



**MILACRON®**

**MILACRON-FANUC**  
**ROBOSHOT**



**HIGH-PRECISION, ELECTRIC INJECTION MOLDING**

# MILACRON-FANUC ROBOSHOT

## HIGH PRECISION ELECTRIC INJECTION MOLDING

### INGENUITY, DEDICATION AND COLLABORATION

With the most-available injection unit sizes on a single frame found in the industry, ROBOSHOT gives you the flexibility to handle more applications. ROBOSHOT's movements are entirely controlled by FANUC designed-and-built, controlled servo drives. This not only results in maximized acceleration, but it ensures ultimate accuracy and exceptional reliability across all processes, as well as highly precise motion, position and pressure control.

### SERVICE AND RELIABILITY

Our commitment to safety and quality cannot be matched. Every component in our machines undergoes strict quality assurance testing, and our catalog of parts allows for decreased downtime. These machines are built to last and our technicians have the training and resources to ensure that is does.

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# CNC PRECISION, RELIABILITY AND REPEATABILITY FOR THE MOST CRITICAL APPLICATION

- Largest tie bar spacing and die height in class
- Equipped with the latest FANUC Panel iH-Pro controller with Windows 10 IoT
- VNC compatible to integrate with auxiliary equipment (optional)
- On-board help and search features to improve operator understanding and faster set-up
- Built-in user and maintenance manual and file import capability
- Preventative maintenance schedule and program capability
- Freely programmable core sequencing and I/O mapping
- Lock-down process changes with standard operator ID management and optional range adjustment limit
- Class leading servo motor technology with highest power and torque for stable and superior load-sensitive performance, machine uptime, fewer components, and less wear



# FANUC ROBOSHOT $\alpha$ -SiB series

HIGH-PRECISION, ELECTRIC INJECTION MOLDING

## ADVANCED CLAMP DESIGN

Advanced toggle mechanism incorporating technology for fast cycles, low maintenance and long life



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## ADVANCED ARTIFICIAL INTELLIGENCE (AI)

Lower tool damage risk by using ROBOSHOT's industry-leading AI technology for Mold Protect (Close/Open) and Eject (Forward/Retract) with automatic set-up

PROVIDING THE HIGHEST PERFORMANCE,  
PRECISION AND FLEXIBILITY.

## iH PRO CONTROLLER

- 21.5" HD, 1920 x 1080 Resolution
- 4 Quad Screen Display selection
- Reliable Capacitance Touch Screen

## FLEXIBLE INJECTION CAPABILITIES

The most available injection unit sizes per model in the industry-giving you the most flexibility



## FLEXIBLE CLAMP

Designed for low deflection and generous mold dimensions. Standard long tie bar for maximum stack height. Increased tonnage and high-speed clamp options available

## SUPERIOR MOTION CONTROL TECHNOLOGY

The world leader for precise and stable molding using advanced servo motor/drive performance and high-resolution pressure feedback



# WORLD LEADING CONTROL

Quick access menu, easy to understand lay-out, includes a single simple setting, giving the operator the ability to quickly modify settings with minimal key strokes.

## PREVENTATIVE MAINTENANCE - TRACEABILITY - FLEXIBILITY

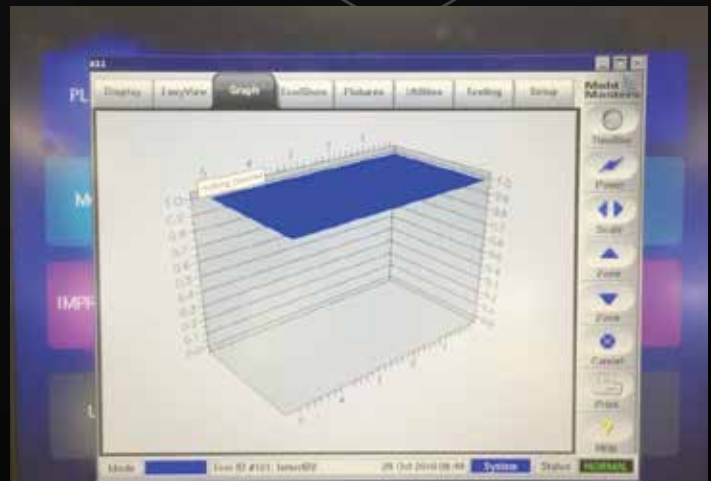
The intuitive visual maintenance interface on FANUC's control facilitates faster recoveries after servicing. The integrated early warning system identifies errors before they occur, ensuring maximum precision and consistent quality standards.

- Built-in user/maintenance manuals with pop-up HELP at each set-point, for easy operator training
- Preventative maintenance scheduling
- 10,000 log including; last change, operation and alarms with 200 operator ID, and optional RFID card reader
- Freely configurable I/O with +300 signals and customize signals using ladder logic like features
- Configurable sequencing for lights-out operation

## VIRTUAL NETWORK COMPUTING (VNC) CAPABILITIES

VNC allows molders to easily integrate their system with:

- Mold Masters Hot Runner
- Milacron Robot
- Other auxiliaries equipped with VNC



## iH PRO CONTROLLER

- 21.5" HD, 1920 x 1080 resolution
- 4 quad screen display selection
- Reliable capacitance touch screen
- Multiple languages and units
- Visualize process controls with graphing
- Download data to USB
- 500 internal mold file storage
- LINKi2 networking for quality control and production monitoring

TWO Ethernet ports



2 USB PORTS

# ROBOSHOT SERIES

The industry standard-setting technology found in the ROBOSHOT Alpha-SiB-series all-electric, injection molding machine is a direct result of over 40 years of partnership and insight between Milacron and FANUC. ROBOSHOT Alpha-SiB-series is the latest generation with advancements in control technology for higher

## Injection Unit Specifications

Model	Euromap Frame	14mm	16mm	18mm	20mm	22mm	26mm	28mm	32mm	36mm
17-iB	50	8	11	18						
33-iB	65	8	11	18	22	27				
55-iB	140	8	11	18	22	27	48	55	72	
110-iB	300HD								97	138
110-iB	300 / 300G		11	18	22	27	48	55	97	138
140-iB	300HD								97	138
140-iB	300 / 300G			18	22	27	48	55	97	138
165-iB	300HD								97	138
165-iB	300	8	11	18	22	27	48	55	97	138
165-iB	700HD / 700G / 700						48	55	114	144
240-iB	700HD / 700G / 700						48	55	114	144
275-iB	900HD, 900						48	55	114	144
330-iB	900HD, 900						48	55	114	144
330-iB	1450HD, 1450									
330-iB	2400									
500-iB	900HD, 900									
500-iB	1450HD, 1450									
500-iB	2400									
500-iB	4560 / 4560L									

## Clamp Specifications

MODEL	TONNAGE	PLATEN SIZE (H X V)
	US tons	mm
S17iB	17	355 x 340
S33iB	33	440 x 420
S55iB	55 (72*)	500 x 470
S110iB	110 (138*)	660 x 610
S140iB	140	730 x 730
S165iB	165 (198*)	800 x 750
S240iB	240	900 x 900
S275iB	275 (330*)	1030 x 960
S330iB	330 (385*)	1130 x 1030
S500iB	500 (550*)	1300 x 1300

\*(Optional)

\*\*\*(Optional/single - platen configuration)




precision and reliable molding capabilities than ever before. Engineered for greater rigidity, ROBOSHOT's proven performance makes it the perfect solution for clean rooms and other molding environments that demand precise process control, high speed injection, and consistent repeatability.

40mm	44mm	48mm	52mm	56mm	64mm	68mm	72mm	80mm	90mm	100mm
171										
171										
171										
171										
171										
171										
178	252	300	416							
178	252	300	416	483						
178	252	300	416	604						
178	252	300	416							
178	252	300	416	604	788	890	998			
					849	1,027	1,228	1,516		
178	252	300	416	604						
		300	416	604	788	890	998			
					849	1,027	1,228	1,516		
						890	998	1,706	2,159	2,665

TIE BAR SPACING (H X V)	MAX DAYLIGHT	MIN/MAX MOLD THICKNESS
mm	mm	mm
260 x 235	420	130 / 260
310 x 290	560	150 / 330
360 x 320	600 / 650**	150 / 350 - 150 / 410**
460 x 410	800 / 900**	150 / 450 - 150 / 550**
530 x 530	970 / 1070**	200 / 570 - 200 / 670**
560 x 510	1015 / 1115**	275 / 675**
650 x 650	1200 / 1300*	250 / 750*
710 x 635	1250 / 1350*	300 / 750* - 300/810*
810 x 710	1250 / 1350* / 1550*	300 / 750* - 300 / 950*
920 x 920	1900	350 / 1000

# CLAMPING UNIT

-  Wide platen and tie bar spacing for greater flexibility
-  Clamp designed for uniform force distribution minimizing platen deflection and reducing mold-flash tendency
-  Automatic die height with closed loop tonnage feedback for adjustment down to 1 US ton
-  Interface with Multi-Servo Driven Cores for oil-free operation allowing higher precision, faster cycle and clean operation
-  AI Mold Protection and AI-Eject protection reduces risk of damaging delicate and expensive molds
-  Minimum clamp force and automatic tonnage adjustment while in-cycle reduces tool wear and improves mold venting
-  Available linear bearing guided platen and stack mold option
-  Available quick mold change systems using magnetic plates or pneumatic clamping systems
-  Optional grease-free tie bars

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# CREATE YOUR MOLDING CELL

RVision fitted to a 6-axis Robot makes an extremely productive alternative to a gantry.

### Quick and easy insert placement

- Reliable visual picking and quality control prior to insertion
- Exact and highly-repeatable insert placement without the need for mechanical guides
- Positional accuracies of +/- 0.02mm

### Visual error proofing

- Integrated vision system, RVision, identifies part errors according to cavity
- Visual identification of part defects or tiny faults
- No revalidation of the production process necessary
- Saves a considerable amount of time
- Only one camera required for multiple cavities



### Part placement and orientation

- FANUC's RVision provides a simple part placement solution
- Inspection of each part on a conveyor
- Automatic identification of the cavity

- Optional advanced FL-Net communications for seamless integration with FANUC robots
- With FL-Net, a single FANUC robot can tend two ROBOSHOTS
- Platen-mounted or floor-mounted robots with varying payload capability

- Core sequence software included
- Custom core sequence included for freely-programmable sequences
- Numerous hydraulic power units available
- Fully-integrated FANUC Servo motor actuated cores available upon request

Core					
Detail	Core set	1 Stop set	Adjust	30.00	==
		2	Sequential1		
	Sign. out.	3 Close set-A	Inj start		
	Continue	4	Sequential3		
	Rev. set				
	On				
	Core pull	1	Sequential2		
		2 Stop pull	Adjust	30.00	==
	Sign. out.	3	Sequential4		
	Stop	4 Open pull-B	Open start		

Servo core					
MOTOR-WA	SET				Torque
CORE-1	Pos.	0.00	0.00	0.00	100 %
Stop	Vel.	0.0	0.0		mm/s
OFF	PULL				Torque
	Pos.	0.00	0.00	0.00	100 %
	Vel.	0.0	0.0		mm/s
	Sv core trq(mold set)	100 %	Actual	0.00	==

# SERVO TECHNOLOGY MAKES THE DIFFERENCE

ROBOSHOT's movements are entirely controlled by FANUC-designed and-built, controlled servo drives. This not only results in maximized acceleration, but it ensures ultimate accuracy and exceptional reliability across all processes, as well as highly-precise motion, position, and pressure control.

## Ⓜ Electrically-driven axes

- Superior FANUC servo motor drive technology
- Accurate / Repeatable / Reliable
- Standard independent motion on all axis
- Available expanded servo operation for cores, rotary table.

## Ⓜ CNC reliability

- 70+ years of superior CNC technology
- CNC motion control accuracy
- Highest performance and reliability
- Industry leading control processing speed

## Ⓜ Industry leading up-time and low maintenance costs

FANUC, synonymous with unparalleled reliability, offers industry leading up-time and low maintenance operation, giving the lowest total cost of ownership.

## Ⓜ World-Class FANUC Servo Motor/Drives Performance



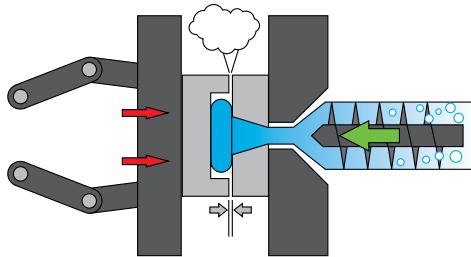
### High-performance injection unit

- Superior injection load sensitivity characteristics
- True cloning of injection processes, even between different models
- Instant acceleration under two-millisecond, with adjustable ramping of both 1st stage velocity and 2nd stage pressure control
- Adjustable Acc/Dec ramping on velocity/pressure
- Servo motor/drives selected for optimum performance with power that exceeds the competition
- High-duty injection performance options available for more demanding applications

### Extremely consistent injection molding

With minimal weight deviation thanks to:

- Precise V-P switchover
- Precise melt pressure control from digital feedback
- Precise temperature control in 0.1 °F steps
- Precise AI pressure profile control
- Precise metering control functions



ROBOSHOT's pre-injection functionality enables the time between the beginning of injection molding and clamping force build-up to be determined freely.

- Ideal for producing of ultra-flat parts and lens molding
- Enhanced mold venting is controlled by injection timing and also available based on pressure or clamp tonnage feedback
- Simple operation with no operator entry or full advance configuration with up to six-steps of control/timing
- Instant cycle time reduction by overlapping of injection and tonnage build and/or clamp force decompression during cooling stage



## Cycle Time Savings

Optimize your cycle time using simple pre-injection function. Typical cycle reduction of 0.3 – 0.7 seconds.





# VERSATILE MACHINERY FOR ALL APPLICATIONS

With models capable of exerting clamping forces from 17 to 550 US tons, ROBOSHOT is ideally suited to a diverse range of straightforward, as well as sophisticated injection molding tasks. Offering huge versatility, ROBOSHOT's unique strength is the freedom it provides you to produce almost anything using just one machine – whether that be delicate items such as, thick-wall

camera lenses, micro-medical, and thin wall packaging products that require high levels of dynamic force to produce. Thanks to its high level of specification, even standard ROBOSHOT machines can be used to produce specialized items such as liquid silicone rubber, powdered metal and ceramic parts.





OPTICAL LENS MOLDING



THIN WALL MOLDING



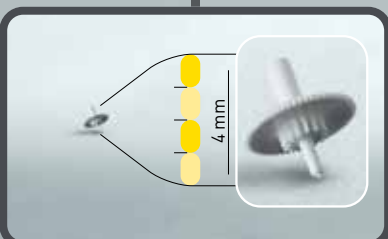
MULTI COMPONENT MOLDING



PRECISION MOLDING



POWDERED METAL / CERAMIC MOLDING



MICRO-INJECTION MOLDING



LSR MOLDING

# AUTOMOTIVE INDUSTRY



ROBOSHOT is ideally suited for the large-scale manufacture of automotive parts. Our machine will continue producing flawless parts over the long term, delivering excellent cycle times and requiring minimum maintenance for maximized uptime. Lights-out operations, custom signals, gas venting – all features contributing to the versatility of the ROBOSHOT controls. Repeatability is also in a class of its own, with the machine delivering exactly the same quality after 30-million cycles as it did on the first shot. We have the capability of providing a complete work cell to encompass all your automation needs, including mold change tables, robots/pickers, conveyors, and more.



## Ultimate flexibility

The ROBOSHOT allows molders the maximum amount of application flexibility with its options for increased tonnage, high speed clamp, and die height position adjustment for faster mold change times. Our machines offer the highest capacity of interchangeable barrels and screws.

## Integrated additional axis capabilities

By using FANUC motors and drives, the ROBOSHOT can fully integrate multiple additional axis all through one control. From Milacron-designed rotary tables to servo cores and additional injection units, the ROBOSHOT has the capability to easily integrate and maintain precise control and movement repeatability.

## Hydraulic and fully integrated servo cores

Automotive parts frequently require cores. For these kinds of applications, ROBOSHOT is also available with hydraulic and fully CNC-controlled servo cores.

## Connectivity and communication

Euromap 63 and 77 communication allows for data to be shared from the ROBOSHOT to a customer's manufacturing execution system.

- Central production monitoring
- Process data capture & extraction
- Machine status visualization
- Customised reports

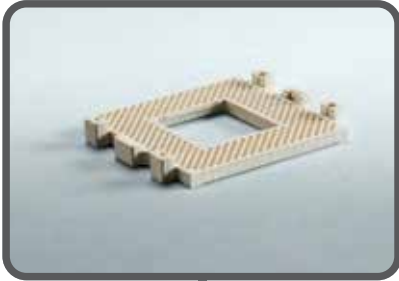


# ELECTRICAL INDUSTRY



ROBOSHOT Precise Metering 3 provides the exact dosing required to produce small high-precision parts, such as liquid crystal polymer connectors for PCB boards. This function checks the volume after plasticizing, automatic V-P and decompression adjustment. Product quality is improved, thanks to the consistent and high-resolution plasticizing back-pressure control, regardless of viscosity. Resulting in superior coefficient variations, dimensional tolerances and elimination.





## Made for micro molding

Offers the largest selection of micro molding machine models using full servo technology with zero oil. Designed to handle typical large tools with small shot sizes for molding the most demanding micro parts.

## High-speed molding capabilities

ROBOSHOT excels in high-speed applications with injection velocities up over 1000mm/s for hard-to-fill applications and engineering resins. High-speed clamp is available for select models, with dry cycle times reduced up to 32%.

## Reduced mold damage

ROBOSHOT's Artificial Intelligent mold and eject protection provides the highest level of sensitivity for the prevention of cavity damage and broken ejector pins.

## Precise insert molding

For processes requiring inserts, ROBOSHOT can be supplemented with a six-axis robot, fitted with iRVision – the product of 30 years of experience in intelligent vision systems. Equipped with this technology, the robot picks and places inserts with an amazing degree of accuracy and repeatability. Perfect for small parts, this solution does not require an external guide or fixing.

## Anti-wear/corrosion injection components

Industry-leading technology for the most punishing applications. When equipped with Milacron's custom-engineered solutions, the life of the barrel and screw can be extended, even when using +40%-filled or highly-corrosive resins.

## Reduced human error

Configurable I/O sequencing, and connectivity to all peripherals, minimizes risks from operator mistakes, resulting in tool damage and defects.

ONE MILACRON, INFINITE POSSIBILITIES

# MEDICAL INDUSTRY



Quality, reliability, and repeatability are critical to plastics processing in the medical industry. Products molded for medical applications are often transparent, making gas venting and changes in viscosity significant issues to consider. ROBOSHOT's highly-sensitive pre-injection process that integrates "smart" AI metering control compensates for variations in viscosity to ensure consistent results, whatever the process may entail. Because ROBOSHOT is equipped with up to seven different screws, manufacturers can easily alter production to accommodate various product types.



## Integrated hot runner control

Featuring up to 96 channels, this function saves time uploading new molds by allowing machine operators to use data and parameters stored in the central monitoring control.

## Quality assurance

For full transparency and superior quality management, ROBOSHOT comes with up to 16 multi-cavity pressure channels, cavity balance monitoring, and historical data collection. To save money, ensure easier operation, and minimize external components, monitoring is done directly through the control. Flexibility to select cavity sensor for control with optional advanced sensor control by parallel operation.

## Reduced human error

Configurable I/O, sequencing, connectivity to all peripherals minimizes risks from operator mistakes resulting in tool damage and defects.

## Historical traceability

Given the nature of medical products, acquiring and processing data is critical. To make this easy, ROBOSHOT is available with smart features – such as Euromap 63, Euromap 77 OPC and LINKi – designed to capture and store data on a central server and provide complete part traceability.

## Enhanced processing information

Just what you need for setting up, validation and on-going monitoring.

- Reference data curve storage
- 100,000 operator change log
- 100,000 process data log
- 200 operator ID and 4-level security
- Export data in CSV format
- Euromap 82.1 / 82.2 auxiliary communications
- Standard digital signals
- Optional analog signals

# PACKAGING



ROBOSHOT offers solutions for maximum productivity in the packaging market. Whether it's sparkling clear, durable, or thin-walled parts, the ROBOSHOT can deliver rapid and precise injection and mold movements. The standard pre-injection function allows for faster injection times without vent burning and decompression of clamp force while in the cooling phase. This can reduce cycle time without compromising part quality. Demanding process capabilities include in-mold-labeling, servo unscrewing for caps or multi-component technology. With the high acceleration injection, instantaneous transition and the high response servo-motor control, ROBOSHOT maintains superior shot weight control.



## Heavy-duty injection units for long holding times

The production of components for the packaging industry often demand machines that are capable of withstanding the long holding times and high pack pressures necessary to produce thick walls. ROBOSHOT is available with high-duty injection units that are ideally suited to the production of these kinds of components.

## Increase the quality of your optical parts

For packaging parts, control of the mold temperature is critical for surface quality. Integrating this functionality into the control saves time and helps prevent errors. Consistent molding is enabled by the clamp and ejector compression function.

## Sensitive handling solutions

Avoiding surface defects is crucial when loading and unloading delicate packaging. FANUC robots provide the dexterity to handle this kind of sensitive handling requirements.

Custom core sequencing and ejection patterns allow for detailed control over part removal. Grease-free tie bar option available to eliminate possible contamination.

## Screw variation and flexibility

Not only does the ROBOSHOT allow up to eight easily interchangeable screw and barrel combinations all on one frame, but Milacron also offers a variety of different screw and barrel materials specifically designed to fit your application. From our KLEARSTAR kits to our WEARSTAR offerings, the ROBOSHOT can be customized to meet your application requirements.



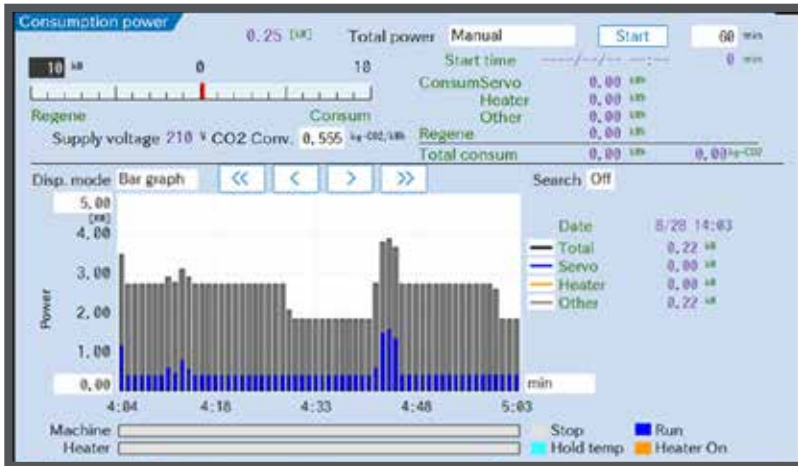
## LOWEST ENERGY CONSUMPTION WORLDWIDE

FANUC's superior servo technology and intelligent energy recovery reduces ROBOSHOT's energy consumption by 50-70% compared to hydraulic machines, and by up to 10-15% compared to other manufacturer's electric machines. ROBOSHOT's industry-leading regenerative power recovery system, stores energy during motor braking and makes it available for other motions. Recycling this energy helps to reduce overall power consumption by 15-25%, which is thousands of dollars saved every year.



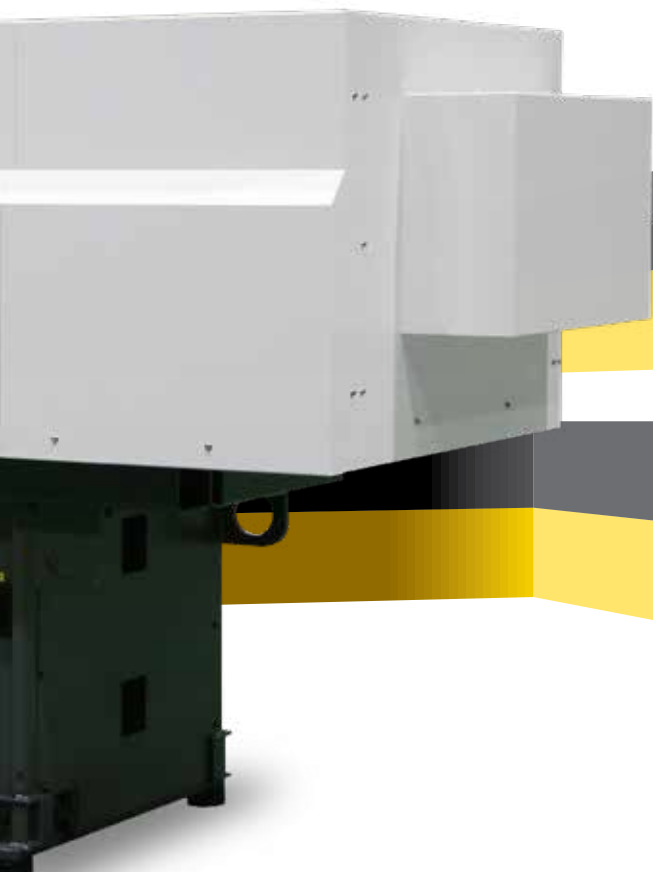
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## POWER CONSUMPTION BREAKTHROUGHS

Standard barrel heaters can be controlled to further reduce the normal power spikes during start-up. Energy-saving insulated heater bands are available in different configurations to further minimize power use. Monitor a machine's energy loss and re-generation with the Consumption Monitoring Page.



Hydraulic machines

Save up to 50–70%

Electrical machines

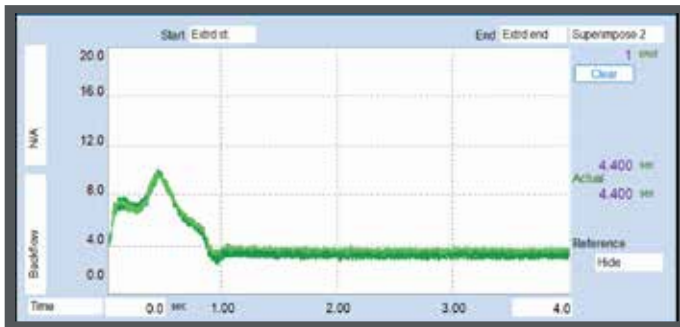
Save up to 10–15%



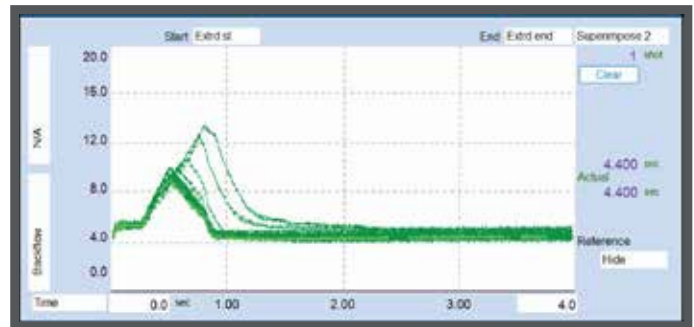
# MACHINE CONTROL & MONITORING

## Unique process control

ROBOSHOT Backflow Monitor shows you what is happening inside the valve, allowing you to monitor the closing characteristics as well as the wear status of the check ring. The injection process is also shown as a curve on the screen, enabling you to check and change your parameters should any irregularities occur. This allows the user to see the effect of process condition changes against the behavior of the check valve. It even helps identify the onset of valve wear without disassembly of the barrel assembly.



The ROBOSHOT Backflow Monitor.  
Example of stable back-flow.



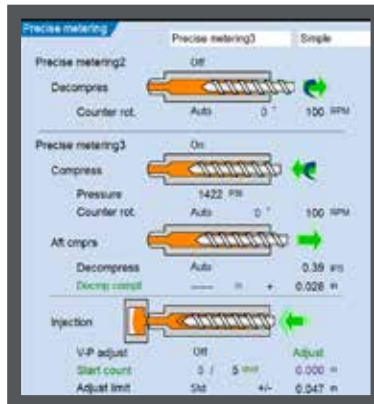
The ROBOSHOT Backflow Monitor.  
Example of evidence that material is leaking and that valve slider closing times are inconsistent.

### Your benefits with ROBOSHOT Backflow Monitor:

- Constant process monitoring
- More transparent injection process
- Easy detection of irregularities
- Early scheduling of maintenance task
- Predictable timing for exchanging the check ring

## Constant parts weight – no need for decompression

ROBOSHOT Precise Metering 2+3 is an additional function designed to avoid uncontrolled volume flow between the end of plasticizing and decompression. Precise Metering 2 provides advanced decompression control with reverse rotation of the screw after plasticizing, while Precise Metering 3 checks the volume after plasticizing, automatic V-P, and decompression adjustment. Set to automatic mode, there is no need to set various different parameters.

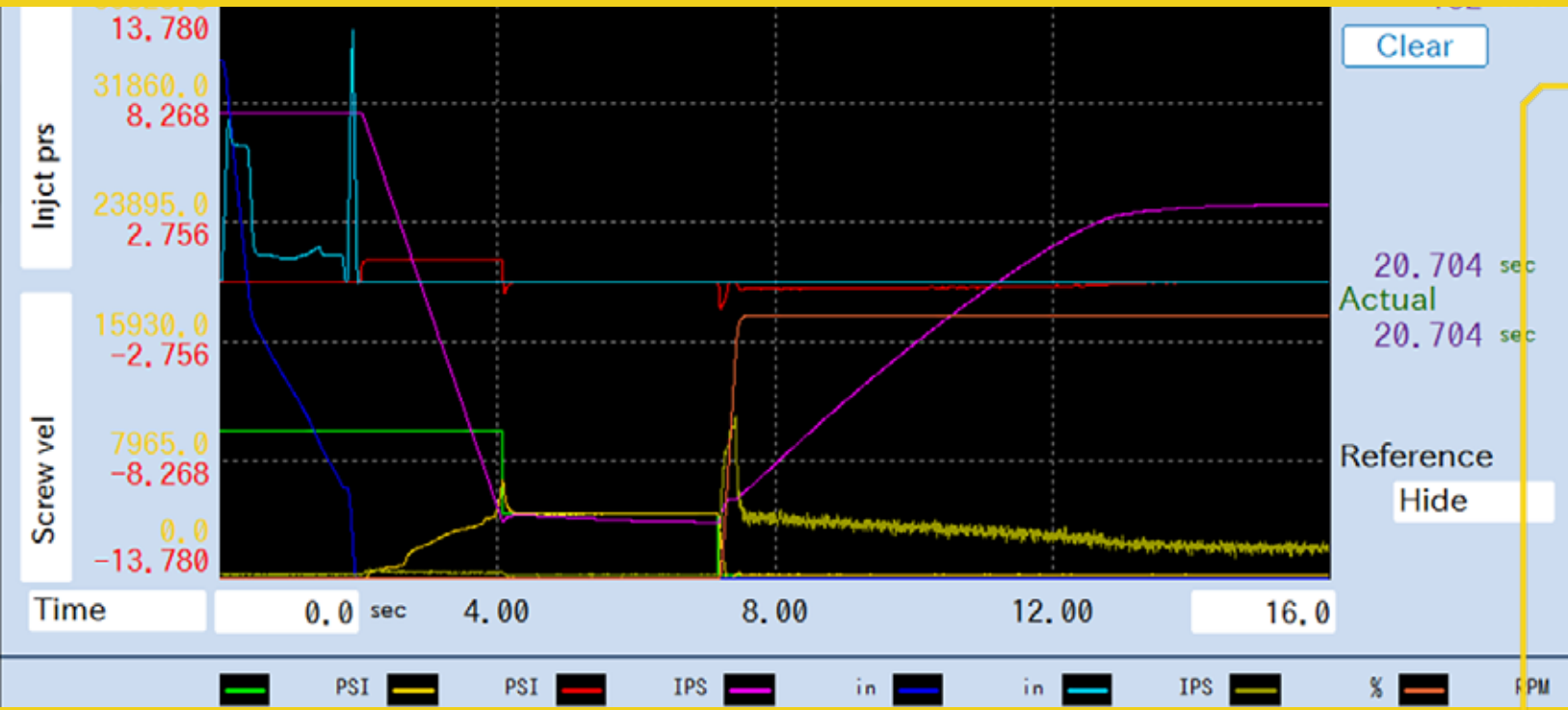


Precise metering for maximum precision and stability

### Your benefits with ROBOSHOT Precise Metering 2+3:

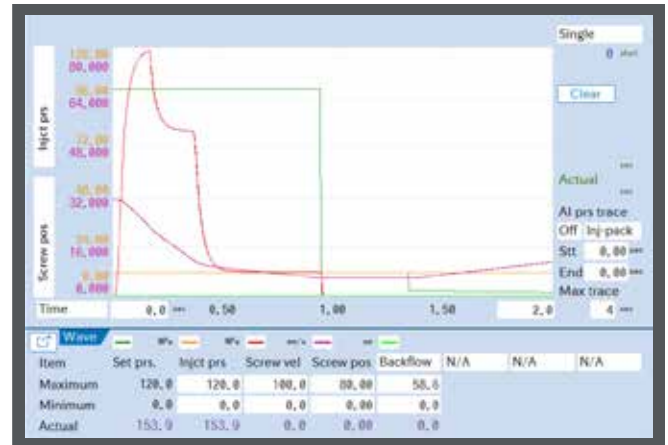
- Constant plasticizing volume for low viscosity materials
- Reduced part weight variations
- Avoidance of bubbles and silver strings
- Automatic V/P adjustment (PMC)
- Automatic decompression adjustment
- Higher parts quality – fewer bad parts

# AI TECHNOLOGY



ROBOSHOT's patented AI features provide innovative technology to make defect-free production a reality.

- AI pressure control automatically adjusts real-time injection profile to provide consistent fill pressure. The optional use of cavity sensor feedback provides the ultimate for eliminating pressure variations within the mold.
- AI meter control automatically adjusts the extruder speed for improved recovery time repeatability.
- AI back flow monitor shows what is happening at the injection non-return valve and includes process alarms for advance warning before failure. When Link/i networking is used, a Wear Score number can provide unparalleled predictive failure notification.



# PROTECT YOUR VALUABLE MOLDS



## MAXIMUM MOLD AND EJECTOR PROTECTION

ROBOSHOT AI Mold and Ejector Protection provides the best mold protection on the market. Built to minimize downtime, it even indicates when greasing is required or the mold is worn.

### MOLD AND EJECTOR PROTECTION IN BOTH DIRECTIONS

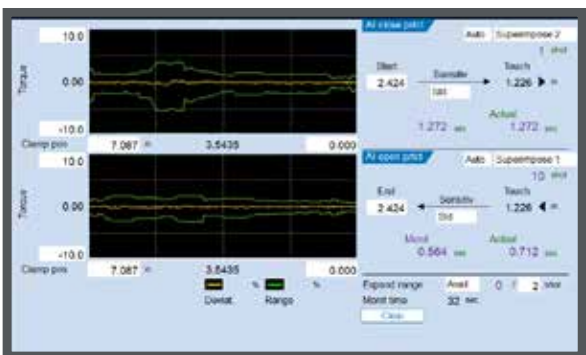
Should an event occur, ROBOSHOT protects your mold during the full opening and closing cycle. Its unique Mold Protection function, measures the motor torque and stops the machine immediately if there is a restriction. The same technology also protects the ejector's forward and reverse movement.

### RELIABLE PROTECTION AT NO COST TO SPEED

Unlike the protection on hydraulic systems, ROBOSHOT's Mold Protection functionality has zero impact on clamp closing speeds. This kind of high-speed responsiveness is provided by its electric drives and superior motion control technology. Clamp tolerances are also programmable across the entire mold movement.

## YOUR BENEFITS WITH ROBOSHOT AI MOLD AND EJECTOR PROTECTION:

- Protects your mold from damage
- Minimal repair costs
- Reduces costly downtime
- Very easy set-up – just turn on and set sensitivity level
- No loss in clamp speed



Automatically creates an upper and lower limit around the torque curve for both AI Mold and AI Ejector Protection. Step-by-step limits are still available for manual input.





**OPTIMIZED CLAMP FORCE SETTING AND FEWER PART DEFECTS**

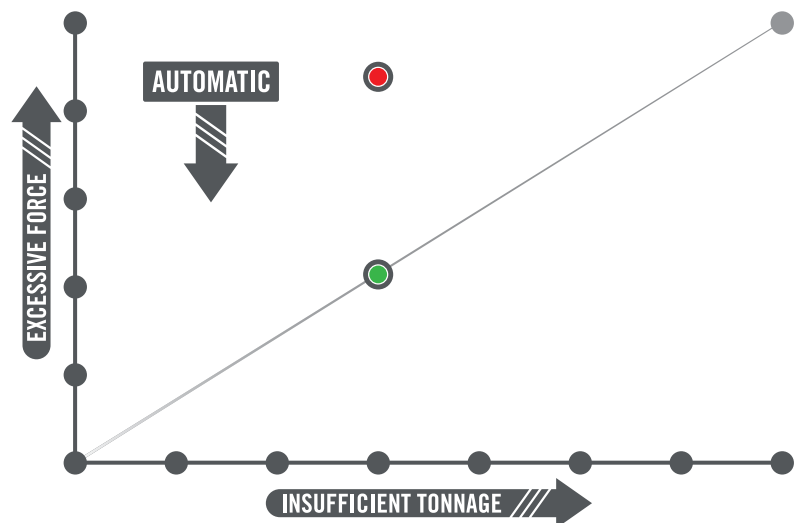
ROBOSHOT clamp force adjustment checks and automatically adjusts the minimum clamp force, providing increased security and eliminating the need to adjust the clamp force manually.

**MINIMUM CLAMP FORCE**

- Automatic adjustment and control to lowest required tonnage
  - Uses clamp force sensor to detect tonnage (mold separation) during injection
- Lower part defects due to burning
- Less mold and machine wear

**YOUR BENEFITS WITH ROBOSHOT CLAMP FORCE ADJUSTMENT:**

- Reduced mold wear
- Increased machine life
- Reduced part defects
- Less energy consumption
- Reduced start-up time



# REMOTE MONITORING WITH ROBOSHOT-LINKi2

LINKi2 is a product and quality management tool that can connect to all ROBOSHOT series in real time from remote PCs or Smart Devices.

## Status monitor

- Achieves lower cost and higher operation rate
- Monitors power consumption

## Quality information

- Provides traceability and advanced quality analysis
- Investigates cause of failure and molding repeatability

## Diagnosis

- Alarm history
- Operation and parameter change history
- Remote operation functions



## Industry 4.0

For over 30-years, the FANUC ROBOSHOT has been engineered with connectivity solutions in mind. With thousands of networking systems in operation at multi-national and local companies, ROBOSHOT has the highest level of connected machines in the industry. Today, advanced OPC/UA Euromap communications have been developed for integration beyond the ROBOSHOT to include a wide array of peripheral equipment and even FANUC robots using FL-Net. With full system connectivity, the ROBOSHOT becomes the master of the molding cell and is able to manage and react to process changes that may be caused by human error resulting in product defects, and simultaneously reduce operational risks.

With the optional LINKi2 networking solution, full data collection of every parameter is instantly available to track quality, monitoring production, perform statistical analysis, predict for out

of process control, as well as storing pressure/velocity graphics for every shot. Every mold file, recover set-ups from history runs, transfer set-ups to other ROBOSHOTs, process tracking, alarms, and operation functions are all standard features. Users can also customize their own preventative maintenance scheduling. The optional WEAR SCORE feature can provide an indication that the screw tip performance is degrading and needs to be replaced. All features are possible without the need for special software development.

ROBOSHOT offers solutions to connect to 3rd party systems (MES) using OPC/UA based on Euromap 77 global protocols with or without the use of LINKi2.

# ELIMINATE HUMAN ERROR

Operator ID combined with operation tracking increases accountability and allows a manager to monitor the changes made to the machine when an alarm occurs.

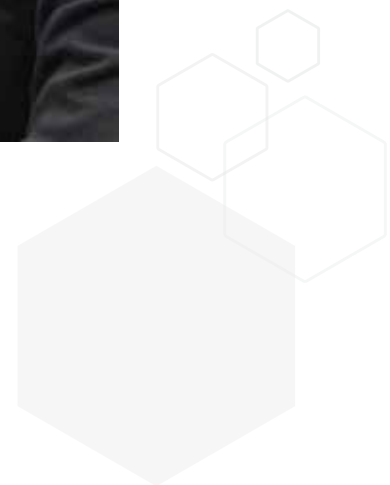
Users can prevent those changes by adding input locks to individual items or entire pages, with four levels of access for operators. Using the Range Setting Function option they can also set value limits to the parameters the operators have access to.

Users can also enable the Custom Menu to rearrange screen placement or hide them completely.

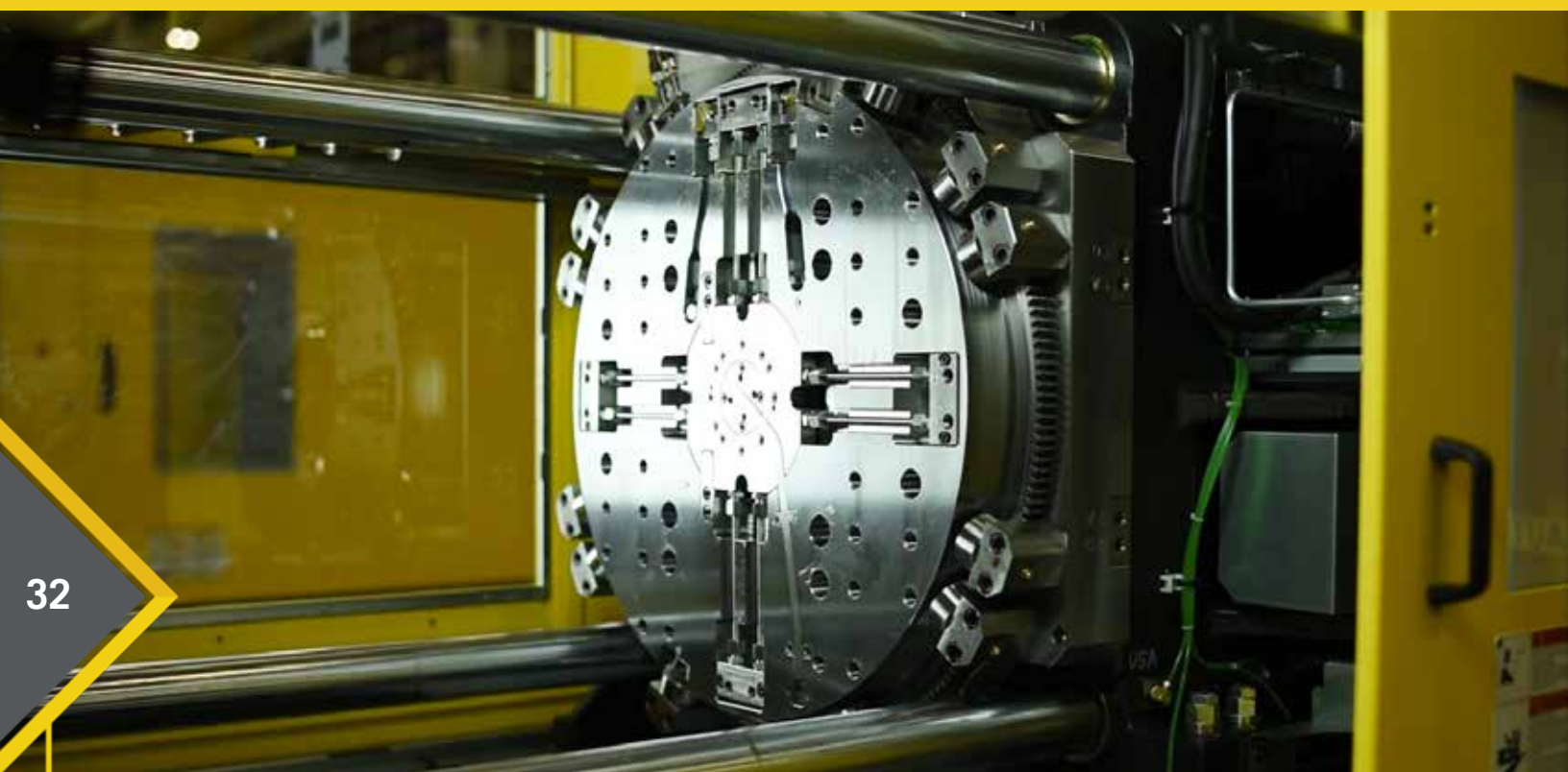
Custom signals and I/O can enable the ROBOSHOT to react to auxiliary alarms, EX: not running barrel heats unless water flow is detected. This can prevent thousands of dollars in damage to the mold.

Set up confirmation uses 2D Bar or QR codes to verify peripherals registered to the mold file.

The Help Icon is available for quick access to the user manual and is very beginner friendly for those who wish to learn more about a feature of the controls.



# MULTI COMPONENT INJECTION MOLDING



32

You can use ROBOSHOT for multi-component injection molding by adding versatile and easy-to-integrate vertical and horizontal injection units. This advanced molding technique allows you to inject three different components simultaneously. The vertical Si20A unit can be added retroactively, and fits on top of the ROBOSHOT. Powered by our powerful CNC, the injection units offer the same levels of accuracy and repeatability as ROBOSHOT.

## YOUR BENEFITS

- Fully-integrated CNC
- Easy to integrate
- Flexible configuration
- Turnkey solutions
- Cost efficient

## ROTARY TABLES

The FANUC servo drive system is fully-integrated, and the table rotation is controlled with the ROBOSHOT control screen. Rotational angle, speed, and start condition is selectable.

- Rotary tables available from 500~1300mm
- Fully-integrated using FANUC motor/drive system
- Adjustable velocity, angle, rotation
- Standard two-independent water/oil circuits



### The ROBOSHOT SI-20A vertical injection unit

ROBOSHOT second injection units are available in both vertical and horizontal configurations. Vertical units can be added to existing ROBOSHOT Alpha series, while horizontal units are supplied with a special modified ROBOSHOT base design.

Controlled by FANUC's world-class CNC technology, accuracy and repeatability are unrivaled. Full seamless integration of the controls are available directly at the ROBOSHOT Panel iH-Pro controller.

### The ROBOSHOT SI-300HA horizontal injection unit

### Easy switching between operation screens



ROBOSHOT operation screen

Second injection unit operation screen





# AFTERMARKET PARTS & SERVICES

CALL 1-800-288-8306 TO ORDER PARTS OR FOR SUPPORT.



## THE TOUGHNESS TO TAKE ON GLASS-FILLED AND OTHER ABRASIVE AND CORROSIVE RESINS

The **WEARSTAR** package from Milacron Aftermarket is a very high wear-resistant plasticizing kit: ultra-wear resistant screw, barrel and tip assembly, all in one turn-key super molding package.

- For any make or any model, old or new
- Backed by a 3-year guarantee



## ELIMINATE BLACK SPECKS AND REJECTS

Struggling with black specks injected into your molds in polycarbonate molding?

Get rid of the problem with **KLEARSTAR** components. They're specially treated for corrosion resistance and lubricity, leading to fewer rejects and greater productivity.

- For any make or any model
- The most productive polycarbonate molding package available



## THE ULTIMATE ANTI-CORROSION SOLUTION FOR PVC AND CPVC PROCESSING

Do you hate shutting down your PVC process for all the corrosion-related maintenance?

Try the **PVCSTAR** Package from Milacron Aftermarket – a corrosive-resistant screw, low-shear screw tip, and end cap that’s proven to reduce resin overheating and minimize the corrosive effects of PVC/CPVC attacking the base metal.

- Prevents blistering of plating caused by penetration of chlorides through the chrome plate

## RING VALVES



## HIGH-PERFORMANCE, NON-RETURN RING VALVES

In today’s high-speed applications, only the toughest processing components will do. For the durable ring valves you need to succeed, turn to the company trusted by processors around the world – Milacron.

Three styles to suit your application:

- **4-Piece Spinner™ Valve** - for high screw speeds and/or fast cycles
- **4-Piece Ring Valve** - tough reusable stainless steel retainer
- **3-Piece Design** - with optional short-stroke check ring

# COMPLETE AUXILIARY SYSTEMS DESIGN AND INSTALLATION



• Bulk Storage Silos



• Robotic Part Handling

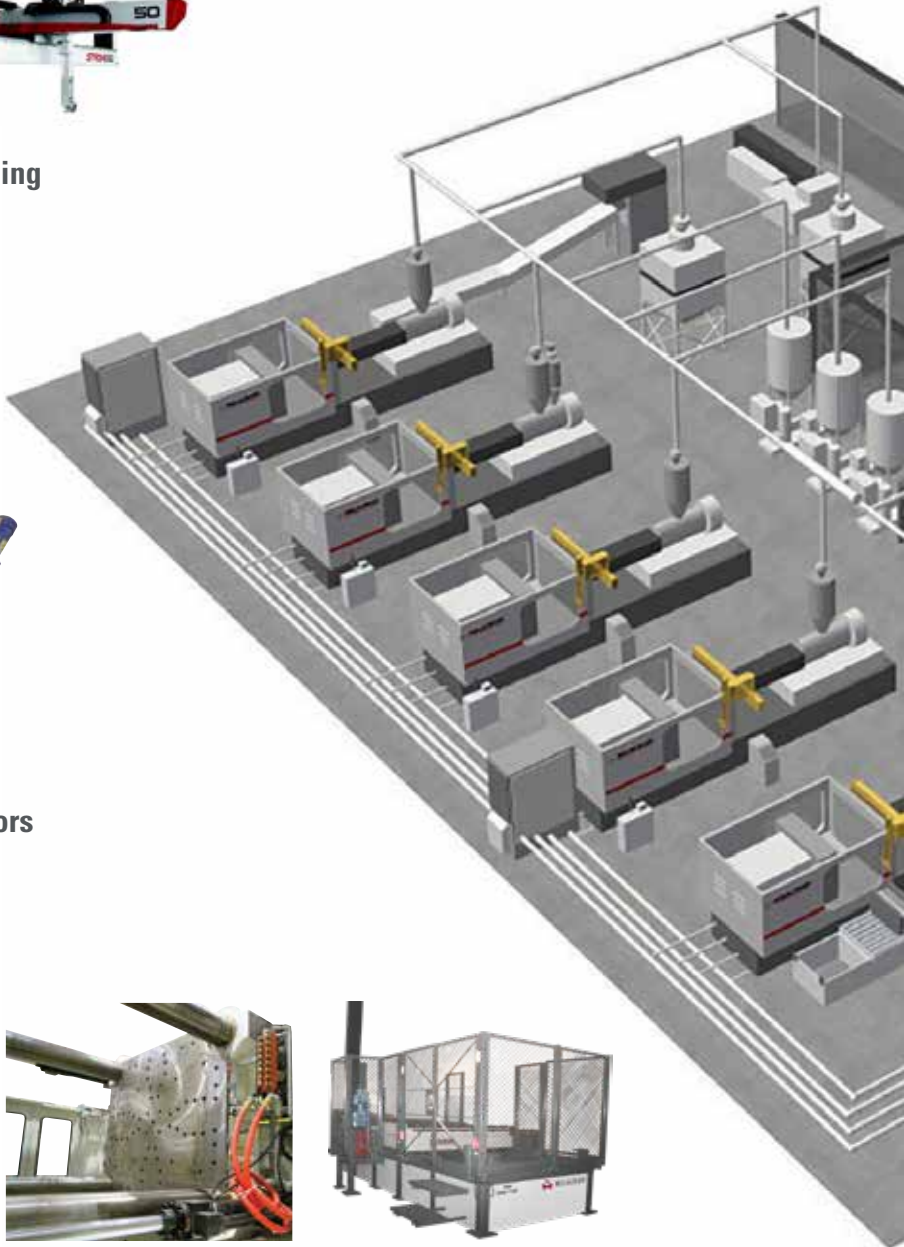
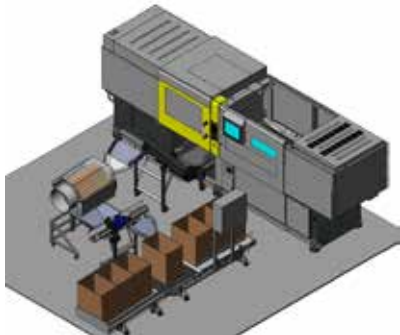


• Press Side & Central Granulators



• Conveyors

• Conveyor Systems



• Magnetic Mold Clamps & Mold Changing Systems

- Water or Air Cooled Chillers



- Blenders

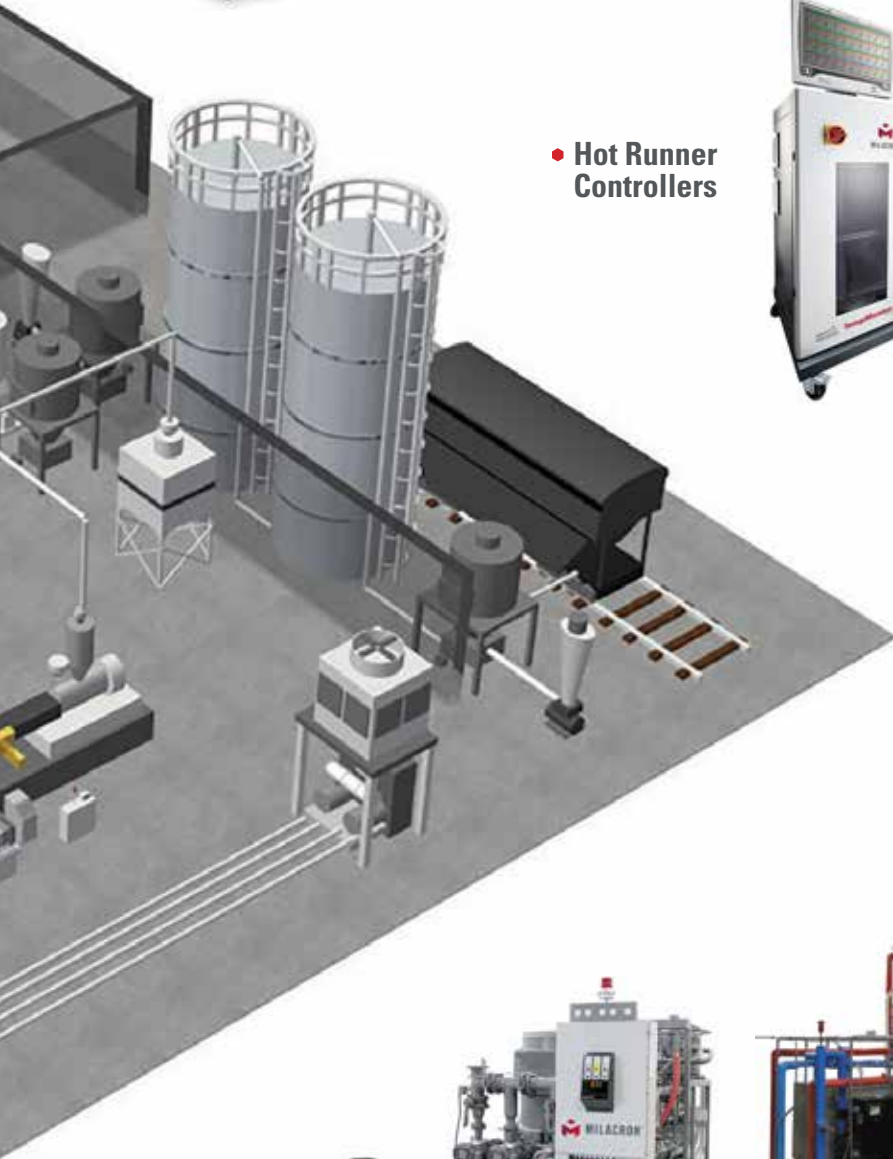


- Conveying

- Hot Runner Controllers



- Drying



- Mold Temperature Controllers



- Central Water Processing

# FEATURES

## Display and Input

NAME	Standard	Optional
21.5" HD touch screen display (1920 x 1080 pixel Resolution)	●	
Simultaneous display of setting screen, monitoring screen & ROBOSHOT-LINK/2	●	
23 languages - selectable	●	
Numerical input, incremental input & character inputs in 23 languages	●	
Managed entry - 200 operators with password and storage in operator log (4 levels + Admin)	●	
Operator management with RFID card instead of password		○

NAME	Standard	Optional
Customization of menu buttons	●	
Setting profile displays - injection, packing, plasticising, clamp open/close ejection & temperature	●	
Enhanced graphical user interface - home screen	●	
Context-sensitive help function for setting, signals & alarms	●	
Operator & maintenance manual displayed on iHMI screen	●	
PDF file import function to document folder	●	
VNC-enabled device for remote operation of VNC-capable device		○

## Injection & Plasticizing

NAME	Standard	Optional
10 stages of injection pressure & speed control	●	
4 modes of injection response mode - selectable	●	
Switchover mode by position, pressure, time, cavity pressure, nozzle pressure signal or filling position	●	
6 stages of holding pressure & time control, including holding speed control	●	
6 stages of plasticising - screw speed and back pressure control	●	
High-speed injection options (limited models)		○
High Pressure filling mode- Not available with all screw diameters		○
High-duty injection (limited models)		○
Special screws for PC and PVC		○
High-wear screw and barrel options		○
Insulated barrel cover, ceramic or TCS Heater Bands for reduced energy consumption		○
Heater band fail detect		○

NAME	Standard	Optional
Synchronous barrel/nozzle heat-up function to eliminate burning	●	
Liquid Silicone Rubber (LSR) injection packages		○
MuCell and Gas Assist Packages- limited models		○
Material residence time monitor	●	
Automatic purge function	●	
Back flow prevention control - precise metering two modes	●	
AI (Artificial Intelligence) metering control	●	
AI (Artificial Intelligence) pressure profile trace control - injection pressure	●	
AI (Artificial Intelligence) pressure profile trace control - cavity & nozzle pressure		○
Hopper slide with drain tube for easy material hopper clean out	●	
Hopper drawer magnet		○
Automatic start-up parameter mode	●	

## Clamp / Ejector

NAME	Standard	Optional
6 stages of closing & 5 stages of opening via speed & position control - auto acceleration control	●	
2-stage ejector and 4 patterns of ejector motion control	●	
3-stage independent air eject	●	
4 to 6-stage independent air eject		○
In mold degating - pre-ejector function	●	
Pre-Injection - simultaneous clamp & injection movement	●	
Simultaneous independent clamp/ejector/extruder operation	●	
Ejector override function - simultaneous ejector retract during clamp closing		○
Minimum clamp force adjustment	●	
Automatic die height adjustment with clamp force sensor	●	
Die height position sensor for quick mold changes		○
Precise clamp force control - automatic adjustment & optimisation	●	
Clamp compression function		○

NAME	Standard	Optional
AI mold protection, complete mold open & close stroke	●	
AI ejector protection, complete forward & backward stroke	●	
Standard extended die height	●	
Special extended die height for the 300 ton ROBOSHOT (810mm or 900mm max die height)		○
High speed clamp- not available with all sizes. Cannot be quoted with increased tonnage		○
Increased tonnage - not available with all sizes. Cannot be quoted with high speed clamp		○
Linear bearing guided moving platen (additional support block optional)		○
Water manifolds		○
Stainless steel water systems		○
Automatic grease lubrication (food grade optional)	●	
Greaseless tie bars (limited models)		○

\*List subject to change without notice



# FEATURES

## Mechanical, Electrical, and Software Features

NAME	Standard	Optional
Mold file storage - 500 files (on-board/USB/LINKi2)	●	
Screen image capture to USB device	●	
Process monitoring - cycle alarms, part rejection for 40 items trend charts 100,000 cycles process monitoring	●	
Process monitoring judgement alarm	●	
Alarms log - 50,000 logs exportable to CSV format	●	
Log management - parameter change log 100,000 events, exportable to CSV format	●	
Log management - operational change log 100,000 events, exportable to CSV format	●	
Lights out capability with auto shutdown sequences	●	
Manned and un-manned mode for lights out operation	●	
Production management - container management, counter stop function, production completion calculation	●	
Range setting function		○
Set up confirmation (uses 2D image format)		○
Good product rate alarm - cycle end stop		○

NAME	Standard	Optional
Preventive maintenance - load & temperature of the machine	●	
AI backflow monitoring through machine learning - check valve ear indication	●	
Cycle time analysis & display - timing chart	●	
Process graphics - wave form display with selectable parameters	●	
Power consumption monitoring & display	●	
Signal output for sampling manually or by designated interval (count or time)	●	
Hydraulic power units- multiple sizes available		○
Pneumatic valves for valve gates and/or pneumatic eject/core circuits		○
4- or 12-zone Integrated mold heaters- not available on the 33iB		○
12- thru 48-zone semi-integrated hot runner- limited models		○
110/220/480V auxiliary outlet packages		○
Step-down transformers (480/220V)		○
Quick mold change systems (QMC)/pneumatic/magnetic		○

## Interfaces / Inputs / Outputs (other interfaces are available)

NAME	Standard	Optional
15 machine status inputs	●	
29 machine status outputs	●	
3- or 4-color alarm lamp		○
2 Ethernet ports - 100Base-TX/1000Base-T	●	
Ethernet hub 5 ports		○
2 USB ports - 3.0/2.0/1.1	●	
Custom signal function 32 points character input of signal name	●	
Configurable core function - maximum 4 systems available	●	
Valve gate interface 8 circuits software (hardware/valves optional)	●	
Valve gate interface 16 circuits (hardware/valves optional)		○
Monitor camera interface	●	
RJG interface signals		○
Bad parts reject function	●	
Cycle stop by external signal - immediate stop, cycle end stop or display only	●	
Alarm signal input - cycle stop by external signals	●	
Shot counter output by 4 binary points of binary data		○
Mold ID signal output by 8 points of binary data		○
Analog input external sensor connection voltage or current, max 2 boards and 4 input signals		○

NAME	Standard	Optional
Process graphics data output by voltage - Analog outputs max 4 signals selectable		○
E82.1 OPC-UA Data communication to auxiliary device - mold temperature, material dryers, hopper loaders & chillers		○
E82.2 OPC-UA Data communication to auxiliary device - Hot runner		○
E67 Robot Interface for non operator's side parts removal	●	
FL Net interface with FANUC Robot		○
E73 Rear Safety Gate interlock (Safety Guarding with Hardware, additional option)		○
ROBOSHOT-LINKi2 Product & Quality management system		○
ROBOSHOT-LINKi2 MES Interface		○
ROBOSHOT-LINKi2 Wearscore (Back flow monitoring)		○
ROBOSHOT-LINKi2 Resin Evaluation Function		○
ROBOSHOT-LINKi2 Production Management Function		○
Stand-Alone ROBOSHOT Communication to MES System using E63 or E77		○
2nd and 3rd Injection Units (Vertical and Horizontal)		○
Additional axis control - Up to 4 servo cores control & positioning via FANUC servo technology		○
Rotary Table Fully Integrated		○

\*List subject to change without notice

