

# DLseries



Two Platen Direct Locking Type Injection Molding Machine

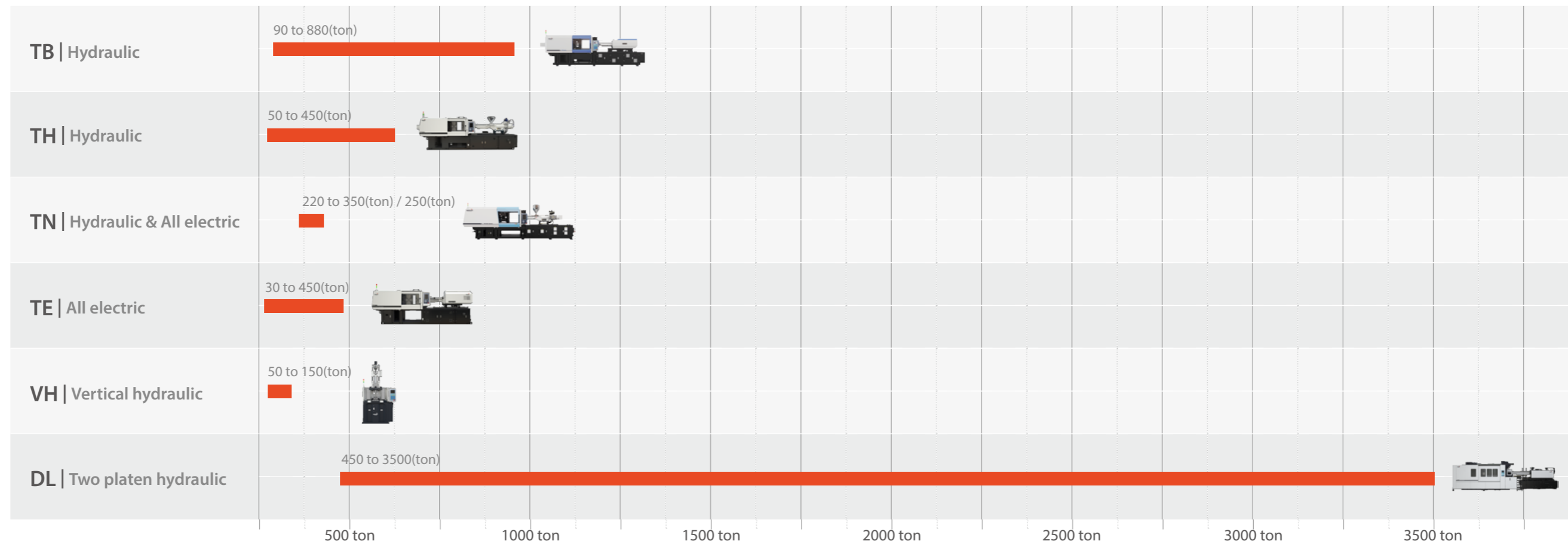
  Compact Design

  High Plasticizing Capacity

  High Precision

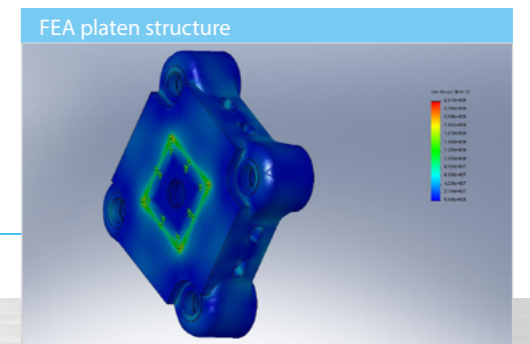
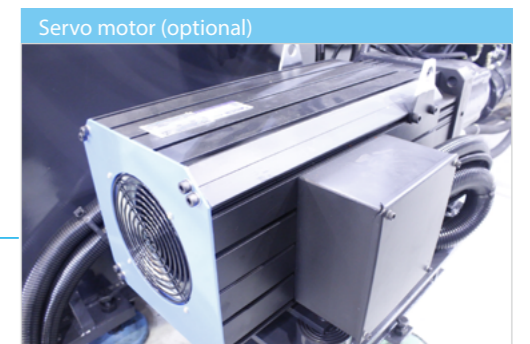
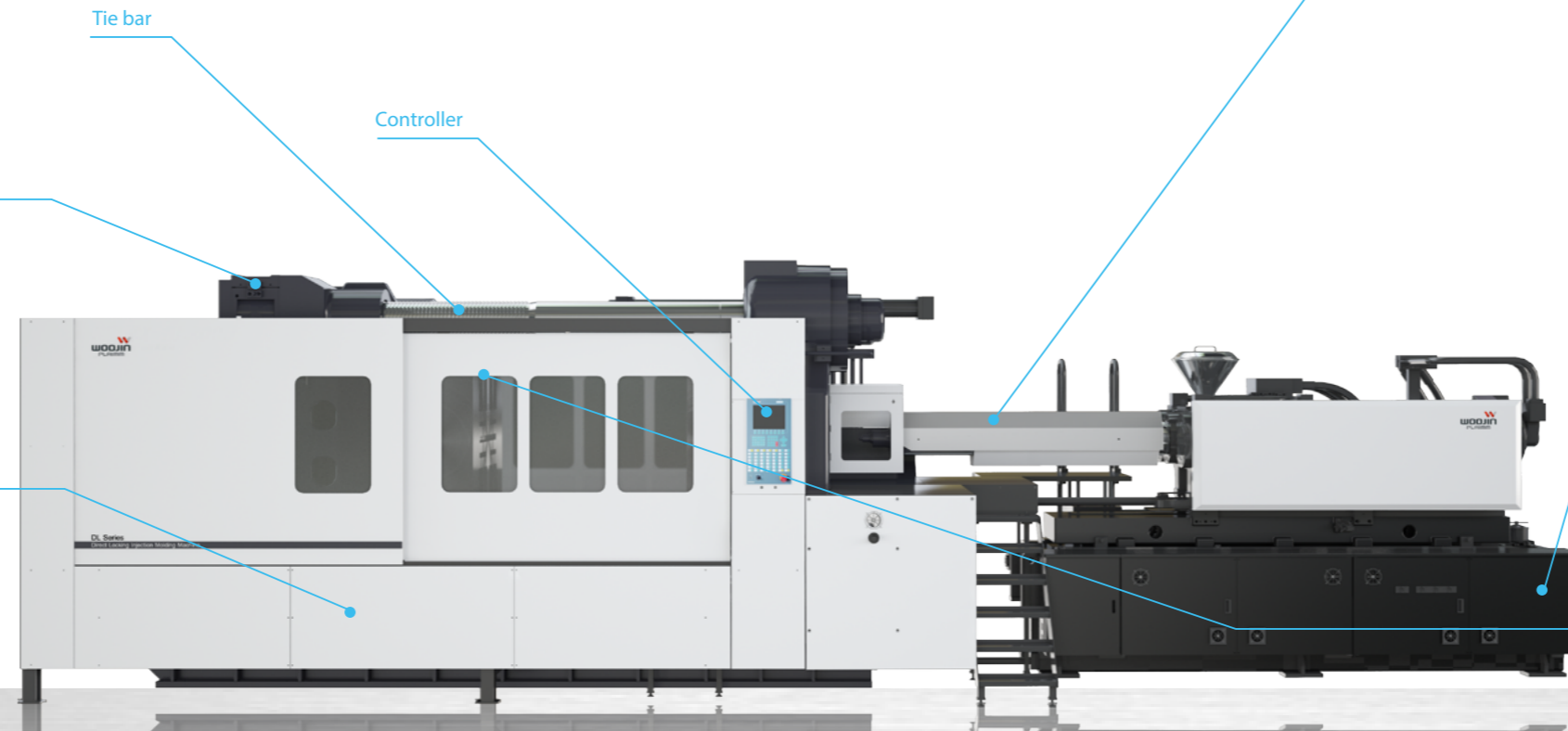
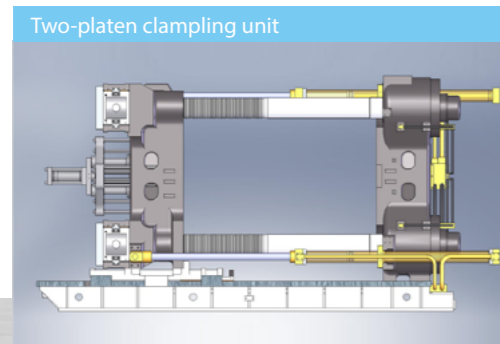
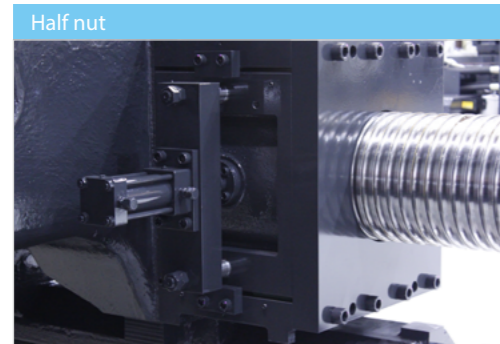
**WOOJIN**  
PLAIMM

# Machine series



# DLseries

The new concept injection molding machine adopted high rigidity two-platen direct locking method. With compact design, it takes up less installation space, maximizing the space utilization producing medium to ultra large 3,500 ton machines.



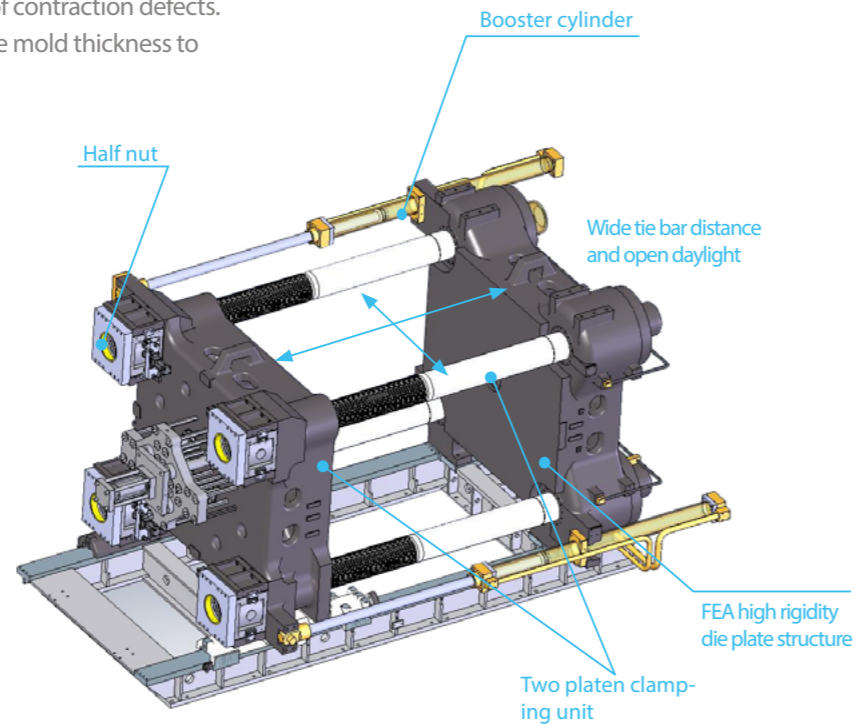
DL series \_ Clamping / Injection Matrix

Model	Clamping force	Tie-bar distance(HxV)	Unit No.	Injection unit [Screw diameter in mm]												
				65	70	80	90	95	105	115	125	140	160	180		
DL450	4413kN	860×810	IH 28	O	A	B										
DL550	5394kN	915×915	IH 42		O	A	B									
DL650	6374kN	1010×1010	IH 59			O	A		O							
DL850	8336kN	1110×1110	IH 88					O	A	S						
DL1050	10297kN	1410×1110	IH 88					O	A	S						
DL1300	12749kN	1410×1410	IH 119							A	B					
DL1800	17652kN	1610×1610	IH 153								A	B				
DL2000	19613kN	1810×1610	IH 153								A	B				
DL2500	24517kN	1820×1620	IH 215									A	B			
DL3000	29420kN	1920×1820	IH 317										A	B		



# Clamping Unit

- The structure of half nut and tie bar was improved to prevent operation errors of half nut for mold open under high pressure.
- It minimizes the volume of mold clamping cylinder to cut down on pressure rising time for realizing short dry cycle.
- It lengthens the mold lifespan by setting clamping force to avoid applying excessive force on the mold.
- 4 tie bar cylinders generate clamping force which is evenly distributed inside a mold, thereby lowering the chances of contraction defects.
- Computational program automatically sets the mold thickness to shorten the time it takes for mold change.



## Energy Saving Solution 1 (Optional)



### AC servo motor's speed control system

AC servo motor's speed control in servo pump system. It has drastically cut down on the energy consumption and effectively prevented the rise of temperature in hydraulic operating oil and noise control.

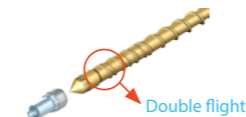
- It saves up to 60% of energy comparing the standard hydraulic type
- It saves 25% of coolant consumption
- It uses 15% less hydraulic operating oil
- Excellent system representation : within 0.1%
- High response : 70ms
- Low speed precision position control : mold protection

# Injection Unit

## Optimized injection plasticizing equipment

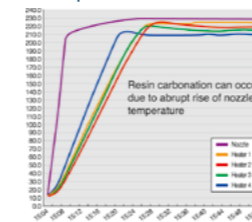
- It enhances the precision in resin temperature control
- Separate temperature control in nozzle area (variable structure of nozzle temperature sensor)
- Heating controller synchronises the temperature rising for temperature rise
- Optimization of thermo couple position in barrel area (variable structure of the rear parts in thermo couple)
- Hopper's automatic control for lowering temperature

## Smart screw (SB) standard application

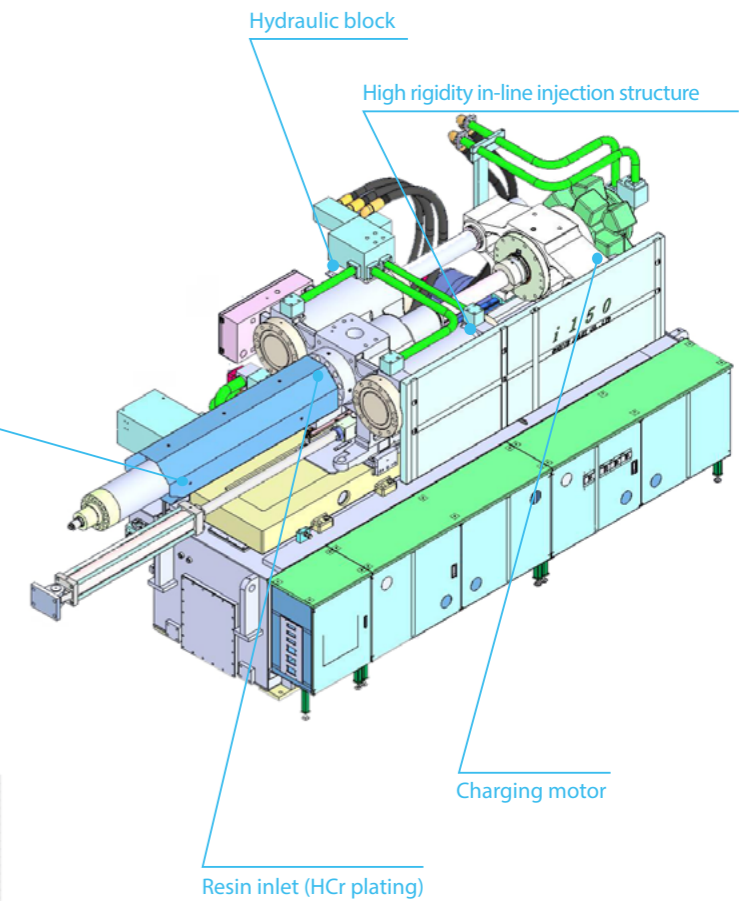
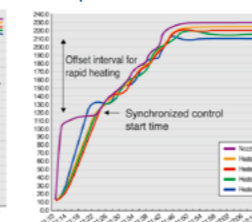


- High plasticizing capacity and stable molding raises productivity
- Screw structure, charging part and compression part, double flight application
- Enhanced plasticizing capacity: 16~25% for each resin
- Better blending effects
- Better color distribution
- Decreased resin pressure change
- Decreased resin temperature deviation

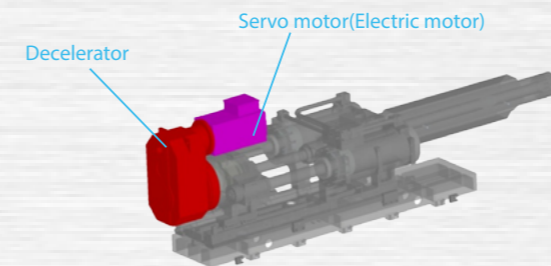
### Heating not synced for temperature rise



### Heating synced for temperature rise



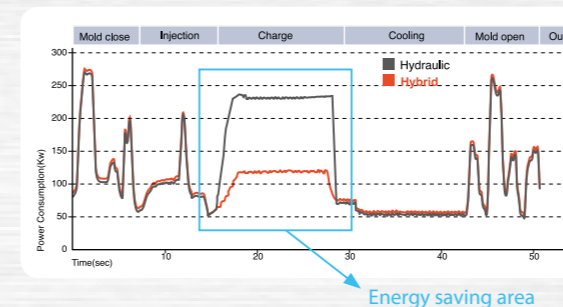
## Energy Saving Solution 2 (Optional)



It saves 30% of energy consumption with mold open/close during screw driven servo motor control and plasticizing.

It saves energy and lowers the noise level applying servo motor system in plasticizing process which takes up over 50% of the entire power consumption, while enhancing productivity with less dry cycle due to separate control.

- It saves max. 30% of energy consumption
- It shortens the process time with mold open/close during plasticizing
- It shortens plasticizing processing time and increasing screw speed
- Capable of tandem molding and stack molding
- Closed-loop control type is excellent in control response and precision of plasticizing process.
- Dispersion effects on hydraulic system make it easy to manage oil temperature.
- Separate control valve in proportion to the clamping control enables the accurate clamping position control and precision mold protection.



# Controller (GTB)

The high performance precision controller enables high speed high precision injection for closed-loop type (option) to guarantee the maximum safety and precision during operation.



## System Features

- INTEL Celeron 600MHz 32bit microprocessor
- 128MB SDRAM 128KB cache memory
- 1ms or less system internal processing time
- 10.4 inch TFT color LCD (800\*600)
- PID type cylinder temperature control
- Input/output module type
- USB printer port

## Position Transducer

- Digital sensor
  - Effective positioning capabilities allow it to adjust the position and measuring without having to reposition the machine all over again.
  - Can be used semi-permanently for literally unlimited amount of time (over 100 million cycle)
  - Excellent analysis of output signal
  - Easy to use and install

## Storing & Printing

Other than an internal storage device, users can easily store the molding and other relevant information and data in USB and print out as they want.

## Multilingual operation

Foreign languages such as English, Russian, Czech, Polish, Spanish and others are available for easy manipulation of the machine in other parts of the world.

## Setting log

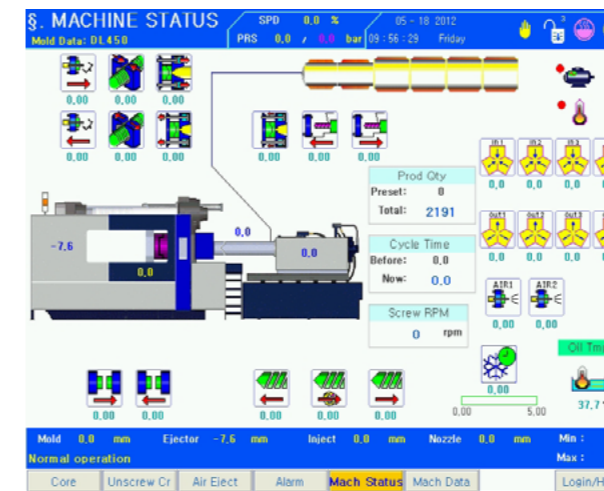
Users can store the changes they made hourly and print out the log of setting changes.

## Central monitoring system (Optional)

Central monitoring computer can have access to maximum 200 injection molding machines at the same time to facilitate the data transmission and management. Such injection related data will be converted into excel files for easier data management and retrieval.

## Process management

The snapshot of process management



It offers a snapshot of the entire monitoring of equipments in operation.

## Alarm function

Wide range of management on errors and glitches

ALM DESCRIPTION	ALM GEN TIME	ALM REL TIME
Heater 2 Temp is too low.	18-May-12 9:56:13 AM	18-May-12 9:56:22 AM
Heater 1 Temp is too low.	18-May-12 9:56:12 AM	18-May-12 9:56:22 AM
Heater 3 Temp is too low.	18-May-12 9:56:12 AM	18-May-12 9:56:21 AM
Heater 2 Temp is too low.	18-May-12 9:56:11 AM	18-May-12 9:56:11 AM
Nozzle Temp is too low.	18-May-12 9:56:11 AM	18-May-12 9:56:22 AM
Alarm A53: Heating Cylinder Temp is too low.	18-May-12 9:56:10 AM	18-May-12 9:56:22 AM
Long Nozzle Temp is too low.	18-May-12 9:56:10 AM	18-May-12 9:56:22 AM
Alarm A55: Machine Oil heating in process.	18-May-12 9:55:33 AM	18-May-12 9:55:40 AM
Heater 4 Temp is too low.	18-May-12 9:55:33 AM	18-May-12 9:55:41 AM
Heater 3 Temp is too low.	18-May-12 9:55:31 AM	18-May-12 9:55:40 AM
Heater 2 Temp is too low.	18-May-12 9:55:31 AM	18-May-12 9:55:41 AM
Heater 1 Temp is too low.	18-May-12 9:55:31 AM	18-May-12 9:55:42 AM
Nozzle Temp is too low.	18-May-12 9:55:31 AM	18-May-12 9:55:42 AM
Alarm A53: Heating Cylinder Temp is too low.	18-May-12 9:55:30 AM	18-May-12 9:55:42 AM
Long Nozzle Temp is too low.	18-May-12 9:55:30 AM	18-May-12 9:55:42 AM

All the information is provided on possible errors and glitches during operation for accurate maintenance and repair.

## Quality management

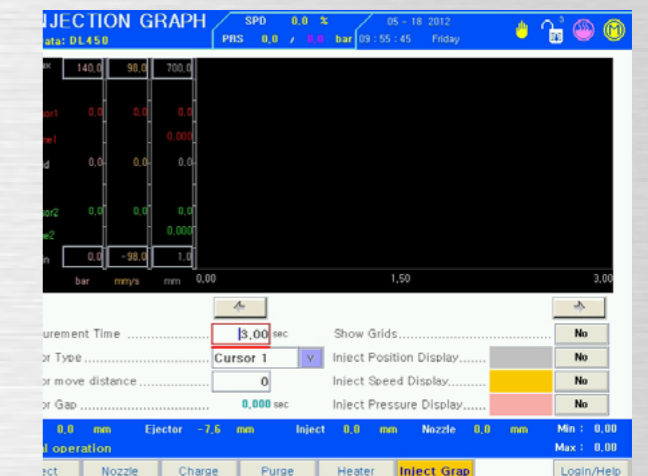
Accurate product management

Cycle count	Inj time	Charge time	Cycle time	Cusion pos	Max Inj spd	Max Screw spd
2191	4.29	3.02	20.1	1.0	17.1	0
2190	4.29	3.02	20.1	1.0	17.1	0
2189	4.29	3.02	20.1	1.0	17.1	0
2188	4.29	3.02	20.1	1.0	17.1	0
2187	4.29	3.02	20.1	1.0	17.1	0
2186	4.29	3.02	20.1	1.0	17.1	0
2185	4.29	3.02	20.1	1.0	17.1	0
2184	4.29	3.02	20.1	1.0	17.1	0
2183	4.29	3.02	20.1	1.0	17.1	0
2182	4.29	3.02	20.1	1.0	17.1	0
2181	4.29	3.02	20.1	1.0	17.1	0
2180	4.29	3.02	20.1	1.0	17.1	0
2179	4.29	3.02	20.1	1.0	17.1	0
2178	4.29	3.02	20.1	1.0	17.1	0
2177	4.29	3.02	20.1	1.0	17.1	0
2176	4.29	3.02	20.1	1.0	17.1	0
2175	4.29	3.02	20.1	1.0	17.1	0
2174	4.29	3.02	20.1	1.0	17.1	0
2173	4.29	3.02	20.1	1.0	17.1	0
2172	4.29	3.02	20.1	1.0	17.1	0
2171	4.29	3.02	20.1	1.0	17.1	0
Mn	1.43	2.49	10.9	1.0	11.4	0
Average	4.29	3.02	20.1	1.0	17.1	0
Max	4.29	3.02	20.1	10.0	17.1	0

Selective data storage and management for quality assurance under maximum 6 categories and trace back to 1,000 processes conducted in the past.

## Graph display

Convenient data visualization service



Detailed data on measured areas that a user may want are displayed in graph.



# DL-Sseries | Two-Platen Direct Lock

		DL 450S			DL 550S			DL 650S			DL 850S		
		IH 28			IH 42			IH 59			IH 88		
<b>Injection Unit</b>													
Screw & Barrel type		O	A	B	O	A	B	O	A	B	O	A	B
Screw diameter	mm	65	70	80	70	80	90	80	90	105	95	105	115
Injection pressure	kg/cm <sup>2</sup>	2191	1889	1446	2465	1887	1491	2386	1885	1385	2145	1756	1464
	MPa	215	185	142	242	185	146	234	185	136	210	172	144
Theoretical injection volume	cm <sup>3</sup>	1270	1480	1930	1690	2210	2790	2480	3140	4280	4110	5020	6020
Injection weight (PS)	g	1170	1364	1778	1557	2037	2571	2285	2894	3944	3787	4626	5547
Screw stroke	cm <sup>3</sup> /s	457	531	693	493	644	815	633	801	1090	844	1031	1236
Injection speed	mm	385	385	385	440	440	440	495	495	495	578	578	578
Injection rate	mm/s	138	138	138	128	128	128	126	126	126	119	119	119
Plasticizing capacity (PS)	kg/h	254	277	342	277	342	394	342	394	495	400	495	564
Screw speed	rpm	200	185	165	185	165	145	165	145	125	130	125	115

## Clamping Unit

Clamping force	ton(kN)	450 (4413)			550 (5394)			650 (6374)			850 (8336)		
Mold opening force	ton(kN)	31 (304)			38 (373)			45 (441)			58 (569)		
Distance between tie bar (HxV)	mm	860x810			915x915			1010x1010			1110x1110		
Platen dimension (HxV)	mm	1240x1190			1330x1330			1460x1460			1610x1610		
Daylight	mm	1450			1600			1800			2300		
Min. thickness of molds	mm	350			400			450			500		
Max. thickness of molds	mm	800			950			1100			1200		
Ejector force	ton(kN)	11.1 (109)			16.6 (163)			19.8 (194)			26.9 (264)		
Ejector stroke	mm	200			220			250			250		

## Generals

Heat capacity	kW	18.5	20.7	24.2	23.0	26.8	30.6	29.4	33.6	39.3	39.7	44.6	49.6
Generator capacity	kW	78.0			92.4			124.7			137.4		
Total electric power capacity	kW	96.5	98.7	102.2	115.4	119.2	123.0	154.1	158.3	164.0	177.1	182.0	187.0
Hydraulic oil volume	ℓ	950			1200			1500			1800		
Machine weight	ton	19			26			32			41		
Machine dimension (LxWxH)	m	6.7x2.3x2.2			7.6x2.5x2.3			8.3x2.7x2.3			9.9x2.9x2.5		
Cooling water requirement	ℓ/min	130			180			180			180		

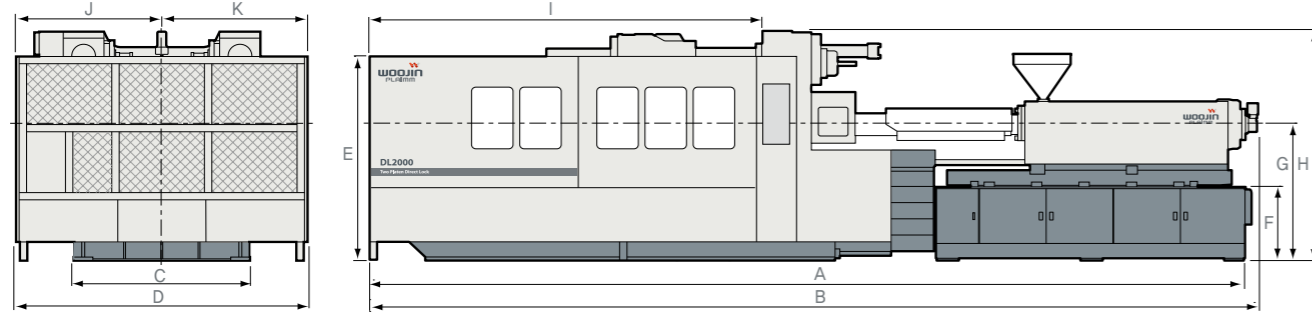
1. Theoretical injection volume: screw cross section x screw stroke.
2. Min. mold dimension should be over 60% of tie bar distance.
3. Coolant consumed for molds are not counted in coolant consumption amount.
4. Specifications are subject to change without notice for quality upgrade.

	DL 1050S			DL 1300S		DL 1800S		DL 2000S		DL 2500S		DL 3000S	
	IH 88			IH 119		IH 153		IH 153		IH 215		IH 317	
	O	A	B	A	B	A	B	A	B	A	B	A	B
	95	105	115	115	125	125	140	125	140	140	160	160	180
	2145	1756	1464	1809	1531	1814	1446	1814	1446	1816	1391	1792	1416
	210	172	144	177	150	178	142	178	142	178	136	176	139
	4110	5020	6020	6570	7760	8430	10580	8430	10580	11850	15480	17690	22390
	3787	4626	5547	6054	7151	7768	9749	7768	9749	10920	14265	16301	20632
	844	1031	1236	1275	1506	1271	1595	1271	1595	1547	2020	1649	2087
	578	578	578	633	633	688	688	688	688	770	770	880	880
	119	119	119	123	123	104	104	104	104	100	100	82	82
	400	495	564	564	627	627	745	627	745	701	843	799	974
	130	125	115	115	105	105	95	105	95	90	80	76	71

	1050 (10297)	1300 (12749)	1800 (17652)	2000 (19613)	2500 (24517)	3000 (29420)
	74 (726)	89 (873)	124 (1216)	138 (1353)	166 (1628)	200 (1961)
	1410x1110	1410x1410	1610x1610	1810x1610	1820x1620	1920x1820
	1950x1650	1950x1950	2150x2150	2450x2150	2500x2300	2550x2450
	2400	2500	3200	3200	3600	3800
	600	700	800	800	900	1000
	1200	1200	1500	1500	1700	1900
	26.9 (264)	34.4 (345)	44.5 (437)	44.5 (437)	67.8 (665)	68.7 (674)
	250	300	300	300	350	350

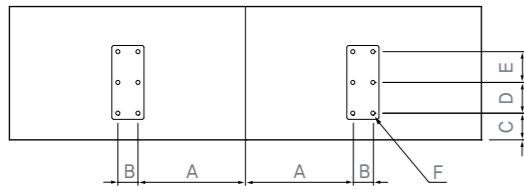
	39.7	44.6	49.6	54.6	58.1	61.9	71.1	61.9	71.1	78.4	91.1	106.3	123.4
	137.4			181.3		181.3		181.3		226.4		238	
	177.1	182.0	187.0	235.9	239.4	243.2	252.4	243.2	252.4	304.8	317.5	344.3	361.4
	1800			2500		3200		3200		4200		4500	
	52			66		95		110		130		150	
	10.1x3.2x2.5			10.7x3.4x3.0		12.0x3.9x3.3		12.1x4.0x3.4		13.6x4.2x3.6		15.0x4.4x3.9	
	180			185		185		185		240		240	

## Machine Dimensions

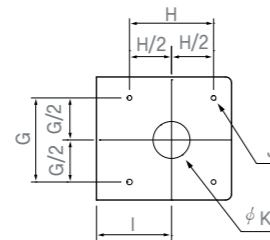


	A	B	C	D	E	F	G	H	I	J	K
DL450	6584	6446	1280	2307	2097	867	1410	2105	2715	1277	1030
DL550	7445	7169	1330	2422	2177	867	1410	2190	2974	1337	1085
DL650	8020	7935	1430	2598	2292	885	1450	2305	3248	1428	1170
DL850	9365	9284	1610	2794	2407	885	1490	2435	3880	1489	1305
DL1050	9525	9444	1910	3133	2382	885	1490	2475	4040	1658	1474
DL1300	10706	10536	1890	3373	2560	989	1720	2915	4470	1687	1687
DL1800	11945	11945	2170	3724	2835	1023	1890	3265	5240	1862	1862
DL2000	11995	11995	2380	3934	2835	1023	1890	3295	5290	1967	1967
DL2500	14035	14265	2480	3983	3218	1215	2085	3578	6027	1992	1992
DL3000	15095	15245	2670	4220	3265	1360	2235	3875	6342	2110	2110

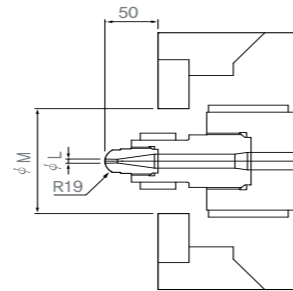
Robot installation drawing



Hopper installation drawing

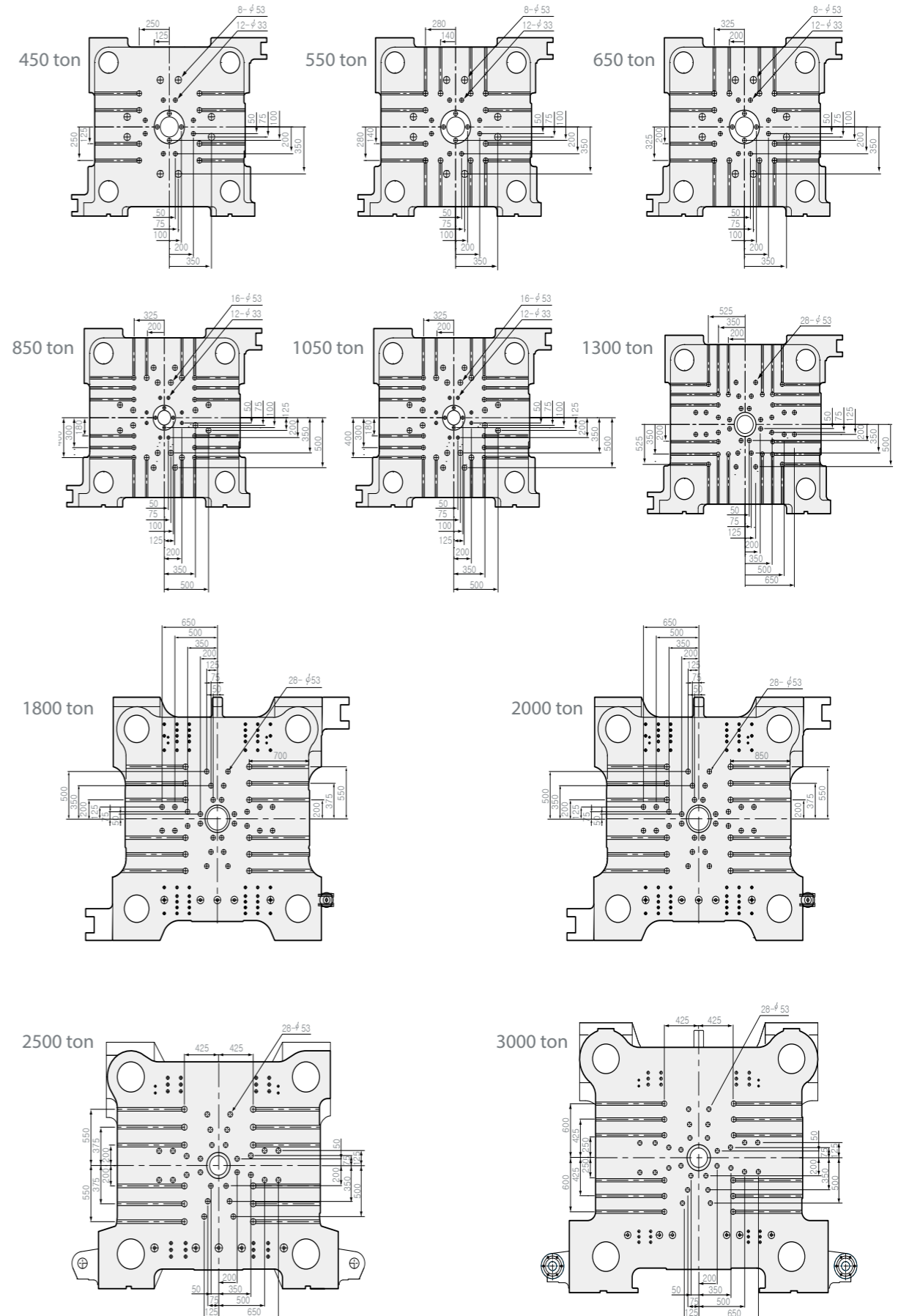


Nozzle dimensions



	A	B	C	D	E	F	G	H	I	J	K	L	M
DL450	210		105	185		4-M20	165	165	120	4-M12	68	4	100
DL550	195		105	245		4-M20	165	165	130	4-M12	78	5	100
DL650	235		110	265		4-M24	165	165	140	4-M12	88	5	100
DL850	235		115	330		4-M24	165	165	170	4-M12	103	6	100
DL1050	335		125	375		4-M30	165	165	170	4-M12	103	6	100
DL1300	535	100	130	150	150	12-M20	280	200	190	4-M16	113	6	120
DL1800	725	450	150	150	150	12-M30	280	200	200	4-M16	123	6	120
DL2000	830	450	150	150	150	12-M30	280	200	200	4-M16	123	6	120
DL2500	850	450	170	200	200	12-M30	280	200	220	4-M16	138	6	120
DL3000	900	500	150	250	250	12-M30	280	200	240	4-M16	158	6	120

## Platen Dimensions



# Feature List

S: Standard O: Option

Injection Unit	DL	
	450~850	1050~3000
1. Injection process control stage (Speed/Pressure)	6	6
2. Holding process control stage (Speed/Pressure)	3	3
3. Charging process control stage (Speed/Pressure)	4	4
4. Back pressure control stage	4	4
5. Suck-back control (before injection)	S	S
6. Suck-back control (After injection)	S	S
7. Injection speed graphic display	S	S
8. Injection pressure graphic display	O	O
9. Closed-loop of injection process	O	O
10. Cushion amount display & alarm	S	S
11. Screw RPM display	S	S
12. Auto purge circuit	S	S
13. Screw cold start prevention device	S	S
14. Heater pre-heating timer (for weekly)	S	S
15. Heater temperature abnormal display & alarm	S	S
16. PID heater temperature control	S	S
17. Cylinder temperature keeping mode	S	S
18. Charging on fly (Mold opening during charging)	O	O
19. Shut-off nozzle (Hydraulic type)	O	O
20. Valve gate 1 stage	S	S
21. Hopper footboard	O	O
22. Antiwear screw & barrel	O	O
23. Antiwear and anticorrosion screw & barrel	O	O
24. Double barrier mixing screw (SBC screw)	S	S

Clamping Unit		
1. Mold open & close speed control stage	5	5
2. Mold open & close pressure control stage	5	5
3. Ejector speed control stage	3	3
4. Ejector pressure control stage	3	3
5. Hydraulic core puller (1 stage)	S	S
6. Core moving or ejecting during mold opening	O	O
7. Unscrewing device	O	O
8. Air blow off unit	S	S
9. Working footboard(1m x 1m)	X	S
10. Safety footboard inside of machine	X	S
11. clamping proportional valve	X	S

General	DL	
	450~850	1050~3000
1. Molding data memory capacity( Internal / External)	1000/usb	1000/usb
2. Alarm history display & saving	S	S
3. Record of setting - value changing	S	S
4. Statistical function	S	S
5. I/O circuit display	S	S
6. Multi language display (Korean, English, Chinese, Japanese, Czech, Russian, Polish, Spanish, Vietnamese, Indonesian)	S	S
7. Robot interlock circuit	S	S
8. Robot interlock interface(Euromap 12/SPI)	O	O
9. Print connect port	S	S
10. Hydraulic oil level alarm	S	S
11. Hydraulic oil temperature over alarm	S	S
12. Water sol valve for oil cooler	O	O
13. Hydraulic oil temperature control & oil cooler scale removal device	O	O
14. Hopper throat temperature control device	O	O
15. Auto grease for clamping unit	S	S
16. Shot data file saving	S	S
17. Hopper moving device	O	O
18. Auto safety door open	S	S
19. Hydraulic oil cleaner	S	S
20. Auto clamps(Quick Die Changer)	O	O
21. Beam sensor for door	S	S
22. Beam sensor clamping unit	X	S
23. Anchor bolts	S	S
24. 3 stage alarm lamp	S	S
25. Maintenance tools	S	S
26. Spare parts	S	S

\* Specifications can be changed for improved development without prior notice.

# Global Network

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