

Plastic Injection Molding Machine

HL2 SERIES



H SERIES

Evolution 2



Now the TOYO H series has hit the next plateau with the latest controller, the PLCS - 11.

This controller has been widely accepted by many Toyo All Electric machine users worldwide.

The new H₂ series has become one of the most reliable and most user friendly hydraulic injection molding machines in the world plastics processing industry today.

Totally Integrated Control Panel
All the settings and functions are made on the panel.

- One-touch cursor movement
- High brightness, 10.4" TFT color LCD
- Practical screen layout

All the operation switches are incorporated in the control panel. And a full touch screen panel is adopted for better man-machine interface.

The control panel can be positioned for perfect visibility of the screen and for easier key operation.



The control panel is designed with a replaceable plastic cover for long term reliability and constant use.

NEW 11 Programmable Logic Control System PLCS-11



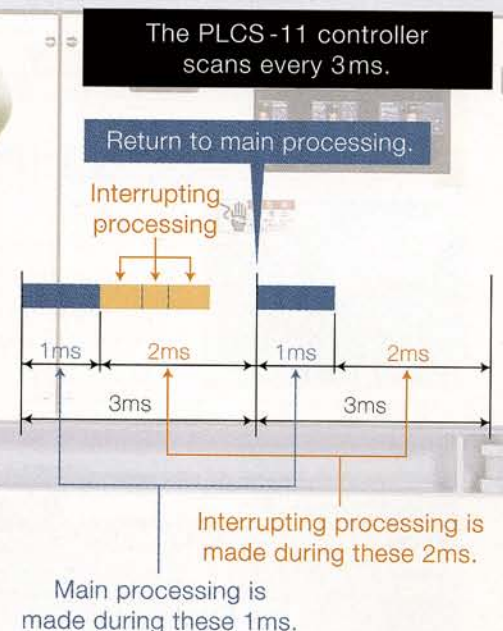
- High speed 32-bit RISC microcomputer makes response three times quicker.

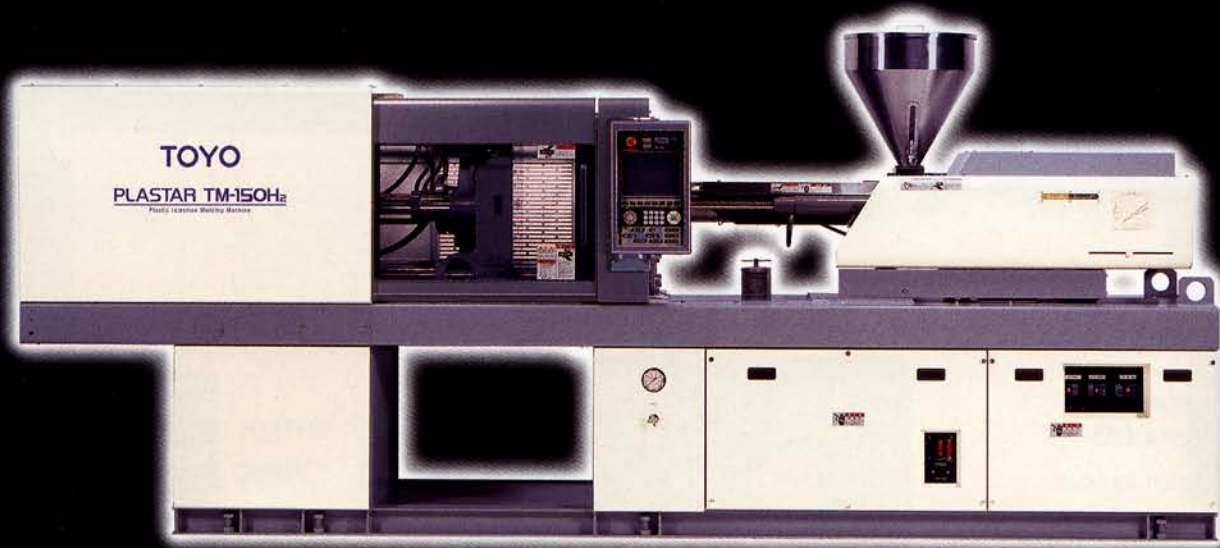
With the adoption of a high speed 32-bit RISC processor, the scanning rate is greatly reduced. This gives greater accuracy at injection change over positions and shot to shot repeatability. Monitored data is also improved tremendously.



32-bit RISC processor 【SH-4】

- Improved monitoring accuracy and stabilized cycle time





TOYO's own technology is incorporated into a streamlined design.

VERSATILITY

A wide variety of TOYO screws are dedicated to specific applications.

● Wide variety of screws

Utilizing Toyo's see through barrel technology. Toyo has developed a wide variety of specially designed screws. The barrel units of the H2 Series are ideal for melt flow, temperature stability and heat capacity, insuring better plasticizing.



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

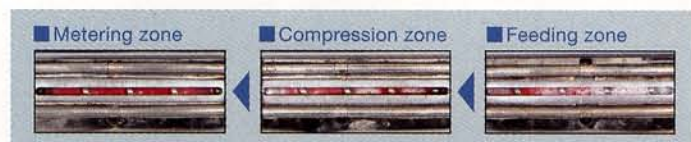
In addition, screw units for optical products and connectors are available.

□ Plasticizing test using the see through barrel



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

□ Plasticizing condition in barrel (PP with 0.5wt% of red color)



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

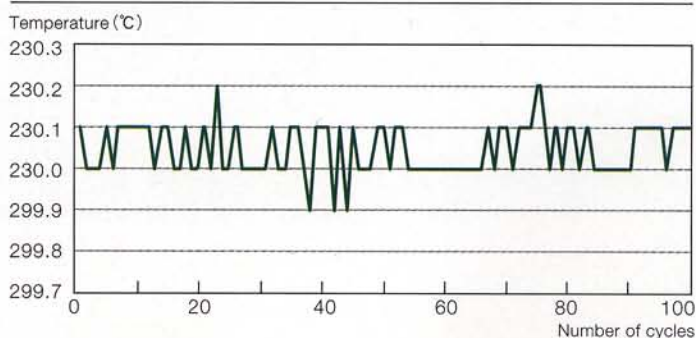
CONSISTENCY

Variation is held to a minimum

● Temperature fluctuation is held within $\pm 0.2^\circ\text{C}$.

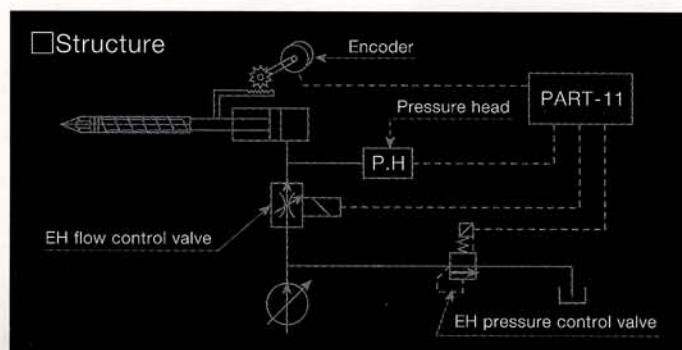
With the H2 series, the temperature fluctuations are kept within $\pm 0.2^\circ\text{C}$ all the way through the metering process, including the hopper area. This insures a more accurate metering consistency.

□ Cycle to cycle temperature fluctuation at Heater 1 zone



● Soft Feedback System Enhances Precision and Stability

Injection speeds and pressures are fed back to the PLCS-11 control and any variations between actual and setup values are corrected. Initial speeds and pressures are based on calibration (Electro-Hydraulic auto adjustment) settings, so deviations are held to a minimum.



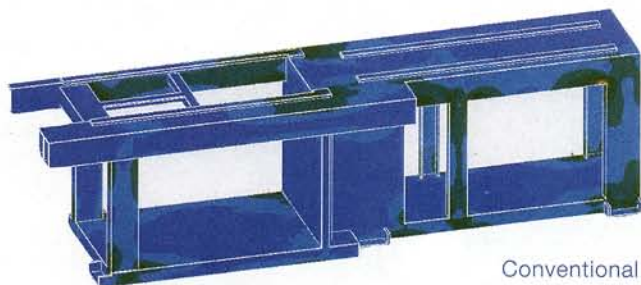
ACCURACY

Robust mechanism assures high accuracy for many years.

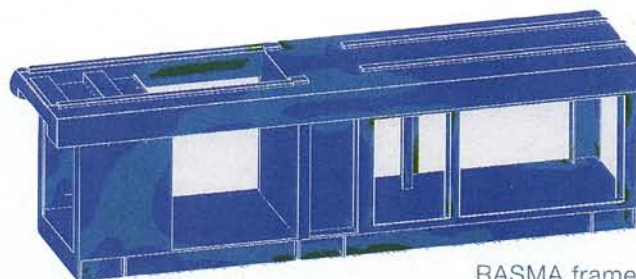
● Ultra-rigid “RASMA” machine frame

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.

■ CAE analysis of RASMA and conventional frames.



Conventional frame



RASMA frame

Rigid And Strong Machine frame

■ Features

- ◆ Die Platen 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

● Double nozzle pull-in cylinders and double supporting rollers

To handle heavy molds, the movable die plate is supported by double rollers, and the nozzle is sealed by two cylinders to maintain precision alignment.



Nozzle is sealed by two cylinders

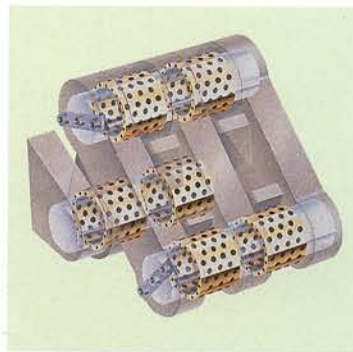


Double rollers

● Lubrication-free toggle mechanism

The lubrication-free toggle mechanism eliminates the need for daily greasing and the possibility of products being stained by excess grease.

(USA PAT. No.4773845)



Lubrication-free toggle

MAINTENANCE

Oil maintenance is a prerequisite for precision molding

● Double oil temperature management system

Combining a hydraulic fluid pre-heat system and a hydraulic fluid temperature control system, the hydraulic fluid temperature is quickly brought up to the preset level and is kept constant.



Oil temperature control device

● Oil cleaner is standard.

H2 series is equipped with an oil cleaner. It filters oil eliminating fine particles.



Oil cleaner

● Key parts used in the hydraulic circuits are machined in-house and cleaned thoroughly.

● Thanks to thorough oil management, hydraulic oil can be used longer and less amount of cooling water is required when compared to ordinary injection molding machine.

PLCS-11

Power switch for heater and motor

Emergency stop button on the operation side

Screen selection switch

Operating mode keys

Operation keys

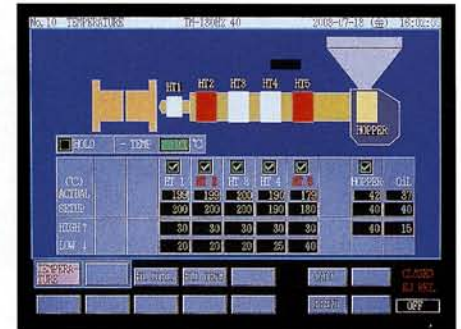


10.4 inch TFT color LCD with full touch panel

Condition setting keys

Slot for memory card

Temperature screen



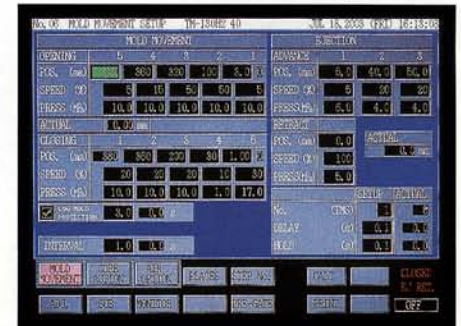
Barrel temperatures can be set along with hopper throat temperature. Mold temperatures can be set and monitored as well. (Options)

Injection, Charging Setup screen



Setting of injection (2-5 steps) and metering (1-6 steps) parameters and indication of measured values.

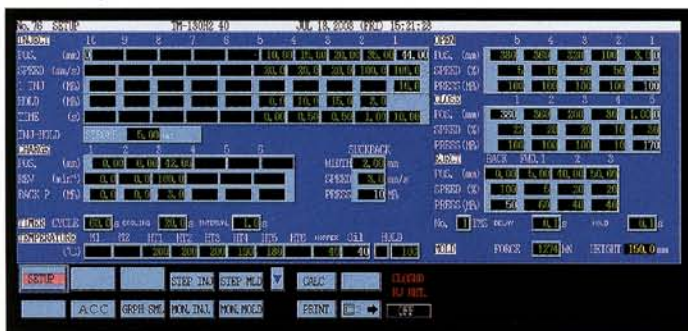
Mold Movement Setup screen



Setting of mold opening (2-10 steps) mold closing (3-5 steps) and ejecting (1-3 steps) for advancing)

Molding condition setting

Setup screen



Most of the essential parameters can be setup in one screen.

Molding data management

Data Memory screen



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

Letter Entry window screen



Job name or any remarks can be recorded in six kinds of letters and characters.

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.

ALL NEW

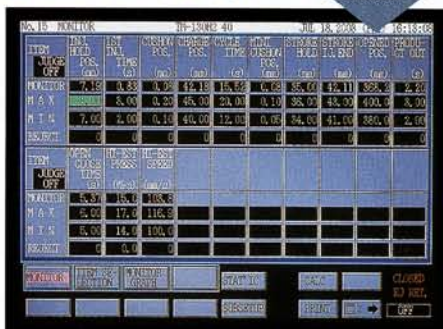
□ Molding status observation

■ Process monitoring parameters



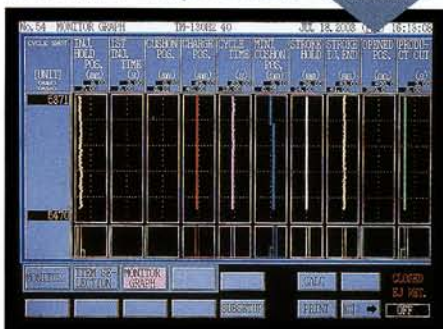
Out of 83 items that can be monitored, 32 can be displayed at any time. They can be viewed numerically or in graph form. This is so a quality judgment can be made at a glance.

■ Monitor screen



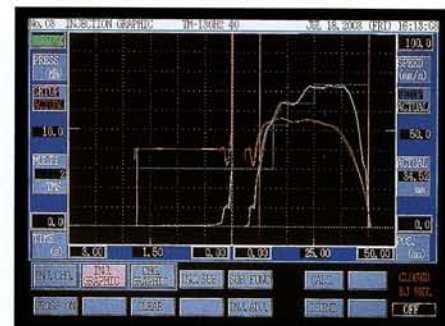
Monitor items are chosen.

■ Monitor Graph screen



Monitored data are visualized.

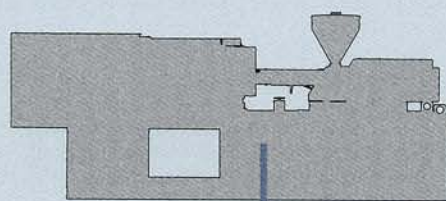
■ Injection Graph screen



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

■ Quality control software

Quality control can be made with your PC.



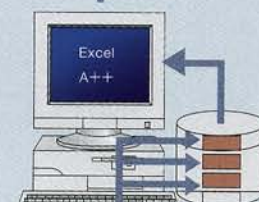
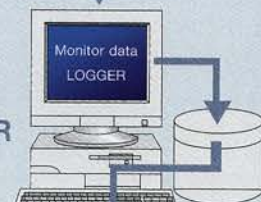
■ RS-232C

- Monitor data output

■ Quality control A++

- Dot graph and distribution chart of selected file
- File changeover every specified cycles

■ Monitor data LOGGER



Network (Windows 2000/XP)

□ Versatile function

■ Signal Select screen



Various optional outputs can be selected on screen.

■ Language selection



▲ Japanese



▲ English



▲ Chinese

Language on the screen can be chosen from English, Chinese, Thai, Korean, Spanish, Turkish (Option)

■ Heater PID Auto-Tuning screen



PID factors for each channel can be automatically tuned to proper values.

☐ Main Specifications

			Unit	TM-110H ₂			TM-150H ₂		TM-200H ₂		
▼ Injection Unit											
Injection system			—	In-line screw			In-line screw		In-line screw		
Injection stroke			in	5.70			6.30		7.87		
Screw diameter			in mm	1.26 32	1.42 36	1.57 40	1.57 40	1.81 46	1.81 46	1.97 50	2.17 55
Nominal Injection capacity			in ³	7.1	9.0	11.1	12.2	16.2	20.3	24.0	29.0
Injection rate	High pressure	in ³ /sec	6.7	8.4	10.4	9.0	12.0	9.3	11.0	13.2	
	High velocity	in ³ /sec									
Injection pressure	High pressure	psi	34,128	29,748	24,088	27,971	21,145	31,995	27,075	22,382	
	High velocity	psi									
Plastication capacity			oz/sec	0.5	0.6	0.7	0.8	1.1	1.1	1.5	1.9
Screw revolution			r.p.m. min ⁻¹	10~320			10~280		10~199・10~285		
Nozzle pressing force			U.S. ton	6.3			6.3		6.3		
Hopper capacity			gal	10.6			14.5		14.5		
Screw drive system			—	Hydraulic motor			Hydraulic motor		Hydraulic motor		

☐ Clamping Unit

Clamping system		—	Double toggle			Double toggle		Double toggle		
Clamping force		U.S. ton	110			150		200		
Clamping stroke		in	14.17			15.75		18.50		
Min. mold height		in	5.91			5.91		7.87		
Max. mold height		in	16.93			17.72		19.69		
Tie bar clearance (H×V)		in	16.14×16.14			18.11×18.11		22.05×22.05		
Die plate size (H×V)		in	22.83×22.83			25.20×25.20		30.71×30.71		
Ejector force		U.S. ton	4.5			4.5		6.2		
Ejector stroke		in	3.15			3.94		4.72		

☐ Others

Heater capacity		kW	6.15			7.2		11.2		
Pump motor		kW (hp)	18.5 (25)			18.5 (25)		22.0 (30)		
Mold height adjust motor		kW (hp)	0.2 (1/4)			0.2 (1/4)		0.2 (1/4)		
Oil tank capacity		gal	42.3			47.6		52.8		
Machine dimension (L×W×H)		in	167.3×42.4×72.7			177.9×46.1×77.2		211.7×50.4×78.0		
Main breaker capacity	230V class	A	200			200		225		
	460V class		75			75		125		
Power source capacity		KVA	32			34		42		
Power cable size	230V class	mm ² (A.W.G ※1)	60 (2/0)			60 (2/0)		60 (2/0)		
	460V class		22 (4)			22 (4)		22 (4)		
Machine weight		U.S. ton	5.2			5.8		7.7		

Notes : 1. Figures in are for the standard-sized screw.

2. The figures are subject to change without any legal obligation on the part of the manufacturer.

3. ※1 A.W.G stands for American Wire Gauge.

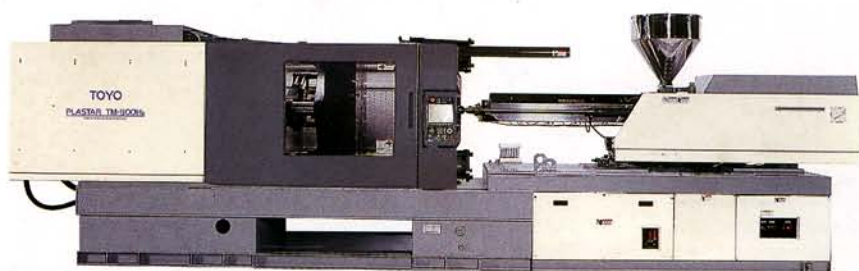
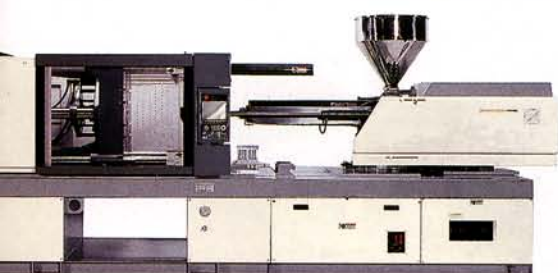
☐ H₂ series line-up



SPECIFICATIONS

TM-245H ₂			TM-300H ₂			TM-400H ₂			TM-500H ₂		
In-line screw			In-line screw			In-line screw			In-line screw		
8.66			10.63			12.05			14.76		
2.17 55	2.36 60	2.68 68	2.36 60	2.68 68	2.95 75	2.68 68	2.95 75	3.27 83	2.95 75	3.27 83	3.54 90
31.9	38.0	48.7	46.6	59.8	72.6	67.8	82.4	101.0	101.0	123.7	145.5
15.7	18.7	24.1	18.4	23.7	28.8	23.4	28.4	34.8	30.6	37.4	44.0
25,724	21,614	16,833	26,847	20,903	17,178	25,397	20,875	17,050	24,714	20,178	17,164
1.9	2.0	2.3	1.9	2.4	2.9	2.4	2.8	2.9	2.4	2.9	3.4
10~183・10~261			10~181・10~257			10~203・10~260			10~162・10~202		
6.3			8.7			8.7			8.7		
14.5			33.0			33.0			33.0		
Hydraulic motor			Hydraulic motor			Hydraulic motor			Hydraulic motor		
Double toggle			Double toggle			Double toggle			Double toggle		
242			300			400			500		
20.47			22.83			27.55			33.50		
9.84			9.84			11.81			13.78		
25.59			25.60			29.52			36.22		
24.02×24.02			28.74×28.74			31.89×31.89			34.25×34.25		
32.28×32.28			37.00×37.00			41.34×41.34			43.90×43.90		
7.2			8.3			10.6			14.7		
5.12			5.51			6.30			7.09		
15.8			19.2			25.6			31.6		
30.0 (40)			37.0 (50)			45.0 (60)			55.0 (75)		
0.4 (1/2)			0.4 (1/2)			0.75 (1)			0.75 (1)		
79.3			118.9			132.0			171.7		
233.6×54.6×82.1			260.0×68.3×87.8			275.6×72.8×95.3			319.6×74.0×95.4		
225			225			300			400		
125			125			150			200		
55			68			84			104		
60 (2/0)			60 (2/0)			100 (3/0)			150 (4/0)		
22 (4)			22 (4)			38 (1)			60 (2/0)		
10.5			14.3			17.6			23.1		

LINE-UP





EQUIPMENT

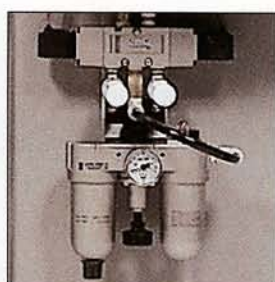
☐ Available Equipment



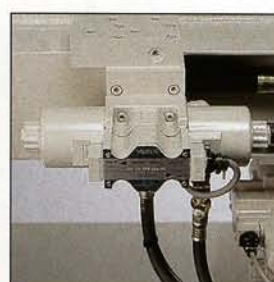
10 Purge cover
(with an interlock)



15 Pneumatic check nozzle



37 Pneumatic core pulling
device (single)



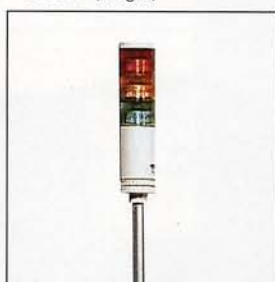
38 Hydraulic core pull
(single, dual)



41 Ejector-in-mold return
confirmation



46 Heat insulation board
(general, precision)



79 Alarming light



101 Cooling water flow gauge



40 Ejector on the fly
(position control)

☐ Substantial Standard Features and Abundant Options

No.	Item	Standard	Option
▼Injection			
1	Multi-step injection control (2-10 steps)	●	
2	Multi-step metering control (1-6 steps)	●	
3	Holding pressure changeover via position, time and pressure	●	
4	Injection slope control	●	
5	Suckback (before and after metering)	●	
6	No back pressure metering in manual mode	●	
7	Injection unit swiveling device (with nozzle alignment mechanism)	●	
8	Melt run-out detection system	●	
9	Programmable melt purging system	●	
10	Purge cover (with an interlock)	●	
11	Non-standard size screw and barrel		○
12	Wear-resistant screw and barrel		○
13	Special purpose screw ※1		○
14	Sprue break	●	
15	Pneumatic check nozzle		○
16	Long nozzle		○
17	Nozzle separated from barrel head		○
18	PID temperature control for hopper throat	●	
19	SSR control for heaters	●	
20	Heater temperature holding control	●	
21	5-zone heater control ※2	●	
22	Heater for high temperature use (Max. indication 500°C) ※2		○
23	Hopper (with a shutter)	●	
24	Hopper swiveling device	●	
25	Accumulator-aided injection system (closed-loop control for speed and pressure)		◎
▼Clamping			
26	Multi-step mold opening control (2-5 steps)	●	
27	Multi-step mold closing control (3-5 steps)	●	
28	Mold exchanging mode (low pressure and speed)	●	
29	Automatic clamping force setup system ※3	●	
30	Low pressure mold protection system	●	
31	Mold protection in mold opening and ejecting	●	
32	Double-roller-supported movable die plate	●	
33	Triple safety device (electric, mechanical, hydraulic)	●	
34	Emergency stop pushbutton (front and rear)	●	
35	Air blow-off device (single, dual)		○
36	3-way valve for air blow-off device (single, dual)		○
37	Pneumatic core pulling device (single)		○
38	Hydraulic core pull (single, dual)		○
39	Multi-step ejector advance control (1-3 steps pressure control)	●	
40	Ejector on the fly (position control)		○
41	Ejector-in-mold return confirmation		○
42	Mold temperature indication (dual, with sensor)		○
43	Mold temperature control (dual, with sensor)		○
44	Locating ring		◎
45	T-throttled die plate	300Hz to 500Hz : ● 110Hz to 245Hz : ◎	
46	Heat insulation board (general, precision)		○
47	Mold height extension	245Hz and up : 3.93 in : ● 110Hz : 2.36 in : ◎ 150Hz and 200Hz : 3.93 in : ◎	
48	Mechanical stopper for mold opening (not available for 350Hz and 450Hz)	●	
49	Reversible chute		○
▼Control			
50	PLCS-11 control system (TFT color LCD, full touch panel)	●	
51	Digital setting for all the machine parameters	●	
52	Internal memory for 32 mold setups	●	
53	Graphic display of injection and metering motion	●	
54	Monitor graph indication	●	

※1 Please consult us for special screws.

※2 The standard heaters can be used for temperatures up to 350°C

※3 Consult us when you use special molds.

No.	Item	Standard	Option
55	Statistical processing of monitored data (SPC)	●	
56	Manned-unmanned operation selection	●	
57	Hour meter	●	
58	Counters (cycle, lot, initial purge, etc.)	●	
59	Monitoring function (32 items selected from 83 items including positions, speeds, pressures, times, revolutions)	●	
60	Alarm function (cycle time, up-down tolerance, heater disconnection, thermocouple disconnection, safety door, etc.)	●	
61	Machine status indication (operation mode, mold clamping completion, ejector-retraction completion)	●	
62	Production control function (Job completion ratio, prospective time of job completion, etc.)	●	
63	Maintenance function (one cycle graph, alarm history)	●	
64	Self-diagnosing function	●	
65	Screw cold-start prevention system	●	
66	Fine PID temperature control (with slope ramp up)	●	
67	PID auto-tuning function	●	
68	One week automatic heater on-off calendar	●	
69	RS-232C interface (1 pc.)	●	
70	Interface for vacuum device		○
71	Valve gate interface		○
72	Conveyor starting interface		○
73	Interface for automatic mold clamping device		○
74	Quality control system (A++)		○
75	Quality control system (Network adaptable)		○
76	Production control system		○
77	Pre-gate device (2 types)		○
78	Alarming light (red)		○
79	Alarming light (red, yellow, green, with mode selection)		○
80	Circuit for unscrewing motor (with a socket)		○
81	Printer terminal	●	
82	100V plug socket for printer (1 pc.)	●	
83	100V plug socket (2 pc. Power source by customer)		○
84	100V plug socket (2 pc. with 10A transformer)		○
85	200V plug socket (3 pc. with 30A transformer)		○
86	Signal output (4 pcs. of non-voltage "a" contacts)		○
87	Printer (monochrome)		○
88	Display in local language (Japanese, Chinese, Thai, Korean, Hebrew, Spanish, Turkish)		○
89	Bilingual display (with selected two languages)		○
90	Transformer for local power source		○
91	Parameter setting history	●	
▼Hydraulic			
92	Automatic hydraulic temperature control system	●	
93	Hydraulic oil heat-up system	●	
94	Hydraulic oil cooling circuit	●	
95	Y-type strainer for cooling water circuit	●	
96	Oil cleaner	●	
97	Oil cleaner clogging alarm	●	
98	Oil temperature alarm	●	
99	Oil level alarm	●	
▼Others			
100	Cooling water piping for mold	●	
101	Cooling water flow gauge		○
102	Memory card for 128 mold setups	●	
103	Interface for robot	●	
104	Installation pads	●	
105	Screw disassembling tool	●	
106	Standard accessories (tool, spare grease, hand grease pump, spare filter element)	●	
107	Mold fittings	●	
108	Chute		○
109	Subsidiary steps		○

●..... Standard

○..... Mountable at customer factory

◎..... Mountable only at Toyo factory