TECHNOLOGY, EQUIPMENT, SERVICE AND SUPPORT

ROBOSHOT S2000*i*-B High-Speed, High-Precision All-Electric Machines. 6 through 385 tons.

POWERLINE NT High-Value All-Electric Machines. 440 to 1125 ton clamp capacities.

MAGNA V Vertical Insert Machines. 30 to 300 tons. Horizontal, shuttle, rotary table models.

K-TEC High Speed Hydraulic Machines. 44 to 500 ton clamp capacities.

MAGNA MTG Advanced Hydraulic Toggle Technology. 170 through 450 ton capacities.

MAXIMA MM Mid-Size 2-Platen Technology. 310 to 880 tons.

MAXIMA MG Advanced 2-Platen Technology. 1100 to industry's largest 6600 tons.

Full line of Auxiliary Equipment, from pellet to part handling.

No other injection molding technology supplier can offer what MILACRON can offer you. In experience, technology, longevity, products and services. We have the broadest product range, with the highest speeds, precision and largest tonnage range in the industry. We're the global leader in all aspects of multi-component-material-color. We offer the best in after-sale technology. Maintenance and operator training. A full range of auxiliary equipment. MRO products and supplies. Around-the-clock replacement parts, service and support. From injection end products to retrofitting and complete machinery remanufacturing. Your single source supplier in a total package.

MILACRON

Milacron Inc. Milacron Marketing Company
4165 Half Acre Road Batavia, Ohio 45103
T 513-536-2000 F 513-536-2624 www.milacron.com

ROBOSHOT S2000*i*-B

THE *ROBOSHOT S2000i-B* SERIES
INJECTION MOLDING MACHINES

PRECISE ALL-ELECTRIC TECHNOLOGY

FEATURES AND BENEFITS

6 ▪ 17 ▪ 33 ▪ 55 ▪ 110 ▪ 165 ▪ 275 ▪ 330

MILACRON-FANUC

ROBOSHOT S2000*i*-B

ALL-ELECTRIC PERFECTION

Roboshot S-2000i 165B

Roboshot S-2000i 55B

Roboshot S-2000i 110B

Roboshot S-2000i 275B

Roboshot S-2000i 330B

THE NEW 55, 110, 165, 275 AND 330 TON MODELS IN THE ROBOSHOT S-2000*i*B SERIES.

The next generation of Artificial Intelligence in injection molding machines. With even higher precision and reliable molding capabilities than before. The NEW 55, 110, 165, 275 and 330 Ton Models in the ROBOSHOT S-2000*i* B Series.

NEW CLAMP DESIGN

- New high rigidity 2 piece moving platen
- Wide platens for larger molds with multi cavities
- **See page 3**

NEW INJECTION DESIGN

- New high rigidity, lower friction injection unit
- New high precision and high resolution digital load cell
- New increased injection rate option on 55 and 110 ton models
- **See page 4**

NEW ADVANCED CONTROL

- New high speed and high precision CNC Model
- 310iS control and servo technology
- **See page 5**

INTEGRATED ROBOTICS (OPTIONAL)

- Integrated SR Mate molded part unloaders available
- **See page 13**

PRECISE PROCESS CONTROL

- Fast Feed Forward (FFF) Instantaneous Servo Acceleration for improved high speed filling of thin wall parts
- V-P (injection-packing) Switching Control
- HR Control for up to eight possible modes for pressure response from injection to pack per individual process requirements
- **See pages 6 and 7**

ARTIFICIAL INTELLIGENCE

- AI Mold Protection
- AI Ejector
- AI Pressure Profile and Trace Control
- AI Metering Control
- **See page 8**

NETWORKING

- MOLD 24i Data Management
- Optional Resin Characteristic Evaluation System
- **See page 9**

QUICK SPECS

ROBOSHOT S-2000*i* 55B

Clamp Tonnage US tons	55 tons standard		71.5 tons optional	
Minimum / Maximum Mold inches	5.9 - 13.8 standard		7.9 - 15.8 optional	
Tie Bar Spacing (h x v) inches	14.2 x 12.6			
Platen Size (h x v) inches	19.6 x 18.5			
Injection Shot Size (oz)	0.78	0.95	1.68	1.95
Maximum Injection Rate (cu in/sec) standard	6.33	7.65	10.69	12.4
Maximum Injection Rate (cu in/sec) optional	9.58	11.6	16.2	18.78

ROBOSHOT S-2000*i* 110B

Clamp Tonnage US tons	110 tons standard			137.5 tons optional		
Minimum / Maximum Mold inches	5.9 - 17.7 standard			9.9 - 21.7 optional		
Tie Bar Spacing (h x v) inches	18.1 x 16.1					
Platen Size (h x v) inches	26.0 x 24.0					
Injection Shot Size (oz)	0.95	1.68	1.95	3.42	4.87	6.02
Maximum Injection Rate (cu in/sec) standard	7.65	10.69	12.4	16.19	20.49	15.33
Maximum Injection Rate (cu in/sec) optional	11.6	16.2	18.78	24.53	31.05	N/A

ROBOSHOT S-2000*i* 165B

165B Clamp Tonnage US tons	165 tons standard			198 tons optional		
Minimum / Maximum Mold inches	7.8 - 19.3 standard			11.8 - 23.2 optional		
Tie Bar Spacing (h x v) inches	22.0 x 20.0					
Platen Size (h x v) inches	31.5 x 29.5					
165 B Injection Shot Size (oz)	4.01	5.08	6.27	8.9	10.59	14.89
Maximum Injection Rate (cu in/sec)	16.19	20.49	25.3	30.61	36.43	42.76
165 B Micro Injection Shot Size (oz)	0.95	1.68	1.95	3.42	4.87	
Maximum Injection Rate (cu in/sec)	7.65	10.69	12.4	16.19	20.49	

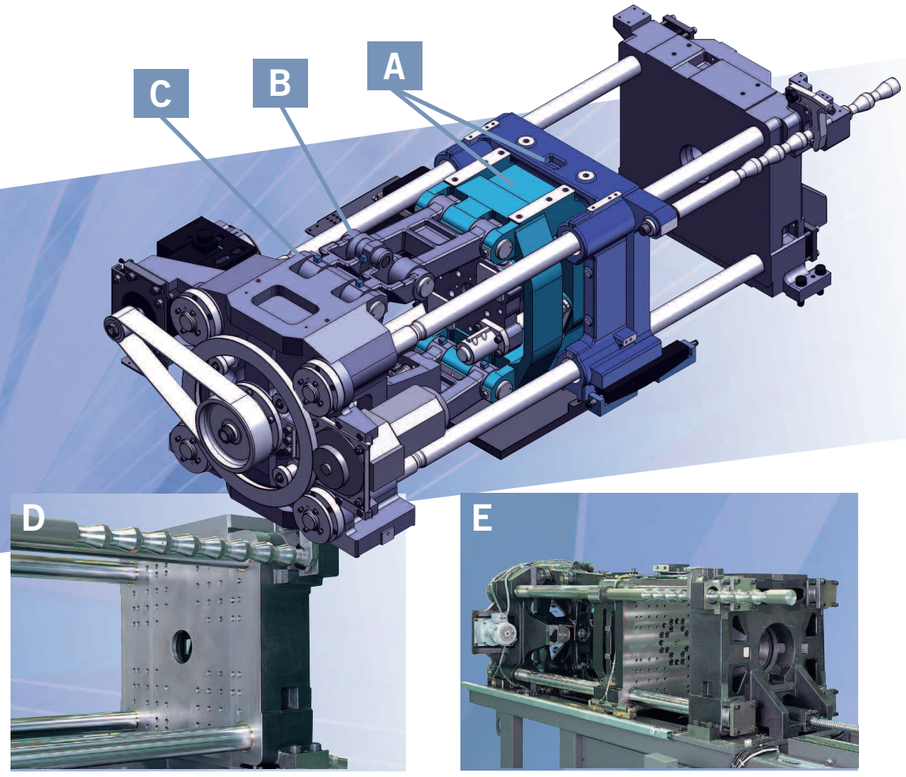
ROBOSHOT S-2000*i* 275B

275B Clamp Tonnage US Tons	275 tons standard			300 tons optional		
Minimum/Maximum Mold Inches	11.8 - 25.6 standard			15.7 - 29.5 optional		
Tie Bar Spacing (h x v) inches	28.0 x 25.0					
Platen Size (h x v) inches	40.6 x 37.8					
275 B Injection Shot Size (oz)	4.01	5.05	6.27	8.9	10.59	14.69
Maximum Injection Rate (cu in/sec)	16.19	20.49	25.30	30.61	36.43	42.76

ROBOSHOT S-2000*i* 330B

330B Clamp Tonnage US tons	330 tons standard				385 tons optional			
Minimum / Maximum Mold inches	11.8 - 25.6 standard				15.7 - 29.5 optional			
Tie Bar Spacing (h x v) inches	31.9 x 28.0							
Platen Size (h x v) inches	44.5 x 40.6							
Injection Shot Size (oz)	6.27	8.9	10.59	14.69	21.29	27.81	31.4	35.2
Maximum Injection Rate (cu in/sec)	18.4	22.27	26.5	31.1	36.07	47.11	53.18	49.68

RIGID 2-PIECE WIDE PLATEN CLAMP



RIGID 2-PIECE WIDE PLATEN DESIGN

A Rigid 2-piece moving platen

B 10-pin toggle assembly enables fast clamp action.

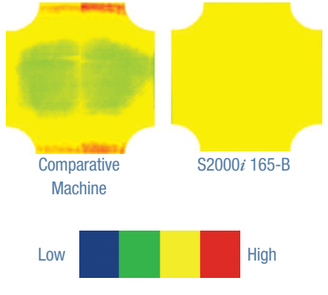
C Reliable wishbone linkage ensures even pin loading and rigid transfer of force.

The horizontal distance between tie bars **D** has been extended to accommodate wider, multi-cavity molds as well as larger, more complex molds. The wider platens also make mold setup easier.

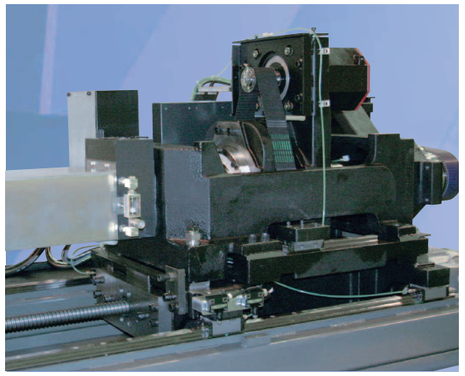
The moving platen now incorporates a new 2-piece structure designed to reduce platen deflection. **E** The 2-piece design suppresses even the slightest deformation of the platen by concentrating the clamping force of the toggle mechanism into the center of the platen. Uniform clamping force applied to the center of the mold assures quality part production. **F** Increased tonnage and maximum mold height are available as options.

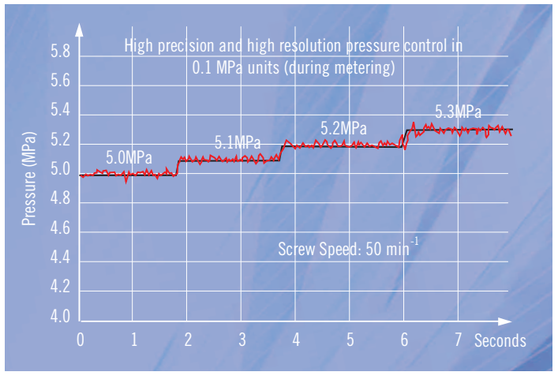
F Mold surface pressure distribution

Surface pressure variations reduced 70%



INJECTION PERFORMANCE





HIGH PERFORMANCE INJECTION UNIT

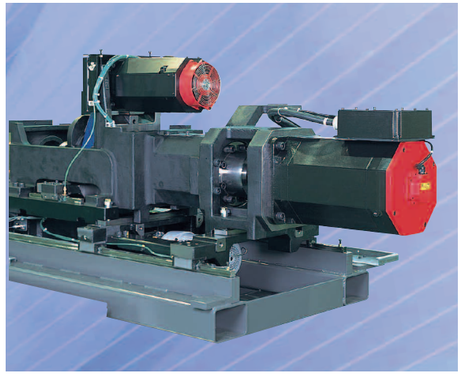
The S2000i-B Series injection units have been engineered for greater rigidity.

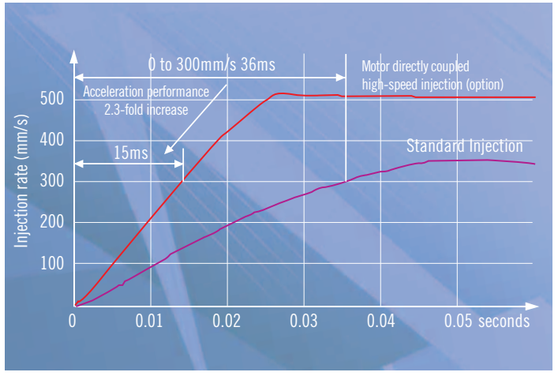
RIGID, LOW FRICTION INJECTION UNIT

A new low-friction guide-bar-less design on 55- and 110-ton models is optimized for the higher acceleration loads and faster cycles required for thin-wall molding.

A new high precision, high resolution digital load cell ensures quality molding through precision pressure control without influence by outside noise.

The highly rigid and low friction injection unit combined with the precise, high resolution digital load cell results in fast injection response and precise pressure control required in precision molding.

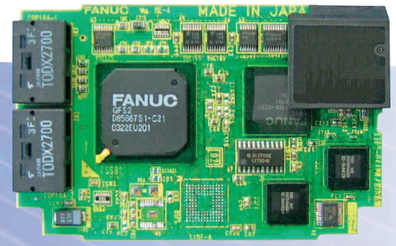




DIRECT CONNECTION HIGH SPEED INJECTION OPTION

An optional new direct-connected, (55 and 110 ton only) high output, low inertia injection servo motor provides even higher speed injection. Capable of achieving a 500mm/sec speed in less than 30msec, accelerating with a force of 2.02G, for producing ever-thinner part walls.

PRECISE 310iS CONTROL



ROBOSHOT'S 310iS CONTROL

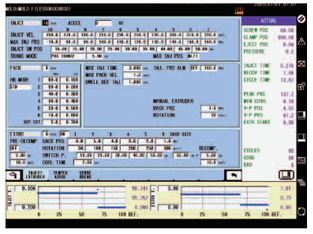
This latest generation of CNC controls incorporates high-speed parallel processors with 64-bit technology. With a sampling time of 1/16,000 second in combination with the latest servo technology, ROBOSHOT offers the highest level of precision position, speed and pressure control necessary for precise, repeatable molding.

The 310iS Control is equipped with

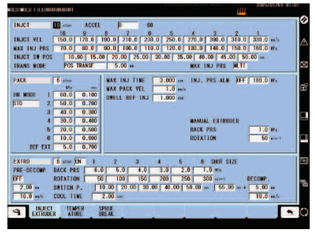
- Windows CE™ display operating system
- PCMCIA memory card slot for additional functions
- Ethernet connection for Mold 24i Network
- Printing to memory card
- Storage of 300 mold files

The 310iS is optimized for "lights-out" manufacturing, including

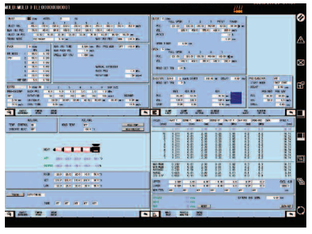
- Shutdown sequence with selectable operation modes
- Configurable inputs and outputs
- Automatic purge



Simultaneous display of settings and monitor screens



Display with one screen maximized



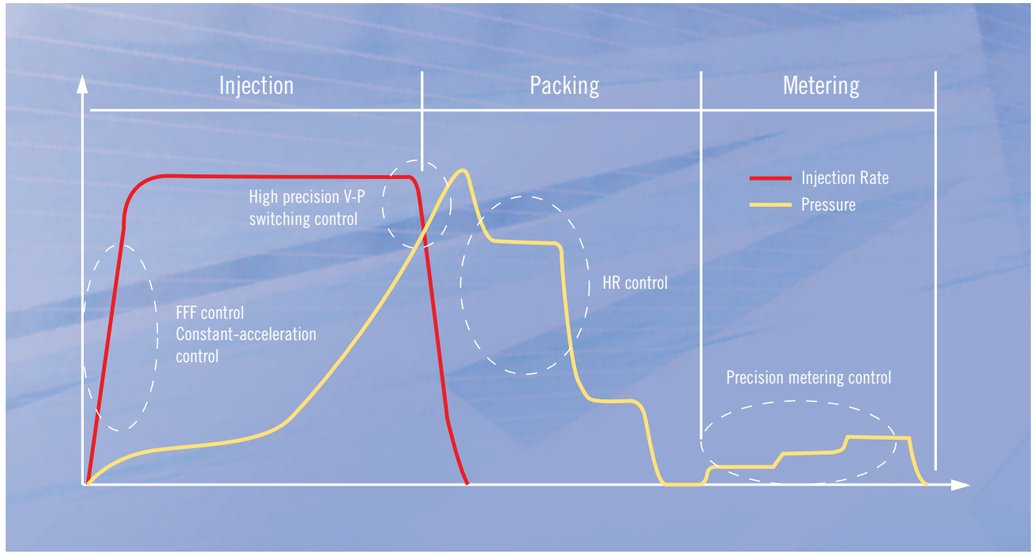
Split screen simultaneous display of four screens for maximum, comprehensive data viewing

LARGE, EASY TO USE CONTROL SCREEN

- 15 inch full color LCD display with 1024 x 768 resolution
- Touch screen operation
- Screens are optimized for easy and intuitive use by the operator.
- Screen images can be stored on a standard commercial memory card as a bitmap file.
- Enables the operator to select between three display patterns with a touch of button, giving him visibility of critical data in various screen combinations.

ROBOSHOT S2000i-B

PRECISION PERFORMANCE



FAST FEED FORWARD (FFF) CONTROL

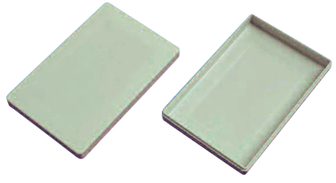
FFF Control makes full use of the latest servo technology by increasing the acceleration capability of the servo motor instantaneously for high speed filling of thin wall parts.

CONSTANT ACCELERATION CONTROL

Constant Acceleration Control enhances the stable molding of precision parts such as narrow-pitched electrical connectors. When molding such parts it can be difficult to set high injection rates to prevent burned resin and air entrapment. With Constant Acceleration Control, even at medium to low injection rates, the slope is the same as that for the maximum rate.

HIGH PRECISION V-P SWITCHING CONTROL

V-P (Velocity-Packing) switching is a precise, high speed control feature with a sampling period of 62.5µs (1/16,000 second) and a new control algorithm for detecting the screw position and pressure. V-P switching control benefits injection transfer and reduces part weight variations.

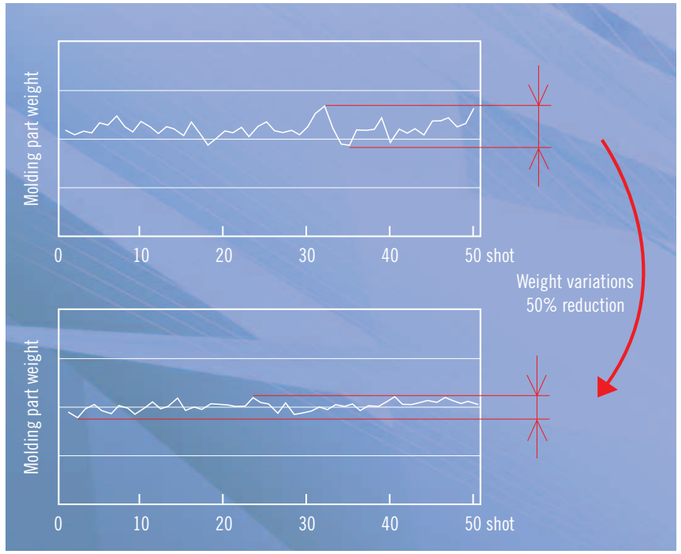


Cell phone battery case
Resin: polycarbonate

Precision and narrow-pitch connectors
Resin: liquid crystal polymer

DVD pickup lenses
Resin: COP

PRECISION PERFORMANCE

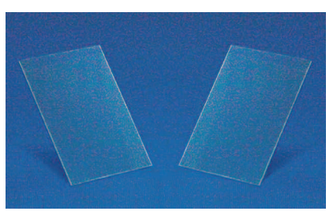


PRECISION METERING CONTROL

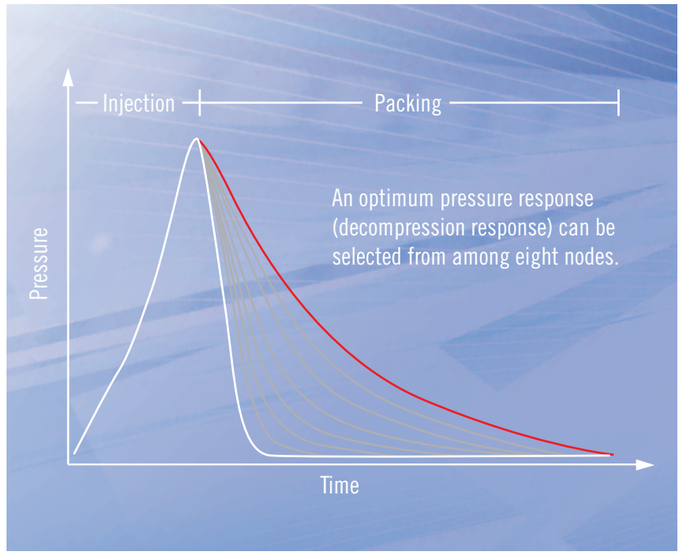
The combination of high precision and high resolution digital load cell along with the low friction injection unit provides stability a repeatability of quality molded parts. Variations in resin pressure are suppressed at the end of metering, thereby stabilizing metering density.

HIGH RESPONSE CONTROL

HR Control enables you to select from eight different modes for the pressure transfer from injection to pack for optimum molding of the part. For thick wall parts, HR Control excels in the prevention of sink marks. For thin wall parts, HR Control prevents warps and improves the uniformity of wall thickness.



Cell phone optical light guide panel
Resin: polycarbonate



ARTIFICIAL INTELLIGENCE

AI MOLD PROTECTION

If an abnormal load is detected during clamp closing, AI Mold Protection brings the clamp to an abrupt stop to protect the mold from damage.

Alarm bands can be set for up to three protection detection levels. AI Mold Protection can be used to detect mold guide pin and slide core failures as well as un-ejected parts or runners.

AI EJECT

AI Eject measures the ejector motor torque and compares it to the memorized signature torque profile. An alarm band limit can be set to detect a fault during ejection. AI Ejector detects the separation of the molded parts as they are ejected and brings the ejector to an immediate stop if the peak separation force exceeds the AI Eject Monitor level. This feature protects the mold and machine from excessive force and can be used to detect unfilled conditions.

AI PRESSURE PROFILE TRACE CONTROL

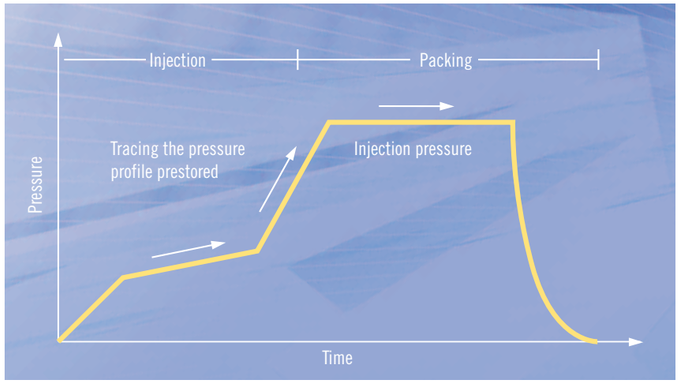
AI Pressure Profile Trace controls the injection packing process by first tracing the recorded pressure profile of an optimally molded piece and storing with the mold file. During production, profiles tracing outside the optimal profile can indicate screw tip leakage or barrel wear. Pressure curve “cloning” between machines can be accomplished. Real time cavity pressure can also be traced.

AI Mold Protection: Clamp closing action is instantaneously stopped upon sensing a jammed molded part.

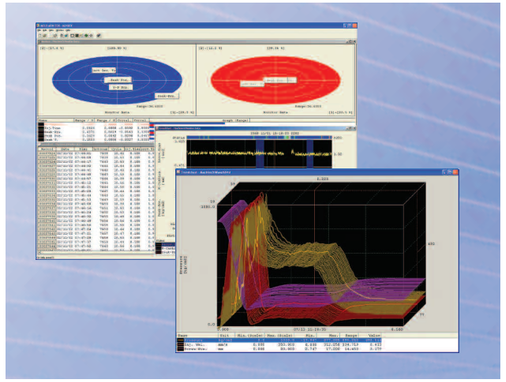
Conventional Mold Protection: Conventional stopping of clamp closing action upon detection of jammed molded part.

AI METERING CONTROL

AI Metering Control captures the optimal recovery rate signature and automatically adjusts the feed screw RPM to maintain melt residence time. This feature can compensate for problems with inconsistent regrind resin blends and pellet size variation. Back pressure is not affected.



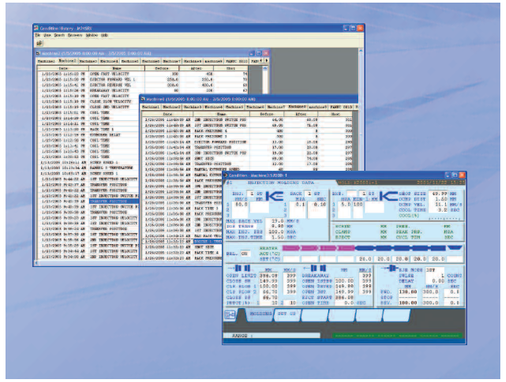
MOLD 24i NETWORKING (OPTIONAL)



QUALITY RADAR

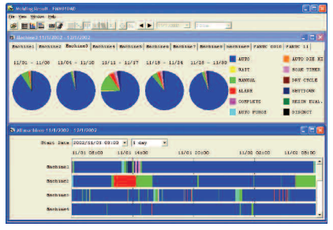
Visually displayed radar charts provide easy understanding of monitored data trends and variations.

- Monitors 40 items or more for up to 1.2 million cycles. Assists in analyzing variations in data between production lots and factors contributing to production problems.
- Displays pressure and speed waveforms in three dimensions to check process stability in detail.



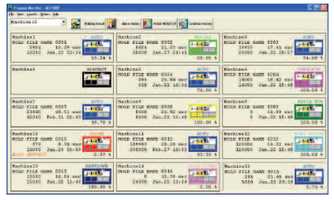
MOLDING PARAMETER CHANGE LOG

History screens displays each time molding parameters are changed. It is possible to reproduce and display the molding conditions at a specified time. Additionally, the molding parameters can be downloaded to the machine as a back-up to the set-up.



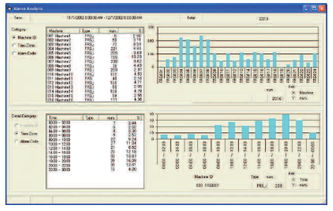
RUN HOUR ANALYSIS

Run time and production data count is automatically sampled and graphically displayed using easy to understand charts.



PROCESS MONITOR

The operation state of the **ROBOSHOT** can be grasped at a glance. Running status of each machine is visually displayed on one screen.

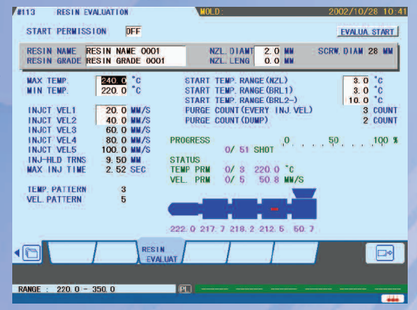


ALARM LOG

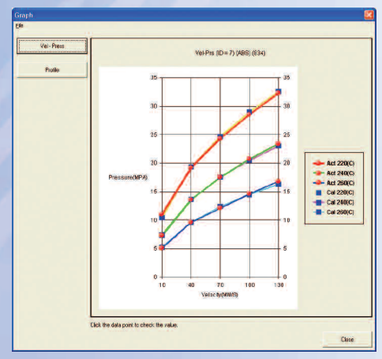
The alarm log per machine is automatically sampled and graphically displayed using charts.

RESIN CHARACTERISTICS EVALUATION (OPTIONAL)

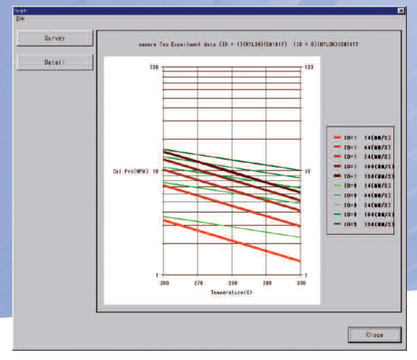
A



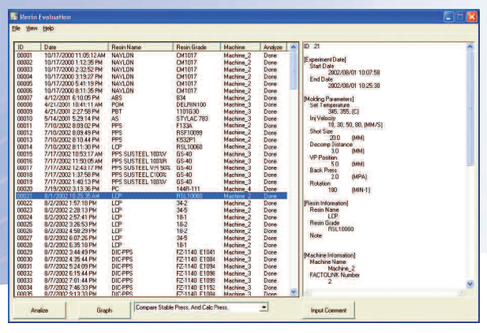
B



C



D



RESIN CHARACTERISTICS EVALUATION (OPTION)

By using the ROBOSHOT as a measuring instrument and the MOLD24i as a data collection and analysis unit, it is possible to measure the viscosity of resin.

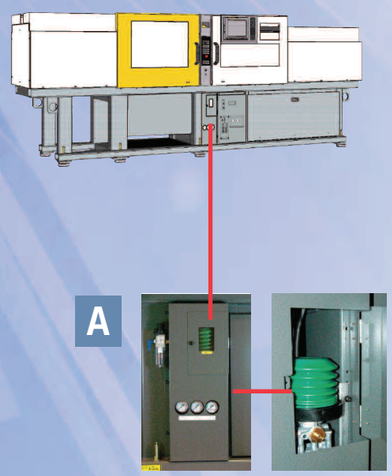
Measurement is automatically conducted merely by setting measurement conditions in the ROBOSHOT control. **A** Measurement results are automatically transferred to the MOLD24i for analysis. **B**

It is possible to accurately analyze molding problems attributable to resin, such as variations between resin lots and the difference in viscosity between recycled and virgin materials. **C** The results can be used as indexes for problem solving.

Analysis results can be stored in the resin database of the MOLD24i. **D**

ROBOSHOT S2000*i*-B

LUBE AND OPTIONS



CENTRALIZED LUBRICATION SYSTEM

An independent 3-path centralized greasing system manages the proper lubrication amounts and intervals as they are pumped to the mechanical sections of the ROBOSHOT.

The grease pump is mounted inside the cover under the operator's panel, A making it easy to replace the grease cartridge.

Fault conditions are detected automatically. This new design uses three separate lubrication frequencies for the clamp and injection unit.

COMMON OPTIONS

- Air ejector
- Flashing light (3 or 4 colors)
- 110V receptacle
- 220V receptacle
- Mold heater
- Core signal interface plug
- Water manifold
- High wear injection packages
- Klearstar polycarbonate injection package
- Liquid silicon rubber
- Heater disconnect detect
- Simultaneous metering/mold opening
- Decompression
- Camera/monitor interface
- Quality sampling

AUXILIARY EQUIPMENT

Milacron's extensive experience in injection molding machines and processes enables us to provide you full system solutions for your complex molding production challenges. Our machinery and system services range from single cell injection molding machines with basic automation to complete plant systems. Milacron's products and services extend from the planning phase through production start up.

- Material conveying, storage, drying and blending systems
- Integrated heat transfer systems
- Mold changing and mold clamping systems
- Robotics and conveyor systems
- Degating, assembly and other secondary operation systems

ROBOSHOT S2000*i*-B

HIGH PERFORMANCE, APPLICATION SPECIFIC OPTIONS

The ROBOSHOT S-2000*i*B Series offers a wide selection of injection units and screw geometry. This means application specific solutions for every material formulation and plasticizing rate, including:

- High performance, high throughput
- Lower melt temperatures
- Better mixing and homogenization
- Wear resistant protection

WEARSTAR

Ultra high wear resistance package including super-alloy feedscrew plus super-wearing alloy barrel and screw tip.

MELTSTAR II

High speed, high throughput, superior mixing without shear and without sacrificing recovery or cycle time.

KLEARSTAR

Lubricity properties and corrosion resistance for optimal processing of polycarbonate without black specks.

PVCSTAR

Anti-corrosive package of feedscrew, smear-head tip and end cap eliminates all corrosive effects of PVC/CPVC processing.

HIGH PERFORMANCE NON-RETURN RING VALVES

4-Piece spinner valve

- High speeds, fast cycles
- Rapid color change

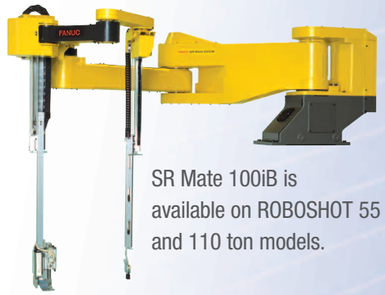
4-Piece ring valve

- Self-cleaning design
- Optional high wear components

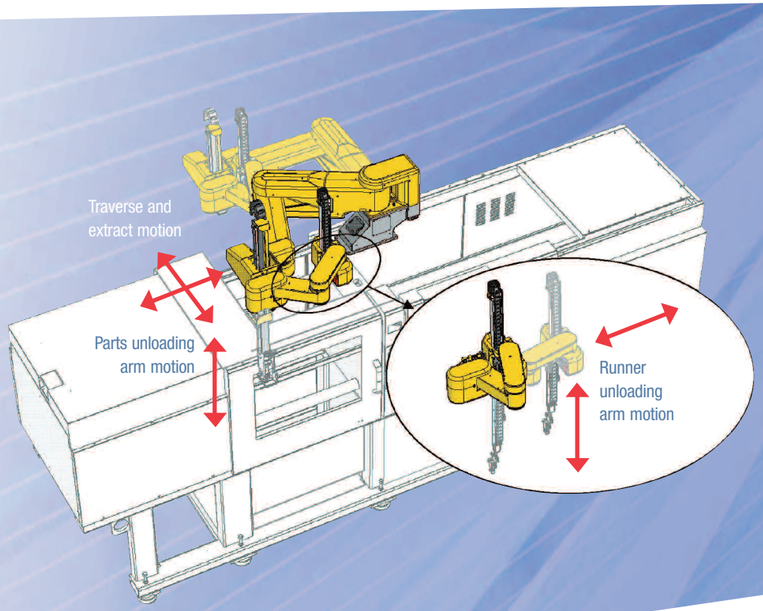
3-Piece Valve

- Optional short stroke – free flow design
- Available in CPM9V or D2 tool steel

SR MATE ROBOTIZATION



SR Mate 100iB is
available on ROBOSHOT 55
and 110 ton models.

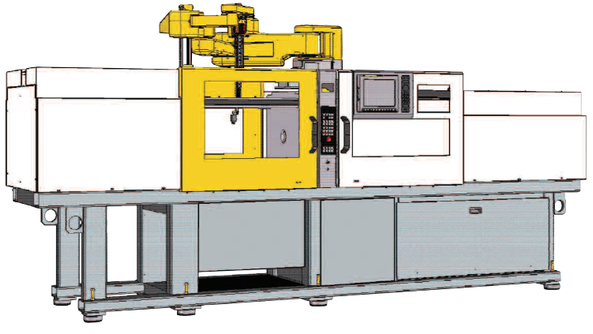


SR Mate 200iB is
available on ROBOSHOT 165,
275 and 330 ton models

SR MATE SERIES PARTS UNLOADER

The optional SR Mate is an all-axis servo driven robot for retrieving molded parts on the ROBOSHOT. Developed as the ROBOSHOT's arm, SR Mate features 2-step speed control in its upper and lower axes for high speed in-mold motion.

The SR Mate ships integrated with the ROBOSHOT, eliminating the trouble of mounting, wiring or adjustment at installation.

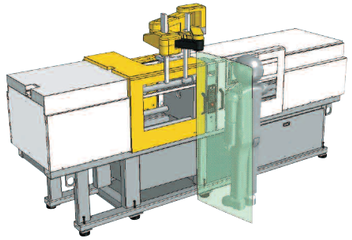


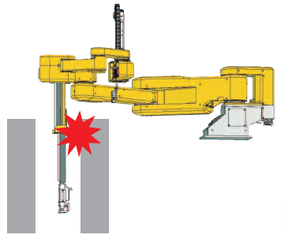
COMPACT UNIT

The SR Mate's low profile enables the ROBOSHOT to be installed in an area with low ceiling clearance.

During a mold change, the arm retracts to the non-operator side to keep the mold change area clear without interference.

ROBOSHOT S2000i-B





OPERATOR SIDE TRAVERSE

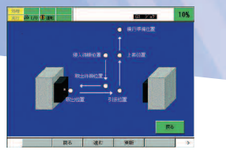
If desired, the SR Mate can unload parts to the operator side of the ROBOSHOT. Convenient for molding condition tuning, for confirming the part quality and for periodical parts sampling. The operator's area and robot arm area can be separated for safety.

ARTIFICIAL INTELLIGENCE COLLISION GUARD

Robot collision can be detected, stopping the robot instantly without a special protection device.

Minimizes potential damage of the mold and peripheral devices during teaching and interference during production.

ROBOSHOT S2000*i* 55B
equipped with SR Mate 100iB



TOUCH PANEL TEACH PENDANT

Easy to understand display with graphics.

Jogging keys are located around the robot outer view, so that even an inexperienced person can jog the arm easily.

International safety instructions are supported.