Sumitomo SHI DEMAG

SE-HY series

HYBRID INJECTION MOLDING MACHINE

Sumitomo Heavy Industries, Ltd.

Hybrid Mechanism

DCPP (Double Center Press Platen)

Standard platen cannot provide more uniform clamp force because clamp force direct apply to upper and lower edges of platen. Double center press platen can provide more uniform clamp force because clamp force is distribute evenly to center of platen due to design structure.

●Solve flash and short shot at the same time.

Standard platen: Unbalanced clamp force
Flash tends to appear at center of platen.
Short shot tends to appear at edges of platen.
Double Center Press Platen: More uniform clamp force by DCPP can release air from the mold easily. DCPP also provides high pressure at the center of platen. As a result, you can solve flash and short shot at the same time.

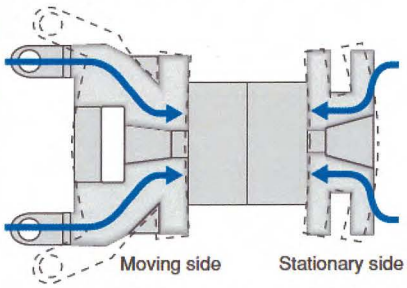
●Reduce clamp force 20 to 30% compared to standard platen

DCPP can reduce clamp force due to more uniform clamp force.

●Longer mold life

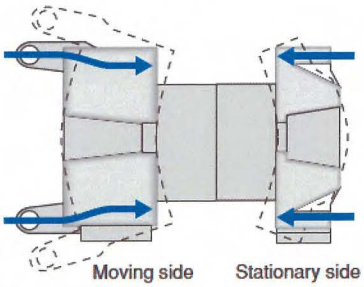
Wear of the mold is caused by deformation of platen because of high surface pressure at the edge of platen. DCPP provides less wearing with less deformation of platen due to more uniform clamp force. Moreover, you can decrease frequency of mold vent cleaning.

DCPP (Double Center Press Platen)



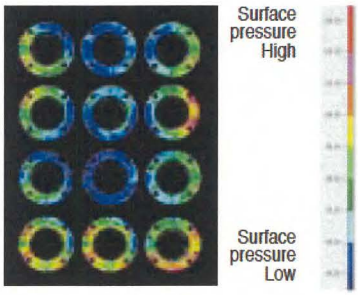
The double center press platen is designed for smooth transmission of the clamp force to the center area as shown in the figure, which can minimize the deflection of the platen.

Conventional Platen



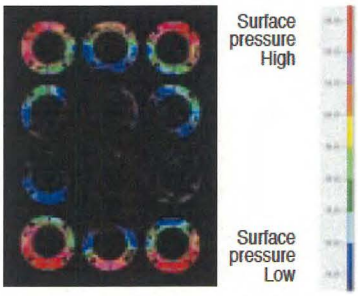
The conventional platen disperses the clamp force upwards and downwards, so that it is deflected as shown in the figure. This deflection reduces the surface pressure around the center area of the molds, causing flash and the core pins to damage.

A more uniform surface pressure distribution is provided.



Example of surface pressures measured (12 cavities cup molds measured with pressure-sensitive paper)

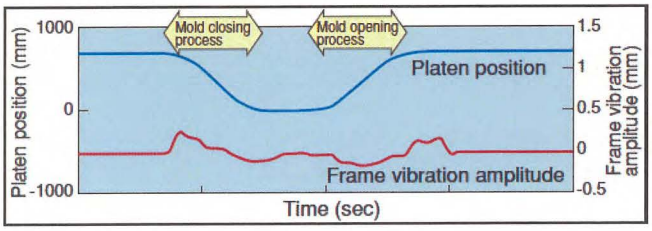
The surface pressure is very high on the upper and lower area of molds, but relatively low at the center part.



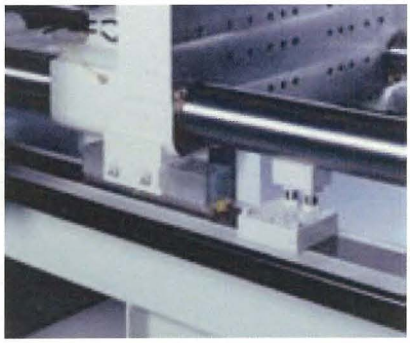
Example of surface pressures measured (12 cavities cup molds measured with pressure-sensitive paper)

Low Vibrations

The high-precision mold open/close control and the highly rigid frame ensure smooth mold open/close operation with few vibrations. The frame vibration amplitude is reduced 50% relative to the conventional hydraulic machines.

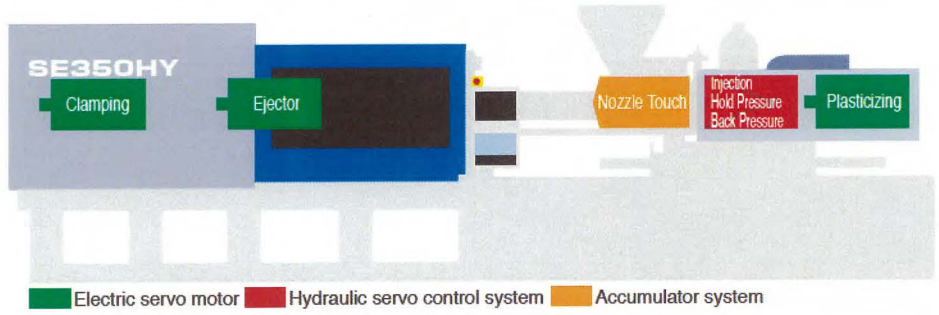


Tie-bar Support System (Option)



The tie bar is supported on the frame to prevent its bending due to the mold weight and the fall-down of the platen, ensuring the high-precision clamping and the longer service life of molds.
(Patent pending)

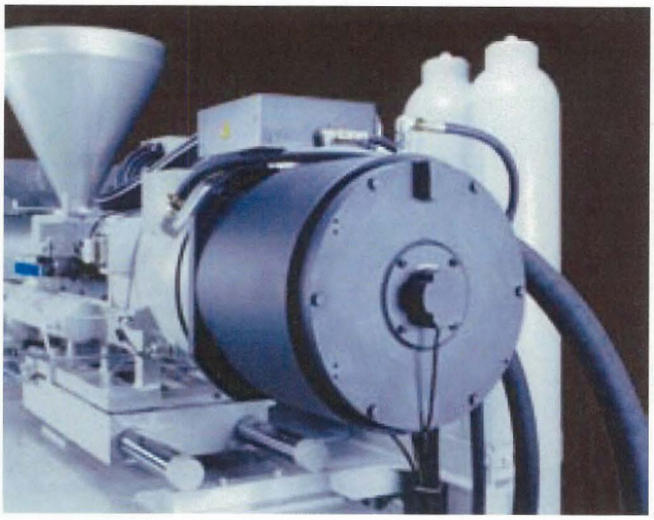
Hybrid Mechanism



The Injection Unit designed based on the SE-S series electric molding machines is driven by a hydraulic servo valve with a high-capacity accumulator in order to substantially increase the injection power.
The hybrid molding machine ensures high-speed molding of multi-type products of thin and viscose resin with high precision.

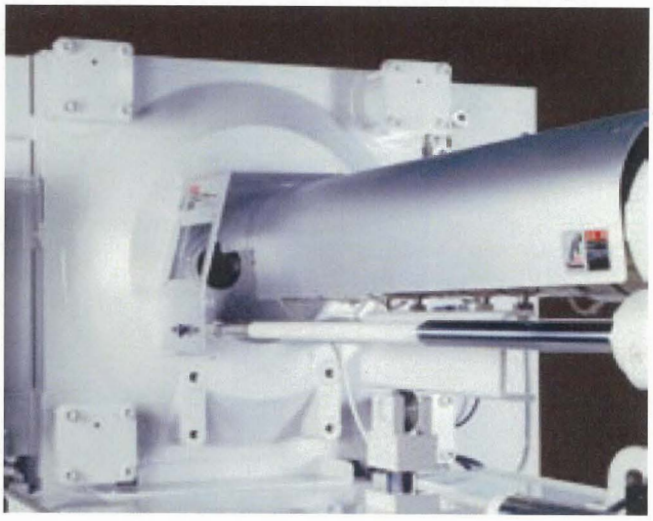
DD Servo Motor (SE350HY or the smaller models)

A newly developed high-load DD servo motor is adopted in the plasticizing drive mechanism, which realizes low noise in the high-speed rotation environment. (Patent pending) (The mold opening/closing, ejector and the SE450HY are belt-driven type.)



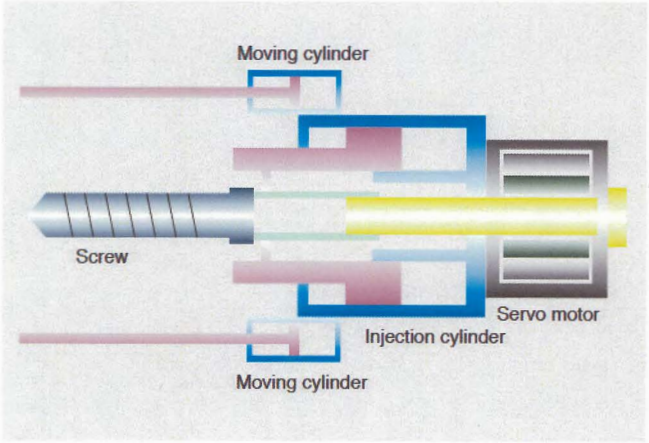
Nozzle Touch & Screw Support Systems

●High-precision high-power nozzle touch system／The 2-unit plasticizing displacement system can prevent the platen falling down and contribute the longer life of molds.
●Screw support system／The heating cylinder end is supported by a support mechanism to prevent a resin leak and nozzle strain due to any center deviation between the nozzle and the mold. (Patent pending)



Injection Unit

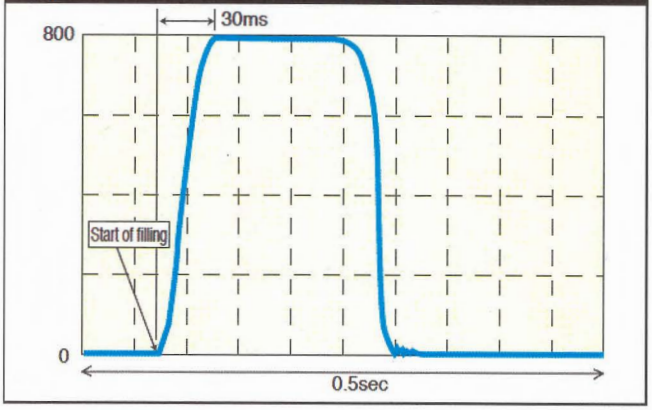
The injection unit has a simple structure unique to SHI that uses no ball screw, ensuring its high reliability and long service life.
●The injection unit use no grease, reducing the grease consumption in the machine to half.



High Injection Response

The digital servo valve with high response and superior reproducibility can prevent the uneven thickness and burrs of the resin, ensuring the stabilized quality and thinness of molded products.

Response and Brake Performance (Air purging waveform)



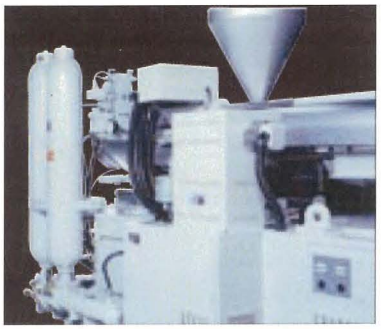
Performance Comparison

Performance	High Productivity	High Response Injection	High Plasticizing Capacity	High Load Molding	Low Vibrations	Energy Saving	Stackability	Mold Open/Close Stop Precision	Ejector Stop Precision
SE-HY	★★★	★★★	★★★	★★★	★★★	★★	★★★	★★★	★★★
Electric Molding Machine	★★	★★	★★	★★	★★★	★★★	★★	★★★	★★★
Electric Injection Molding Machine	★★	★★	★★	★★★	★★	★★	★★	★	★
Hydraulic Molding Machine	★★	★★	★★	★★★	★★	★	★★	★	★

★★★:Superior ★★:Good ★:Inferior

Hybrid Performance

High-capacity Accumulator Circuit

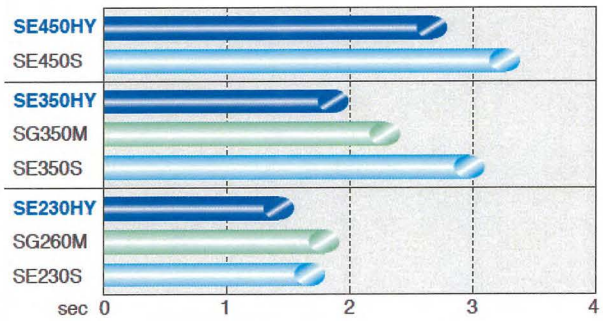


This machine is provided with a hydraulic circuit consisting of a high-capacity accumulator combined with a high-response servo valve, realizing a high-speed, high-response injection.

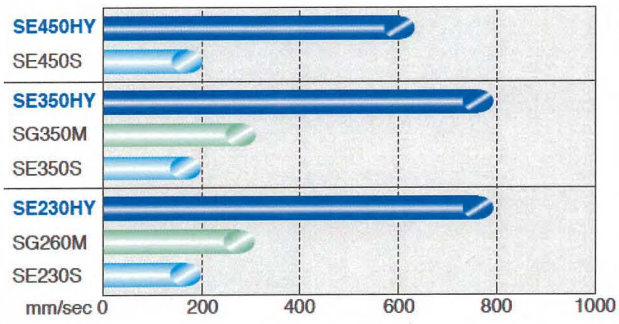
Fast cycle Specifications

This machine is designed on standard specifications to ensure fast cycle molding.

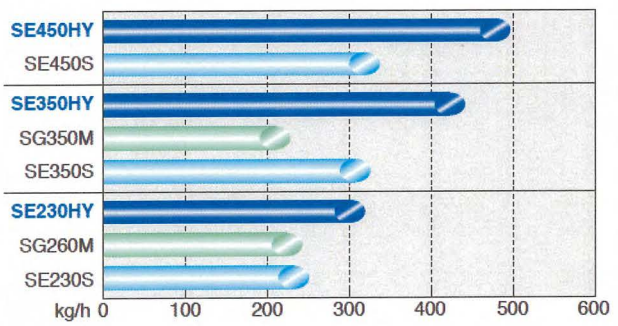
Shortest time of mold opening/closing in the same class



High-speed injection for thin molding



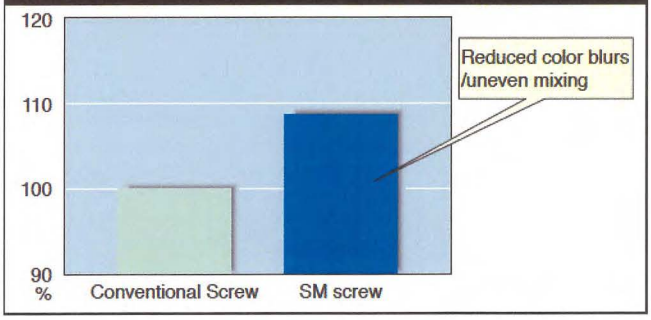
High-capacity injection for shorter time of plasticizing



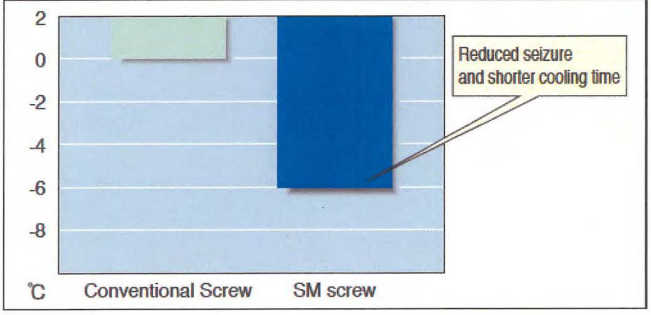
SM Screw for Plasticizing at Low Temperature

The Sumi-Melt (SM) screw is an improved version of the conventional high-rate mixing screw which can obtain uniformly melt resin at a lower temperature. Its low-temperature plasticizing performance contributes to a reduction of seizure and uneven mixing and a shorter cycle of molding.

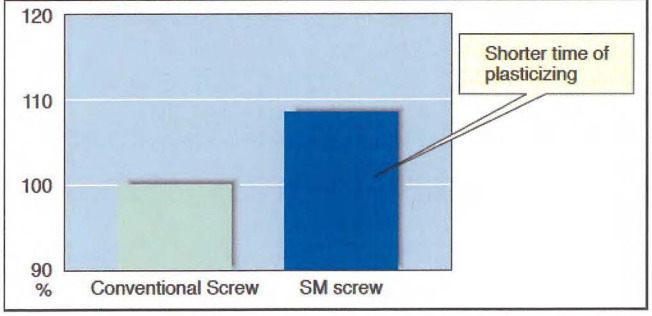
Mixing Rate



Fall of Resin Temperature



Plasticizing Capacity



NVII Controller

●Easy-to-see Large Color LCD
The NVII Controller is provided with a larger color LCD than that in the conventional injection molding machines.

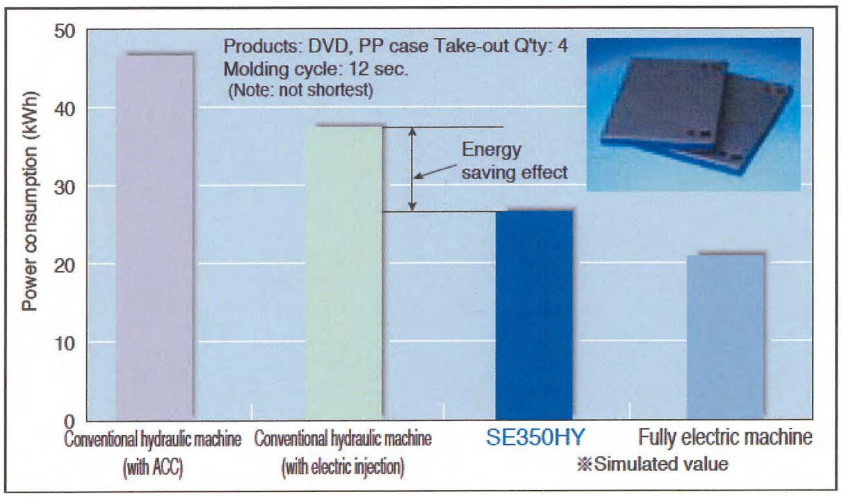
●One-touch Changeover of 3 Languages
The language changeover function is capable of changeover of Japanese, English and Chinese.

●User-friendly Operating Position
The NVII Controller mounted on the stationary platen can be operated at a standing position watching molded products and molds.

Comparison of Power Consumptions

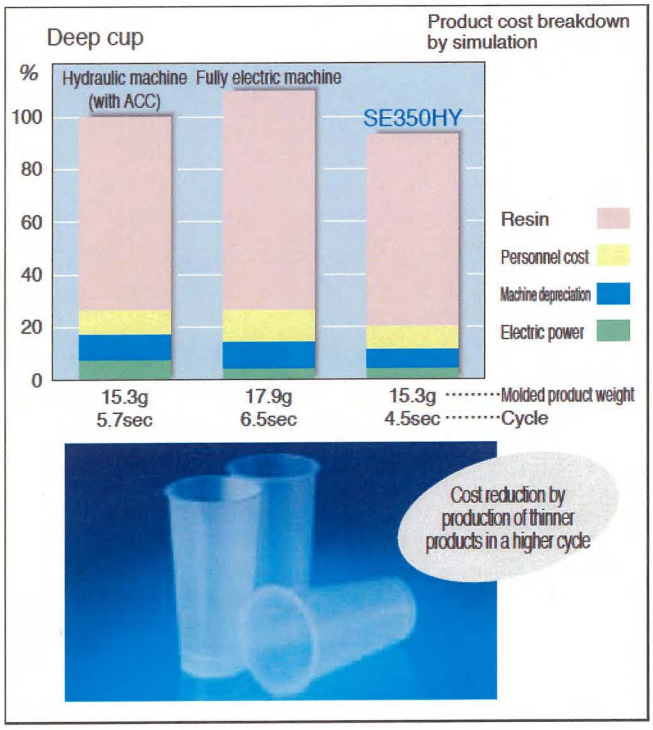
The SE-HY series is a very economical machine having a higher effect of energy saving of approx. 20kWh than the conventional hydraulic machine (with an accumulator) and approx. 11kWh than the molding machine with an electric plasticizing unit.

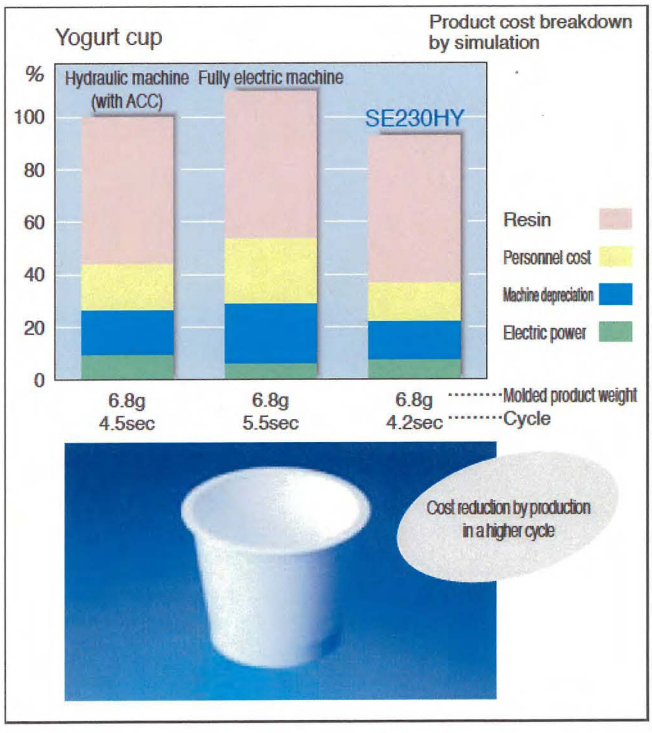
Molding machine type (300-ton class)	Hydraulic drive motor
Conventional hydraulic machine (with ACC)	75kW
Conventional hydraulic machine (with electric injection)	55kW
SE350HY	22kW
Fully electric molding machine	—



Cost Comparison of Molded Products by Machine

The cup production cost structure consists of a resin cost, a personnel cost, a machine depreciation cost and a running cost (electric power charges). The resin cost accounts for more than 60% of the mass production cost. The SE-HY series has the superior features to allow the production of thinner products than the conventional machines, contributing to the lower unit prices of the products. The molding cycle is shorter, ensuring the reduction in the line personnel cost, machine depreciation cost and other costs for an increased production quantity per time unit.





Series Lineup

	SE230HY		SE260HY		SE350HY		SE450HY	
Clamping force	2250kN {230tf}		2540kN {260tf}		3430kN {350tf}		4410kN {450tf}	
Injection unit	C1250		C1600		C2500		C3300	
Screw diameter	50mm	56mm	56mm	63mm	71mm	80mm	80mm	90mm
Injection capacity ※1	217kg/h	267kg/h	267kg/h	318kg/h	370kg/h	440kg/h	440kg/h	495kg/h
Max. injection speed ※2	800mm/s		800mm/s		800mm/s		625mm/s	

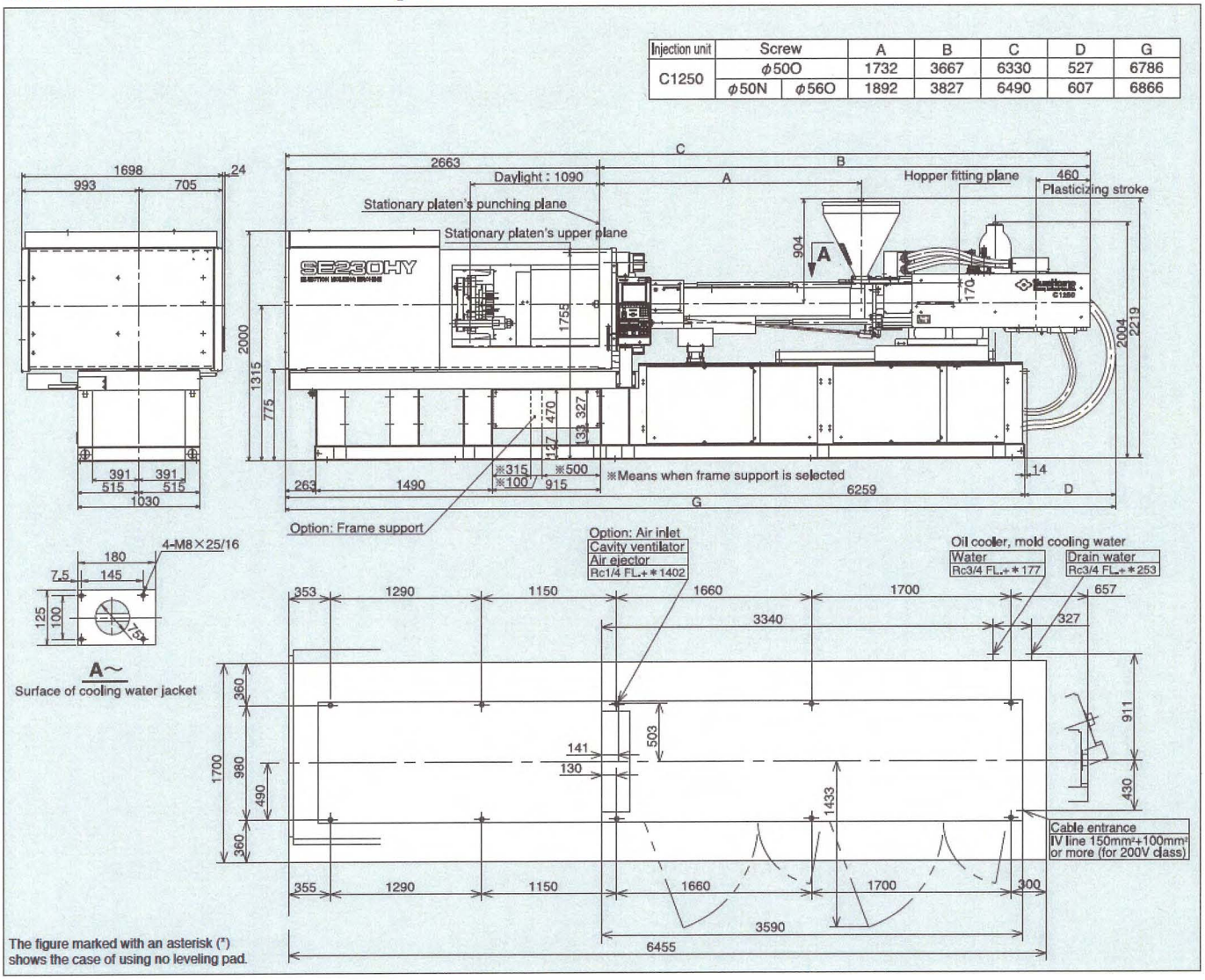
※1／GGPS:The injection capacity is a screw value at the screws maximum revolutions. ※2／Air shots:The maximum injection speed is a value of air shots under SHI standard.

SE230HY

The following drawing's dimensions are Japanese specification

Machine Dimension & Installation Diagram

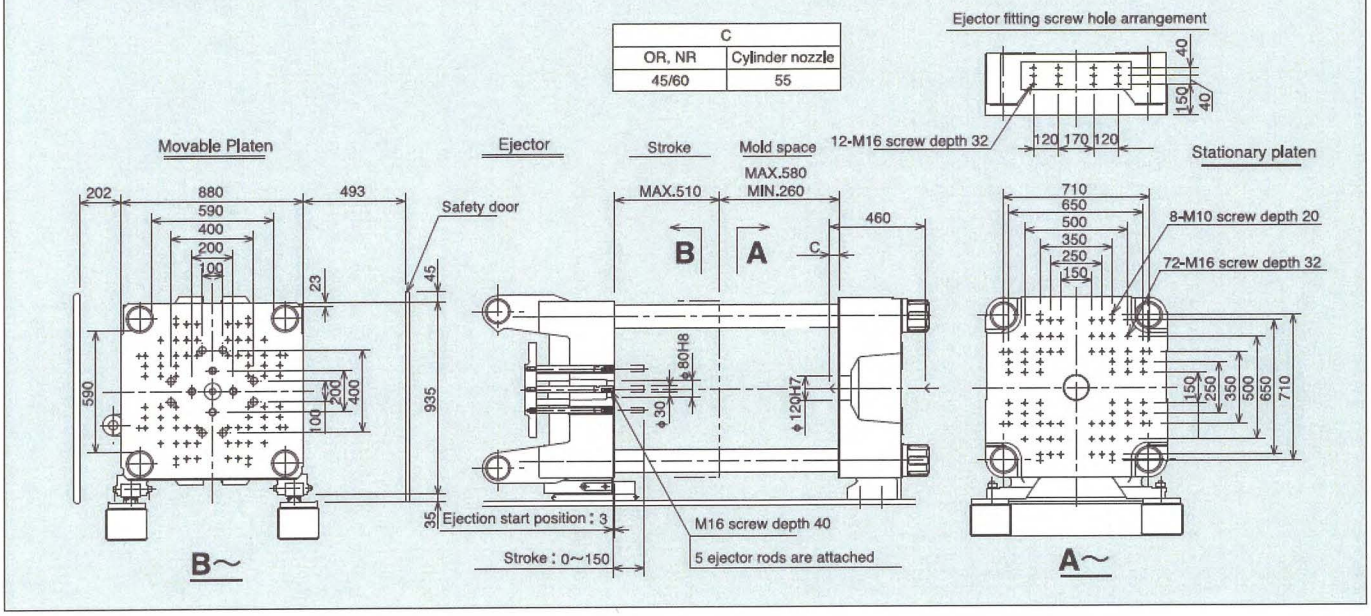
Injection unit	Screw		A	B	C	D	G
C1250	φ50O		1732	3667	6330	527	6786
	φ50N	φ56O	1892	3827	6490	607	6866



Mold Mounting Diagram

(Mold Mounting Diagrams comply with JIS B 6701.)

C	
OR, NR	Cylinder nozzle
45/60	55

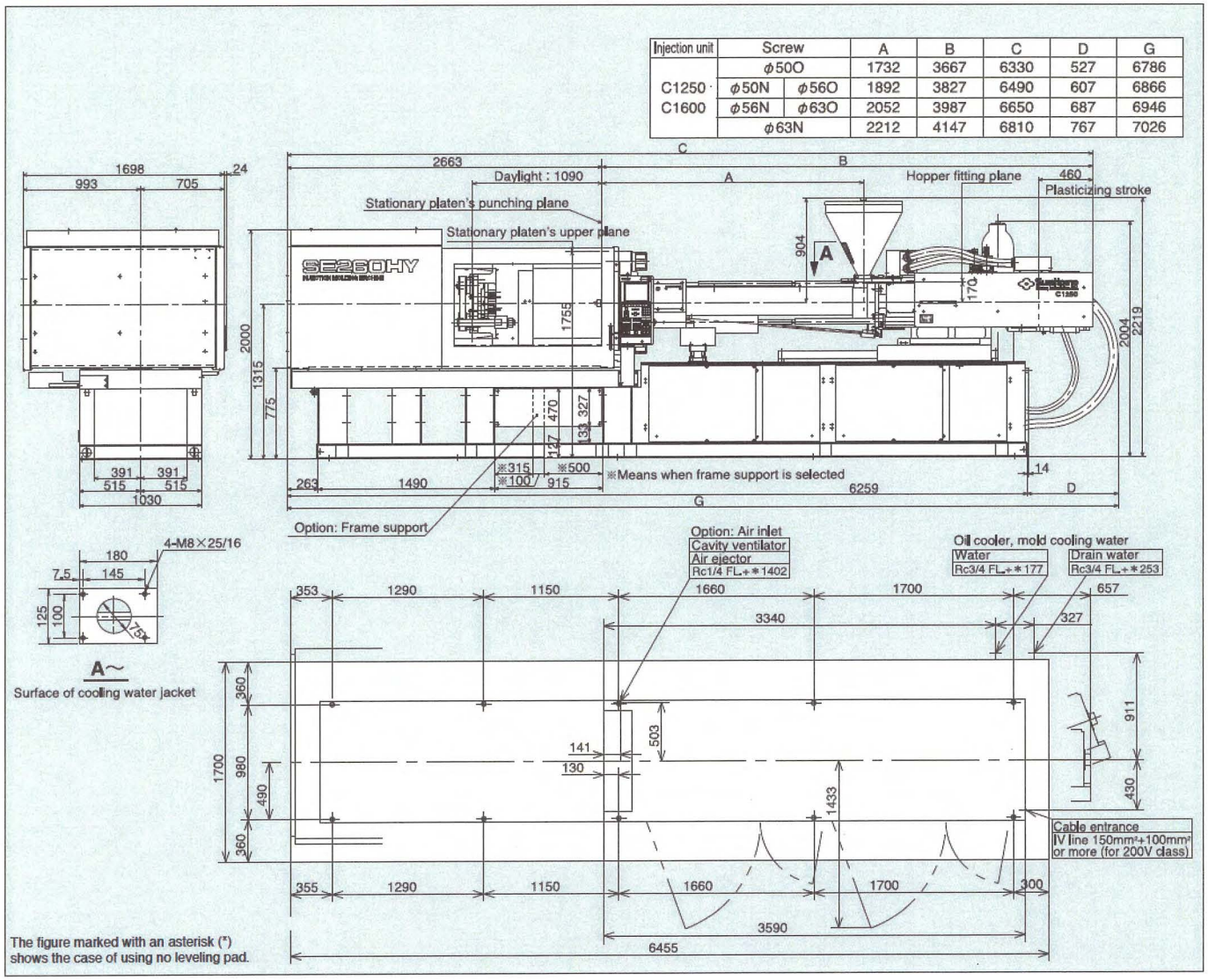


SE260HY

The following drawing's dimensions are Japanese specification

Machine Dimension & Installation Diagram

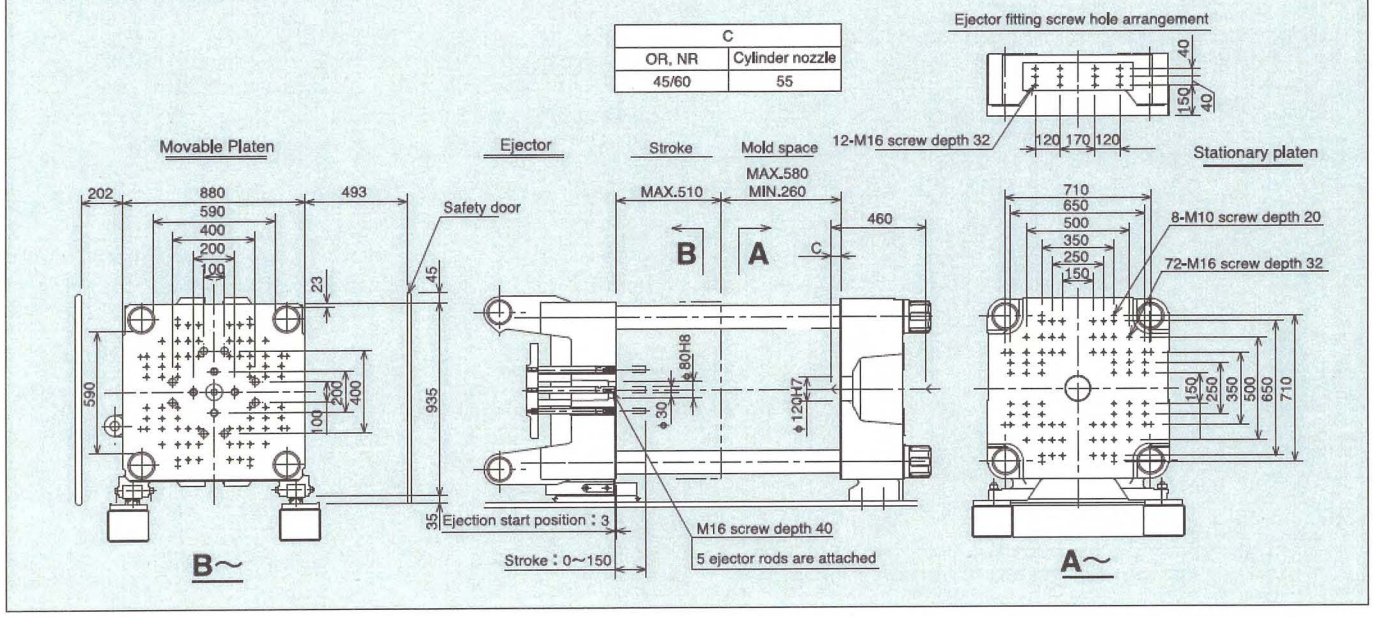
Injection unit	Screw		A	B	C	D	G
C1250 · C1600	φ50O		1732	3667	6330	527	6786
	φ50N	φ56O	1892	3827	6490	607	6866
	φ56N	φ63O	2052	3987	6650	687	6946
	φ63N		2212	4147	6810	767	7026



Mold Mounting Diagram

(Mold Mounting Diagrams comply with JIS B 6701.)

C	
OR, NR	Cylinder nozzle
45/60	55

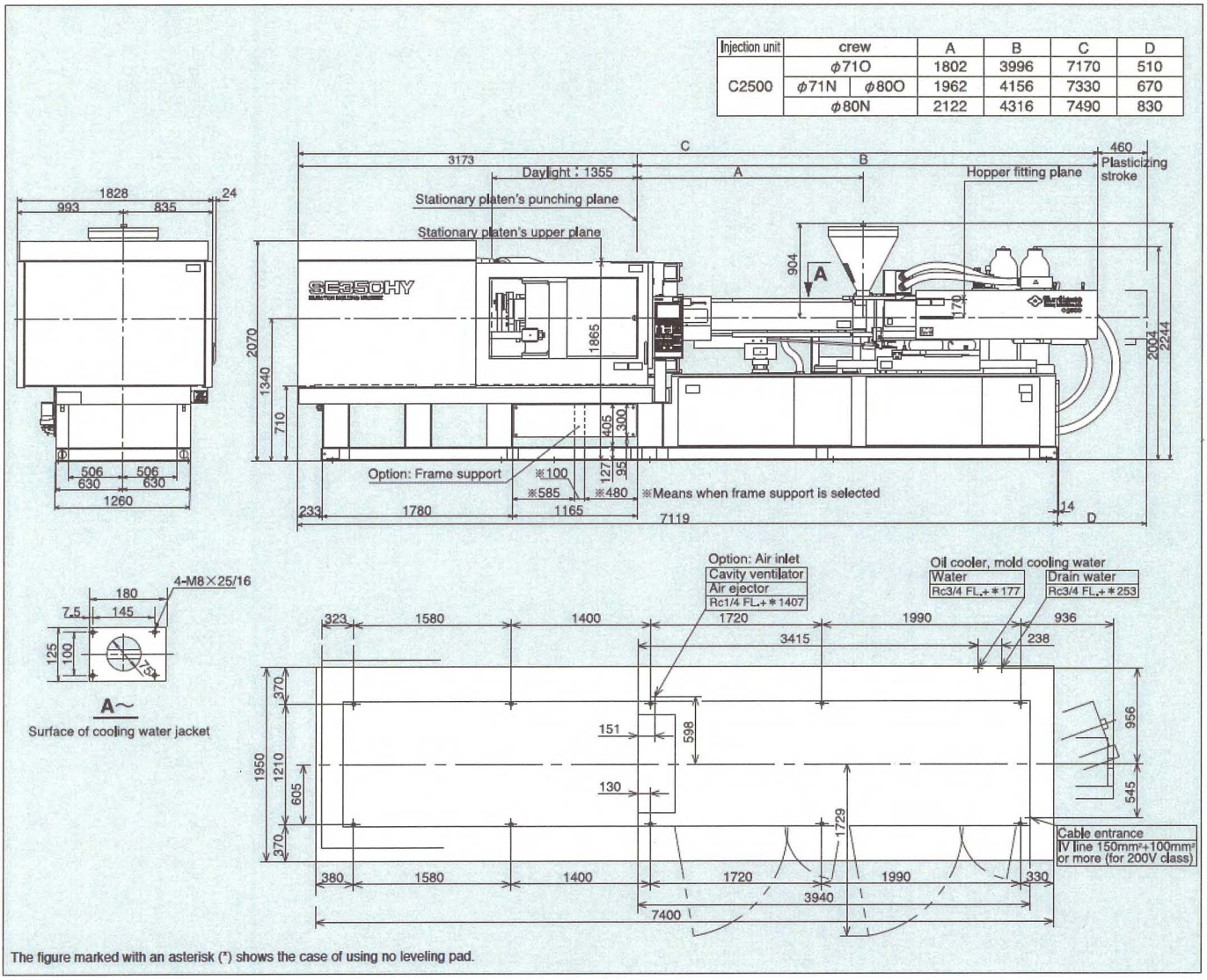


SE350HY

The following drawing's dimensions are Japanese specification

Machine Dimension & Installation Diagram

Injection unit	crew		A	B	C	D
C2500	φ71O		1802	3996	7170	510
	φ71N	φ80O	1962	4156	7330	670
	φ80N		2122	4316	7490	830

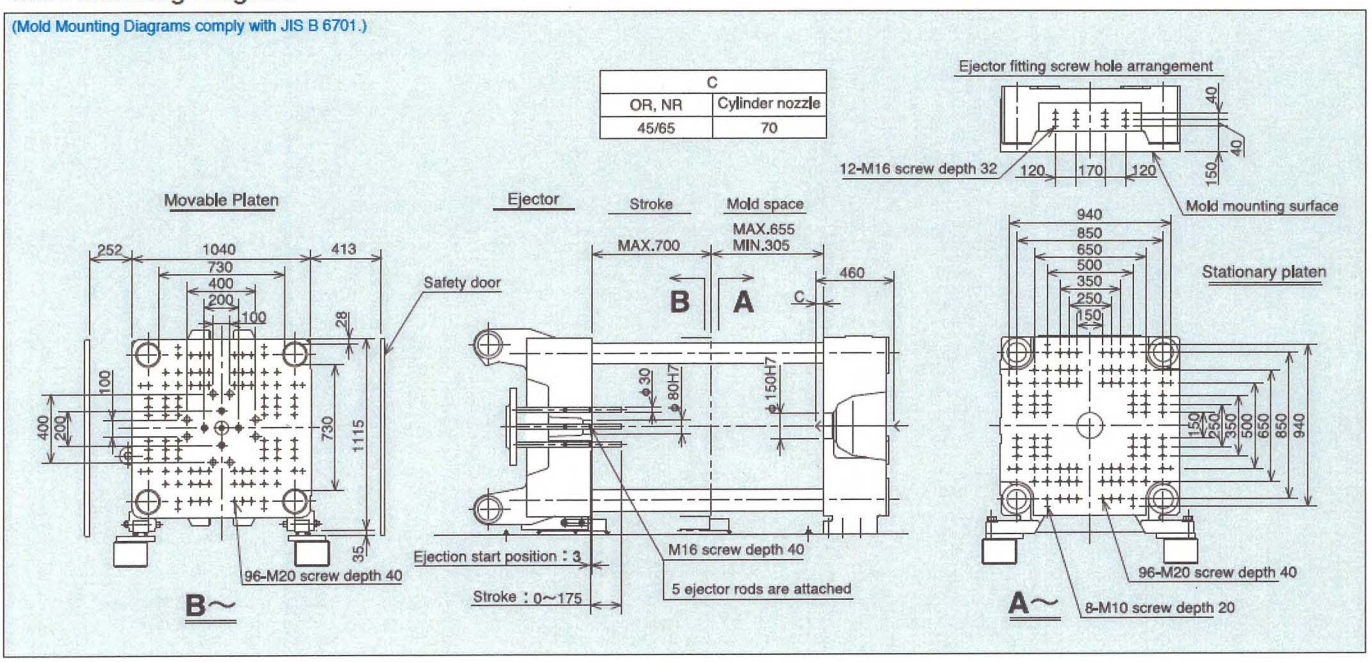


The figure marked with an asterisk (*) shows the case of using no leveling pad.

Mold Mounting Diagram

(Mold Mounting Diagrams comply with JIS B 6701.)

C	
OR, NR	Cylinder nozzle
45/65	70



Main Specifications

Main Specifications

	Unit	SE230HY	SE260HY	SE350HY	SE450HY
●Clamp unit					
Clamp system		Double toggle (5 point) Electric	Double toggle (5 point) Electric	Double toggle (5 point) Electric	Double toggle (5 point) Electric
Clamp force	kN {tf}	2250 { 230 }	2540 { 260 }	3430 {350}	4410 {450}
Clearance between tie-bars (LXH)	mm	590X590	590X590	730 X730	820X820
Clamp platens max. (LXH)	mm	870X870	870X870	1040 X1040	1220X1210
Daylight	mm	1090	1090	1355	1600
Mold opening stroke	mm	510	510	700	800
Mold installation height (min.~max.)	mm	260~580	260~580	305~655	350~800
Ejector type		Electric (13point)	Electric (13point)	Electric (13point)	Electric (17point)
Ejector force	kN {tf}	60 {6.2 }	60 {6.2 }	73 {7.5}	98 {10}
Ejector stroke	mm	150	150	175	175

●Injection unit											
Plasticizing unit		C1250		C1250		C1600		C2500		C3300	
Screw diameter		L		L		L		L		L	
	mm	50	56	50	56	56	63	71	80	80	90
Injection pressure max. [※2]	MPa {kgf/cm²}	279 {2840}	222{2260}	279 {2840}	222{2260}	280 {2850}	221 {2250}	229 {2340}	180 {1840}	220 {2250}	173 {1770}
Hold pressure max. [※2]	MPa {kgf/cm²}	279 {2840}	222{2260}	279 {2840}	222{2260}	280 {2850}	221 {2250}	229 {2340}	180 {1840}	220 {2250}	173 {1770}
Theoretical injection capacity	cm³	448	562	448	562	562	711	1140	1448	1448	1832
Max. injected weight (GPPS)	g	425	533	425	533	533	675	1090	1390	1390	1760
	OZ	15.0	18.8	15.0	18.8	18.8	23.8	38.4	49.0	49.0	62.1
Continuous injection ability [※3]	cm³/min	a)1190	a)1490	a)1190	a)1490	a)1490	a)1890	a)2500	a)3180	3440	4360
		b)1630	b)2050	b)1630	b)2050	b)2050	b)2600	b)3300	b)4200		
Plasticizing rate max. (GPPS) [※4]	kg/h	217	267	217	267	267	318	370	440	440	495
	(rpm)	(430)	(430)	(430)	(430)	(430)	(400)	(350)	(320)	(320)	(280)
Injection rate (Air shot) 注5]	cm³/s	1571	1970	1571	1970	1970	2494	3167	4021	3141	3976
Injection speed (Air shot)	mm/s	800	800	800	800	800	800	800	800	625	625
Injection rate (2/3load pressure) [※5]	cm³/s	1080	1355	1080	1355	1478	1870	1662	2111	1809	2290
Injection speed (2/3load pressure)	mm/s	550	550	550	550	600	600	420	420	360	360
Injection system		Hydraulic		Hydraulic				Hydraulic		Hydraulic	
Screw stroke	mm	228		228				288		288	
Pull back speed max.	mm/s	120		120				110		100	
Screw driving system		Electric		Electric				Electric		Electric	
Screw speed max.	rpm	430	430	430	430	430	400	350	320	320	280
Number of temperature control zone		5	5	5	5	5	5	5	5	5	5
Heater capacity	kW	24	29	24	29	29	31	41	44	39	53
Nozzle contact force	kN {tf}	72 {7.3}		72 {7.3}		66 {6.7}		66 {6.7}		66 {6.7}	
Moving stroke (protrusion)	mm	460 (45)		460 (45)				460 (45)		525 (65)	
Hopper capacity	ℓ	100		100				100		100	

●Electrical & Hydraulics					
Pump drive	kW	a)18.5 b)22	a)18.5 b)22	a)22 b)30	30
Pressure in hydraulic circuit	MPa {kgf/cm²}	15.2 {155}	15.2 {155} / 19.1 {195}	19.1 {195}	19.1 {195}
Oil tank capacity	ℓ	170	170	200	300

●Machine dimension & weight					
Machine dimension (LXWXH) [※7]	m	6.5X1.7X2.2	6.7X1.7X2.2	7.8X1.9X2.2	8.7X1.9X2.2
Machine weight	t	12	12	17	25

※1 Specifications subject to change without notice for performance improvements.
※2 Max injection pressure and Max hold pressure is calculated numbers. These numbers are machine's output , not the prssure of resin.
※3 These numbers are theoretical numbers of pull back screw, hydraulic core tractor and press α without oil pressure
※4 Plasticizing rate max is the number with max screw rotating.
※5 These numbers are based on Sumitomo standard.
※6 The number of { } are reference numbers.
※7 The total length is the number of Placticing Unit max setback with thick open screw.
※8 The dimensions are Japanese specification.

◇This series originally comply to safety standards of Japan, the US and Europe, in addition, also China GB22530 and KC mark.

Standard Equipment

Plasticizing/Injection Unit	
1	Digital closed servo control of injection and hold pressure
2	Burr protection control
3	Shrinkage protection control
4	Screw centering mechanism
5	Screw support system
6	Liquid-cooled plasticizing servo motor (340 tons or less)
7	Pull-back speed remote setting unit
8	High-precision, high-power nozzle touch unit
9	Pull-back delay control
10	Standard SD screw assembly (open nozzle or ion-nitride)
11	Injection program control (in 5-/2-levels)
12	Hold pressure program control (in 4-/2-levels)
13	Plasticizing program control (in 4-/2-levels)
14	Screw pull-back (after pressure holding/plasticizing)
15	Digital indicator of screw position (0.1mm)
16	Hold pressure setting to 0.01 sec.
17	V-P switchover (pressure, time and position)
18	Filling delay timer
19	Automatic purging unit
20	Heating cylinder temperature remote setting unit
21	Heating cylinder temperature PID control
22	Heating cylinder temperature switchover to Molding/Warming
23	Screw1s cold startup protection (with variable interlock timer)
24	Nozzle band heater
25	Injection unit retracting time selector (with delay timer)
26	Injection unit advance remote setting device (nozzle touch detection and advancing time)
27	Digital indicator of screw revolutions
28	Water cooling cylinder temperature indicator
29	Water cooling cylinder detector
30	Purging shield (with limit switch)
31	Plasticizing rotation unit (with nozzle center adjusting mechanism)
32	Remaining cooling time indication
33	Plasticizing start delay timer

Control Unit	
1	1 TFT color LCD monitor
2	Molding condition memory (internal memory: 40 parameters)
3	Data change protection
4	Three-language screen changeover (Japanese/English/Chinese)
5	Operation guide
6	Setting record display (60 items)
7	Injection profile monitor (injection position, speed and pressure setting and waveforms)
8	Display hardcopy
9	Printer interface circuit
10	Maintenance guide (display of checking time, items and procedure)
11	Automatic start/stop (heater warming and start, and machine stop)
12	Timer clock
13	Molding process indication
14	SSR heater drive circuit
15	Operation hour timer
16	Speed/position/pressure/revolutions entry in SI unit

Clamping Unit	
1	High-speed mold opening/closing
2	Highly durable clamping ball screw
3	Movable center press platen (350 tons or less)
4	High-rigidity stationary platen (350 tons or less)
5	Mold open/close speed/pressure programming device
6	Mold protection unit
7	Low-pressure mold clamping unit
8	Digital indication of mold open/close position
9	Remote control of mold open/close position and speed
10	Closed control of mold open/close position and speed
11	Remote setting of clamping force
12	Ejector (with multi-ejection selector and return check)
13	Ejector ejection delay timer
14	Ejector remote setting (position, speed and stroke)
15	Ejector 2-speed control
16	Ejector ejection holding device
17	Ejector ejection interlock (mold open limit in manual operation)
18	Ejector ejection during mold opening
19	Ejector return check
20	Mold space adjuster
21	Standby mode for mold mounting (low-speed mold opening/closing)
22	Grease-free tie-bar bushing
23	Clamping safety interlock (electrical and mechanical)
24	Safety doors with acryl plate
25	Emergency stop button switch (on operation side)
26	Product take-out robot interface circuit
27	Take-out robot fitting holes
28	Mold opening/closing selector (3 modes)
29	Non-adjusting mechanical stoppers
30	Movable platen support
31	Automatic centralized greasing unit

Monitoring Unit	
1	Actual operation value indication (15 items)
2	Error monitoring (5 items)
3	Automatic setting of error monitoring conditions
4	Error logging display (error items and time)
5	Product quality monitoring (10 items)
6	Quality control (actual values and quality graph display)
7	Production control
8	Heating cylinder temperature monitoring
9	Self-diagnosis
10	Alarm buzzer
11	Shot counter
12	Molding cycle error monitoring (with attended/unattended selector)
13	Automatic production ending circuit
14	Lubricant temperature monitoring
15	Hydraulic filter stopping monitoring

Miscellaneous	
1	Spare power supply socket (20A x 1)
2	3-way open space frame (350 tons or less)
3	Mold cooling water block (2 lines) (detector and valve are optional)
4	Oil cleaner (RRR-make)
5	In-line filter
6	High-capacity hydraulic oil cooling unit
7	Hydraulic oil temperature stabilizing device (electromagnetic valve, PID control)
8	Accumulator
9	Standard tools (nozzle ring spanner)
10	Standard spare parts (touchup paint, cooler packing and fuses)

Optional Equipment

Plasticizing & injection selection	
1	Hard chromium plating screw assembly
2	Wear & corrosion resistant screw assembly Ⅱ&Ⅲ
3	SF screw assembly
4	Needle valve nozzle (pneumatic nozzle actuating cylinder)
5	Extension nozzle
6	Cylinder nozzle
7	Zone 1 High capacity heater
8	Plasticizing cylinder cover with insulator

Injection unit	
1	Temperature controller for nozzle
2	Resin temperature finder (when needle type nozzle is installed)
3	Standard type hopper
4	Water cooling jacket temperature control device
5	VP switchover control (with cavity pressure)
6	Needle valve nozzle drive circuit
7	Hopper swiveling device
8	Plasticizing signal
9	Synchronized temperature rising

Clamping unit	
1	Ejector pressure remote setting
2	Pneumatic ejector
3	Cavity ventilator
4	Preumatic control circuit 4/8lines
5	Hydraulic core pull circuit (control circuit only)
6	Pneumatic core pull circuit
7	Core rotation control circuit (motor drive ; 1.5kW or less)
8	Temporary stop of mold closing
9	Temporary stop of mold opening
10	Ejected products sensor circuit
11	Interface of fast take out robot
12	Heat insulating plate
13	Hydraulic mold clamp (horizontal & vertical)
14	Mold ejector plate retum signal (input signal to molding machine)
15	Mold closing/opening signal (spear control signal ; no voltage dry contact)
16	Valve gate drive circuit (control circuit only)
17	Valve gate drive circuit (control circuit & pneumatic circuit)
18	Valve gate drive circuit fast cycle spec (Control circuit and pneumatic circuit)
19	Emergency stop switch (on non-operation side)
20	Multi-toggle
21	Multi-toggle for media spec
22	Ejector protrusion during mold opening
23	Hydraulic ejector in mold drive circuit
24	Mold space extension
25	Tie-rod support
26	Mold clamp stand by position

Control & monitor	
1	Monitor (heater burnout & SSR damage)
2	Monitor(Hydraulic oil level)
3	Monitor (leak circuit breaker : up to 415V)
4	Monitor (mold temperature)
5	Monitor (detection of fire)
6	Monitor (auxiliary facility)
7	Oscillograph connection circuit
8	Production control (with stocker feed signal)
9	Automatic mold temperature controller (1 zone)
10	Automatic mold temperature controller (2 zone)
11	Automatic mold temperature controller (10 zone)
12	Mold cooling water flow regulator (4/8/12-lines separate type)
13	Mold cooling water flow regulator (2x12lines attaced on frame)
14	Closed-circuit type mold cooling water connection 2x12lines (operation side/non-operation side)
15	Automatic starting system (heater, external output signal)
16	Automatic starting system (heater,water supply, external output signal)
17	Automatic starting system (heater,water supply, auxiliary equipment, external output signal)
18	Revolving alarm lamp
19	3-color alarm lamps
20	SPACE Ⅱ memory card device
21	4-Lines closed circuit cooling water piping connection (with flow detector, stop valve)
22	PC connection circuit (RS232C)
23	Electric power supply socket
24	Electric power supply socket for tools (with transformer)
25	Cooling water stop valve & filter
26	Key-switch for protecting setting
27	All-in-one setting screen
28	N2 Gas pressure Monitor
29	Flow detector & stop valve (for 2-lines closed circuit cooling water piping connection)
30	Reinforcement of frame member at product drop opening space

Spare parts & accessories	
1	Mechanical spare parts A (lubrication parts, notch bolts, brake linings)
2	Electric spare parts A (thermocouples)
3	Spare parts for exporting from Japan
4	Leveling pards (for one machine)
5	Anchor bolts (for one machine)
6	Line filter element for oil cleaner
7	Tools A
8	N2 Gas charge kit/Adapter
9	Line filter element
10	Printer (with cable & carriage)
11	Additional ejector rods
12	Grease cartridge
13	Memory card (for SPACE Ⅱ card)

Stack spec

	Unit	SE230HY	SE260HY	SE350HY	SE450HY
Daylight	mm	1190	1190	1555	1900
Mold installation height (min.~max.)	mm	360~680	360~680	505~855	550~1100

※Specifications subject to change without notice for performance improvements.
※The export of this product for use for or in development and/or production of massive destruction arms and weapons (nuclear weapons, biological weapons, chamical weapons, missiles) or the export of this product to any person, party or corporation engaged or involved in the development and/or production of above described goods is subject to the authorization of the Japanese government pursuant to Foreign Exchange and Foreign Trade Control Law.

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