

Fully Electric Injection Molding Machine

Si-III



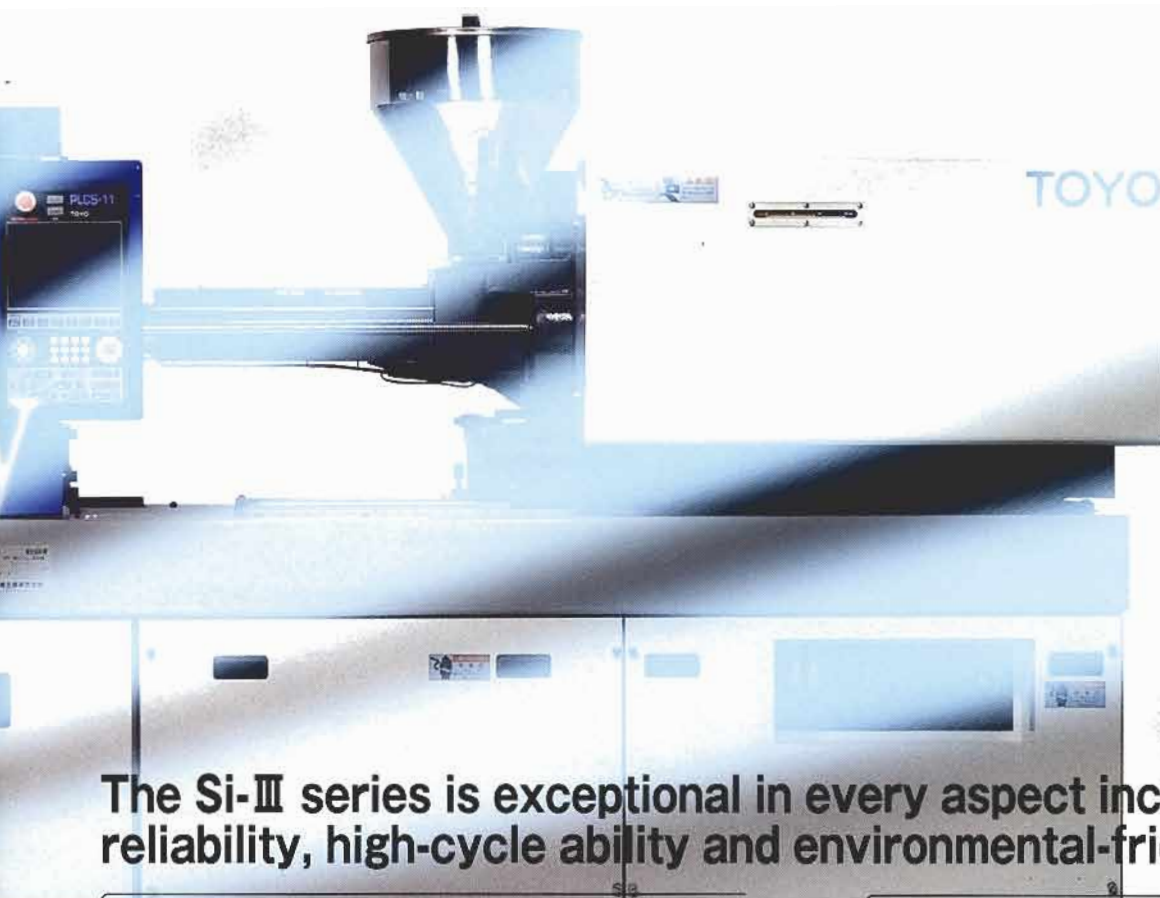
New Toyo Si-III series --- Ultimate performance brings you new success!



PLASTAR
Si-150III
Fully Electric Invasive Matching Machine



Ecology



The Si-III series is exceptional in every aspect including precision, reliability, high-cycle ability and environmental-friendliness.

Core Technology

Core technology

- The control system is further advanced with adoption of the new network servo system.
- The new injection unit responds 50% faster than the conventional model.
- The new temperature control system holds temperature fluctuation within $\pm 0.2^{\circ}\text{C}$ enabling constant metering time.
- The standard screw covers a wide range of plastics. In addition, a wide variety of special screws are available for specific needs.

Reliability

Reliability

- The SRC-II metering system has dramatically stabilized metering density.
- The vibration-resistant ultra-rigid RASMA frame maintains machine accuracy for extended years.

High-Cycle

High-cycle

- The high-efficiency RISC engine and high-response servomotor have realized high-cycle operation.

Ecology

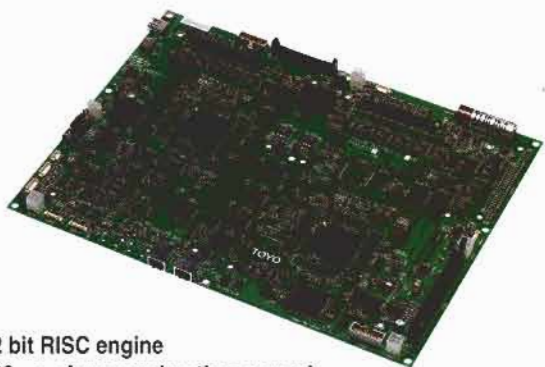
Ecology

- The new network servo system achieves substantial energy saving.
- Power consumption is less than a third (1/3) when compared with our hydraulic machines. In addition, further cuts of 3% are possible over our conventional electric machines.

The Si-III series employs the new network servo system for fast, reliable and efficient machine drive.

New network servo system

Machine motion control



- 32 bit RISC engine
- 200 μ s of processing time per axis
- High-speed microprocessing software

LAN

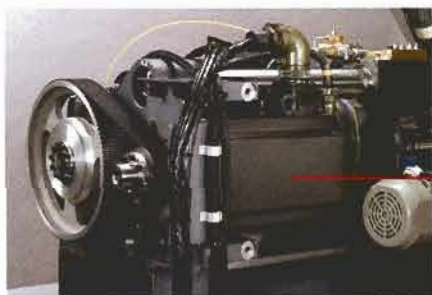
Servo driver



- Four-axis driver dedicated to injection molding machine
- Vibration-suppressing control
- High response (600 Hz)
- High energy-efficiency (Low electricity consumption)
- High reliability

Servomotor

- 12-polar high power-rated servomotor (low cogging torque)
- High resolution non-battery sensor
- High resistance against dirt and water (IP67)



Servomotor

The Si-III injection system responds 1.5 times faster than the conventional system.

Low inertia, high response servomotors; The new PLCS-11 control system;

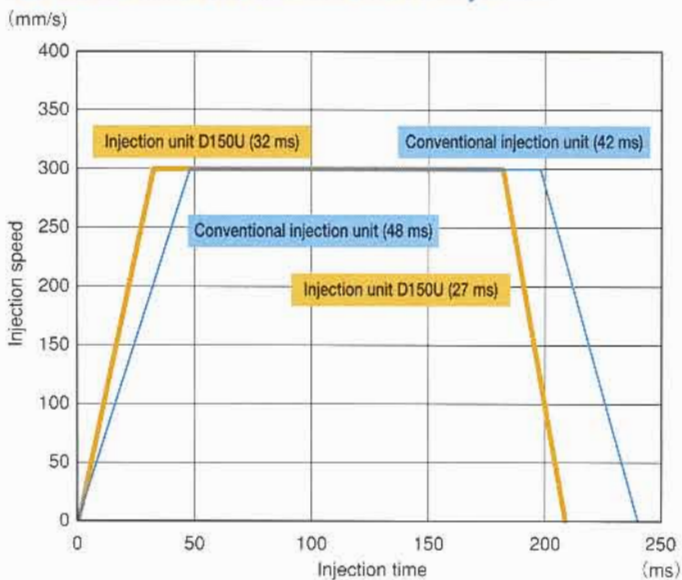
High rigidity injection units with low friction design:

As a total effect, 50% faster response is obtained without sacrificing rigidity when compared with conventional machines.

32 ms for acceleration and 27 ms for deceleration (Injection unit D150U)

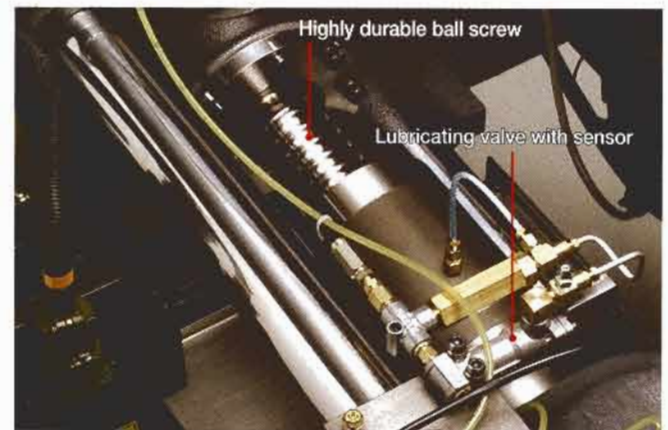
With the new injection unit, the Si-III series has achieved a significant ramp-up time of 32 ms to reach the top speed, cutting 16 ms from conventional machines. The deceleration time is only 27 ms. This greatly contributes to high-precision molding and super thin-wall molding.

Acceleration and deceleration in injection



Highly durable ball screws

Ball screws employed to the Si-III series are of optimal design and the best quality developed based on our 20 years' of experience. Retainer-fitted ball screws are adopted for the critical driving units so that quiet and high accuracy operation can be assured for the long periods of use.



Automatic lubricator

The automatic grease lubrication device supplies an optimum amount of grease to toggles and ball screws. Especially, the injection ball screw is protected from lubrication failure by a lubrication valve fitted with a sensor.

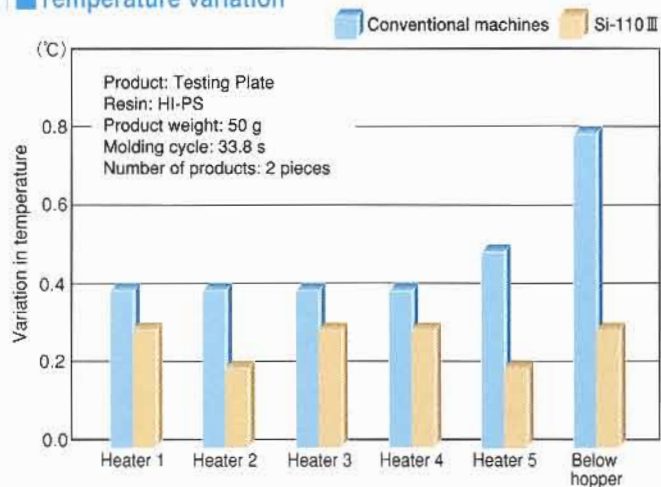


The new temperature control system holds temperature fluctuations within $\pm 0.2^{\circ}\text{C}$, realizing highly constant metering time.

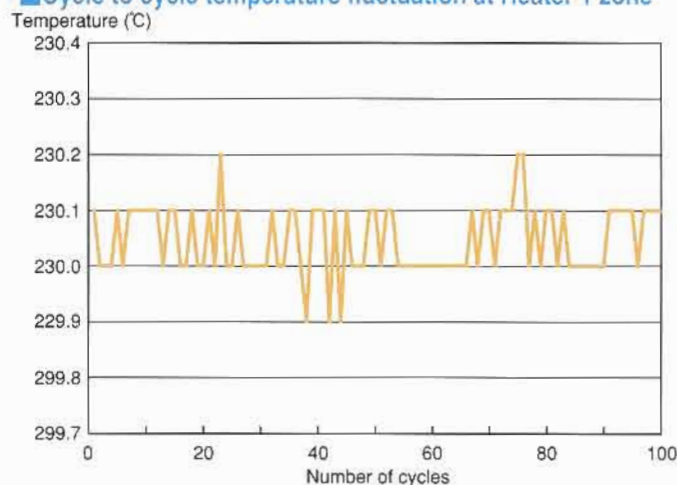
Keeping metering time constant is important to ensure quality parts from every cycle. To realize it, it is essential to minimize the temperature fluctuation in the rear zone of the heat barrel by which a constant amount of melt is fed in every cycle.

With the Si-III series, the temperature fluctuations are kept within $\pm 0.2^{\circ}\text{C}$ all the way through the metering process including the below hopper area. Thus, the metering time has become highly constant.

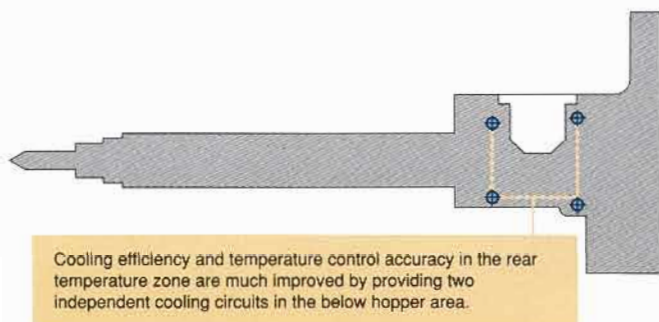
■ Temperature variation



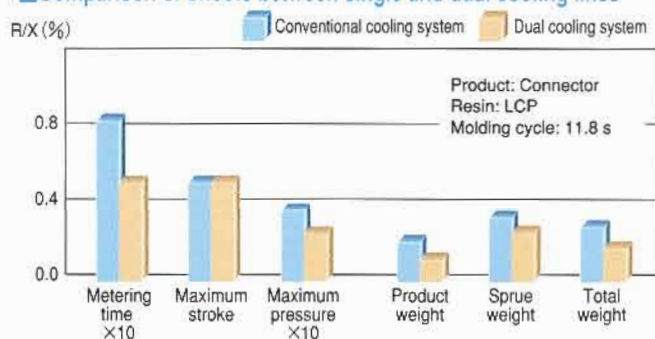
■ Cycle to cycle temperature fluctuation at Heater 1 zone



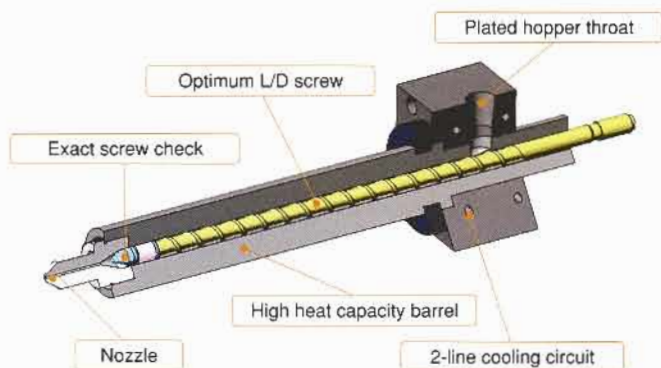
The below-hopper area is efficiently cooled with independent dual cooling lines.



■ Comparison of effects between single and dual cooling lines



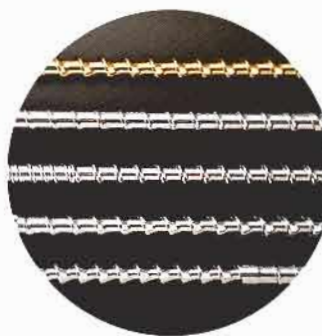
While the standard screw has great versatility covering a wide range of resins, specially designed screws are available for specific processing requirements.



■ A variety of TOYO's screws dedicated to specific uses

Screw type	Application
Sub-flight	High mixing performance, uniform melt temperature
Mixing	High mixing performance, uniform coloring
LOT	For resin with high viscosity
HIT	For resin with low viscosity

In addition, screw units for optical products and connectors are available.



Utilizing TOYO's own see-through heat barrel technology, we have developed various type of screws best suitable to specific resins. The barrel units of the Si-III series are ideal in terms of melt flow rate, temperature stability, heat capacity and so on, contributing to much improved plastication.

■ Plasticizing test using the see-through heat barrel



TOYO's first-in-the-industry see-through heat barrel allows observation of the plasticating condition in the barrel. TOYO uses this see-through heat barrel technology to develop the best screw for each plastic material.

■ Plasticizing condition in the heat barrel (PP with 0.5wt% of Red Master Batch)

Mixing condition is easily observed as the melt color turns to uniform red over plastication process.

● Metering zone



Resin has been completely melted and mixed.

● Compression zone



Pellets gradually turn to melt through this zone.

● Feeding zone

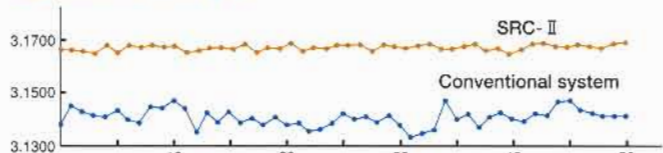


Resin is fed to the compression zone. Most of resin is still in pellet form.

The SRC-Ⅱ metering system offers highly constant metering. PAT.PEND

The Si-Ⅲ series is provided with the SRC-Ⅱ metering system as standard. With the SRC-Ⅱ system, the screw imposes optimum pressure on the melt immediately after metering. This process makes the melt density even and brings about constant product weight in every molding cycle.

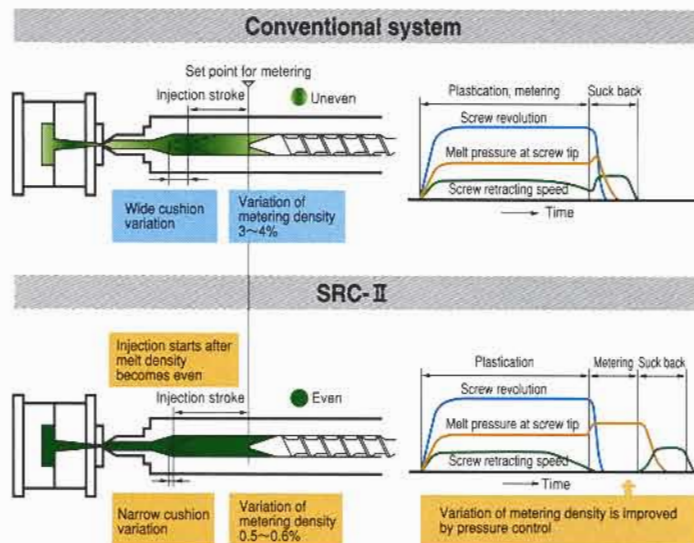
Stability of weight



Machine type: Si-55 Ⅲ (φ 24)
Product: Small gear
No. of cavities: 4 pcs.
Material: PA-66

SRC-Ⅱ	$\bar{X}=3.1666\text{g}$ $R=0.0044\text{g}$ $\sigma=0.0010\text{g}$ $3\sigma/\bar{X}=0.094\%$
Conventional system	$\bar{X}=3.1423\text{g}$ $R=0.0137\text{g}$ $\sigma=0.0031\text{g}$ $3\sigma/\bar{X}=0.295\%$

The above values include the weight of the sprue and the runner.



The SRC-Ⅲ metering system prevents melt backflow. PAT.

The SRC-Ⅲ metering system (optional) locks the check upon completion of metering.

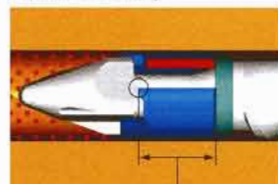
- Structure is simple.
- Check seat is standard.
- Standard metering is available even with SRC-Ⅲ screw check fitted.

During plastication



Locking mechanism

After metering



Check ring is locked.

During suck back

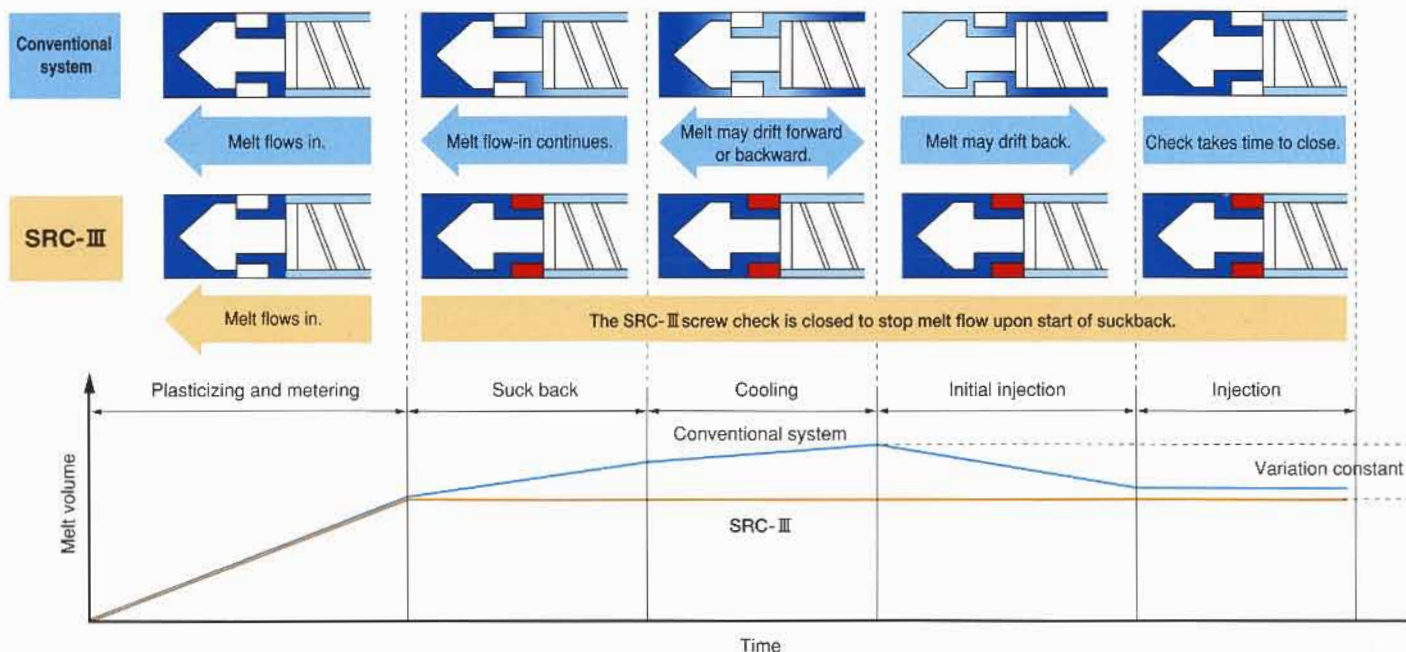


Suck back is carried out with check ring locked.

Screwcheck triplet for SRC-Ⅲ

PAT.





Stability of metered melt density



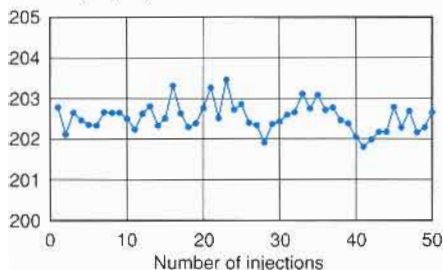
Melt density variation after metering was compared among three metering systems. The fluctuation of the melt density can be shown with the variation of the bar length in the molding given constant injection stroke without holding pressure control.

Machine type: Si-110 III (φ 28)
Product: Bar flow
Resin: GP-PS

Conventional metering system



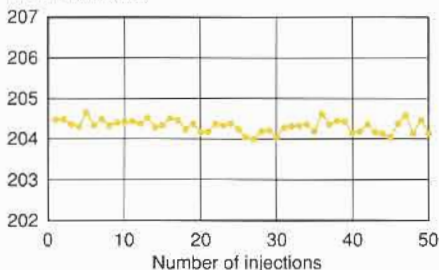
$\bar{X}=202.5\text{mm}$ $R=1.67\text{mm}$ $\sigma=0.3496\text{mm}$
 $R/\bar{X}=0.825\%$
Flow length (mm)



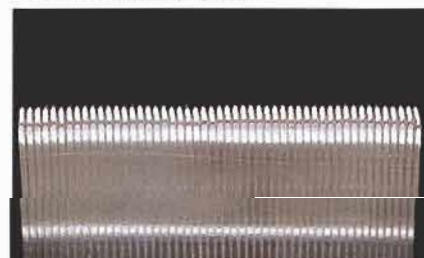
SRC- II metering system



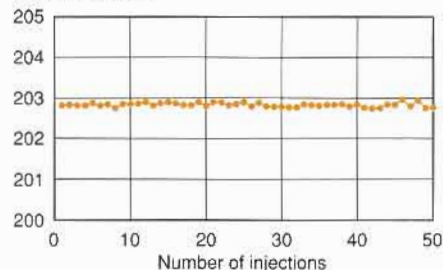
$\bar{X}=204.3\text{mm}$ $R=0.66\text{mm}$ $\sigma=0.1552\text{mm}$
 $R/\bar{X}=0.323\%$
Flow length (mm)



SRC- III metering system

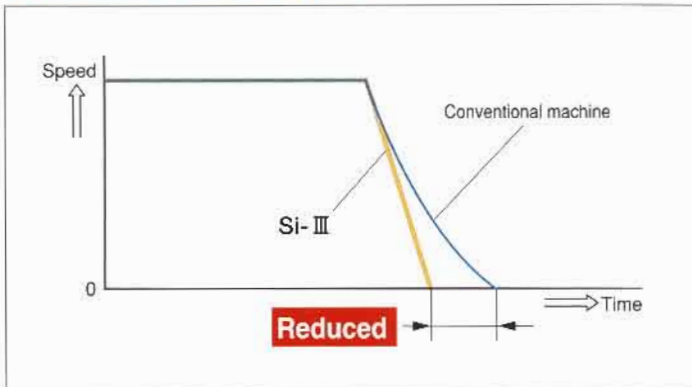


$\bar{X}=202.8\text{mm}$ $R=0.21\text{mm}$ $\sigma=0.0511\text{mm}$
 $R/\bar{X}=0.104\%$
Flow length (mm)



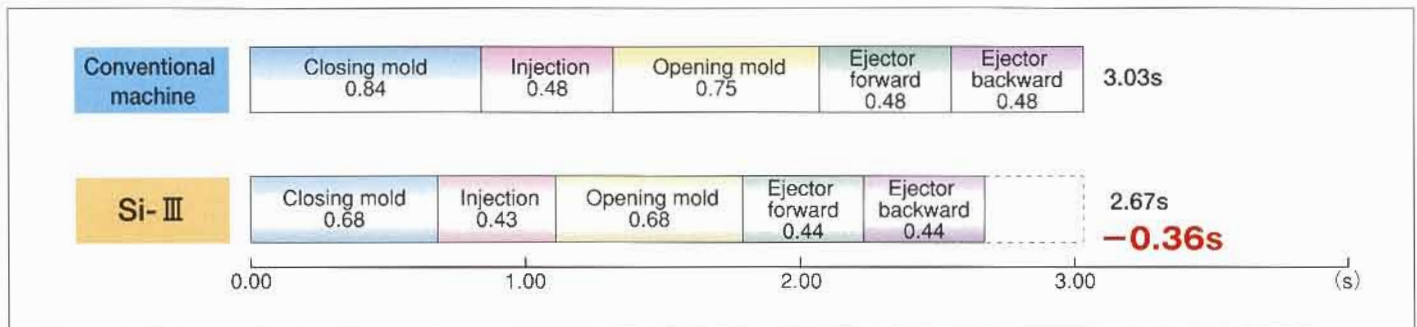
With the adoption of high-performance RISC engine and high-response servomotors, each machine motion has become sharp and crisp.

Reduction of positioning time



The synergy effects of high speed machine motion control, high efficiency servomotor driver and low-inertia, high-response servomotors allow the linear motion to stop in much shorter time enabling each molding process to be shorter.

Shortened cycle by shortened time in each process



High cycle by parallel machine motion

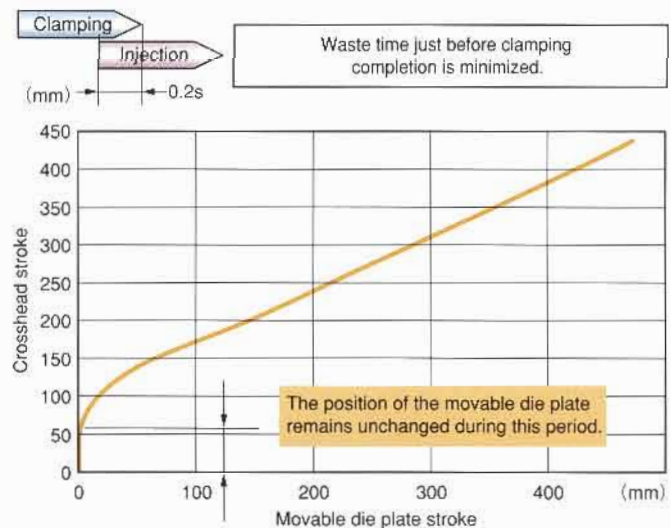
With the Si-III series, injecting, metering, mold clamping and ejecting are driven by respective servomotors. By making two motions effectively overlapped, cycle time can be shortened. Special molding methods such as injection compression and pre-gating can further reduce the cycle time.

High cycle molding by special molding methods

- Injection compression molding (Mold closing + Injection)
- Pre-gate system (Injection + Ejection)
- Compression-in-part molding (Injection + Ejection)



Injection during high pressure clamping process



Machine Frame

Ultra-rigid "RASMA" machine frame

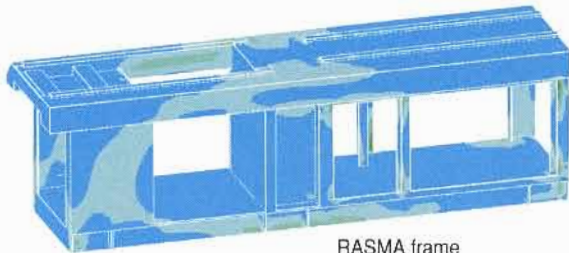
The vibration-resistant and ultra-rigid RASMA machine frame is the result of thorough CAE analysis of the conventional machine frame. The RASMA frame holds high rigidity without adding much weight due to its unique box structure.

Features

- Die plate parallelism is maintained.
- Heavy stress is dispersed through box structure.
- Machine vibration is suppressed to a minimum.

Advantages

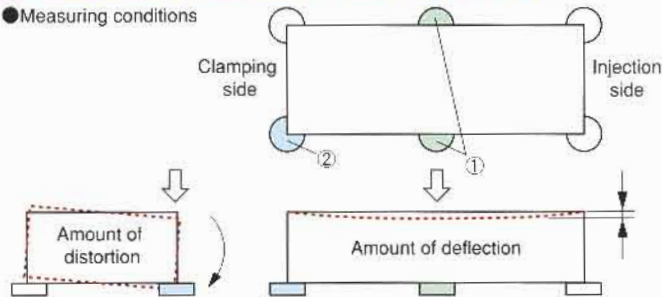
- High accuracy is maintained for many years of machine use.
- Small impact on other machines
- With four-point support, frame deflection is one-third that of the conventional frame.



RASMA frame

Deflection and distortion of the machine frame

● Measuring conditions



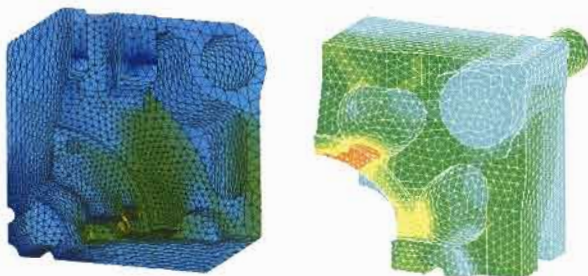
● Measured deflection and distortion

	Hydraulic machine	Conventional electric machine	SI-55 III
① Deflection with center rubber pads removed	0.32	0.15	0.08
② Distortion with rubber pad on operator side removed	0.85	0.30	0.25

Unit: mm

High rigidity clamping mechanism

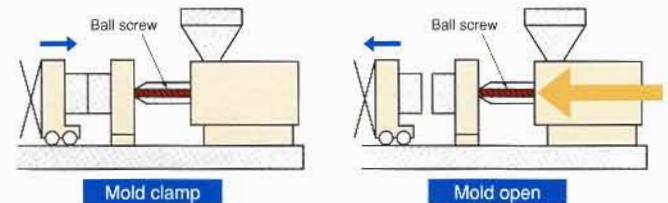
Total rigidity and strength have been improved through computer analysis of various data and simulations.



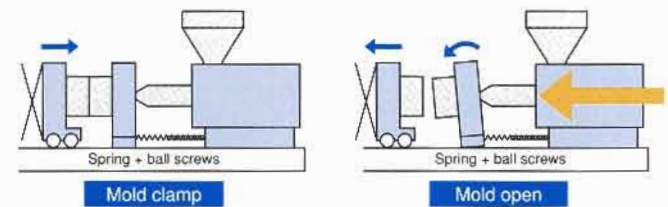
Double nozzle-touch mechanism

In connecting the injection unit and clamping unit, two nozzle-touch ball screws are adopted. It prevents the inclination of the stationary die plate and imbalance of load on tie-bars during mold opening/closing operation.

● TOYO (double nozzle-touch system)



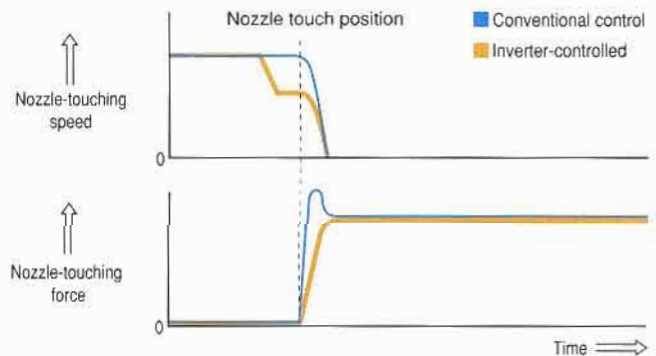
● General all-electric machines (single nozzle-touch system)



* In all-electric machines, the nozzle-touch force is applied to the mold all the time.

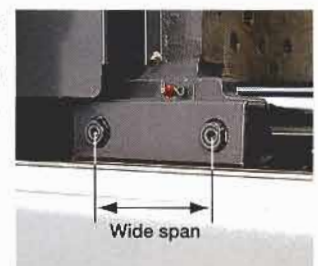
Soft nozzle-touch system

Inverter-utilized two-step slow down control of the nozzle-touch ball screw reduces impact on the nozzle and mold.



Double-roller supported movable die plate

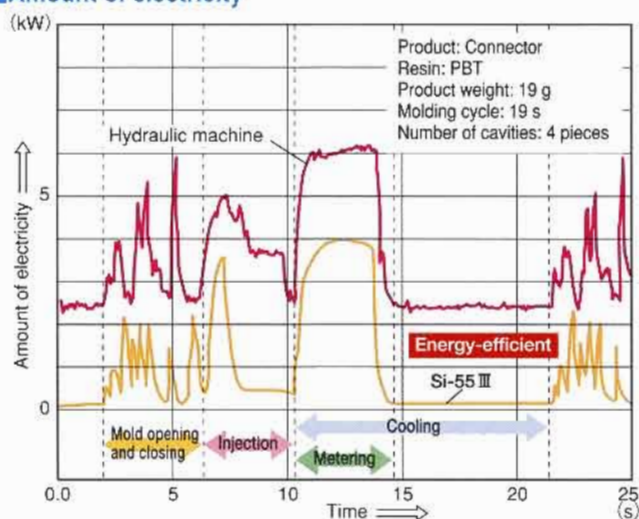
To sustain heavy molds, the movable die plate is supported by wide-span double rollers to maintain better accuracy and parallelism of die plates.



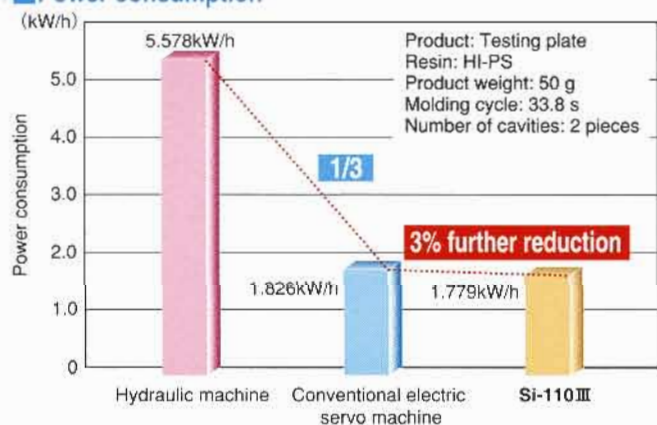
Sharp cuts in power consumption reduce both initial investment costs (facilities for cooling water and air-conditioning) and running costs.

Fully electric injection molding machines consume about one third of the electricity that ordinary hydraulic machines require. With the new network servo system employed, the Si-III series demands a further 3% less electricity than the conventional electric machines. Water is required only for cooling in the below-hopper area. Demand for air conditioning is quite small as heat is generated mostly in the heat barrel area only.

Amount of electricity



Power consumption

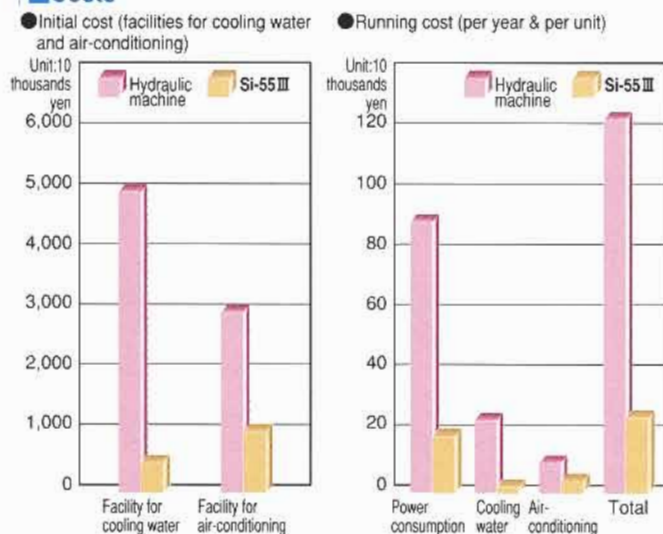


Clean up of workspace

To collect waste grease, easily-detached grease pans are fitted below injection and clamping units.



Costs



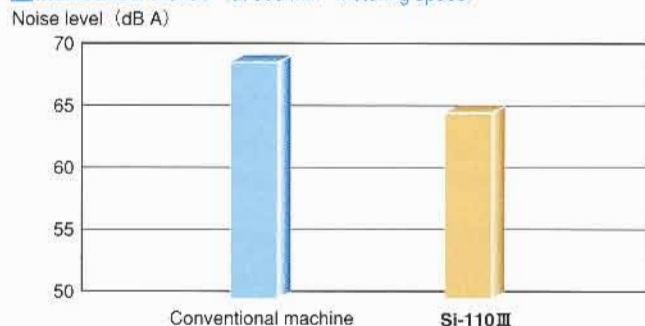
* Facility: 65 molding machines on a molding floor of 720 m²
* Operation hours: 24 hours a day, 24 days a month
* Electricity charge: ¥18/kw/h

Low-noise power transmission mechanism

By adopting a plastic pulley and low noise type timing belt, the noise level has been much reduced. The timing belt also serves as a shock absorber that minimizes the impact on mechanical parts.



Measured noise (at 300 min⁻¹ metering speed)



Easy-to-see, easy-to-use control panel with a large display

The high-performance RISC engine has made screen shifting and printing much faster.

Emergency stop button on the operation side

Power switch for heater and motor

Screen selection switch

Operating mode keys

Condition setting keys

Operation keys



Screen layout made from the viewpoint of operators

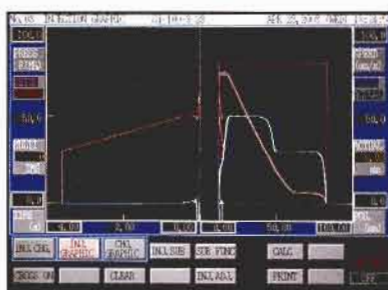
Injection/Metering setup screen

Parameter setting for injection and metering. Set values and measured values are displayed.



Graphic screen of injection

Both set and measured values of speeds and pressures for injection and holding stages are displayed graphically.



Mold movement setup screen

Parameter setting for mold opening and closing as well as ejecting. Setting for mold protection can be made on this screen.



Temperature screen

Temperature setting for heat barrel, hopper throat and mold (option). Measured temperatures are also shown.



Setup value history screen

Every time a setting is changed, the previous setting is recorded for future reference. A maximum of 250 settings can be stored.



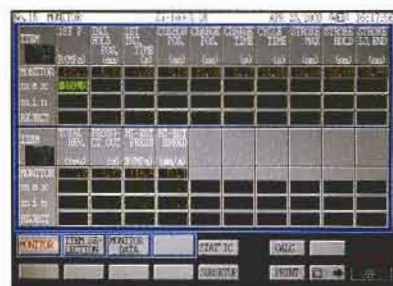
Molding condition memory screen

All the molding parameters are recorded. The internal memory can store 32 mold setups; the memory card, 128 mold setups.



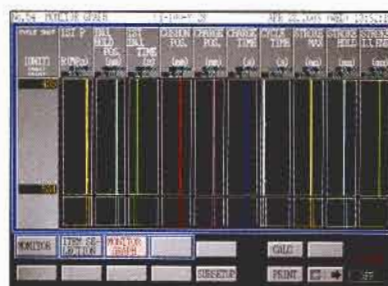
Monitor data screen

Out of a total of 71 monitoring items, a maximum of 32 items are displayed.



Monitor graph screen

The monitored data are displayed graphically. Quality judgment can be made at a glance.



Option selection screen

Various optional signals are easily taken out with a setting on the screen.



Specifications

			SI-35 III					SI-55 III					SI-110 III											
INJECTION	Injection system	—	in-line screw					in-line screw					in-line screw											
	Injection unit type	—	B		C			B		C		D	C		D		E		F					
	Injection stroke	in	2.51	2.83	3.77			2.51	2.83	3.77		4.40	3.77		4.40		5.03	5.66	6.29					
	Screw diameter	in (mm)	0.63 (16)	0.70 (18)	0.78 (20)	0.94 (24)	1.10 (28)	0.63 (16)	0.70 (18)	0.78 (20)	0.94 (24)	1.10 (28)	1.25 (32)	0.94 (24)	1.10 (28)	1.10 (28)	1.25 (32)	1.41 (36)	1.57 (40)	1.57 (40)	1.81 (46)			
	Injection capacity	in³	0.79	1.09	1.40	2.62	3.60	0.79	1.09	1.40	2.62	3.60	4.21	5.49	2.62	3.60	4.21	5.49	6.28	8.97	11.04	12.26	16.23	
	Injection capacity(PS)	oz	0.43	0.59	0.76	1.43	1.96	0.43	0.59	0.76	1.43	1.96	2.29	2.99	1.43	1.96	2.29	2.99	3.84	4.89	6.03	6.69	8.86	
	Standard	Injection unit	—	—			C55U		—			C55U		D75U		C55U		D75U		E75U		F150U		
		Injection rate	in³/s	—			5.5	7.5	—			5.5	7.5	7.5	9.8	5.5	7.5	7.5	9.8	7.4	9.3	11.5	11.5	15.0
		Max. injection speed	in/s	—			7.8		—			7.8		7.8		7.9		7.9		5.9		5.9		
		Max. injection pressure	psi	—			34114	26442	—			34114	26442	34172	26296	34114	26442	34114	26296	31271	27718	22743	31271	24164
		Max. injection holding pressure	psi	—			28429	21321	—			28429	21321	25586	21321	28429	21321	25596	21321	28429	24875	19900	27007	21321
High speed	Injection unit	—	B55U			C75U		B55U			C75U		D150U		C75U		D150U		E200U		F200U			
	Injection rate	in³/s	3.7	4.6	5.7	8.2	11.2	3.7	4.6	5.7	8.2	11.2	11.2	14.7	8.2	11.2	11.2	14.7	14.2	18.0	22.2	16.1	21.3	
	Max. injection speed	in/s	11.8			11.8		11.8			11.8		11.8		11.8		11.8		11.4		8.3			
	Max. injection pressure	psi	34114	34114	29139	34114	26442	34114	34114	29139	34114	26442	34114	26296	34114	26442	34114	26296	31271	27718	22743	31271	24164	
	Max. injection holding pressure	psi	34114	31271	27993	28429	21321	34114	31271	27993	28429	21321	25586	21321	28429	21321	25596	21321	28429	24875	19900	27007	21321	
Super high speed	Injection unit	—	BH75U			—		BH75U			—		—		—		—		—		—			
	Injection rate	in³/s	5.5	7.0	8.6	—		5.5	7.0	8.6	—		—		—		—		—		—			
	Max. injection speed	in/s	17.7			—		17.7			—		—		—		—		—		—			
	Max. injection pressure	psi	34114	34114	29139	—		34114	34114	29139	—		—		—		—		—		—			
	Max. injection holding pressure	psi	31271	31271	27645	—		31271	31271	27645	—		—		—		—		—		—			
CLAMPING	Recovery rate	oz/s	0.11	0.15	0.20	0.35	0.58	0.11	0.15	0.20	0.35	0.58	0.40	0.61	0.35	0.58	0.40	0.61	0.61	0.87	1.11	1.11	1.69	
	Motor capacity	kW	B55U :5.5 BH75U:7.5			C55U:5.5 C75U:7.5		B55U :5.5 BH75U:7.5		C55U:5.5 C75U:7.5		D75U :7.5 D150U:15.0		C55U:5.5 C75U:7.5		D75U :7.5 D150U:15.0		E75U :7.5 E200U:20.0		F150U:15.0 F200U:20.0				
	Screw revolution	min ⁻¹	500			500		500		500		350		500		350		350		350				
	Meterring motor capacity	kW	4.5			5.5		4.5		5.5		7.5		5.5		7.5		9.0		15.0				
	Nozzle pressing force	U.S.ton	1.10			1.64		1.10		1.64		2.19		1.64		2.19		2.74		2.74				
	Clamping system	—	Double toggle					Double toggle					Double toggle											
	Clamping force	U.S.ton	35					55					110											
	Clamping stroke	in	9.05					10.62					14.2											
	Min. mold height	in	4.72					5.90					5.9											
	Max. mold height	in	13.77					14.96					20.1											
OTHERS	Tie bar clearance (H×V)	in	11.41×11.41					12.79×12.79					16.1×16.1											
	Die plate size (H×V)	in	15.74×15.74					18.11×18.11					22.8×22.8											
	Ejector force	U.S.ton	0.88					2.2					2.8											
	Ejector stroke	in	2.36					2.75					3.9											
	Heater capacity	kW	2.05	2.28	2.58	3.55	5.50	2.05	2.28	2.58	3.55	5.50	5.50	5.85	3.45	5.50	5.50	5.85	5.85	6.50	7.95	7.95	11.20	
	Mold height motor output	kW	0.1					0.1					0.2											
	Nozzle touch motor output	kW	0.2					0.2					0.2											
	Machine dimension (L)	in	118.11		126.77	129.33	135.0		136.22	140.0	140.0	143.97	163.41	163.46	163.46	167.44	174.44	177.71	182.36	188.26	191.10			
	Machine dimensions (W×H)	in	34.68×59.05					37.87×62.0					43.1×64.5											
	Power source	—	Three-phase AC200V/200,220V±10% 50Hz/60Hz					Three-phase AC200V/200,220V±10% 50Hz/60Hz					Three-phase AC200V/200,220V±10% 50Hz/60Hz											
Breaker capacity:230V [460V※1]	A	75 [40]					75 [40]					D75U :75 [40] D150U:100 [50]		125										
Total electric capacity	kVA	B55U :9 BH75U:11			11		B55U :9 BH75U:11		11		D75U :11 D150U:20		11		D75U :7.5 D150U:20.0		E75U :11 E200U:26		F150U:20 F200U:27					
Cable size:230V [460V※1]	in²	0.02 [0.01]					0.02 [0.01]		0.02 [0.01]		D75U :0.02 [0.01] D150U:0.03 [0.02]		0.02 [0.01]		0.02 [0.01]		E75U :0.02 [0.01] E200U:0.06 [0.02]		F150U:0.03 [0.01] F200U:0.06 [0.02]					
Machine weight	U.S.ton	2.2			2.4		2.2		2.4		2.6		3.8		4.0		4.2		4.4					

NOTES

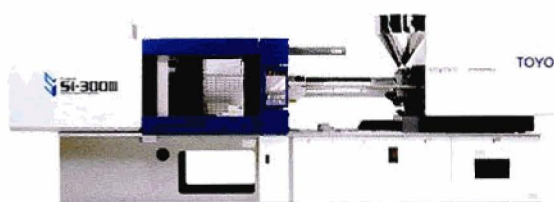
- The figures are subject to change without any legal obligation on the part of the manufacture.
- Maximum injection pressure and Injection holding pressure show in the applicable maximum value and they may be restricted according to the actual molding conditions and cycles.
- The figures for the maximum injection rate and the maximum injection speed are calculated ones.
- Actual injection rate and the injection speed will be restricted by the set pressures.
- When the large size screw unit is mounted on the machine, the some kind of resin are unavailable for molding sometimes.
- Figures in [] are optional.

※1. A transformer(option) is necessary on the machine side.

			SI-150Ⅲ								SI-200Ⅲ								
INJECTION	Injection system	—	in-line screw								in-line screw								
	Injection unit type	—	D		E		F		E			F		G					
	Injection stroke	in	4.40		5.03	5.66		6.29		5.03	5.66		6.29		7.24	7.87			
	Screw diameter	in (mm)	1.10 (28)	1.25 (32)	1.26 (32)	1.41 (36)	1.57 (40)	1.57 (40)	1.81 (46)	1.26 (32)	1.41 (36)	1.57 (40)	1.57 (40)	1.81 (46)	1.81 (46)	1.96 (50)	2.16 (55)		
	Injection capacity	in³	4.21	5.49	6.28	8.97	11.04	12.26	16.23	6.28	8.97	11.04	12.26	16.23	18.67	23.98	28.98		
	Injection capacity(PS)	oz	2.29	2.99	3.84	4.89	6.03	6.69	8.86	3.84	4.89	6.03	6.69	8.86	10.19	13.09	15.83		
	Standard	Injection unit	—	D75U		E75U		F150U		E75U			F150U		G250U				
		Injection rate	in³/s	7.5	9.8	7.4	9.3	11.5	11.5	15.2	7.3	9.3	11.5	11.5	15.2	15.2	17.9	21.7	
		Max. injection speed	in/s	7.9		5.9		5.9		5.9			5.9		5.9				
		Max. injection pressure	psi	34114	26296	31271	27718	22743	31271	24164	31284	27729	22752	31284	24174	31284	27018	22752	
		Max. injection holding pressure	psi	25596	21321	28429	24875	19900	27007	21321	28440	24885	19908	27018	21330	28440	24174	19908	
	High speed	Injection unit	—	D150U		E200U		F200U		E200U			F200U		G300U				
		Injection rate	in³/s	11.2	14.7	14.2	18.0	22.2	16.1	21.3	14.2	18.0	22.3	16.1	21.3	21.3	25.2	30.5	
		Max. injection speed	in/s	11.8		11.4		8.3		11.4			8.3		8.3				
		Max. injection pressure	psi	34114	26296	31271	27718	22743	31271	24164	31271	27718	22742	31271	24164	31271	27007	22742	
		Max. injection holding pressure	psi	25596	21321	28429	24875	19900	27007	21321	28429	24875	19900	27007	21321	28429	24164	19900	
	Super high speed	Injection unit	—	—								—							
		Injection rate	in³/s	—								—							
		Max. injection speed	in/s	—								—							
		Max. injection pressure	psi	—								—							
		Max. injection holding pressure	psi	—								—							
	Recovery rate (PS)	oz/s	0.40	0.61	0.61	0.87	1.11	1.11	1.69	0.61	0.87	1.11	1.11	1.69	1.54	1.96	2.22		
	Motor capacity	kW	D75U :7.5 D150U:15.0		E75U :7.5 E200U:20.0		F150U:15.0 F200U:20.0		E75U :7.5 E200U:20.0			F150U:15.0 F200U:20.0		G250U:25.0 G300U:30.0					
	Screw revolution	min ⁻¹	350		350		350		350			350		300					
	Metering motor capacity	kW	7.5		9.0		15.0		9.0			15.0		25.0					
	Nozzle pressing force	U.S.ton	2.19		2.74		2.74		2.74			2.74		2.74					
CLAMPING	Clamping system	—	Double toggle								Double toggle								
	Clamping force	U.S.ton	150								200								
	Clamping stroke	in	15.74								18.50								
	Min. mold height	in	5.91								7.87								
	Max. mold height	in	21.65								23.62								
	Tie bar clearance (HXV)	in	18.11×18.11								22.04×22.04								
	Die plate size (HXV)	in	25.20×25.20								30.70×30.70								
	Ejector force	U.S.ton	3.9								3.85								
	Ejector stroke	in	3.94								4.72								
OTHERS	Heater capacity	kW	5.50	5.85	5.85	6.50	7.95	7.95	11.20	5.85	6.50	7.95	7.95	11.20	11.20	13.50	16.70		
	Mold height motor output	kW	0.2								0.2								
	Nozzle touch motor output	kW	0.2								0.2								
	Machine dimension (L)	in	178.6		179.4	182.7	186.5	193.2	198.6	212.83		216.41	223.07	228.46	234.01	237.4	246.1		
	Machine dimensions (WXH)	in	46.7×66.3								51.61×70.87								
	Power source	—	Three-phase AC200V/200,220V±10% 50Hz/60Hz								Three-phase AC200V/200,220V±10% 50Hz/60Hz								
	Breaker capacity:230V [460V※1]	A	175								225								
	Total electric capacity	kVA	D75U :14 D150U:20		E75U :14 E200U:26		F150U:20 F200U:27		E75U :14 E200U:26			F150U:20 F200U:27		G250U:27 G300U:37					
	Cable size:230V [460V※1]	in²	0.02 [0.01]		E75U :0.02 [0.01] E200U:0.05 [0.02]		F150U:0.03 [0.02] F200U:0.05 [0.02]		E75U :0.02 [0.01] E200U:0.05 [0.02]			F150U:0.03 [0.02] F200U:0.05 [0.02]		G250U:0.05 [0.02] G300U:0.05 [0.03]					
Machine weight	U.S.ton	5.2		5.4		5.6		7.4			7.6		7.8						

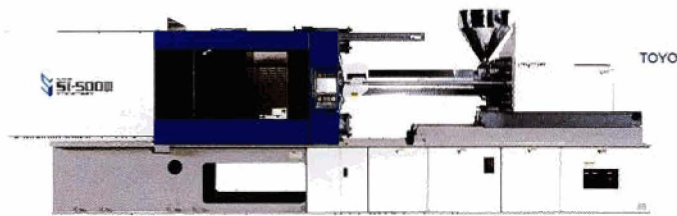
Specifications

Si-300Ⅲ

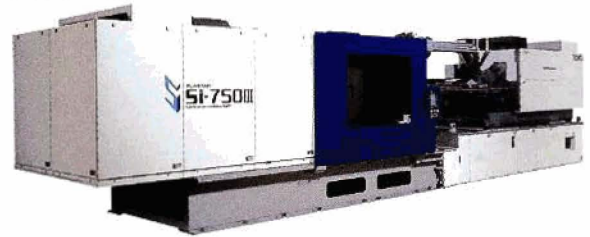


		SI-300Ⅲ						SI-400Ⅲ							
INJECTION	Injection system	—	in-line screw						in-line screw						
	Injection unit type	—	H			I			I			J			
	Injection stroke	in	7.87	8.66		8.66	10.62		8.66	10.62		10.62	12.04		
	Screw diameter	in (mm)	1.96 (50)	2.16 (55)	2.36 (60)	2.16 (55)	2.36 (60)	2.67 (68)	2.16 (55)	2.36 (60)	2.67 (68)	2.36 (60)	2.67 (68)	2.95 (75)	
	Theoretical injection capacity	in³	23.98	31.85	37.96	31.85	46.56	59.81	31.85	46.56	59.81	46.56	67.80	82.45	
	Injection capacity(PS)	oz	13.16	17.49	19.78	17.49	25.56	32.83	17.49	25.56	32.83	25.56	37.22	45.26	
	Standard	Injection unit	—	H370U			I450U			I450U			J450U		
		Injection rate	in³/s	23.98	28.99	34.48	28.99	34.48	44.30	28.99	34.48	44.30	31.00	39.85	48.52
		Max. injection speed	in/s	7.87			7.87			7.87			7.08		
		Max. injection pressure	psi	34085	28428	24164	34114	28428	21321	34114	28428	21321	29841	24164	19894
	High speed	Max. injection holding pressure	psi	31271	25585	21321	28428	24164	18478	28428	24164	18478	26999	21321	17057
		Injection unit	—	—			—			—			—		
		Injection rate	in³/s	—			—			—			—		
		Max. injection speed	in/s	—			—			—			—		
	Super high speed	Max. injection pressure	psi	—			—			—			—		
		Max. injection holding pressure	psi	—			—			—			—		
		Injection unit	—	—			—			—			—		
		Injection rate	in³/s	—			—			—			—		
	CLAMPING	Max. injection speed	in/s	—			—			—			—		
		Max. injection pressure	psi	—			—			—			—		
		Max. injection holding pressure	psi	—			—			—			—		
Recovery rate (PS)		oz/s	1.96	2.22	2.37	2.22	2.37	3.29	2.22	2.37	3.29	2.06	2.86	3.78	
Screw revolution speed		min ⁻¹	300						300			260			
Nozzle pressing force		U.S.ton	3.30			4.40			4.40						
Clamping system		—	Double toggle						Double toggle						
Clamping force		U.S.ton	300						400						
Clamping stroke		in	22.83						25.59						
Min. mold height		in	9.84						11.81						
Max. mold height		in	27.55						30.31						
OTHERS		Tie bar clearance (H×V)	in	28.74×28.74						31.88×31.88					
	Die plate size (H×V)	in	37.00×37.00						41.33×41.33						
	Ejector force	U.S.ton	7.92						7.92						
	Ejector stroke	in	5.51						5.90						
	Heater capacity	kW	13.50	16.70	19.50	16.70	19.50	24.80	16.70	19.50	24.80	19.50	24.80	31.20	
	Mold height motor output	kW	0.4						0.75						
	Nozzle touch motor output	kW	0.4						0.4						
	Machine dimension (L)	in	252.12	254.84	261.61	266.18	271.85	281.92	280.94	286.61	296.69	293.11	299.72	312.08	
	Machine dimensions (W×H)	in	62.24×85.90						65.55×93.58						
	Power source	—	Three-phase AC200V/200,220V±10% 50Hz/60Hz												
Main breaker capacity:200V [400V ※1]	A	300						350							
Total electric capacity	kVA	56	58	60	65	67	71	65	67	71	67	71	75		
Cable size:200V Class [400V Class ※1]	in²	0.15 [0.05]						0.15 [0.05]							
Machine weight	U.S.ton	19.25			19.80			22.0			23.1				

Si-500 III



Si-750 III



		SI-500Ⅲ									SI-750Ⅲ					
INJECTION	Injection system	—	in-line screw									in-line screw				
	Injection unit type	—	I			J			K			L		M		
	Injection stroke	in	8.66	10.62		10.62	12.04		12.04	14.76		17.72		19.69		
	Screw diameter	in (mm)	2.16 (55)	2.36 (60)	2.67 (68)	2.36 (60)	2.67 (68)	2.95 (75)	2.67 (68)	2.95 (75)	3.26 (83)	3.54 (90)	3.94 (100)	3.94 (100)	4.33 (110)	
	Theoretical injection capacity	in³	31.85	46.56	59.81	46.56	67.80	82.45	67.80	101.07	123.77	174.4	216.0	240.1	290.0	
	Injection capacity(PS)	oz	17.49	25.56	32.83	25.56	37.22	45.26	37.22	55.48	67.95	95.6	118.4	131.5	159.2	
	Standard	Injection unit	—	I450U			J450U			K600U			L750U		M750U	
		Injection rate	in³/s	28.99	34.48	44.30	31.00	39.85	48.52	39.85	48.52	59.38	62.0	76.8	72.0	86.9
		Max. injection speed	in/s	7.87			7.08			7.08			6.30		5.90	
		Max. injection pressure	psi	34114	28428	21321	29841	24164	19894	31262	25578	21315	27018	22041	27018	22041
		Max. injection holding pressure	psi	28428	24164	18478	26999	21321	17052	28428	22736	18478	24174	19908	24174	19908
High speed	Injection unit	—	—			—			—			—		—		
	Injection rate	in³/s	—			—			—			—		—		
	Max. injection speed	in/s	—			—			—			—		—		
	Max. injection pressure	psi	—			—			—			—		—		
	Max. injection holding pressure	psi	—			—			—			—		—		
Super high speed	Injection unit	—	—			—			—			—		—		
	Injection rate	in³/s	—			—			—			—		—		
	Max. injection speed	in/s	—			—			—			—		—		
	Max. injection pressure	psi	—			—			—			—		—		
	Max. injection holding pressure	psi	—			—			—			—		—		
CLAMPING	Recovery rate (PS)	oz/s	2.22	2.37	3.29	2.06	2.86	3.78	2.20	2.91	3.89	4.41	6.00	5.64	7.41	
	Screw revolution speed	min ⁻¹	300			260			200			170		160		
	Nozzle pressing force	U.S.ton	4.40									4.41				
	Clamping system	—	Double toggle									Double toggle				
	Clamping force	U.S.ton	500									750				
	Clamping stroke	in	31.49									39.37				
	Min. mold height	in	13.77									17.72				
	Max. mold height	in	35.43									43.31				
	Tie bar clearance (HXV)	in	36.02×36.02									45.08×45.08				
	Die plate size (HXV)	in	48.03×48.03									60.63×60.63				
	Ejector force	U.S.ton	11.0									16.5				
Ejector stroke	in	7.08									7.87					
OTHERS	Heater capacity	kW	16.70	19.50	24.80	19.50	24.80	31.20	24.80	31.20	38.80	49.4	53.4	53.4	57.4	
	Mold height motor output	kW	0.75									0.2				
	Nozzle touch motor output	kW	0.4									0.2				
	Machine dimension (L)	in	311.61		317.79	314.21	320.82	333.18	326.14	335.23	342.08	426.2	435.1	442.8	451.6	
	Machine dimensions (W×H)	in	72.55×90.96									92.6×96.7		92.6×99.6		
	Power source	—	Three-phase AC200V/200,220V±10% 50Hz/60Hz													
	Main breaker capacity:200V [400V ※1]	A	400 [200]									500 [250]				
	Total electric capacity	kVA	71			75			98			125		131		
	Cable size:200V Class [400V Class ※1]	in²	0.15 [0.05]						0.23 [0.09]			0.31 [0.155]				
Machine weight	U.S.ton	25.3			25.3			26.4			48		50			

NOTES

• Figures in [] are optional.

※1.A transformer(option) is necessary on the machine side.

Standard/Optional Features

	Number	Feature	Standard	Optional
Injection	1	SRC-Ⅱ metering system	●	
	2	SRC-Ⅲ metering system		○
	3	SNF control	●	
	4	Closed-loop control of Injection speed, position and pressure	●	
	5	Programmable control of injection (2 to 7 steps)	●	
	6	Programmable control of metering (1 to 3 steps)	●	
	7	Holding pressure changeover via position, time and pressure	●	
	8	Slope control of injection	●	
	9	Suck-back control (before and after metering)	●	
	10	No-back pressure metering in manual mode	●	
	11	Injection during high-pressure clamping	●	
	12	Injection unit swiveling mechanism (with nozzle alignment mechanism)	●	
	13	Melt run-out detection system	●	
	14	Automatic purging system	●	
	15	Purge cover (with interlock)	●	
	16	High-pressure injection design (for C, D injection units only)		○
	17	Non-standard diameter screw and barrel		○
	18	Wear-resistant screw and barrel		○
	19	Specially designed screw *1		○
	20	Nozzle reciprocating function	●	
	21	Air-operated check nozzle		○
	22	Long nozzle		○
	23	Long nozzle in small diameter		○
	24	Separable nozzle		○
	25	Hopper throat temperature control (PID)	●	
	26	Heater SSR control	●	
	27	Heater temperature holding control	●	
	28	5-zone heater *2 (4-zone heater for φ24 screw unit or smaller)	●	
	29	High temperature use heater band (up to 842°F)		○
Clamping	30	Closed-loop control of speed and position for mold opening and closing	●	
	31	Closed-loop control of ejection speed and position	●	
	32	Programmable control of mold opening (2 to 5 steps)	●	
	33	Programmable control of mold closing (3 to 5 steps)	●	
	34	Mold exchanging mode (low pressure, low speed)	●	
	35	Automatic clamping force setup system *3	●	
	36	Low pressure mold protection system	●	
	37	Mold protection in mold opening and ejecting	●	
	38	Movable die plate supported by double rollers	●	
	39	Double safety system (electrical and mechanical)	●	
	40	Emergency stop pushbutton (for operation and non-operation sides)	●	
	41	Air ejector (single or dual lines)		○
	42	3-way valve for air ejector (single or dual lines)		○
	43	Air-driven core system (single)		○
	44	Hydraulic core system (single, independent hydraulic unit)		○
	45	Programmable control of ejector forwarding (1 to 3 steps)	●	
	46	Ejecting during mold opening (with timer)	●	
	47	Mold ejector plate return detector (metal contacts)		○
	48	Mold temperature display (2 lines; with magnet sensor)		○
	49	Mold temperature control (2 lines; with magnet sensor)		○
	50	T-slotted die plate For SI-150Ⅲ to 200Ⅲ	◎	
	51	Heat insulating board General or high precision		○
	52	Reversible chute		○

In the above table:

- Standard
- Options which can be fitted after shipment
- ◎ Options which should be fitted at TOYO

*1. For further details on the specially designed screw, contact us.

*2. The standard band heater can be used for temperatures up to 660°C.
For higher temperatures, use the high temperature band heater.

*3. When a specially designed mold is used, consult us.

	Number	Feature	Standard	Optional
Control	53	PLCS-11 microprocessor-aided control (TFT color LCD with full touch panel)	●	
	54	Digital setting of all the parameters	●	
	55	Internal memory of 32 mold setups	●	
	56	Graphic display of injection and metering motion	●	
	57	Monitor graph indication	●	
	58	Statistical processing of monitored data	●	
	59	Manned/Unmanned mode switching function	●	
	60	Hour meter (operated hours indication)	●	
	61	Multi-counter (injection, lot, repeating lot, warning bell, initial rejection, continuous failures, operation)	●	
	62	Monitoring function (32 items selected from a total of 71 items including positions, speeds, pressures, times, revolutions)	●	
	63	Alarm function (cycle, up-down tolerance, heater disconnection, thermocouple disconnection, safety door, etc.)	●	
	64	Machine conditions display (operating mode, completion of clamping, ejector retraction limit)	●	
	65	Production control function (job completion ratio, prospective time of job completion, etc.)	●	
	66	Maintenance function (1-cycle graphic, alarm history, grease timing display, servo amplifier communication)	●	
	67	Self-diagnostic function	●	
	68	Screw cold-start prevention system	●	
	69	Fine PID temperature control (with slope ramp up)	●	
	70	PID automatic tuning function	●	
	71	One week automatic heater on-off calendar	●	
	72	RS-232C interface (1 port)	●	
	73	Vacuum device interface		○
	74	Valve gate interface		○
	75	Conveyor starting interface		○
	76	Automatic mold clamping device interface		○
	77	Quality control system (A++)		○
	78	Quality control system (network-capable)		○
	79	Production control system		○
	80	Injection compression system Standard specification		○
	81	Pre-gating system		○
	82	Holding pressure vibration system		○
	83	Indicator light of one color (in red)		○
	84	Indicator light of three colors (selectable: red, yellow, blue)		○
	85	Unscrewing motor connecting circuit (with socket)		○
	86	Printer output (molding conditions, monitoring data, screen)	●	
	87	100 V plug socket for printer (1 port)	●	
	88	100 V plug socket (2 ports, power source by customer)		○
	89	100 V plug socket (2 ports, with transformer of 5 A each)		○
	90	200 V plug socket (4 ports, 2 lines of 30 A)		○
	91	200 V plug socket (4 ports, 2 lines of 30 A, with breaker)		○
	92	Various signal outputs (4 non-voltage normally-open contacts)		○
	93	Kanji character printer (monochrome)		○
	94	Local-language display (Japanese, Chinese, Thai, Korean, Hebrew, Spanish, Turkish)		○
	95	Bilingual display (2 languages selectable)		○
	96	Compatibility with various voltage source (with transformer)		○
	97	Setting value history	●	
Other	98	Automatic greasing device	●	
	99	Automatic entire grease lubricating device		◎
	100	Mold cooling water line		○
	101	Cooling water flow gauge		○
	102	Memory card (for 128 mold setups)	●	
	103	Unloader interface	●	
	104	Rubber pads		○
	105	Accessories (mold clamp, tool, backup grease, hand grease pump)	●	
	106	Chute Si-110Ⅲ and below Si-150Ⅲ to SI-200Ⅲ	●	○
	107	Auxiliary step		○

Si-35III



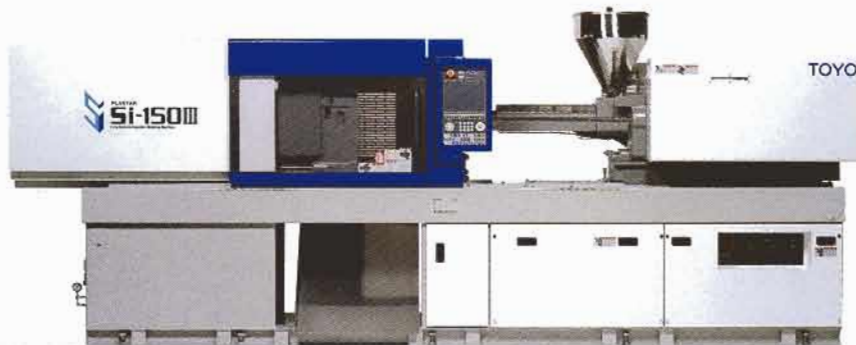
Si-55III



Si-110III



Si-150III



Si-200III



Fully Electric Injection Molding Machine

Standard/Optional Equipment

