parameters according to process.

Example clamping force reduction by FFC

In tests conducted by Sumitomo, a table disc was molded with a clamping force of 70 kN by FFC molding, whereas 1100 kN were required in conventional molding.

Clamping force reduced by 90%!

Product: Table disc  Resin: PC

Low pressure clamping without unnecessary force

The CL7000 builds in detection capabilities for sensing the minimum force (home position) required to clamp the mold. With molds for the complicated profiles of heat shields, springs, sliding cores or angular pins, clamping force required for actual molding can be set by measuring the home position, so molding is performed effectively without applying unnecessary force. Moreover, the difference in mold setting before and after maintenance can be easily identified.

Example clamping force reduction by FFC

In tests conducted by Sumitomo, a table disc was molded with a clamping force of 70 kN by FFC molding, whereas 1100 kN were required in conventional molding.

Clamping force reduced by 90%!

Product: Table disc  Resin: PC

Complicated molding made simple.
Innovative molding processes only Sumitomo can offer. Imagine no defects, loss or faults! Zero!

Zero-molding

Restart from the origin.

Pat. P.
## Main specifications

<table>
<thead>
<tr>
<th>Items</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamping unit</td>
<td></td>
</tr>
<tr>
<td>Clamping system</td>
<td>Double toggle (5 points)</td>
</tr>
<tr>
<td>Max. clamping force</td>
<td>kN (tf)</td>
</tr>
<tr>
<td>Plate size</td>
<td>L x T mm</td>
</tr>
<tr>
<td>Daylight</td>
<td>mm</td>
</tr>
<tr>
<td>Mold opening/closing stroke</td>
<td>mm</td>
</tr>
<tr>
<td>Mold space</td>
<td>Max.</td>
</tr>
<tr>
<td>Locating ring diameter</td>
<td>mm</td>
</tr>
<tr>
<td>Ejector type</td>
<td>Electric (121 points)</td>
</tr>
<tr>
<td>Ejection stroke</td>
<td>mm</td>
</tr>
</tbody>
</table>

| Injection unit | | |
| Screw diameter | mm |
| Max. injection pressure | MPa (kgf/cm²) |
| Max. hold pressure | MPa (kgf/cm²) |
| Theoretical injection volume | cm³ |
| Injection weight (GPPS) | g |
| Plasticizing capacity (GPPS) | kg/h |
| Screw rotation speed | rpm |
| Injection rate | cm³/sec |
| Screw stroke | mm |
| Max. injection speed | mm/sec |
| Max. screw rotation speed | rpm |
| Number of temperature control zones | |
| Heater capacity | kW |
| Nozzle touch force | kN (tf) |
| Nozzle position | mm |

### Selection of injection module

<table>
<thead>
<tr>
<th>Model</th>
<th>Injection unit</th>
<th>Screw diameter</th>
<th>Max. injection pressure</th>
<th>Theoretical injection volume</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL7000</td>
<td>CL2300</td>
<td>63</td>
<td>215 (2200)</td>
<td>198 (1510)</td>
<td>186 (1900)</td>
</tr>
<tr>
<td>CL2200</td>
<td>76</td>
<td>148 (1510)</td>
<td>155 (1560)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL1100</td>
<td>76</td>
<td>137 (1510)</td>
<td>159 (1560)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL7000</td>
<td>84</td>
<td>131 (1510)</td>
<td>155 (1560)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Screw assembly

- **Specifications**
  - Wear resistant (1)
  - Wear and corrosion resistant (2)
  - No corotation

### Mold mounting diagram

- **Mold thickness extension**
  - The values marked with * are not included level pad height.

The machine dimensions and installation diagrams show the detailed layout and specifications, including the machine's overall dimensions, clamping area, and various assembly features. Contact Sumitomo about using resins that contain 30% or more wear-prone compounding ingredients or highly corrosive compounding ingredients.
Zero-molding equipment

1. Zero-molding Main screen: Simple process setting
2. Zero-molding Main screen: Process monitoring
3. Zero-molding Main screen: Basic process setting
4. Zero-molding Main screen: Program control
5. Zero-molding Main screen: Clamping force setting
6. Zero-molding Main screen: Molding condition setting
7. Zero-molding Main screen: Quality control
8. Zero-molding Main screen: Maintenance
10. Zero-molding Main screen: Parameters setting
11. Zero-molding Main screen: Machine status
12. Zero-molding Main screen: Machine information
14. Zero-molding Main screen: Machine control

Wear and corrosion resistant (II) Screw assembly

Resin temperature finder (Only for needle type nozzle)

Standard type hopper

Pneumatic ejector 1 line

Pneumatic ejector 2 lines

Cavity ventilator

Hydraulic core pull control circuit 1 line (Control circuit, Piping connection)
Pneumatic core pull control circuit 1 line (Control circuit, Piping connection)

Standard type hopper

Hydraulic drive circuit

Hydraulic drive package

Locating ring (Fixed with bolts) 1D o/100

Emergency stop switch on injection unit side (Operation and non-operation sides)

Leak circuit breaker (AC200V, 220V 3phase/3W+1E For Japan and Asia only)

Mold temperature monitor 2 zones (Without thermocouple and type-K)

Mold temperature monitor 4 zones (Without thermocouple and type-K)

Auxiliary fan motor (Standard I-2N)

Analog data output connection circuit

Mold temperature controller (Type-K 2 zones) 3W

Mold temperature controller (Type-K 4 zones) 3W

Mold temperature controller (10 zones) 1W For Hot runner system

Automatic starting system (Heater, Water supply, External output signal)

Resolving alarm lamp (On the toggle support, non-operation side)

Resolving alarm lamp (On the toggle support, operation side)

Resolving alarm lamp (On the injection unit, operation side)

Multi-function 3-color LED alarm lamp lights (On the toggle support, non-operation side)

Multi-function 3-color LED alarm lamp lights (On the injection unit, operation side)

Closed circuit type cooling water piping + lines (Back side of the injection unit)

Electric power supply socket sets (Type-B, Type-C, IEC 544-1, 16A, 250V)

Electric power supply socket for tools (16A, Operation non-operation side)

Electric power supply socket for tools (16A, Operation non-operation side)

Key-lock switch for molding setup

Manual one-touch plasticizing

Internal memory of mold conditions (200 conditions)

Operation guide for beginners

Production control

Automatic purging program Interlock attaching (Select between nozzle touch and plasticizing unit withdrawal)

Injection unit: 2-mode temperature control (Operation/Standby)

Cooling system startup protection (Interruption variable timer attaching)

Injection unit: injection delay (With delay timer)

Fan, tank, and air coolers (Dissipation of dye, cool, Moving time)

Screen speed digital indicator

Flow indicator for mold seal mounting (Sure mold closing/opening speed)

Safety doors with clear PMMA windows

Emergency stop switch with lockout ring (Operation side)

Emergency stop switch (Non-operation side)

Toggle covers with clear PMMA windows side

Tappet holes for lead-out robust installation

Grease central lubrication for clamping and injection

Interlock safety doors (Electrically, Mechanically)

Mold opening/closing mode selection (See operation/high-speed)

Moving plunger support (Sliding type)

Double Cylinder Press/Pak

Ejected products sensor circuit

Multi-touching

Ejector with break mechanism

Monitor screen

Actual operating values indicator

Heater load burnout monitor

Auxiliary facility monitor (1-16)

Alarm monitor (6 items)

Automatic setting of monitor high/low value

Abnormal history item (Item and Area)

Statistics product quality control (Actual value control, Quality transition graph)

Production control

Automatic starting system (Heater, External output signal)

Cylinder heater temperature monitor (All zones)

Self-diagnosis

Audible alarm

Shot control

Molding cycle time monitor (Attention/Attentioned selection)

Low fuel level monitor

Monitor setting fail protection

Miscellaneous

Automatic centralized greasing device

Mold cooling water block (2 lines) (Flow indicator and valve are optional)

Standard spares parts (Touch up paint, Feam)

Fire holder (Mold control panel)

External views appearing in this catalog may differ from the actual equipment.