

Shibaura Machine



series

DIE CASTING MACHINE

Shibaura Machine

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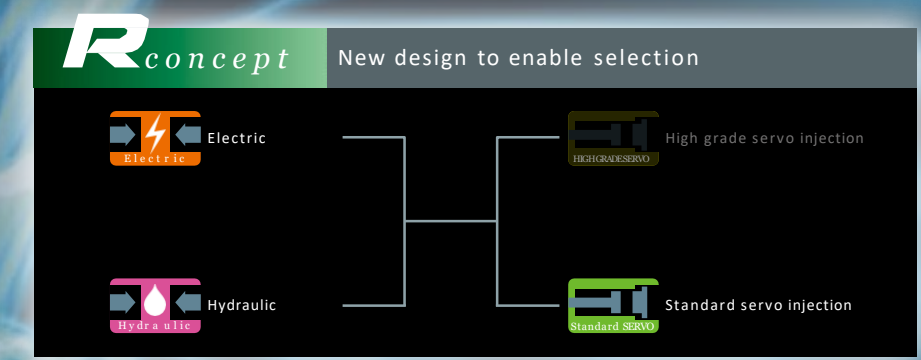
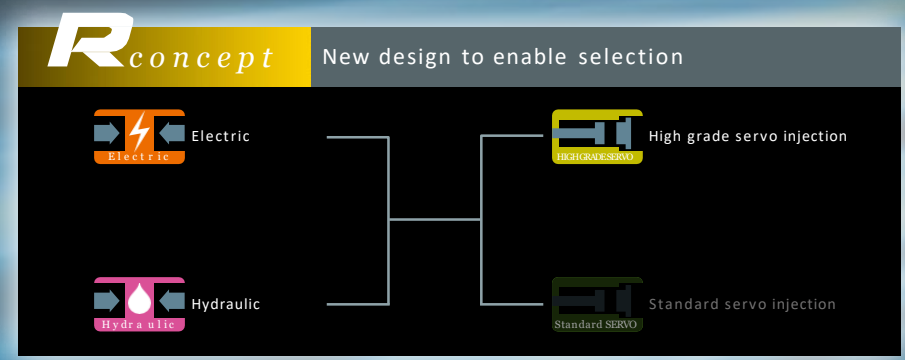
shibaura-machine.com



Compatible with hydraulic servo injection and mold clamping mechanism, R-series with high quality, high efficiency, high production.

The flagship machine of the R-series with its high-grade servo injection control for the super-high-speed injection, an acceleration of **100G** is achieved.

The standard machine of the R-series with its standard hydraulic servo injection control for the multistage injection, an acceleration of **70G** is achieved.

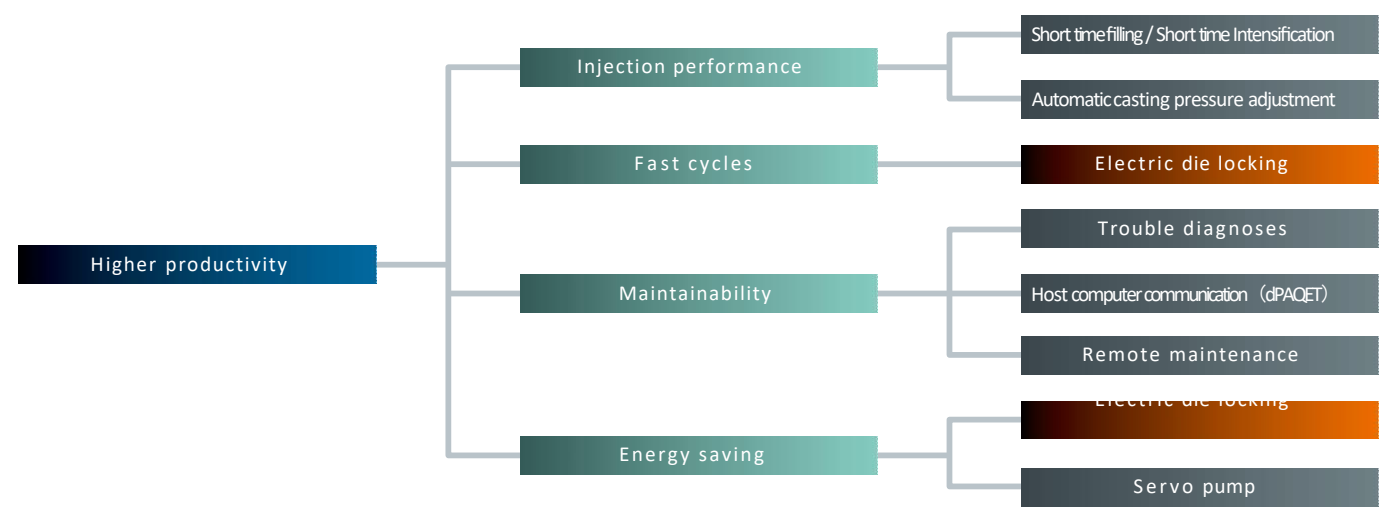


DC800R-EH
 • N.B.:The photograph include some optional features.



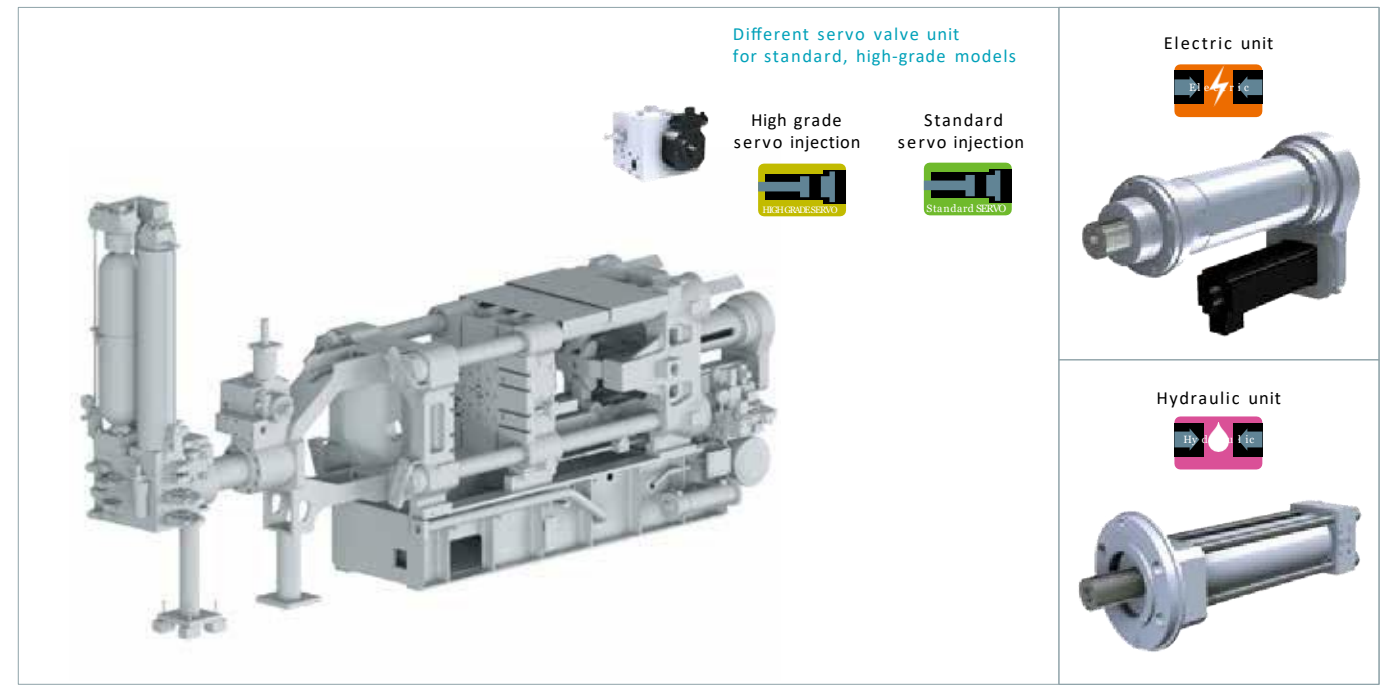
DC350R-EM
 • N.B.:The photograph include some optional features.

Shibaura Machine suits the individual technologies highly supported by customers for many years to the changes in the market needs requiring higher quality, and strives to increase customers' productivity with newest technology!



In order to handle the needs for higher quality, globalization of the market and energy saving, Shibaura Machine has developed R-series by using the new development method. By changing the combination of four injection units and two die locking units, with the three modules (of injection end, die locking end and the base frame) interchangeable, the production of seven R-series machines, from the standard hydraulic type to the electric die locking, to the super-high-speed hybrid injection one, is made possible. Shibaura Machine believes it should always continue to be innovative while preserving technologies of proud traditions.

Injection setup		Standard servo injection	High grade servo injection
Die locking	Electric	DC * R-EM	DC * R-EH
	Hydraulic	DC * R-M	DC * R-H



Shibaura Machine supports the maximization of customer's profit through the technologies of long-time proud traditions and the innovative technologies that they think should be pursued!

1 Extensive model configuration (module selection)

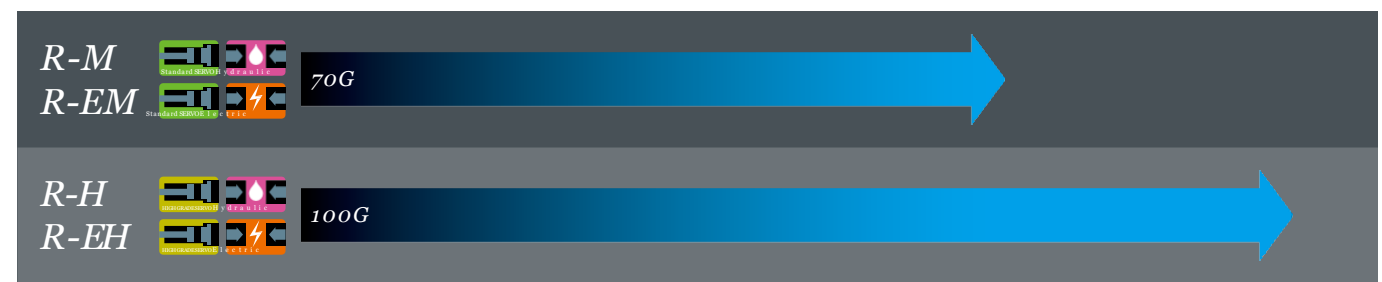
Proposing optimal facilities to realize high productivity such as high quality, global production base, energy saving measures etc.

Model	Injection setup	Die locking	Control system	Point
R-EH	High grade servo injection	Electric	TOSCAST-888	Ultra high performance (Hard casting, Mg) + Electric
R-H	High grade servo injection	Hydraulic	TOSCAST-888	Ultra high performance (Hard casting, Mg)
R-EM	Standard servo injection	Electric	TOSCAST-888	High performance (Hard casting) + Electric
R-M	Standard servo injection	Hydraulic	TOSCAST-888	High performance (Hard casting)

2 Acceleration ability

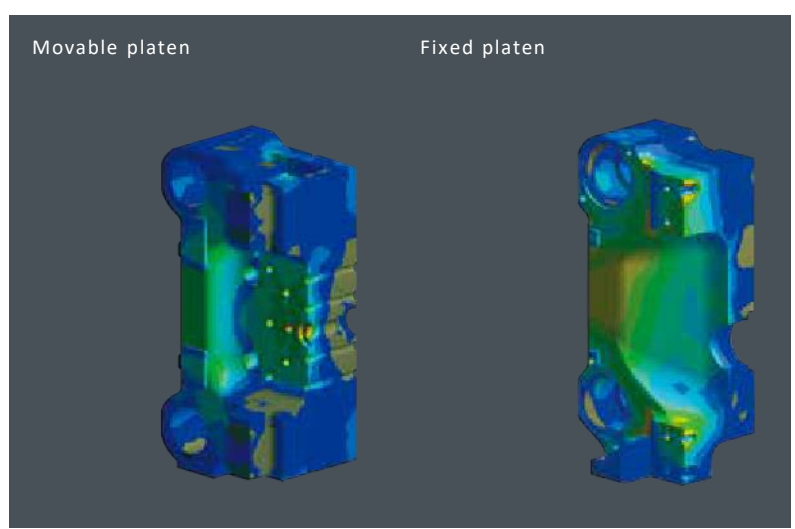
Shibaura Machine worked on improvement of short time filling and short time intensification, which most affects the non-defective rate of cast products. In the R-series, the standard injection and high grade servo injection are realized for the performance improvement of the conventional machine. We propose an optimal injection mechanism for each required quality.

•100G represents the capability to accelerate to 10m/sec at 10msec.



3 Increasing Die-Locking Rigidity (The optimal design by FEM)

While the production bases are getting globalized, even in a different manufacturing site/environment, the same production efficiency is required as in the mother plant. Based on the know-how obtained from the service tours to many customers inside/outside the country, the conventional die-locking rigidity was changed and the new die-locking system that enables high productivity even under harsh environments was developed and put on the R-series.



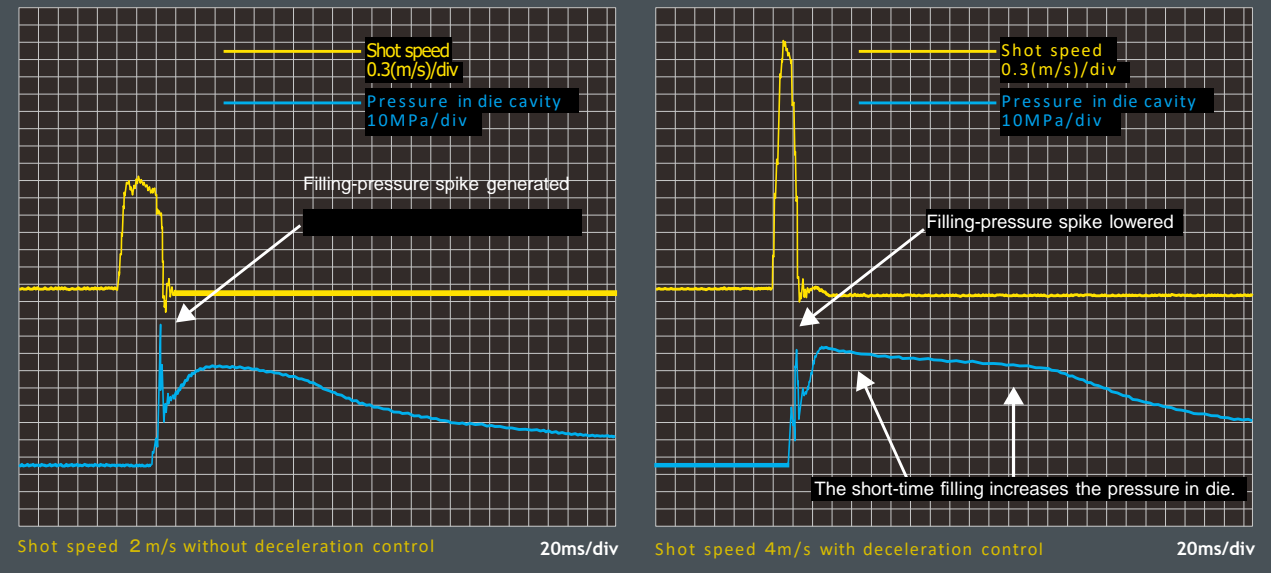
4 The Ultimate Multistage Injection

Necessary capacity to exceed the high speed

Injection capacity not to yield to filling resistance (high acceleration/servo & learning control)
 More-complex shapes are demanded with die castings. On filling the die of precise and complex configurations at high speed, the filling resistance continues changing from moment to moment.
 If it cannot respond to those changes, stabilized high speed will not be achieved in a super-high-speed range.

Injection capability to lower filling pressure spike (high-response deceleration by servo control)
 In the speed range that exceeds the conventional injection speed, flash will occur without deceleration. The flash that occurs when the injection speed is raised is due to the pressure spike at the end of filling. The super-high-speed die casting will not be achieved unless this pressure spike is lowered.

Only the control of filling-pressure spikes enables to exceed the speed

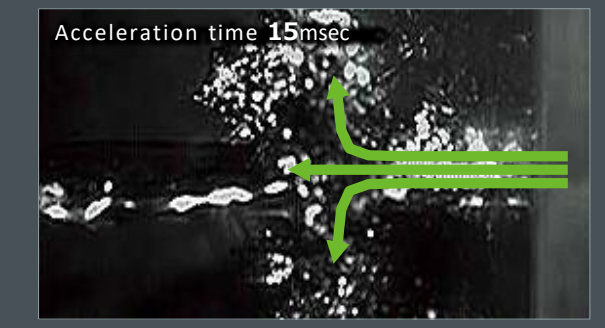
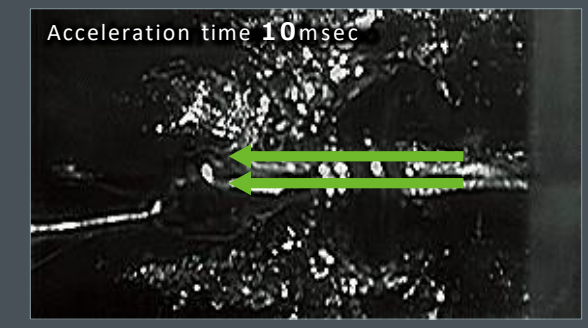


Shibaura Machine controls the hydraulic servo valve in the meter-out side and achieves the exact output control with a real-time feedback control and a learning control function. Equipped as standard with the powerful deceleration function that puts injection inertia force under control, which would be impossible with meter-in control, it achieves sure control of filling-pressure spikes.
 We would like many die casters to experience for themselves an authentic super-high-speed-injection die casting machine.

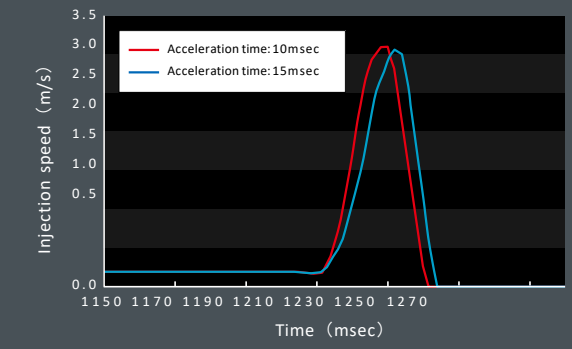
5 Short-time filling

The short-time-filling method, which Shibaura Machine proposes, has two reasons to improve quality. One is making it possible to make casting porosity smaller by applying pressure before the molten metal solidifies. The other is that it is considered possible to make the entrapped porosity finer by dispersing the molten metal. We filmed the molten metal spurting from the gate, with a high-speed camera.
 We analyzed the images with our own made analysis software. In the test we conducted, we filmed, observed and examined into the short-time-filling domain.

Short-time filling to control the filling time that affects the part exterior/internal quality to the shortest.

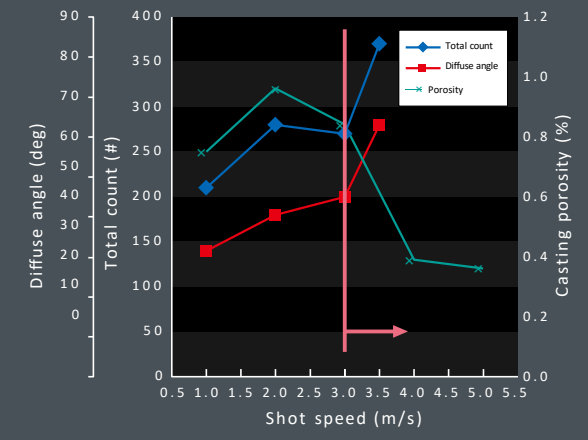


Melt behavior spurting by slow shot



Suppose the fast shot occurs after the gate. With the shot acceleration low, the filling gives way to the wall of slow shot melt and weakens.

Fast shots after the gate would change the melt flow unless the acceleration should be set high.



【Experimental results with test mold】

- Sharp reduction in porosity percentage between 3.0 and 4.0 m/sec
- Assuming the spurting condition to be the same, The spray condition changed at 3.5m/s from 3.0m/s.

If dispersing the melt with higher shot speed, the entrapped gas is also fine dispersed.

6 Better Pressure Buildup

Shibaura Machine has succeeded in reducing the pressure buildup time by improving the hydraulic intensification circuit for the R-series.

Exploring pressure buildup time lag on die casting machine side

Old hydraulic circuit for intensification

When intensification starts, speed and intensification cylinders flows together

New hydraulic circuit for intensification

When intensification starts, speed and intensification cylinders flows separately

The intensification movement is not interrupted by backpressure, but becomes smooth and reduces the time lag on machine side.

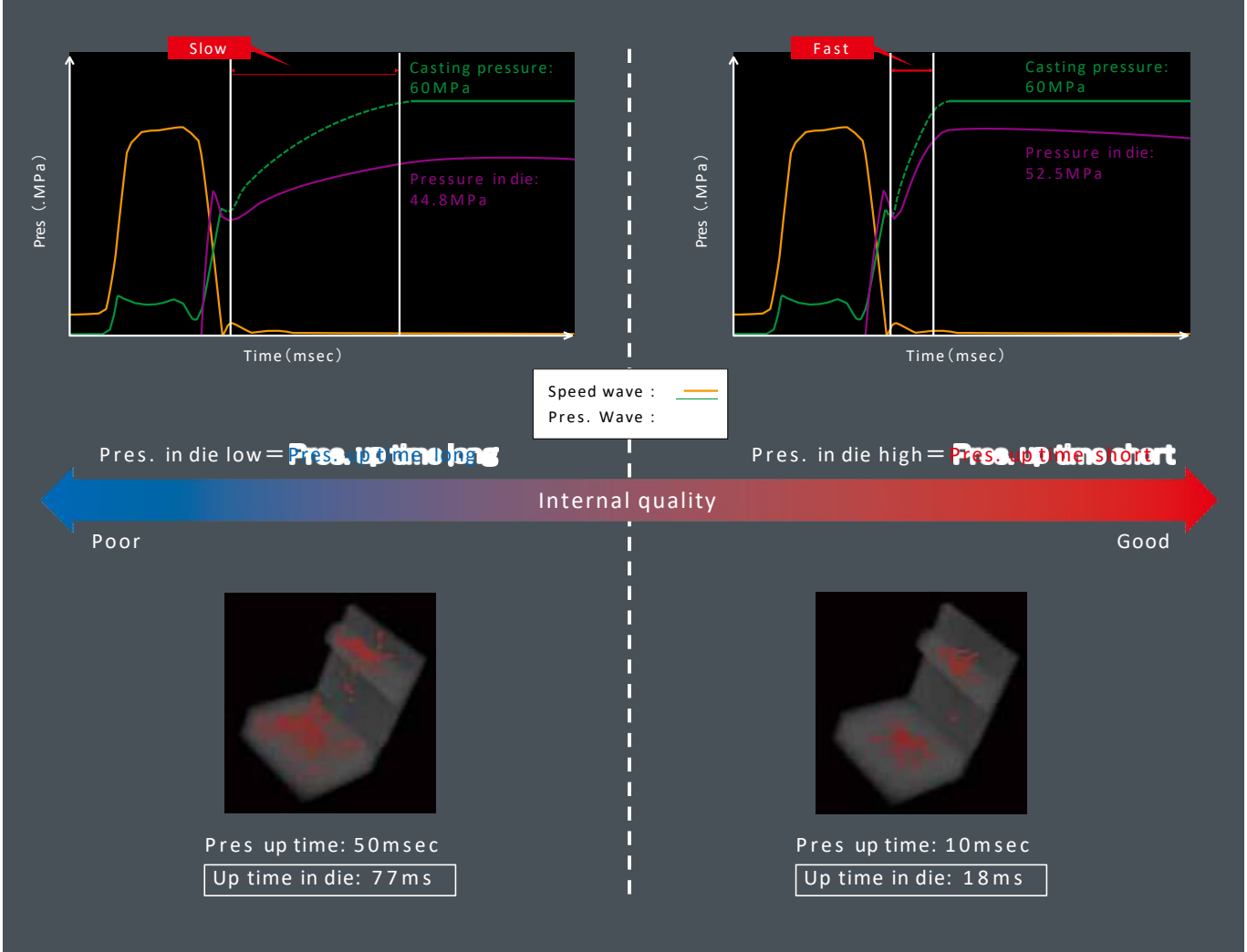
Reduced pres. buildup time

➔

Higher metal pressure

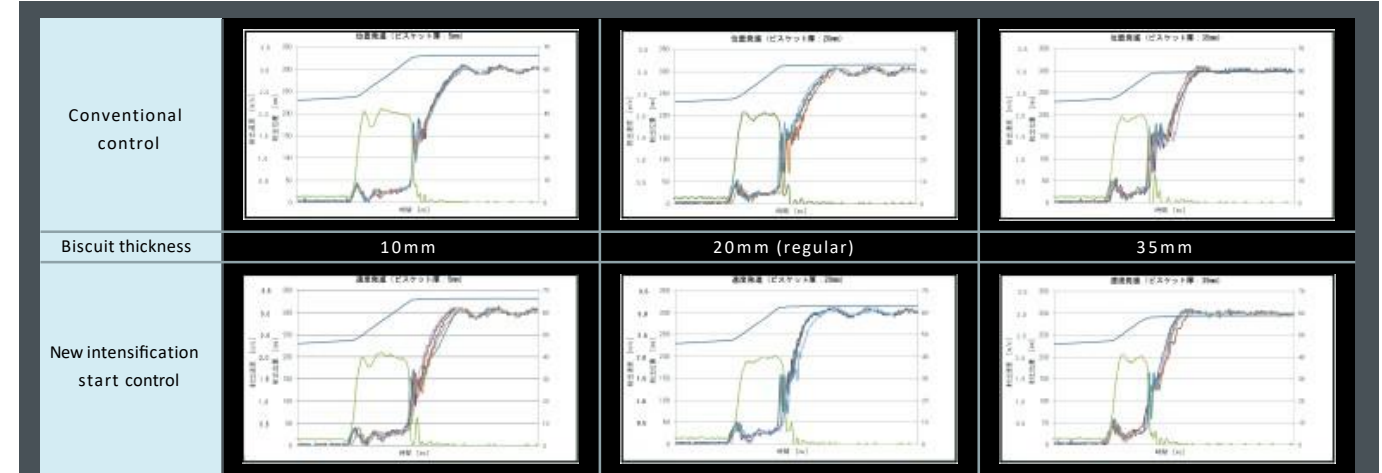
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Reduced porosity

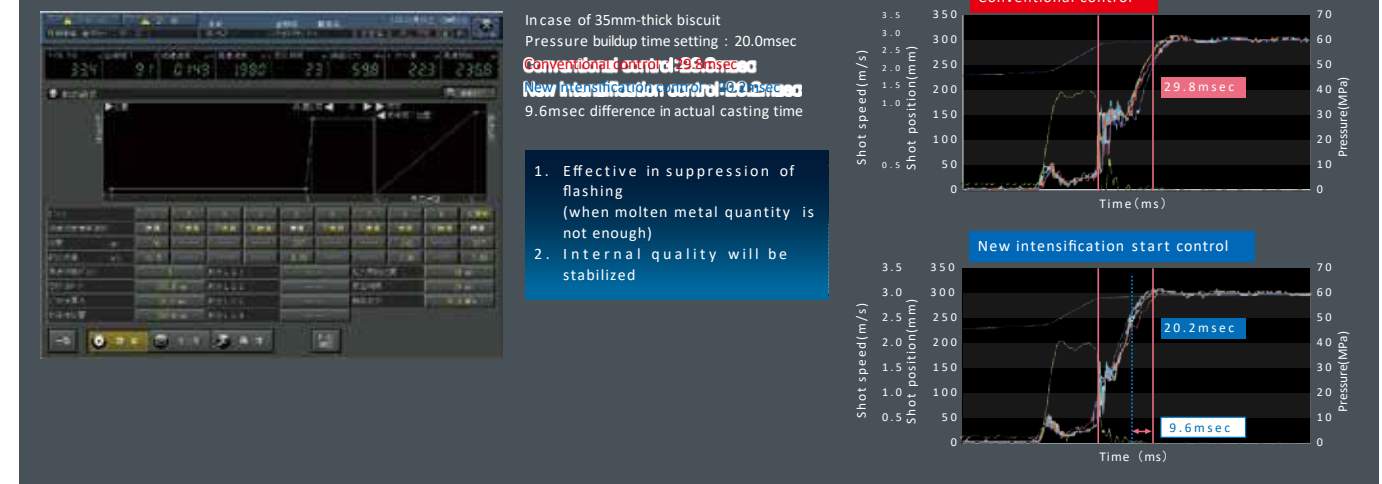


7 New intensification start control

Compared with the conventional position-based start control, the new control system has been developed to start the intensification always at the same timing even with the ladling volume variation. It is effective in case of higher fast shot speeds and/or using the slowdown control.



The new intensification start control compensates the fluctuation of molten metal quantity and helps to stabilize the internal quality.



8 Adoption of New Accumulator(option)

Having changed from the conventional oil level control method to the piston control, which does not require an oil level gage, the accumulator adjustment time is shortened and will help customers to improve their productivity (.Intensification accumulator is optional)

- N₂ pressure detected
- Adjustable casting pressure range calculated
- Set desired pressure
- Piston to be controlled (Automatic adjustment)

➔

Faster accumulator adjustment achieved (helping your casting uptime, productivity)

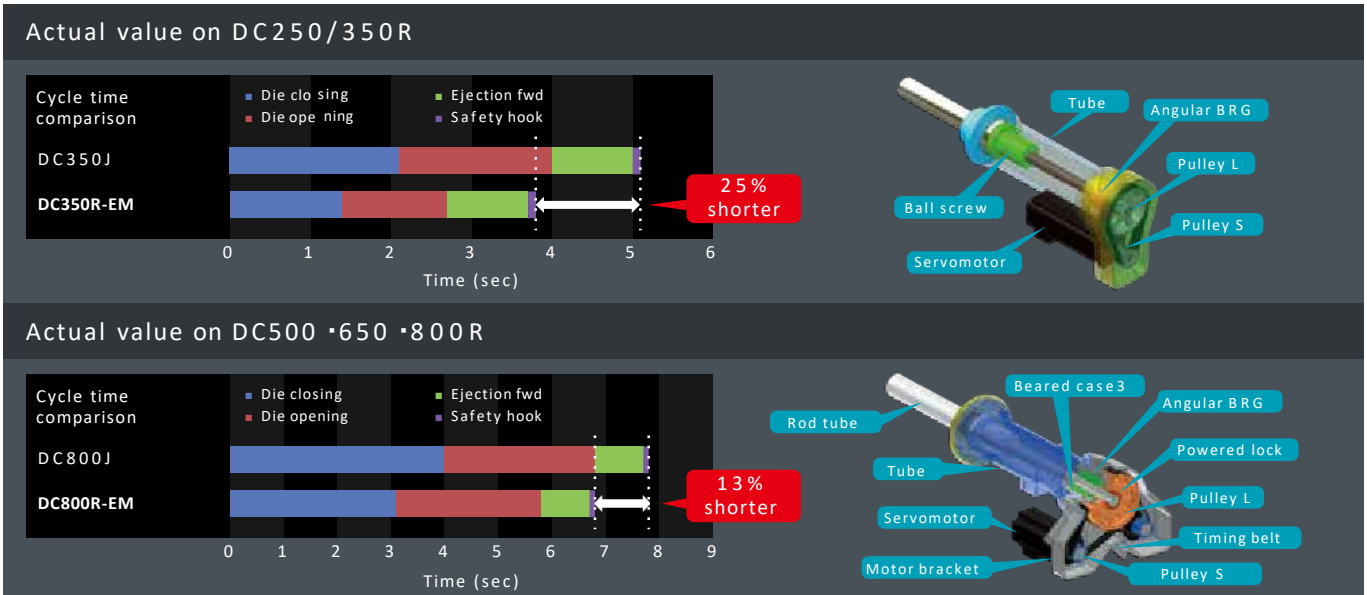
➔

- Oil leak, breakage trouble reduced
- ACC startup adjustment time shortened
- ACC charge pressure-changing time shortened
- Plunger tip-replacing time shortened

Piston accumulator Piston Accumulator for intensification
Piston control Piston control
Fill of hydraulic oil
Pressure cylinder (Nitrogen)
Fill of hydraulic oil

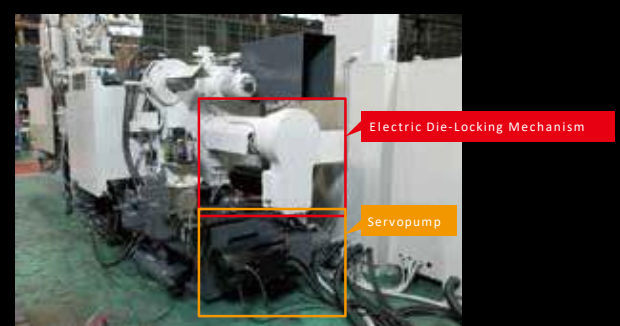
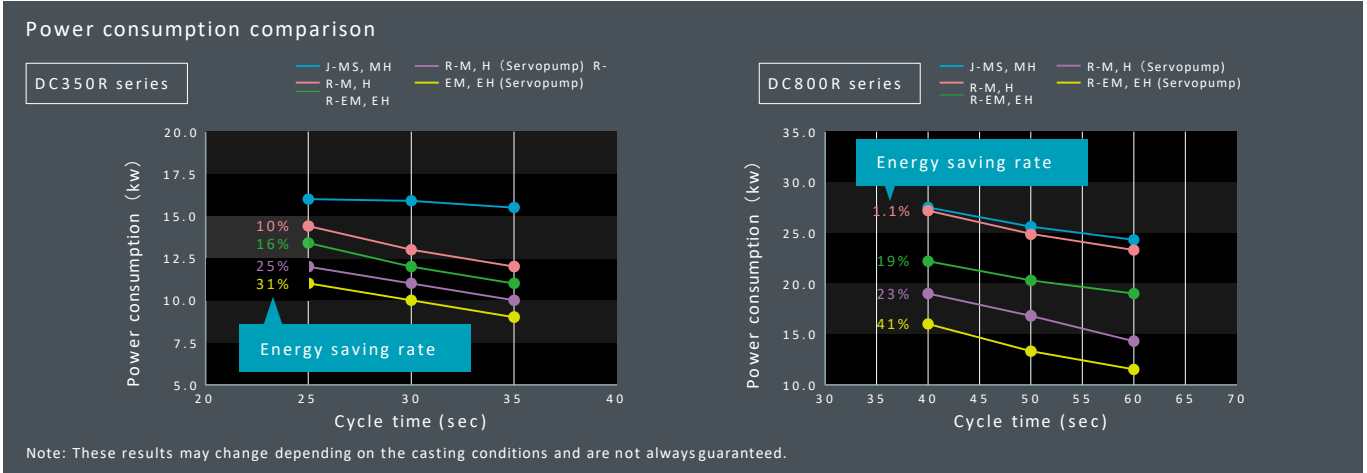
9 Electrical Die locking System(E type)

Shibaura Machine developed the DEC150MT equipped with electric die-locking system as standard in 2000 the first in the industry.
Of the R-series, the R-E models have the electric die-locking system as standard to achieve cycle time reduction and help customers to improve their productivity.



10 Improvement of Power Consumption(option)

Shibaura Machine worked on the reduction of the power consumption, which is one of the measures for the environmental activities. Of the R-series, the electric die locking system, the hybrid injection, the energy saving circuit and the servo pump can be chosen according to the customer's needs.



11 Reliable automatic devices to support quick cycles (optional)

For Small size machines FOR DC250・350R

Automatic Ladle Device
DAL※SVSH2
The servo control has increased the ladling accuracy by two times (compared to Company's old ones).

Automatic Spray Device
DBS※LR, DBS※MSH2/3
Employing the up/down mechanism with a servomotor specified achieves a cycle time reduction.(DBS※LR)

Product Take-out Device
DTO※SLH2, DTO※SLR
Adoption of the link mechanism and the inverter control has enabled the smooth move in/take-out motions.

For Medium Size Machines FOR DC500・650・800R

Automatic Ladle Device
DAL※SVSH
The servo control has increased the ladling accuracy by two times (compared to Company's old ones).

Automatic Spray Device
DBS※LR2
Adoption of the new spray head has enabled the fine atomization of die lubricant.

Product Take-out Device
DTO※SLR
The servomotor-driven speed and acceleration/deceleration smoothness have achieved quick stable taking out.

12 New Controller (TOSCAST-888)

All machine models of the R-series come with the new controller (TOSCAST-888) as a standard feature. Thanks to the large 15-inch screen, the human-machine interface based on ergonomics, the operator's maintenance/management environments are improved. The multilingual capability and input restriction control are possible to help improve the global production control efficiency. In addition, it includes as standard the trouble diagnostic functions by the Shibaura Machine's own technology, and together with the host communication (optional) and remote maintenance functions (optional) it helps improve the maintenance ease and production efficiency.

Trouble diagnostic function

On alarm occurrence the causes are indicated including the location (by photograph/drawing), what to check and how to check.



Line display

Besides the standard 26 items, 3 points of temperature monitor can be added. In addition to the above, a total of up to 48 items can be added if desired. All of these contribute to your quality control and help increase acceptance rate.



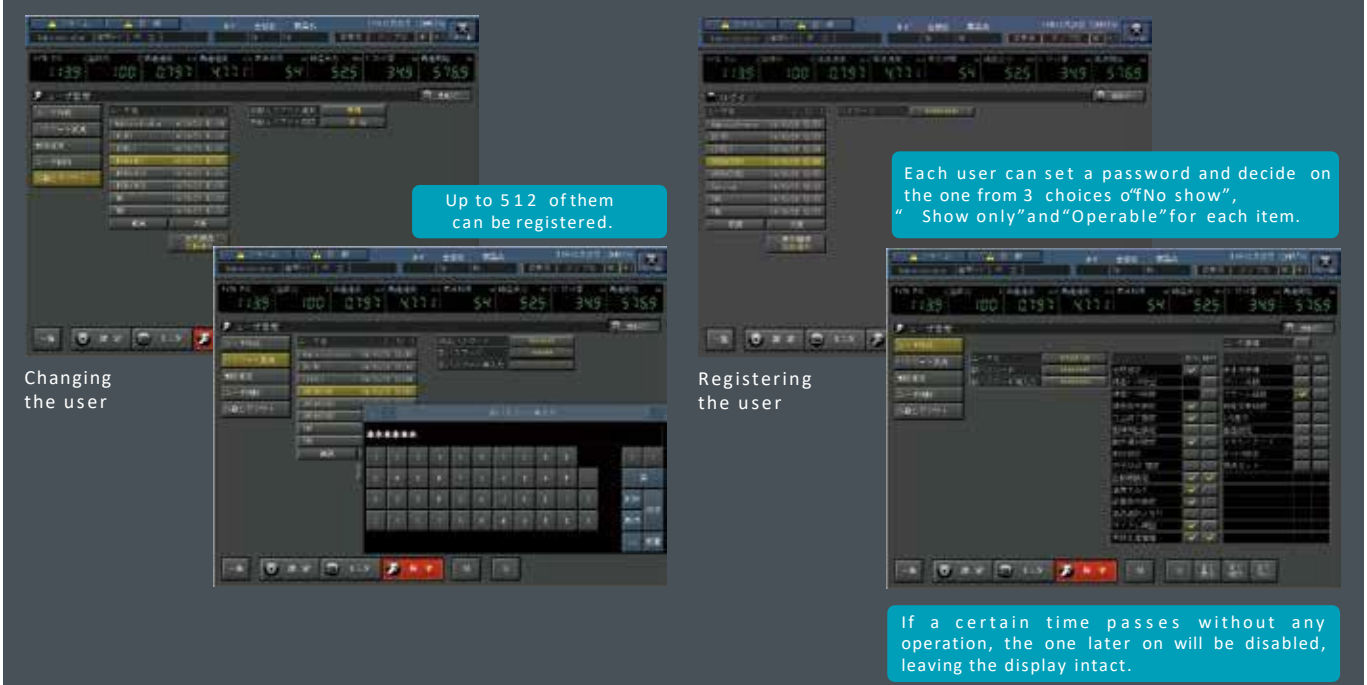
Injection waveform

Possible to view vacuum and position waveforms simultaneously. In addition to the vacuum, a different waveform can be added. All of these contribute to your casting analysis and help improve your casting technology and acceptance rate.



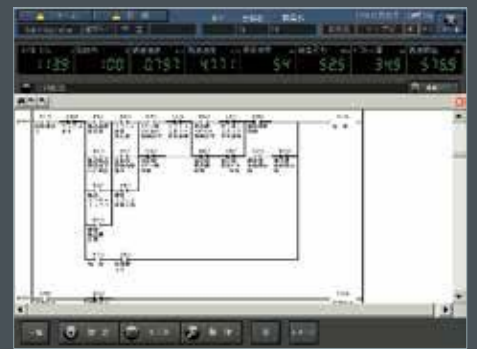
Password function

If a data outside the range is inputted, it becomes automatically the one in the range to prevent accidents.



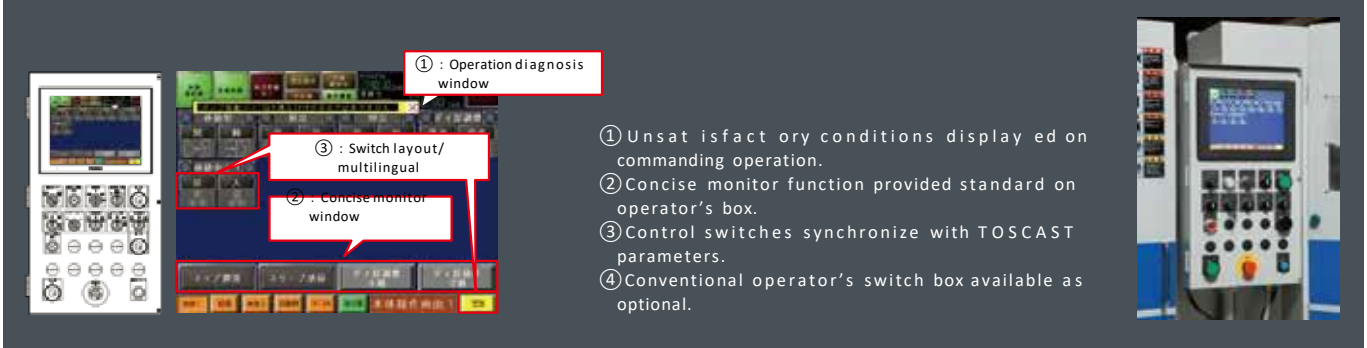
PLC circuit-monitoring function

PLC circuit can be monitored in real time, on TOSCAST screen; effective in handling troubles.
 • Real-time monitoring is possible without connecting to PC.
 • Designations of contacts are written in Japanese/English.
 • For safety's sake the values and/or circuitry cannot be changed.



Operator's box layout (touch panel)

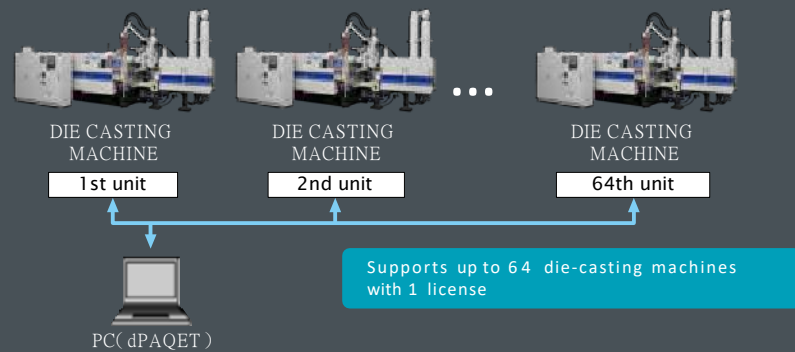
To improve the operational ease on R-M/H series, a 12-inch touch-screen display is situated on the operator's box. The control switches are synchronized to TOSCAST parameters to be played automatically, making the operational ease highly improved.



13 Data collection and monitoring software for TOSCAST-555/888 Introduction of dPAQET

Do not be able to more easily aggregate the data and operating conditions, etc. involved in the casting...dPAQET will resolve such worries!

Easy start to help reduce installation costs



Three characteristics of dPAQET



Thorough traceability

Automatically saves data relating to castings such as injection waveforms and monitoring data.



Easy Centralized Management

※As it uses general-purpose Ethernet technology, it can easily create a centralized management system.



Inexpensive system

※Dedicated server etc is not necessary, it is inexpensive because it uses a general-purpose PC. In addition, if you purchase 1 corporate 1 license, additional licenses are unnecessary even if more machines are managed.

Andon function enables to factory site monitoring from office.



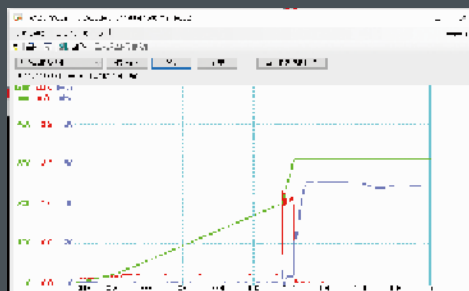
Data collection and analysis from operation status

Easy to check machine occupancy rate



Saving data of die casting quality to office PC.

Traceability is very important in many working environment.



14 Technical Support

Shibaura Machine will help customers having such wishes as -"want to use the newest servo shot die casting machine efficiently to achieve a challenge for further upgraded technology, improved quality and/or a new field".

DC School

casting practice using a machine and lectures for maintenance work. Not just knowing of Shibaura Machine's know-how, but also technical exchange among the customers who are engaged in die casting in various types of industry is active. Those who participate the DC school can always obtain new technology.



Casting Trial

Customer is to bring the die; Shibaura Machine is to carry out the die-casting trial with its newest powerful machine. Having managed more than 50 casting trials a year, the sales engineers with the knowledge of casting technology in the world will provide complete customer support. In addition, they can also handle special die casting such as high-vacuum die casting, special material casting or casting using Squeeze Master.



Casting Support

In order for Customer, who has introduced the die-casting machine, to make the most of the machine's performance, our sales engineer visits and implements directly consulting support for casting. We devote ourselves to the profit of various Customers either inside Japan or outside.



Standard/Optional List

Specification item			DC250・350R		DC500～800R	
			Standard	option	Standard	option
1	Die closing	Machined T-slots on fixed/ movable platens	●		●	
2		Auto lubrication on Toggle (with alarm)	●		●	
3		Moving shoe height adjustment system	●		●	
4		Automatic die-locking force adjustment	●		●	
5		Die height adjuster	●		●	
6		Digital load meter (Display one point on Toscast)	●		●	
7		Pouring start LS (for Shibaura Machine made ladler)	●		●	
8		Take-out start LS (for Shibaura Machine made extractor)	●		●	
9		Die open mid-way stop for shorter cycle (only with EM)	●		●	
10		Tie-bar draw-out unit on upper operator side		●		●
11		Tie-bar draw-out unit on upper helper side		●		●
12		Tie-bar draw-out units on upper operator & helper sides		●		●
13		Extra plate (s) for platen surface protection		●		●
14		Ejector plate clamp (H-bar type)		●		●
15		Die support		●		●
16		Die eject cylinder (in fixed platen)		●		●
17		Ratchet type safety hook		●		●
1	Injection	Hydraulic servo controled injection	●		●	
2		Short-sleeve specification	●			●
3		Long-sleeve specification		●	●	
4		Automatic control of injection conditions	●		●	
5		Automatic adujster of injection force	●		●	
6		Batch loading of casting conditions (64 dies)	●		●	
7		Piston accumulator	●		●	
8		Gas accumulator by ASME		●		●
9		China Accumulator		●		●
10		Intensification accumulator		●		●
11		Multi injection position		●		●
12		Injection push button switch		●		●
13		Injection stop at high speed start position		●		●
14		Shot end waste oil tray		●		●
1	Cores	Movable core 1 set	●		●	
2		Core spray circuit (with Shibaura Machine sprayer)	●		●	
3		Movable core additional 1 set		●		●
4		Movable core additional 2 sets		●		●
5		Fixed core additional 1 set		●		●
6		Fixed core additional 2 sets		●		●
7		Squeeze-compatible circuit on movable core-1		●		●
8		Squeeze-compatible circuit on movable core-2		●		●
9		Squeeze-compatible circuit on fixed core-1		●		●
10		Squeeze-compatible circuit on fixed core-2		●		●
11		Extra movable core port on the middle of helper side		●		●
12		Core residual pressure releaf circuit		●		●
13		Dedicated squeeze circuit on movable side (Simplified method)		●		●

Specification item			DC250・350R		DC500～800R	
			Standard	option	Standard	option
1	Hydraulic cooling water	Ejection position automatic control	●		●	
2		Fire-resistant hydraulic fluid specification	●		●	
3		Mineral oil based hydraulic fluid specification		●		●
4		Provision for fat acid ester based hydraulic fluid		●		●
5		Cooling water collecting box (fixed platen helper side)	●		●	
6		Cooling water adjusting valve (7 at fixed/ 8 at movable)	●			
7		Cooling water adjusting valve (7 at fixed/ 10 at movable)			●	
8		Oil cleaner	●		●	
9		Magnetic separator	●		●	
10		Glycerin-filled pressure gage		●		●
11		Position change of movable die cooling water piping		●		●
12		Cooling water collecting box (movable platen helper side)		●		●
13		Automatic cooling water supply valve for oil cooler		●		●
14		Hydraulic oil level lower limit alarm		●		●
15		Hydraulic oil thermo meter (with one upper limit contact)		●		●
1	Controls	Die casting machine total control system (TOSCAST)	●		●	
2		Programmable logic cotroller (TC200)	●		●	
3		Indication of LS faults	●		●	
4		Spray start at extractor's moving away position from die(for Shibaura Machine device)	●		●	
5		Startup control	●		●	
6		Ladle slight tilt at fwd limit (Shibaura Machine made ladler)	●		●	
7		Protection by Password	●		●	
8		Heat exchanger on control panel		●		●
9		Digital indicators for die locking force, biscket thickness,cycle time, pouring volum		●		●
10		Lotaly light on control panel		●		●
11		Short circuit breaker		●		●
12		Temp. monitor specification		●		●
13		Pouring volume adjustment by biscket thickness		●		●
14		Injection LS output signal for vacuum		●		●
15		Warm up shot output signal		●		●
16		Melt shortage output signal		●		●
17		Injection plunger return (return to backward end)		●		●
18		Injection plunger return (return to backward mid-point)		●		●
19		Y-Δstart		●	●	
20		Outlet (100V) on control panel		●		●
21		Air conditioner on control panel		●		●
22		Light inside control panel		●		●
23		UL approved electrical parts		●		●
24		Provision for Squeeze Master Unit (SQM)		●		●
25		Provision for vacuum device (DVF)		●		●
26		Provision for die support		●		●
27		Full automatic circuit		●		●
28		Interlocks for other maker's automatic devices		●		●
29		Interlocks for other maker's spray robot devices		●		●
30		Interlocks for other maker's extractor robot devices		●		●
31		Interlocks for die clamper		●		●
32		Die number output signal		●		●

Standard/Optional List

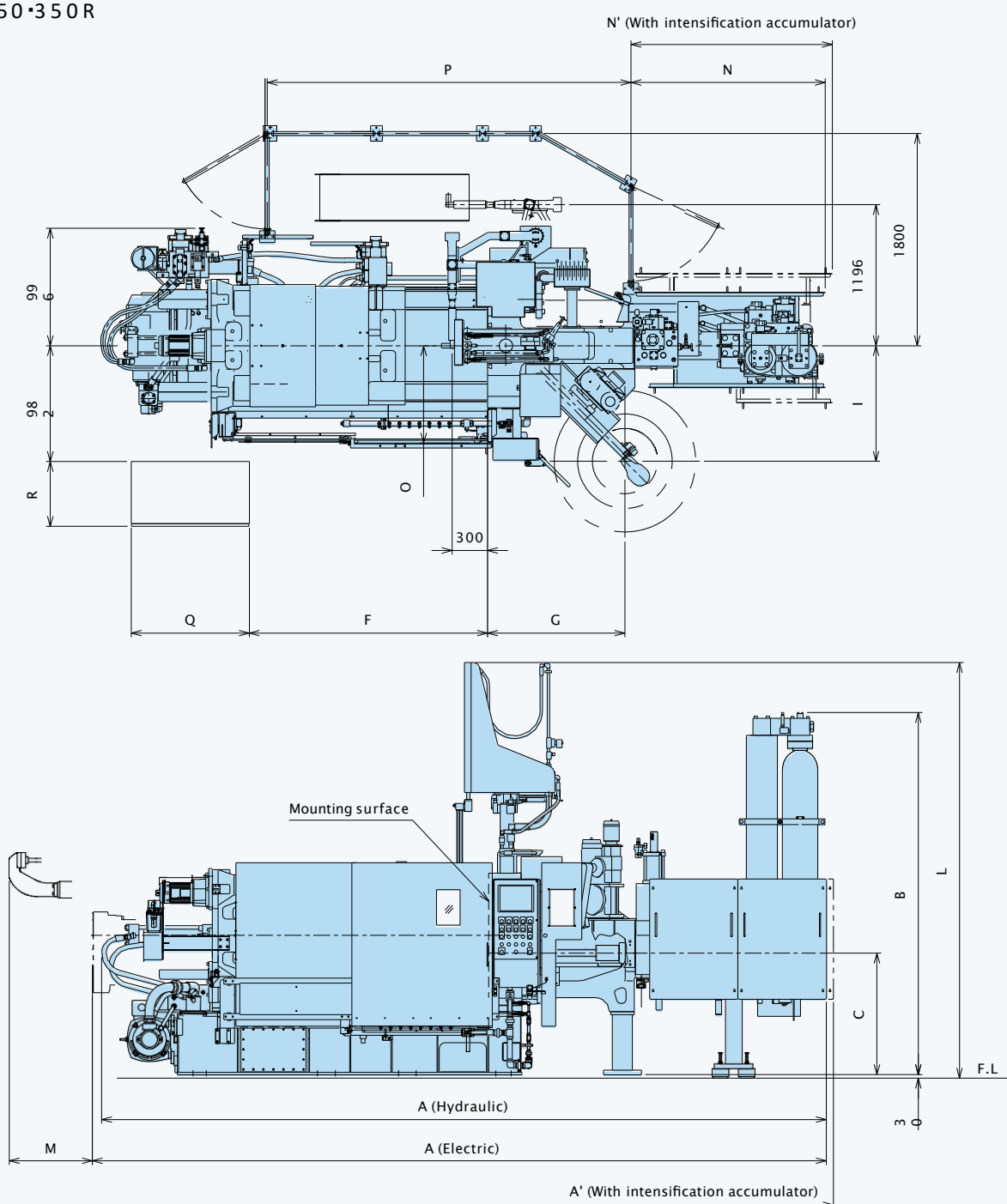
Specification item			DC250~350R		DC500~800R	
			Standard	option	Standard	option
1	Safety	Operator side manual type door	•		•	
2		Toggle side covers (operator side/helper side)	•		•	
3		Injection end cover (operator side)	•		•	
4		Injection end cover (helper side)	•		•	
5		Helper side fence		•		•
6		Ladle path chute	•		•	
7		Die-opening limit safety hook	•		•	
8		Anti-repeat circuit (die-closing push button check)	•		•	
9		Control panel door with interlock	•		•	
10		Control panel door handle with key lock	•		•	
11		Emergency stop buttons (two places)	•		•	
12		Emergency stop buttons		•		•
13		Helper side manual type door		•		•
14		Operator side manual type door (for long core cylinder)		•		•
15		Operator side automatic door (self-standing type)		•		•
16		Operator side automatic door (self-standing type/ Mirror type)		•		•
17		Photoelectric tube safety device		•		•
1	Peripherals	Color (Ivory & Gray)	•		•	
2		Color (specified)		•		•
3		Foundation (I beam)	•		•	
4		Foundation (anchor)		•		•
5		Foundation (frame)		•		•
6		Maintenance Tools		•		•
7		N ₂ gas hose		•		•
8		Plunger lubrication device	•		•	
9		Plunger lubrication mixing system		•		•
10		Plunger lubrication pump delivery volume change (5cc→2cc)		•		•
11		Plunger lubrication lower limit alarm		•		•
12		Automatic ladle device (DAL)		•		•
13		Heat insulation cover for ladle device		•		•
14		Ladle stand (slide type) for exchange of short and long		•		•
15		Automatic spray device (DBS)		•		•
16		Lubricant booster tank (200L)		•		•
17		Lubricant booster tank (200L) with agitator		•		•
18		Lubricant booster tank (100L) with agitator		•		•
19		Automatic extractor device (DTO)		•		•
20		Photoelectric product detector		•		•
21		Vacuum die-casting device (DVF)		•		•
22		SQUEEZE MASTER (SQM)		•		•
23		Host communication function (dPAQET)		•		•
24		Cover for open area of frame on operator side		•		•
25		Cover for open area of frame on helper side		•		•
26		Oil cooler up size		•		•
27		Servo motor for main pump		•		•

Specification Numbers

Specification item		Unit	DC250R	DC350R	DC500R	DC650R	DC800R	
Die closing	Die-locking force	kN	2500	3500	5000	6500	8000	
	Platen size (VxH)	mm	850x850	935x935	1060x1060	1200x1200	1400x1400	
	Tie-bar spacing (VxH)	mm	580x580	650x650	750x750	850x850	930x930	
	Tie-bar diameter	mm	115	135	150	160	180	
	Die thickness	mm	600~300	700~300	850~350	900~350	950~400	
	Die-opening stroke	mm	360	420	550	660	760	
Injection	Maximum injection force	kN	270	344	490	550	600	
	Intensification ratio		1:1.94	1:2.07	1:2.54	1:2.52	1:2.56	
	Plunger stroke	mm	415	480	580	670	750	
	Plunger tip protrusion	mm	230	265	250	300	350	
	Injection port (below center)	mm	125	150	175	175	250	
		mm	125	150	175	175	250	
	Injection speed	H/EH	m/s	0.03~8.0	0.03~11.0	0.03~2.0	0.03~10.5	0.03~10.0
		M/EM	m/s	0.03~8.0	0.03~6.5	0.03~8.0	0.03~7.0	0.03~6.5
	Plunger tip diameter	mm	50~70	60~80	70~90	75~95	80~100	
	Plunger sleeve length	mm	212	247	365	405	445	
	Eject	Ejection force	kN	124	190	235	294	371
Ejection stroke		mm	20~80	20~90	10~100	10~125	10~125	
Hydraulic	Number of moving-die cores	Set	3/8"×1Set	3/8"×1Set	1/2"×1Set	1/2"×1Set	3/4"×1Set	
	Number of moving core ports	Set	3/4"×2Sets	3/4"×2Sets	3/4"×2Sets	3/4"×2Sets	3/4"×2Sets	
	Operating pressure	MPa	15	15	15	15	15	
	Required volume of hydraulic fluid	ℓ	430	430	700	900	1100	
	Hydraulic fluid tank capacity	ℓ	350	350	550	750	950	
Cooling water	Die-cooling water inlet size	Rc	1 + 1/4"	1 + 1/4"	1 + 1/2"	1 + 1/2"	1 + 1/2"	
	Die-cooling water outlet size	Rc	2 + 1/2"	2 + 1/2"	3"	3"	3"	
	Oil cooler-cooling water inlet size	Rc	1"	1"	1"	1"	1"	
	Oil cooler-cooling water outlet size	Rc	1"	1"	1"	1"	1"	
	Fixed-die-cooling water valve	Rc×Set	1/4"×7	1/4"×7	1/4"×7	1/4"×7	1/4"×7	
	Moving-die-cooling water valve	Rc×Set	1/4"×8	1/4"×8	1/4"×10	1/4"×10	1/4"×10	
	Sprue bushing-cooling water valve	Rc×Set	1/4"×2	1/4"×2	1/4"×2	1/4"×2	1/4"×2	
	Required cooling water for cooler	ℓ/min	35	35	50	50	50	
	Required cooling water for die	ℓ/min	70~120	70~120	70~120	70~120	120~160	
Electrical	For hydraulic pump	kW	22	22	37	37	45	
	For die-height adjustment	kW	15	15	22	22	37	
	For lubrication pump	W	40	40	40	40	40	
	Electrical capacity	kVA	4.0/60	4.0/60	6.0/105	6.0/110	7.5/130	
	Power supply	V	AC200/220	AC200/220	AC200/220	AC200/220	AC200/220	
	Air	Air connecting port	Rc	1/4", 3/8" one dash	1/4", 3/8" one dash	1/4", 3/8" one dash	1/4", 3/8" one dash	1/4", 3/8" one dash
Air pressure		MPa	0.4	0.4	0.4	0.4	0.4	
Machine size	Required floor space	mm	5807×2150	6223×2197	7502×2770	8364×2810	8990×3028	
	Machine height	mm	2803	3071	3350	3671	3998	
	Machine mass	H/M	ton	97	125	205	285	38
EH/EM		ton	101	129	218	300	393	

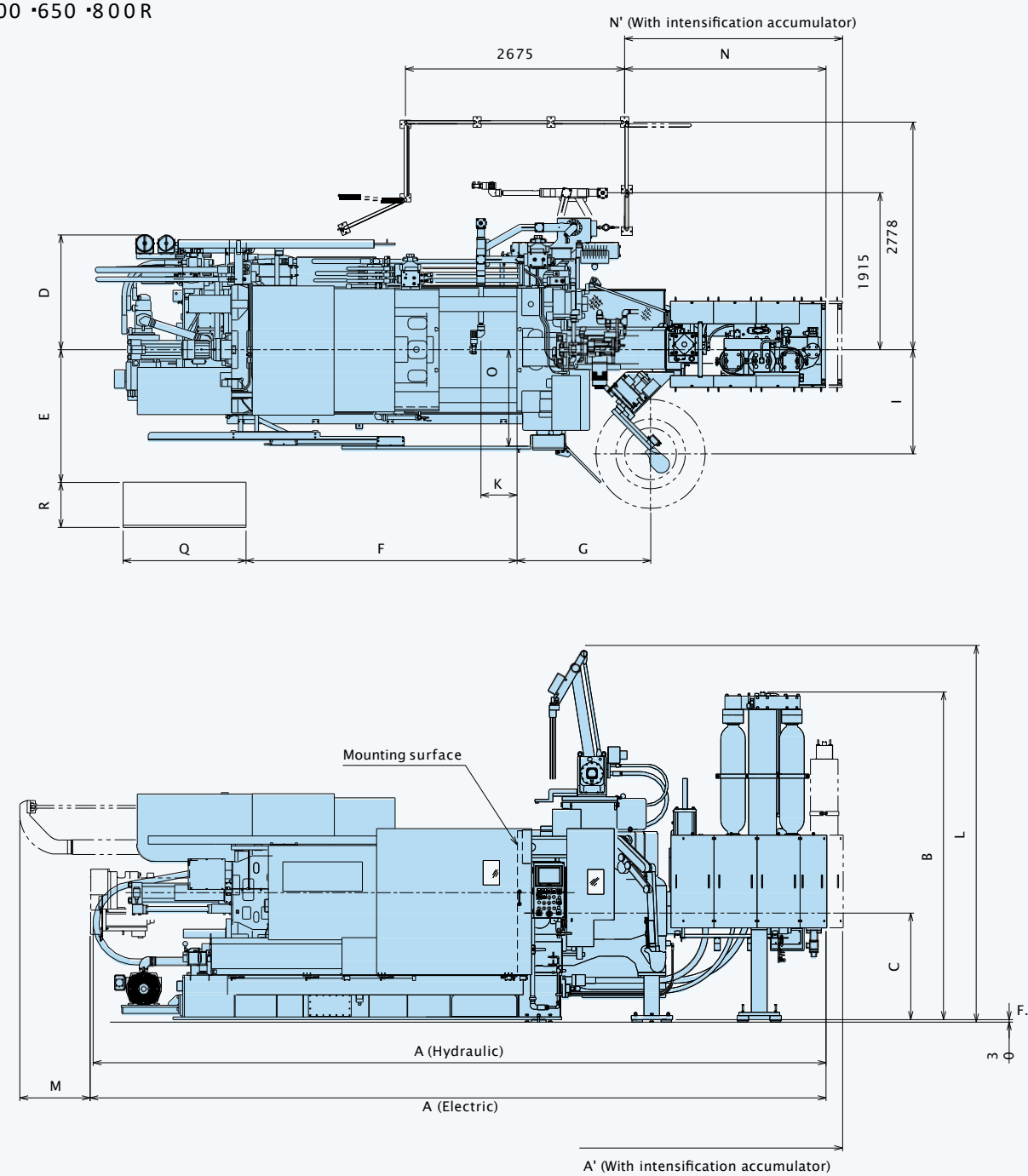
General View/Dimensions

DC250 • 350 R



	A	A'	B	C	F	G	I	L	M	N	N'	O	P	Q	R
DC250R-H/M	5,789	5,849	2,803	960	2,070	1,135	975	3,407	502	1,393	1,453	769	2,589	1,000	550
DC250R-EH/EM	5,807	5,867	2,803	960	2,070	1,135	975	3,407	483	1,393	1,453	769	2,589	1,800	550
DC350R-H/M	6,144	6,204	3,071	1,030	2,020	1,165	980	3,525	651	1,647	1,707	826	3,084	1,000	550
DC350R-EH/EM	6,223	6,283	3,071	1,030	2,020	1,165	980	3,525	703	1,647	1,707	826	3,084	1,800	550

DC500 • 650 • 800 R



※ Intensification accumulator is optional

	A	A'	B	C	D	E	F	G	I	K	L	M	N	N'	O	Q	R
DC500R-H/M	7,502	7,702	3,350	1,080	1,279	1,500	2,800	1,457	1,257	220	4,350	583	1,958	2,158	970	1,500	550
DC500R-EH/EM	7,375	7,575	3,350	1,080	1,279	1,500	2,800	1,457	1,257	220	4,350	707	1,958	2,158	970	2,300	550
DC650R-H/M	8,192	8,387	3,671	1,225	1,285	1,500	3,200	1,594	1,259	320	4,495	739	2,324	2,519	1,065	1,500	550
DC650R-EH/EM	8,364	8,559	3,671	1,225	1,285	1,500	3,200	1,594	1,259	320	4,495	783	2,324	2,519	1,065	3,300	550
DC800R-H/M	8,927	9,127	3,998	1,300	1,401	1,600	3,430	1,633	1,273	440	4,570	895	2,854	3,054	1,180	1,500	550
DC800R-EH/EM	8,990	9,190	3,998	1,300	1,401	1,600	3,430	1,633	1,273	440	4,570	859	2,854	3,054	1,180	3,300	550

