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SHC Series

SUMITOMO
PLASTICS-MACHINERY

SUMITOMO'S SHC Series

Increased speed, precision and control. Expanded production flexibility. Countless new features and capabilities.

Plus an even more affordable price.

It's the SHC Series. And by any measure, it redefines general purpose in the 110 - 385 ton range.

More precision in, more precision out

SHC precision starts with screw positioning to .001 in. and a Fine Flow Screw assembly that delivers smooth, accurate pressure transmission. Plus programmable V/P switchover for precision filling.

Add to that faster response, PID temperature control of up to six barrel zones to .1°F. And the Auto Slow Down mode optimizes plasticizing.

The SHC's hydraulic drive system combines a new, fully closed loop, Direct Digital Servo system and a new Triple Pump System, raising the standard for stable injection control.

It's a whole new level of precision in GP machines. And it means more good parts at the end of the day and higher profits at the end of the year.

The fastest, smoothest clamping in its class

It's an achievement of two Sumitomo innovations — a new, hydromechanical rotary shutter design that gives you faster, smoother and more reliable clamping. And new electronics — Direct Digital Control, fully closed loop — that deliver faster response with greater accuracy in mold positioning.

The result: dry cycles up to 38% faster and mold open/close accuracy +/- 0.1 in. even at high speeds. Plus greater savings in energy costs.

Greater flexibility by design

Easier mold change, increased production flexibility and capacity translates to your competitive advantage. That's why the SHC has wider platens with increased horizontal tie bar spacing and a large capacity injection unit.

Every operator a 'Pro', every mold protected

Every feature of the new N-VII control says 'operator friendly.' From its 10.4 inch, full-color, flat screen to the scores of ease-of-use features, the N-VII helps any operator run the SHC with confidence.

And say goodbye to inappropriately changed settings or mold damage due to operator error. The N-VII's 2-level Password Protection and new Fail Safe Mold Protection features virtually eliminate these problems.

End-to-end reliability — Sumitomo style

With the SHC, you get Sumitomo advanced engineering, rugged construction and ISO 9001 certified manufacturing that add up to unsurpassed machine reliability.

Plus an end-to-end, 24/48 month warranty covering everything except filters, fuses and bulbs. And all the advantages of Sumitomo processing assistance, training, field service, parts availability and financing.

The SHC Series. General purpose machines that deliver higher performance and improved productivity at an even more affordable price.

That's a redefinition of general purpose in anyone's book. *And it's what advanced technology should be.*

The Injection Unit

Improved injection performance

The improved precision and shot-to-shot repeatability of the SHC's injection unit are due to many Sumitomo engineering innovations and added features.

Screw positioning, now settable to .001 in., is just the beginning.

SH100C to SH160C machines feature a Fine Flow Control (FFC) screw assembly. Using the same technology proven effective on the SGM Series, the FFC provides superior pressure transmission and easier color change.

Improved plasticizing without time-consuming adjustments is made possible by the new, selectable Auto Slow Down mode. This easy-to-set program automatically reduces the rotation speed at the end of plasticizing to ensure optimum stroke accuracy and stability without hampering cycle time. A 2-step slow down is also available with precision settings to .001 in.

The SHC's new PID temperature control capabilities also contribute to optimum melt conditions, regardless of changes in the molding environment. With 6 barrel zones settable to .1°F and sampling every 2 seconds, this new PID system shortens heat up time and provides higher precision temperature control.

Programmable switchover from velocity to hold — now selectable by position, time or pressure — is another standard feature that enhances precision filling of the cavity.

These features, working together with the SHC's new closed loop hydraulics, rewrite the specs for stable, precision injection performance among general purpose machines.

The Hydraulics

Increased capacity and flexibility

Designed to increase your production capacity and flexibility, the SHC comes with a large injection unit and the power to back it up. There are also new, standard features, such as High-Resolution Low Speed mode and the capability for intrusion molding, that make the SHC adaptable to molding a wider range of products.

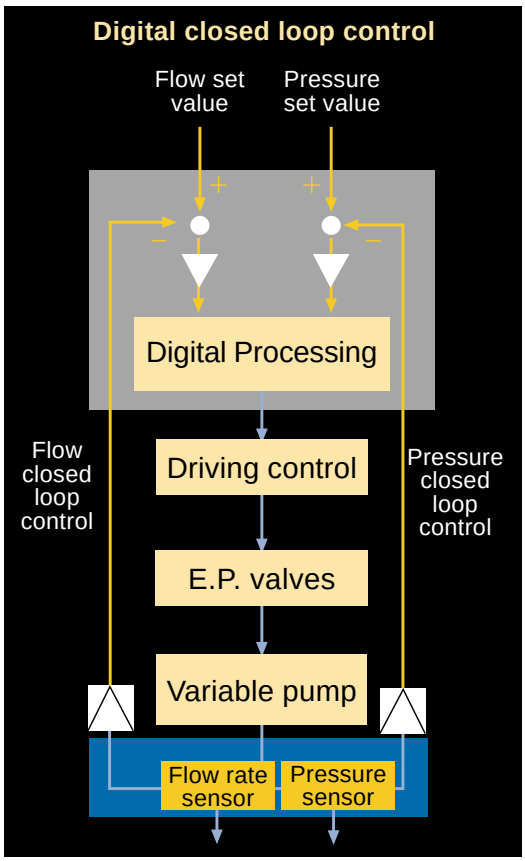
Ease of maintenance

The oil cleaner, oil cooler and electric motor are now externally mounted for easy inspection and maintenance. Other ease-of-maintenance features include: location of the pull-in cylinder under the injection unit, swing-away control panel and improved access to the nozzle and screw, selectable Auto Purge, and on-screen displays of the inspection guide, I/O check, and maintenance log.

Improved hydraulic system stability

A higher level of hydraulic system stability is achieved by Sumitomo's new Triple Pump System (TPS) with Direct Digital Servo (DDS) control technology (Patent Pending).

The Triple Pump System consists of a variable volume pump and two fixed delivery pumps. The variable volume pump is the main driving source of the actuators. Stable pilot pressure is fed to the variable volume pump by the first fixed pump. Mold clamping force is supplied by the second fixed pump for superior stability compared with systems using a check valve.



The Direct Digital Servo control technology detects flow rate and pressure of the variable volume pump as digital values, compares the values with the set values, and provides closed loop control through the feedback circuits. The speed and precision of this new system improves:

- Injection control (linearity) from low (1%) to high velocity
- Responsiveness at injection start-up
- Shot-to-shot repeatability

An in-line filter and an externally-mounted, 3-micron bypass oil cleaner ensure longer service life of the hydraulic oil and reliable operation.

The Clamp

The Clamp

Start with a field proven hydromechanical clamp design. Add an improved rotary shutter system and electronic Direct Digital Control of mold open/close. Then add wider platens, an array of innovative mold protection features and hydraulically-driven mold height adjustment.

It's the SHC's clamping system. And compared with other general purpose machines, it gives you:

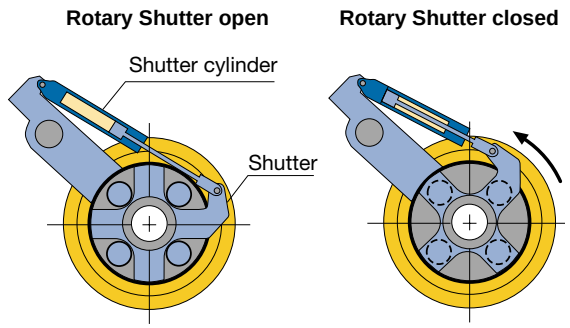
- Higher precision positioning and timing
  - Mold open to +/-.01 in.
  - Mold protection to .001 in.
  - Clamp and ejector timer to .01 sec
- Smoother, faster mold open/close with a 20-38% drop in dry cycle time
- More reliable, energy efficient operation
- Greater production and applications flexibility
- Superior mold protection due to increased precision and reduced operator error

Hydromechanical clamp operation

The SHC's hydromechanical clamp gives you the 'best of both worlds.' The separate mold height adjustment and faster operation of toggle clamps. Plus the precision control of tonnage and low pressure mold protection of direct hydraulic clamps.

First, high pressure oil is fed to the auxiliary cylinders to advance the moving platen. The rotary shutter quickly rotates 45° to provide a solid column with the guide bars and moving platen. High pressure oil is fed to the main "pancake" hydraulic cylinder to build tonnage. The rotary shutter opens and oil is fed to the auxiliary cylinders to retract the moving platen.

The relatively small volume of oil in the main hydraulic cylinder: reduces time to increase/decrease clamp pressure; lowers oil flow resistance and packing resistance for greater energy efficiency; and lowers hydraulic oil requirements.



The two position (open/closed) rotary shutter rotates on a central axis. The new design's fast, smooth and reliable operation means faster dry cycling.

Long-term, reliable operation, even at high speeds, is ensured by the precision linearity of the 4 guide bars and the clamp unit's high rigidity and durability.

Direct Digital Control

The SHC's Direct Digital Control technology provides several key advantages. Mold open/close is faster — as much as 1 second faster — smoother and more accurate. Position setting for mold clamping is now .001 in. That means no banging, even at high speeds. And mold open stop position accuracy has been improved to +/- .01 in., an important factor for take-out robots and 3-plate molds.

Fail Safe Mold Protection

In addition to Direct Digital Control, the SHC includes many other mold protection features. "Pop-up" screens help avoid operator errors. Plasticizing stroke monitoring, auto-conversion to standby temperature, auto or semi-auto startup mode, and mold open position monitoring are just some of the features that protect your mold and your bottom line.

24/48 Warranty

Warranties say a lot about a manufacturer's belief in the quality and reliability of their machines. The 24/48 Warranty is a testament to the strength of Sumitomo's belief in the quality and reliability of the SHC.

The 24/48 Warranty is reprinted here in it's entirety:

"
- 48 months for Sumitomo-designed and/or manufactured components except melt-stream components.
- 24 months for melt-stream components, including screw and barrel, non-return valve assembly, barrel and nozzle heater bands and thermocouples.
- 24 months for Sumitomo-purchased components including: hydraulic, pneumatic, and lubricating parts; printed circuit boards; and electrical components. Excluded components are filters, fuses and bulbs.

This warranty covers repair or replacement made necessary due to defects in materials or workmanship. It does not cover normal wear, corrosion, damage, machine modification, misuse, and improper or insufficient maintenance.

Repair labor, including travel expenses, will be provided for warranty-covered repairs or replacement for the the first 12 months after the machine is delivered."

Only the most reliable machines can carry a warranty as straightforward and comprehensive as this. *And it's what advanced technology should be.*

The N-VII Control

Injection analysis

The Analysis Screen displays velocity, pressure and screw position graphs based on 10 parameters, selectable 4 at a time. In addition to assisting you with quality control, this screen helps you analyze initial molding conditions and results from changes in process parameters.

The SHC's new, fully remote N-VII control is designed to increase your productivity.

With the N-VII's improved precision capabilities, for example, you can achieve screw position control to .001 in. And minimum velocity control down to 1% — the lowest in the industry.

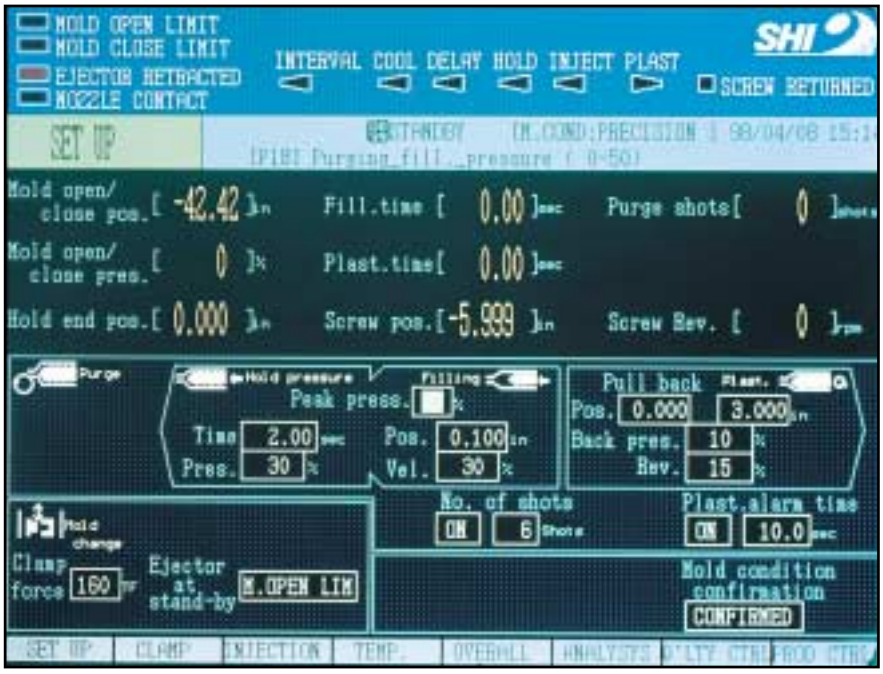
The QC function allows monitoring and control of 10 variables plus multi-function production control.

Another new feature is Sumitomo's unique Fail Safe Mold Protection function. "Pop-up" screens ensure the proper sequence of operation, reminding the operator to: change the molding conditions if the mold has been replaced, check for over packing, or purge the plasticizing unit.

This feature, combined with the N-VII's new 2-level Password Protection, virtually eliminates costly mold damage due to operator error and gives you more control of the production process.

Ease-of-use features of the N-VII include:

- Ergonomic positioning of the control panel
- Large 10.4 in., color LCD screen with high intensity graphics
- Instant access to commonly used screens
- Screens formatted for fast, accurate reading
- Internal memory storage of 40 setups (plus 20 setups per optional memory card)
- Screen-prompted setup assistance and auto-programming of initial molding conditions
- Standard English units (metric available)
- Printer connection for screen and data printouts



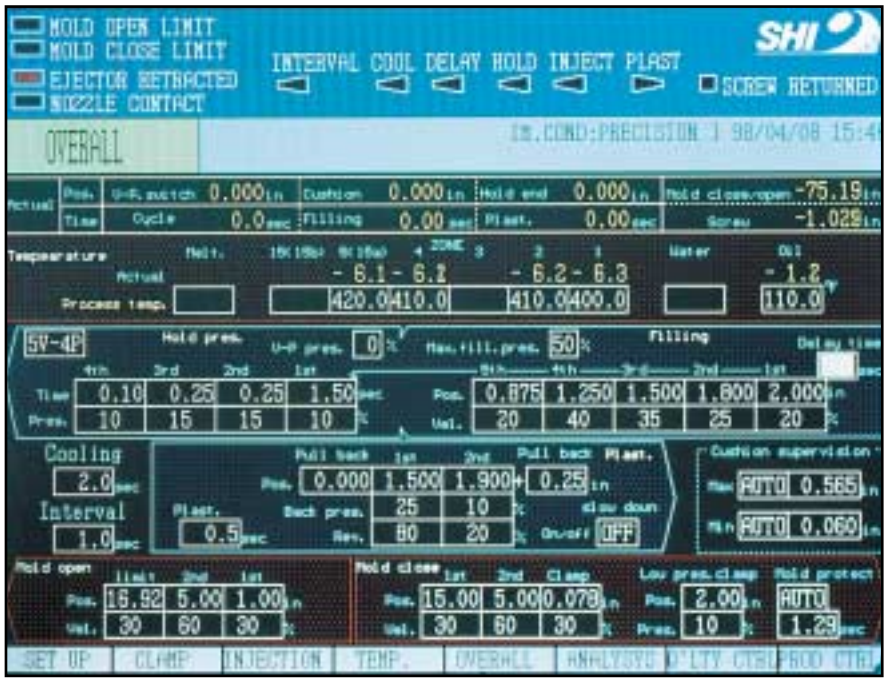
Easy setup with mold protection

Machine setup couldn't be easier on the SHC. From setting up Auto Purge and clamp tonnage, to innovative mold protection features.

The Setup Screen's new Mold Condition Confirmation requires the operator to confirm, prior to running the machine, if the mold has been changed or new molding conditions have been downloaded.

Selectable Auto Short Shot, another new feature, decreases hold pressures by 50% to avoid over-packing on the first shot at machine startup.

There's even auto programming of initial molding conditions, available on a separate screen.



Convenient single-screen overview

The Overall Screen is a standard feature of the SHC's control system. All the main settings are combined and clearly displayed on this single screen.

Data from the temperature, injection and clamp screens are available at a glance, allowing the operator to set and change conditions without switching to other screens. And because of its convenience, many operators choose to run the machine from this screen.

The Overall Screen also permits quick setup of similar applications.

What advanced technology should be.

More precise temperature control

Improved precision PID temperature control to .1°F is easy to setup and monitor on the Temperature Screen. The exceptionally fast response combined with up to six zones of barrel temperature control ensure optimum melt conditions.

Selectable profiling

The Injection Screen allows a 2 velocity/2 pressure basic profile or a 5 velocity/4 pressure profile for multi-step injection. The new plasticizing Auto Slow Down function for screw rotation optimization is also selectable from this screen.

Faster and more accurate open/close

Using the Clamp Screen, molders can take full advantage of the improved Direct Digital Control, higher precision settings to .001 in., and three-stage speed control (%). The results: faster, smoother open/close and superior mold protection.

Quality control

The Quality Control Screen allows operators to monitor a full range of machine functions and obtain followup documentation. This screen also provides a quick review of the actual values for the last 50 shots and the average of the last 30 shots.

STANDARD EQUIPMENT

Injection Unit

1. General purpose screw assembly for unfilled resin
2. Fine Flow Control screw assembly (≤ SH160C)
3. Profile program for injection and plasticizing:
   - 2 or 5 injection velocity set points
   - 2 or 4 hold pressure set points
   - 2 screw back pressure set points
   - 2 screw revolution set points
4. Closed loop control of velocity and pressure
5. Digital readout of screw position to .001 in.
6. Injection start delay timer
7. Injection speed selection (standard or low speed mode)
8. V/P switchover control (pressure/time/position)
9. Timers for hold pressure profile to 0.01 sec.
10. Screw pull back before and/or after plasticizing
11. Selectable sprue break with delay timer
12. Auto slow down function for screw rotation
13. Automatic purging program
14. Intrusion molding circuit
15. Screw cold start-up protection
16. Adjustable screw interlock timer
17. PID temperature control of barrel zones
18. Nozzle PID temperature control (≤ SH160C)
19. Digital readout of screw RPM
20. Water cooling jacket temperature indicator
21. Protective purge shield with interlock
22. Injection unit swivel and control panel pivot
23. Single torque range screw drive motor

Clamp Unit

1. Three-stage mold open/close speed control (%)
2. Closed loop control of mold closing and opening
3. Low pressure mold protection setting to .001 in.
4. Digital setting of mold open/close positions to .01 in.
5. Digital setting of mold clamping force
6. Hydraulic ejector with selectable multiple functions
7. Hydraulic ejector forward delay timer
8. Digital setting of hydraulic ejector position and speed
9. Hydraulic ejector forward hold timer
10. Manual mode interlock for hydraulic ejector
11. Movable platen supports (≥ SH220C)
12. Motorized hydraulic mold height adjustment
13. Robot interface circuit (5 in/7 out relay contacts)
14. Standby mode for mold mounting with low clamp speed
15. Operator's door interlocked hydraulically, electrically and mechanically
16. Operator's door with clear PMMA window
17. Emergency stop button on operation side
18. Mounting holes on top of fixed platen for robot
19. Adjustment-free mechanical safety stop bar
20. Grease-lubricated tie bar bushings
21. Central grease lubrication of adjusting die plate
22. Fully implemented ANSI B151.97 guarding

Electronic & Hydraulic Systems

1. Color TFT display (large 10.4 in. high intensity LCD)
2. On-screen operation guide for easy use
3. Auto-programming of initial molding conditions
4. Internal memory of conditions for 40 mold setups
5. Multi-language selection
6. Indicator of current molding cycle phase
7. Logging of last 50 setup changes
8. Real-time readout of actual operating values
9. Graphic display of injection set values vs. actual
10. Running hour meter and shot counter
11. Supervision function monitor for unattended operation
12. PID barrel temperature control setting to .1°F
13. Temperature control for production and standby modes
14. Fast-rise PID response curve for barrel heat up
15. Two second PID cycle for temperature control
16. SSR control circuit for heater bands
17. Hi/Lo alarm monitor of barrel temperatures
18. Logging and display of abnormal functions
19. Product quality control by injection value monitor
20. Production control monitor and completion warning
21. Overall cycle and plasticizing time monitor
22. On-screen operation guide for maintenance
23. On-screen diagnostics and troubleshooting
24. Printer connection port
25. Print screen function
26. Audible warning alarm
26. Oil temperature PID control and readout
27. In-line return filter with bypass alarm
28. 3 micron oil cleaner
29. Suction strainer with blockage alarm
30. Direct Digital Servo (DDS) system with closed loop control of pressure and flow
31. Triple Pump System (TPS) drive system with electronically controlled variable volume pump and two fixed pumps
32. Star-Delta starter for 40hp motor and larger
33. Open machine base with three-way part removal
34. Two closed-circuit water connection lines

NOTE: Specifications subject to change without notice. Machine configurations may be different from those shown in photo. Please consult your Sumitomo representative for details.

OPTIONAL EQUIPMENT

Injection Unit

1 Wear/corrosion resistant screw/barrel assembly
2 SF sub-flight barrier screw
3 Screw assembly for high-temperature resins
4 High watt capacity heater bands
5 Nozzle PID temperature control (≥ SH220C)
6 High temperature heater control circuit
7 Insulated plasticizing cylinder cover
8 Separate temperature control zone for nozzle
9 Water jacket flow indicator
10 Water jacket PID temperature control
11 Standard type hopper with sight glass
12 Hopper slide mounting plate
13 Sink mark suppression control

Clamp Unit

1 Pneumatic ejection (air blow off)
2 Cavity ventilator (air poppet)
3 Hydraulic core pull circuit
4 Pneumatic core pull circuit
5 Rotating core control circuit
6 Interface for ejected product sensor
7 Adjustable ejector return confirmation signal
8 Mold ejector plate return signal
9 Temporary stop of mold closing
10 Temporary stop of mold opening
11 Two-stage mold clamp force control
12 Hot runner mold open/close signal
13 Moveable platen supports (≤ SH160C)
14 Platen-mounted mold insulating plates
15 Product drop chute (≤ SH220C)
16 Emergency stop button on non-operation side
17 Hydraulic ejection during mold opening
18 Hydraulic mold mounting clamps
19 Guide rollers for loading mold
20 Mold open/close signal for hot runner
21 Ejector protrusion during cooling

Electronic & Hydraulic Systems

1 Two temperature zones for electric mold heat
2 Automatic calendar start-up system
3 Electric power supply receptacles
4 Star-Delta starter for motors less than 40hp
5 Heater band burnout monitor and alarm
6 Hydraulic oil level monitor
7 Electrical circuit breaker leak monitor
8 Cooling water interruption monitor
9 Mold temperature monitor
10 Color feeder signal during plasticizing
11 Production stocker-feed signal
12 Oscillograph connection circuit
13 SPI motion/no-motion key lock switch
14 Two-direction product reject chute (≤ SH220C)
15 Revolving alarm lamp (red)
16 Tower alarm lamp (3 colors)
17 Personal computer connection port (RS232C)
18 Space II mechanism for memory card
19 Memory card for 20 mold setups
20 Waveform and data logging memory storage function
21 Four closed-circuit water connection lines
22 Mold cooling water flow regulator (4, 8 or 12)
23 Cooling water shut-off valve and strainer
24 Monitor for clogged suction filter and pressure gauge for fixed delivery pump
25 Machine leveling pads

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What advanced technology should be.

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