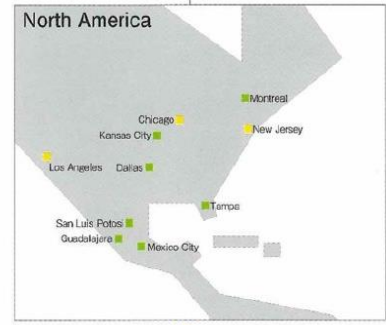
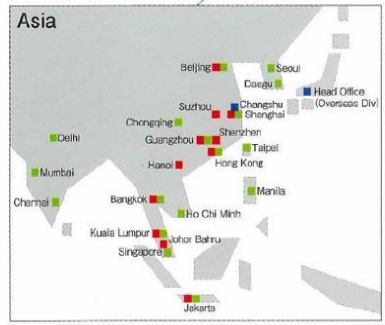
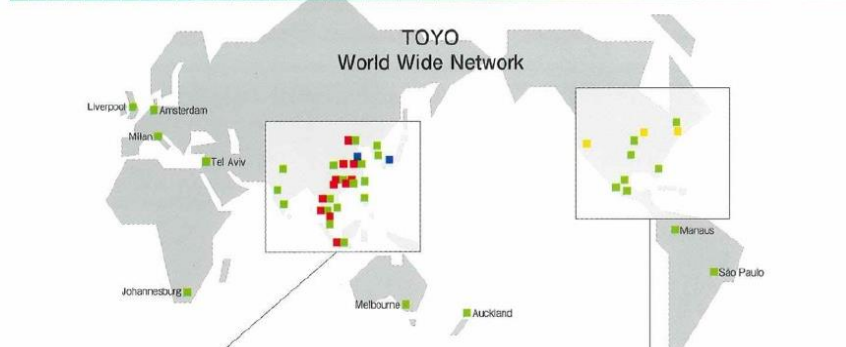


D_s-Series

Servo Control Die Casting System



- TOYO Head Office/Factory
- TOYO Office
- Distributor with resident Japanese engineers
- Distributor with local engineers



TOYO MACHINERY & METAL CO., LTD.

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Precaution For safe use of the machine, please read the respective manual carefully, especially sections for operation and maintenance, and follow all the safety precaution instructions specified in the manual.

- ① Photographs in the catalog include optional devices.
- ② For the improved of the product, the appearance and specification are subject to change without notice.
- ③ If these products and technologies (including programs) are subject to the Japanese export control laws including the Japanese Foreign Exchange and Foreign Trade Law, the products and technologies are required to obtain an export license of the Japanese government, when exported from Japan.

URL <http://www.toyo-mm.co.jp/>



Environment-Friendly Die Casting Machine

D_s-Series

Servo Control Die Casting System

SINTAI 新台通商



Let's think die casting!



**ELECTRIC SERVO CONTROL SYSTEM DELIVERS
ENVIRONMENT-FRIENDLY, ENERGY SAVING,
HIGH-CYCLE AND HIGH STABILITY OPERATION!**

Equation for the new die-casting machine



Originality for the next generation

Here's how superior the electric servo motor-driven machine is over the hydraulic type of the same size:

Electricity consumption : **70% reduced**

Dry cycle time : **35% reduced or more**

Carbon foot print : **75% reduced**

Figures are compared between Ds and Toyo's BD-V4-T(Hydraulic model).

Let's think die casting!

For more ecological die-casting!!



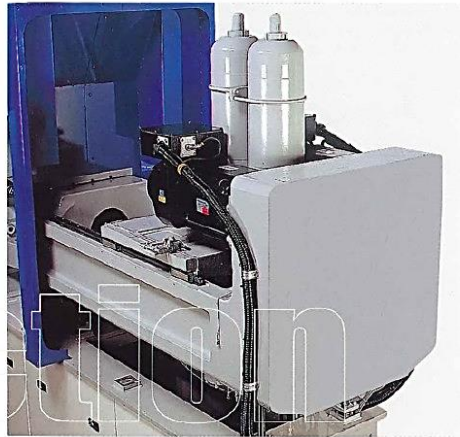
Electric Servo Motor Injection System

Electric servo motors are used for low-speed injection and intensification, and hydraulic accumulators for high-speed injection.

Toyo is the first in the world to adopt an injection system combining electric servo motors and hydraulic accumulators for injection, achieving stable speeds and super high-speed injection.

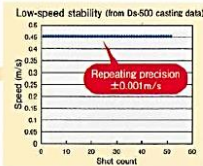
Patent pending

- A frame and a linear guide construction to ensure injection stability and precision



Low-Speed Injection Performance [Electric Servo Motor]

- Improved positioning accuracy
- Low speed injection repeatability ± 0.001 m/sec
- Low-speed multistage control (maximum setting of 9 points) enabling optimal speed setting



High-Speed Injection Performance [Hydraulic Servo Valve + Accumulator]

- High-speed real-time feedback control
- Speed inclination + multistage setting control (maximum setting of 5 points)
- Equipped with a buffer cylinder for high acceleration performance, contributing to improved productivity and quality



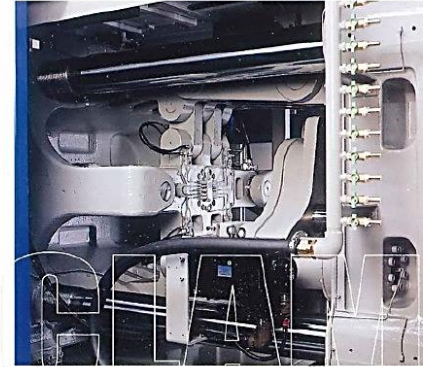
Intensification Performance [Electric Servo Motor]

- Real-time intensification pressure feedback control
- Multi-step intensification pressure control (maximum 4-level setting)
- Intensification pressure slope control improves productivity by reducing burrs and extend the service life of die molds



Electric Servo Motor Clamping System

The electric servo motor clamping system makes it easy to set up the die movement in a shockless, high-speed manner.



- Optimum die stroke setting for high cycle operation, and accurate low pressure clamping system for die protection.
- The high-strength, high-rigidity clamping design can withstand high-cycle operations.
- The ease of operation has been improved through the guide bar-less design.
- The drive system has adopted a dustproof design to withstand the harsh working environment of die-casting plants.
- Optimized clamp design with CAE analysis for the precision casting, this system contributes to productivity improvement.

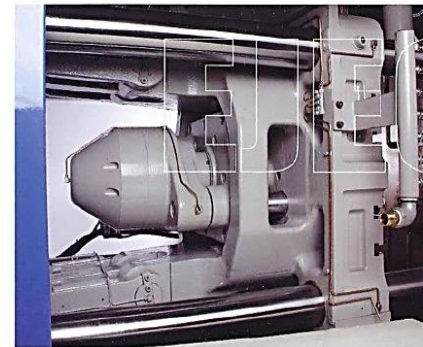
Patent pending



Electric Servo Motor Ejection System

Superior positioning repeatability by the multi-step setting of the ejector speeds.

The electric servo motor ejection system uses ejection patterns that are matched to the products in order to eliminate product distortions during ejection.



- The drive system has adopted a dustproof design to withstand the harsh working environment of die-casting plants.
- Equipped with an ejection force monitoring function.
- Enables ejector motion during die opening for high cycle, stable and die-protective operation.

Control System

The latest electronic control system brings machine performance into full play.

Easy operation

Next-Generation Human-Machine Interface: PLCS-12

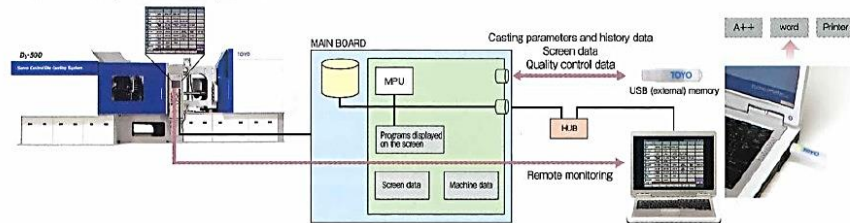


T-Station network control system brings your production control to new stage

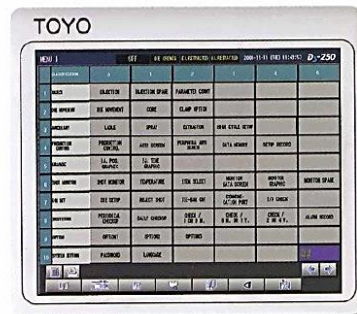
The T-Station is TOYO's original new network control system that can remotely monitor as many as 32 die-casting machines using a server. The Ds series has necessary software and interface for the T-Station as standard. (Software on the server side is optional.) With the T-Station, the current machine operating status can be

monitored real-time no matter where you are via the internet or a wireless LAN. The PLCS-12 control system tremendously improves the efficiency of your production control regardless of a place or a time.

■T-Station system configuration



All-in-one menu screen from which any screen can be accessed



Customer-satisfying PLCS-12 control

The PLCS-12 controller accommodates all the features that fulfill needs and wishes given from customers to our previous PLCS-10 controller.

Frustration-free, instant access to any screen

Any desired screen can be accessed directly from the main menu screen. In addition, one screen can be shifted to another much quicker than previous controller.

Screen-storing function

Maximum five screens can be stored in the internal memory. Stored screens can be called up by just touching FORWARD or BACK buttons. This function is just one of the unique features you can find only in PLCS-12 control.



The screen and the controls are integrated in the control panel.

The control panel includes user-friendly pictorial symbols.

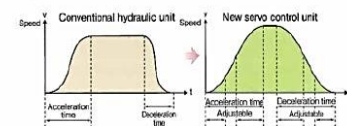
A protrusion-free key sheet is used for switching modes and operating peripheral devices.

■PLCS-12 supports the overseas operations of the customers.

- Language selection function (4 languages included in standard specifications)
Japanese, English, Chinese (traditional & simplified), and Korean

Stable, continuous casting for shockless operation

The new control system effects finely tuned, individual control of speed changes at the beginning and the ending of acceleration and deceleration. Thus, it draws the movement speed curves with gently sloping hills, resulting in a shockless and quiet high-speed die movement.



■PC-touch easy entry operation



Entry with 10-key screen

The popped up screen can be dragged to a convenient place for easy entry operation.

■Security features



Password function

The PLCS-12 controller is provided with a 4-step security protection using respective passwords for each authority level. If an upper level screen is left unattended for a certain time, it is automatically shifted to a default level screen.

Job title	Job title example	Operation authority
Manager	Plant general manager, manager	User management and addition, password assignment
Maintenance	Maintenance staff	Model changes, board replacement semi-finished values, environment screen
Technician	Technical staff	Casting condition changes
Operator	Operation staff	Start/stop operation, screen display only

■Easy-to-see screen design



Ladle screen

Pops up the selection contents.



I/O monitor screen

The input and output conditions can be checked at one glance.

Enhanced flexibility in quality control management

	Previous control system	New PLCS-12 control system
Transferring data to PC	Only conditions can be stored on a memory card	Conditions, constants, graphs, monitor data, screen hardcopies USB memory (Toyo specified) ⇒ transferring to PC • Internal 400 type • External 400 type (1GB USB memory) • 40 internal graphic patterns #1
Printer support	ESC/P control code support printer	ESC/P control code support printer (option) • USB printer support (Toyo specified)

#1 The number of the graphic is limited by the number of casting condition data.

Graphic function

Easily visible, the diverse graphic functions help improve operation efficiency.

The 12.1-inch color touch panel screen guides you easily and smoothly to all operations, including the various setup, adjustment, checking, and inspection functions.

Condition Settings

Injection screen



Sets up the injection change position, speed, and accumulator pressure.

Ladle screen



Sets up the ladle arm, ladle change position, speed, and timer.

High cycle setup screen



Sets up high-cycle related functions.

Die movement and ejection screen



Sets up the position and speed of the die and ejection movement. And also sets up the monitoring value.

Extractor screen



Sets up the extractor mode.

Reject shot screen



Sets up the actions related to reject shots during a startup.

Core setup screen



Sets up the core moving sequence.

Spray screen



Sets up the spray timer and mode.

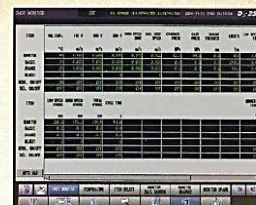
Injection spare screen



Sets up the models related to injection.

Monitoring Conditions

Shot monitor screen



Displays the measurement value for every shot.

Injection position graphic



Displays an injection graph for the horizontal axis stroke.

Monitor data screen

Displays data for 200 shots.

Injection time graphic



Displays an injection graph for the horizontal axis time.

Monitor graphics screen



Displays data for 200 shots on a monitor graph.

Alarm record screen

Stores alarm messages that have been created (400 pieces).

Management

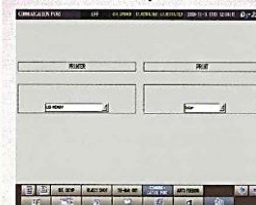
Production control screen

Displays a simplified production control function.

Data memory screen

Stores casing conditions for 400 dies and graphic data for 40 dies in memory.

Communication port screen



The conditions can be printed on a printer and stored on USB memory.

Condition Support

Parameter count screen



Calculates the injection parameters. The results can be checked visually.

Setup record screen

Stores 300 items of setup records in memory.

Password screen



Prevents the conditions from being changed unless a password is entered.

Line-up

Toyo's die-casting machines meet all possible needs

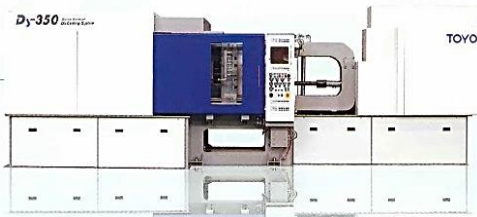
Ds-250

Ds-250 with high-cycle operation and energy-saving functions, which offer increased productivity and higher quality!



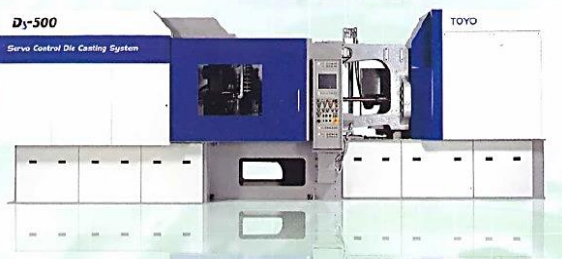
Ds-350

TOYO's best selling size 350 ton will prove a powerful tool for all of applications!



Ds-500

Mild-size electric servo control machine delivers the full power & performance you need to deal with the environment!



Ds-800

Large-sized electric servo-driven machine with superior energy-saving and cost performance



Die-Casting Machine Main Specs

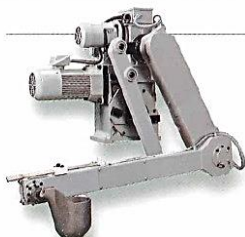
Performance to lead the die-casting machines of the future.

Model name	Ds-250	Ds-350	Ds-500	Ds-800	
Control system	PLCS-12	PLCS-12	PLCS-12	PLCS-12	
Injection system	Motor-driven servo + Hydraulic pressure ACC	Motor-driven servo + Hydraulic pressure ACC	Motor-driven servo + Hydraulic pressure ACC	Motor-driven servo + Hydraulic pressure ACC	
Clamping	Clamping force [kN]	2500	3500	5000	8000
	Die plate (H×W) [mm]	850×850	935×935	1070×1070	1400×1400
	Tie-bar distance (H×W) [mm]	584×584	652×652	748×748	941×941
	Die stroke (Max. Min.) [mm]	380~250	420~300	560~400	760
	Die thickness (Max. Min.) [mm]	600~250	700~350	850~350	950~400
	Tie-bar diameter [mm]	110	125	150	180
Injection	Injection force [kN]	282	335	486	607
	Intensity ratio (maximum 4 step setting)	1 : 2.16(variable)	1 : 2.16(variable)	1 : 2.3(variable)	1 : 2.5(variable)
	Plunger stroke [mm]	370	425	580	725
	Maximum high-speed injection stroke [mm]	230	230	330	430
	Tip jog-out stroke [mm] (from fixed die plate surface)	150	165	250	325
	Injection position [mm]	-125	-150	-175	-275
	Tip diameter [mm] (○:Standard)	50·55·60·65·70	60·65·70·75·80	70·75·80·85·90	80·85·90·95·100
	Injection pressure [MPa] (standard tip diameter)	99.7	87.2	96.7	95.4
Ejection	Low injection speed [m/s] (maximum 9 point setting)	0.01~0.5	0.01~0.5	0.01~0.5	0.01~0.5
	High injection speed [m/s] (maximum 5 point setting)	0.5~10.0	0.5~10.0	0.5~10.0	0.5~10.0
	Ejection force [kN]	125	190	251.4	342
	Ejection stroke [mm]	0~80	0~100	0~110	0~125
Coolant	Coolant inlet pipe diameter [Rc]	1	1	1-1/4	1-1/4
	Coolant drain pipe diameter [Rc]	2	2	2-1/2	2-1/2
	Die coolant adjustment valve (fixed side) (size x quantity)	3/8×7	3/8×7	3/8×9	3/8×11
	Die coolant adjustment valve (movable side) (size x quantity)	3/8×7	3/8×7	3/8×12	3/8×15
	Required coolant volume (die mold) [L/min]	30~70	30~70	50~90	50~150
Electrical	Power supply capacity [kVA]	30	40	55	60
	Power supply voltage [V] (50Hz/60Hz)	AC200/220(±10%)	AC200/220(±10%)	AC200/220(±10%)	AC200/220(±10%)
Air	Air connection port [Rc]	1	1	1-1/2	1-1/2
	Machine dimensions (L×W×H) [mm]	6290×1950×2280	6885×2067×2302	8000×2480×2698	10246×3342×2697
Other	Machine weight [t]	11	17	27	42
	Hydraulic fluid tank capacity [L]	40	60	70	150

P

eripheral Equipment

A robot system is controlled together with a die-casting machine.



Automatic Ladle KD1-M3 series

Using a linkage system and full bearings, the drive system operates smoothly with a minimum amount of aging changes.

Model	KD1-35M3	KD1-65M3	KD1-100M3
Installed die-casting machine	Ds-250・350	Ds-500	Ds-800
Pouring capacity(kg)	3.5	6	10
Pouring accuracy(%)※	+1		
Ladle(each 1pc)(kg)	Ds-250 : 0.8・1.6・2.5 Ds-350 : 1.6・2.5・3.6	2.5・4.0・6.0	4.0・6.0・8.0・10
Min-diameter of crucible(mm)	550	650	750
Arm driving motor(kW)	0.75	0.4	1.5
Ladle driving motor(kW)	0.2	0.4	0.4
Control unit	Integrated control by die-casting machine control panel		
Lading adjustment system	Digital setting		

※ Under conditions without molten metal runs or lading residues.

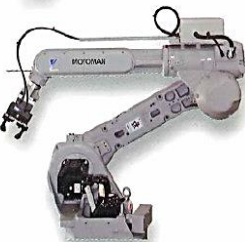


Spray robot RTS1 series

Environmentally friendly robot system is operated together by the die-casting machine.

Robot model	RTS1-5	RTS1-6	RTS1-20
Number of nozzle ※1	4 oil-based, 4 water-soluble	6 oil-based, 6 water-soluble	
Number of axis	6		
Liquid discharge volume(cc/sec) ※2	0.01~0.25		
Power capacity(kVA)	1.0	1.5	2.6
Primary air pressure(MPa)	0.5 minimum		
Applicable die-casting machine	Ds-250・350	Ds-500	Ds-800

※1 The quantity of nozzle and the layout of nozzle can be adjusted to the customer's requirements.
※2 Per nozzle (oil-based die release agent)



Extraction robot RTE1 series

The die-casting machine is capable of accessing the program.

Robot model	RTE1-20	RTE1-50	RTE1-165
Clamping diameter (mm) ※1	φ40~50	φ50~80	φ80~120
Number of axis	6		
Product sensing photobeam(pieces) ※2	4		
Max handling weight(kg) ※3	20	50	165
Power capacity(kVA)	2.6	5	7.5
Primary air pressure(MPa)	0.5 minimum		
Applicable die-casting machine	Ds-250・350	Ds-500	Ds-800

※1 The figure of clamp can be adjusted to the customer's requirements.
※2 The quantity of photobeam can be adjusted to the customer's requirements.
※3 Including hand weight.

Hydraulic core unit ND series

Equipped with an accumulator to achieve a large capacity and energy-savings.

Model	ND-35	ND-65
Size of solenoid valve(R)	3/8	1/2
Hydraulic cutter(Rc)	3/4	
Number of valve(set)※	3	
Rated pressure(MPa)	14.7	
Power capacity(kW)	3.7	7.5
Oil tank capacity(L)	45	90
Applicable die-casting machine	Ds-250・350	Ds-500・800

※ The quantity of the core solenoid valves can be adjusted to the customer's requirements.

A selection of robot models, specifications, and manufacturers is available to meet the customer's requirements.

Standard and Optional Specifications

	Applicable tonnage	●Standard ○Option					
		Ds-250	Ds-350	Ds-500	Ds-800		
Injection	Standard sleeve length	257	292	365	445		
	Tip joint system	○	●	●	●		
	Specified sleeve diameter	○	○	○	○		
	Piston type accumulator	●	●	●	●		
	Tip lubrication device	●	●	●	●		
	Tip lubrication mixing system	○	○	○	○		
	Injection ball screw grease automatic lubrication system	●	●	●	●		
	Injection area cover (helper side)	●	●	●	●		
	Injection graphic screen display	●	●	●	●		
	Injection monitor function	●	●	●	●		
	Injection condition screen setup	●	●	●	●		
	Injection servo valve	●	●	●	●		
	Injection condition feedback function	●	●	●	●		
	Low-speed injection device	●	○	○	○		
	Hot sleeve device	○	○	○	○		
	Electric servo motor injection system	●	●	●	●		
	Injection force adjustment	●	●	●	●		
	Intensifying time adjustment	●	●	●	●		
	Servo motor intensifying system	●	●	●	●		
	High-speed servo valve specifications	●	●	●	●		
Clamping	Automatic lubrication device (toggle area)	●	●	●	●		
	Clamping ball screw grease automatic lubrication system	●	●	●	●		
	Extractor ball screw grease automatic lubrication system	●	●	●	●		
	Slide plate system for movable-plate reciprocation	●	●	●	●		
	Die-height adjustment device	●	●	●	●		
	Automatic clamp force setup	●	●	●	●		
	Clamping force automatic adjustment	●	●	●	●		
	Clamping force monitoring function	●	●	●	●		
	Digital load meter (1 piece)	●	●	●	●		
	Electric motor tie bar pull out device (on operation side)	○	○	○	●		
	Chrome-plated tie bar and guide bar	○	○	○	○		
	Steel plate over die plates	○	○	○	○		
	T-slot on die-plates	●	●	●	●		
	Low-pressure die protection system	●	●	●	●		
	Operation side manual safety door	●	●	●	●		
	Operation side automatic safety door	○	○	○	○		
	Helper side fence	○	○	○	○		
	Toggle cover (operation side, helper side)	●	●	●	●		
	Injection cover (operation side, helper side)	●	●	●	●		
	Totally enclosing cover for clamping unit	●	●	○	○		
Individual cover for clamping unit	○	○	○	●			
Squeeze pin specifications	○	○	○	○			
Casting	Vacuum casting VCS	○	○	○	○		
	Hydraulic core unit	○	○	○	○		
	Core	Core 1 installation	○	○	○	○	
		Core 2 installation	○	○	○	○	
		Core 3 installation (fixed die plate helper side)	○	○	○	○	
		Core motion selectable circuit	○	○	○	○	
		Core speed adjustment function	○	○	○	○	
		Core state display function	○	○	○	○	
		Core unit pressure reducing valve	○	○	○	○	
		Taiwa connector	○	○	○	○	
		Nanahoshi connector	○	○	○	○	
		Other	Hydraulic-Cooling	Mineral hydraulic fluid	○	○	○
	Water glycol spec			●	●	●	●
	Inline filter			●	●	●	●
	Inline filter clogging alarm			●	●	●	●
	Hydraulic fluid temperature rise alarm			●	●	●	●
	Hydraulic fluid surface level lower limit alarm			●	●	●	●
	Fan cooler automatic ON-OFF			●	●	●	●
	Temperature display function (maximum 9 points)			○	○	○	○
	Die cooling adjustment valve (standard)			14	14	21	26
Die cooling ON-OFF valve fitting	○			○	○	○	
Control	Drainage box for die cooling water (helper side)		○	○	○	○	
	Nitrogen gas charging tool and hose		●	●	●	●	
	Glycerin sealed pressure gauge		○	○	○	○	
	Hydraulic fluid heat up function		●	●	●	●	
	Microprocessor control (PLCS12)		●	●	●	●	
	All-movement real-time feedback		●	●	●	●	
	USB interface (1 connection)		●	●	●	●	
	Quality control system (A++)		○	○	○	○	
	Touch key system		●	●	●	●	
	Internal memory (400 type)		●	●	●	●	
Other	External USB memory (400 type) ※1	●	●	●	●		
	Digital setting for injection clamping, ejection and lading	●	●	●	●		
	Timer digital setup	●	●	●	●		
	Shot counter	●	●	●	●		
	Production control function	●	●	●	●		
	Monitor function (32 items) ※2	●	●	●	●		
	Automatic correction (2 items)	●	●	●	●		
	Calculation of shot condition	●	●	●	●		
	Spray time step control	●	●	●	●		
	Spray time control based die temperature	○	○	○	○		
Alarm message	●	●	●	●			
Alarm history indication function	●	●	●	●			
Regular inspection display function	●	●	●	●			
High-cycle specifications	○	○	○	○			
Interlock with other products automated devices	○	○	○	○			
Emergency stop push button	●	●	●	●			
Defect product signal output	○	○	○	○			
Reject shot function	●	●	●	●			
Color LCD	●	●	●	●			
Indication light 3 levels (with mode selection function)	○	○	○	○			
Production monitoring system (T-Station)	○	○	○	○			
Local language display (English, Chinese, Korean)	●	●	●	●			
Tool box set	○	○	○	○			
Tip lubrication pressure sensor	○	○	○	○			

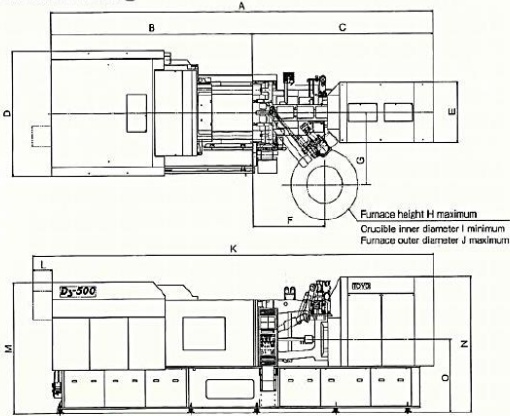
※1 : For saving casting conditions only
※2 : Among 61 items, maximum of 32 items can be selected for display

※ The specifications are subject to change without notice.

Dimensions

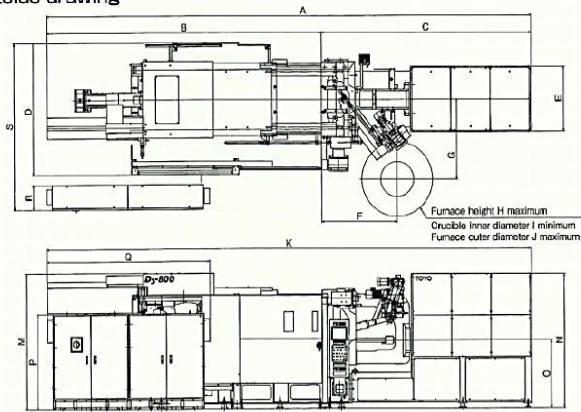
Equipped with the latest technology unique to Toyo

■Ds-250~500 outside drawing



●The exterior drawing of Ds-500 is used for dimensions of Ds-250 and Ds-350.

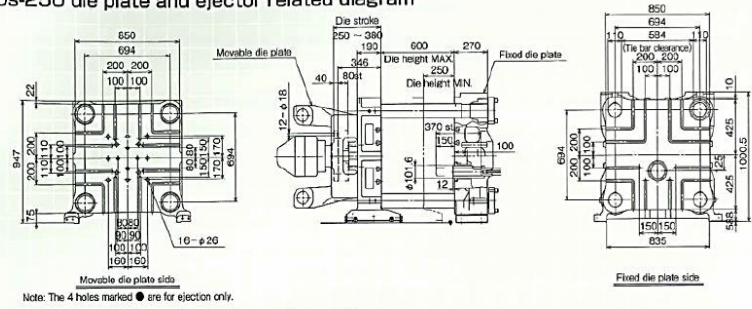
■Ds-800 outside drawing



Machine name	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
Ds-250	6290	3445	2845	1950	1100	1299	1310	1177	550	1500	-	-	2013	2260	1140	-	-	-	-
Ds-350	6885	3715	3170	2067	1100	1299	1310	1177	550	1500	7135	250	2121	2302	1162	-	-	-	-
Ds-500	8000	4220	3780	2480	1200	1497	1433	1200	750	1400	8400	400	2604	2898	1455	-	-	-	-
Ds-800	10257	5813	4445	2638	1300	1600	1600	1300	700	1600	10257	-	2720	2891	1360	1900	3200	500	3342

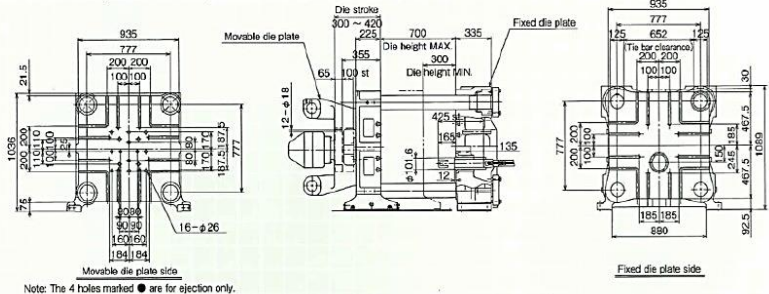
●The value unit is mm, unless indicated otherwise. ●The specification values are subject to change without notice.

■Ds-250 die plate and ejector related diagram



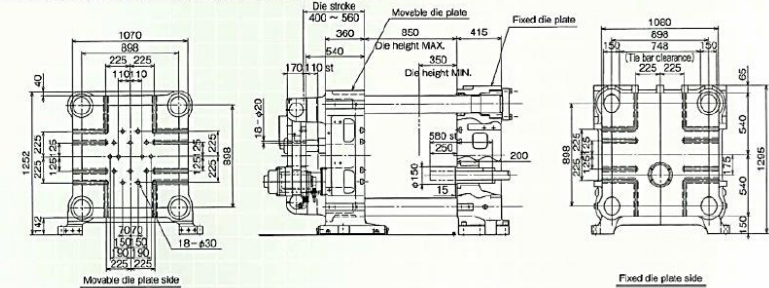
Note: The 4 holes marked ● are for ejection only.

■Ds-350 die plate and ejector related diagram



Note: The 4 holes marked ● are for ejection only.

■Ds-500 die plate and ejector related diagram



■Ds-800 die plate and ejector related diagram

