SE18DUZ

Sumitomo SHI **DEMAG**

SE-DUZ

ALL ELECTRIC INJECTION MOLDING MACHINE

Defects

'Zero

Loss

Faults

'Zero-molding system

Sumitomo Heavy Industries, Ltd.

'Zero-molding by FFC (Injection system)

Patent pending | New functions

Stable molding conditions via smooth filling

Conventional molding

Resin pressure inside cavities | Resin pressure inside cylinder

- Overfilling occurs at inner cavities
- Poor gas release
- Flash formation

General programmed control
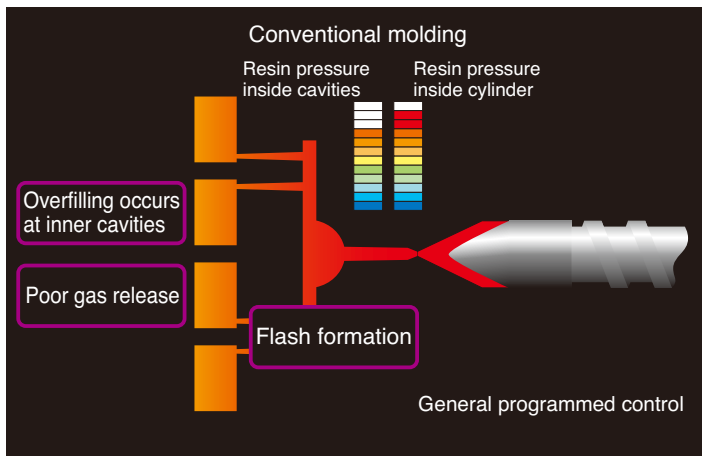
In conventional molding systems, resin is fully charged into mold cavities and consequently is apt to suffer excessive compression.

Molding by FFC

Resin pressure inside cavities | Resin pressure inside cylinder

- Complete consistent filling
- Good gas release
- No flash formation

'Zero-molding
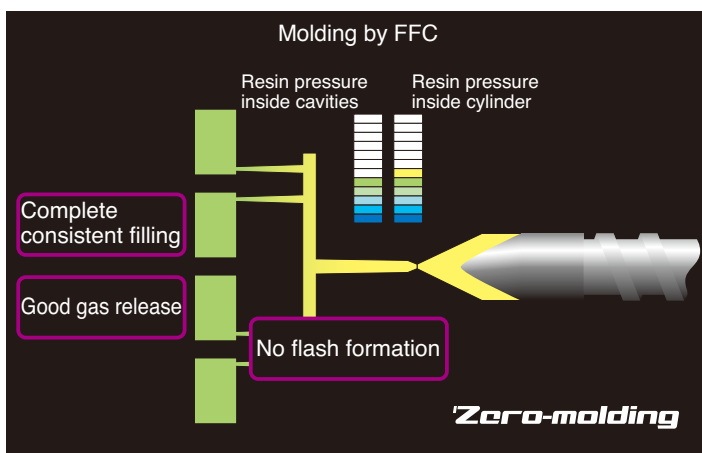
FFC is a viscoelasticity-assisted injection molding scheme where resin is not exposed to high pressures.

In FFC (Flow Front Control), screw movement is restricted by Flash Control to optimize the flow front. This enables molding at low internal pressures inside cavities, which, besides preventing flash, eliminates short shots by effectively releasing gases when filling.

Example improvement in cavity balance

Conventional molding

Cav. 1 | Cav. 2

Molding by FFC

Cav. 1 | Cav. 2
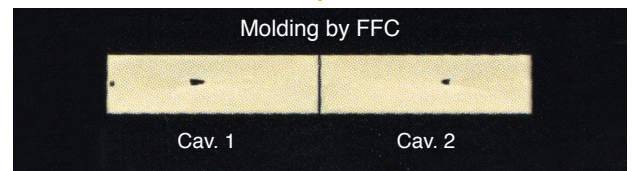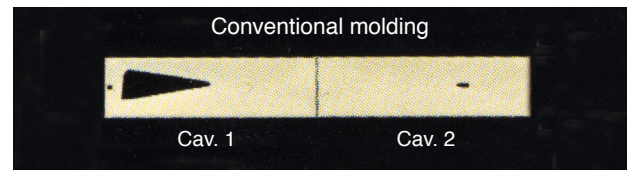
Molding by FFC improves cavity balance. All cavities face the same conditions that would lead to short shots and flash.
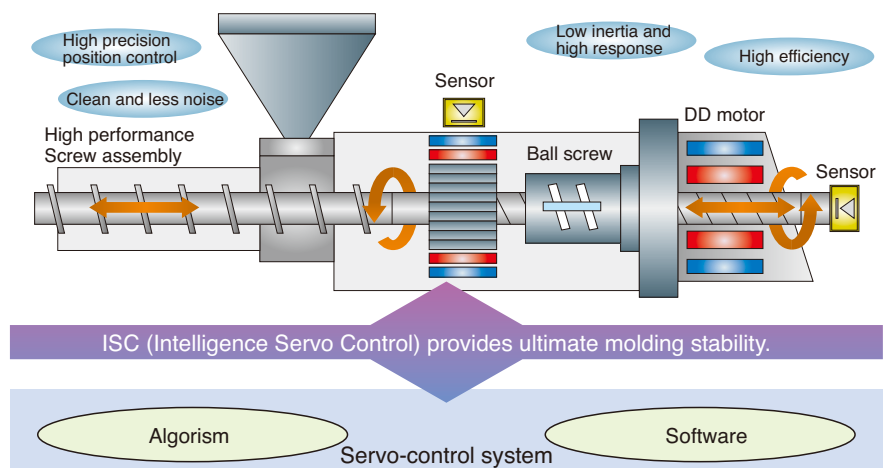
Example clamping force reduction by FFC
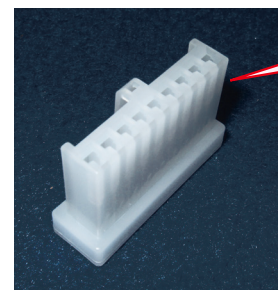
Clamp force reduced by 90% !

In internal tests using an automotive connector mold, pressure inside cavities was reduced by about 50%.
As a result, the previously required clamp force of 30 kN.

Product: Automotive connector
Resin: PBT (4 cavities)
IMM:SE30DUZ

A more evolved ISC system to support FFC

The already proven ISC (Intelligent Servo Control) system has been given a new algorithm that brings new filling control to all-electric machines. Furthermore, direct drive motors of low inertia incorporate a newly developed servo control card. By improving both the hardware mechanisms and control system, molding results more stable.

High precision position control
Clean and less noise
High performance Screw assembly
Sensor
Low inertia and high response
High efficiency
DD motor
Ball screw
Sensor

ISC (Intelligence Servo Control) provides ultimate molding stability.

Algorism | Software
Servo-control system

makes innovative molding possible

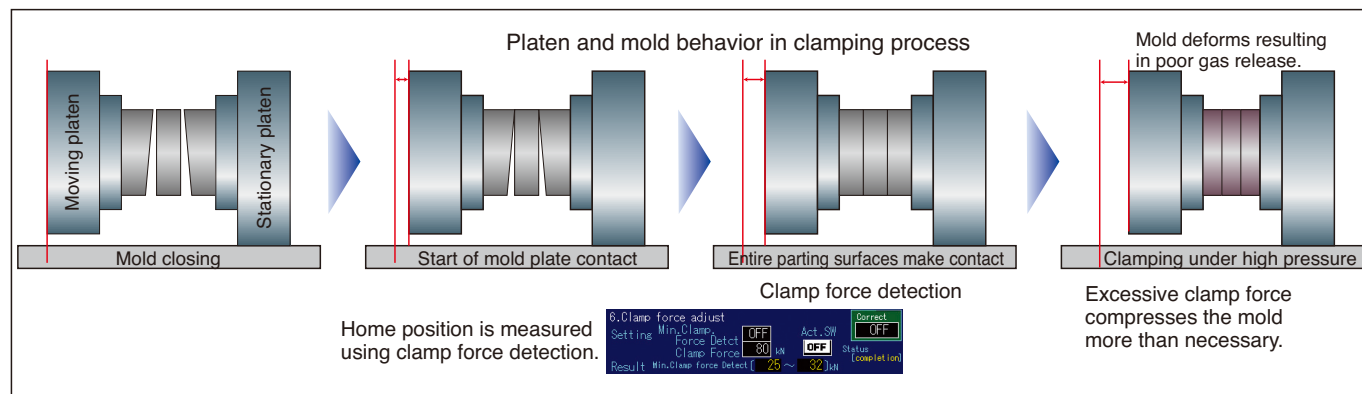## *Zero-molding* by MCM (Mold clamping system)

New functions

Low pressure clamping without unnecessary force

The SE-DUZ builds in detection capabilities for sensing the minimum force (home position) required to clamp the mold. Even with molds for the complicated profiles of heat shields, springs, sliding cores or angular pins, the clamp force required for actual molding can be set by measuring the home position, so molding is performed effectively without applying unnecessary force. Moreover, the difference in mold sitting before and after maintenance can be easily identified.

Platen and mold behavior in clamping process

Moving platen — Stationary platen

Mold closing → Start of mold plate contact → Entire parting surfaces make contact → Clamping under high pressure

Mold deforms resulting in poor gas release.

Clamp force detection

Home position is measured using clamp force detection.

Excessive clamp force compresses the mold more than necessary.

Mold comparison after 1000 shots

MCM enables molding with the detected minimum required clamp force. Gas is greatly reduced to the following benefits.

● Burning and shrot shots are eliminated
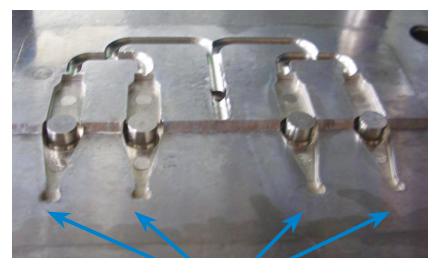● Mold maintenance is required less frequently

By reducing the mold clamp force, users can expect reductions in power consumption and shorter cycles, besides avoiding damage such as broken pins.

Conventional molding (Moving side)
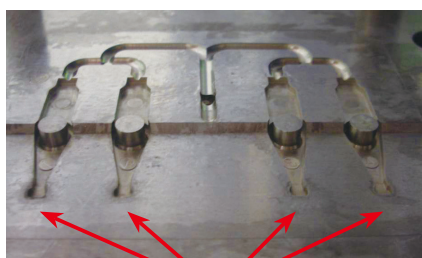
Gas burning occurs in flow end.

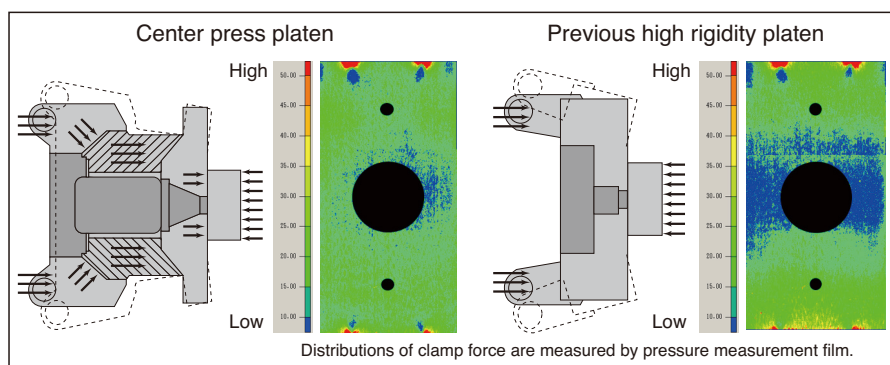**Molding at low clamp force (Moving side)**

Gas burning is avoided because gas is released from entire parting surfaces.
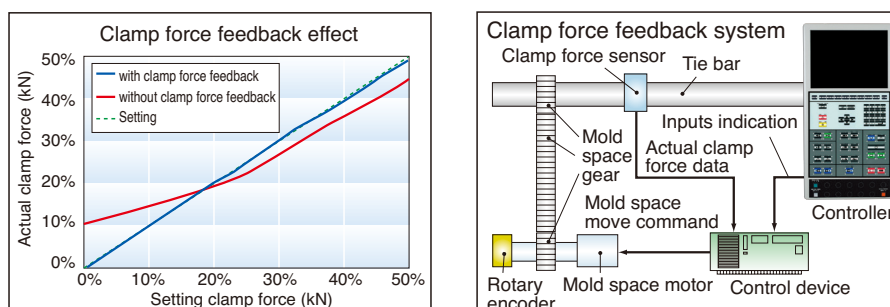
Evolved clamping system to support MCM

CPP (Center Press Platen) for balanced clamp force around molds

Sumitomo's CCP is proven technology that evenly applies clamp force to balance the surface pressure acting on molds.

Center press platen — Previous high rigidity platen

Distributions of clamp force are measured by pressure measurement film.

Clamp force feedback control optimizes clamp force

Force detecting sensors are employed to appropriately control clamp force to that needed for molding from 0 kN to the maximum applied load. Key to Zero-molding, this feature delivers sound accuracy even at low force settings.

Clamp force feedback effect

- with clamp force feedback
- without clamp force feedback
- Setting

Actual clamp force (kN) vs Setting clamp force (kN)

Clamp force feedback system

Clamp force sensor — Tie bar — Inputs indication — Actual clamp force data — Controller — Mold space gear — Mold space move command — Rotary encoder — Mold space motor — Control device

Zero-molding, *Zero-molding* is a registered trademark of Sumitomo Heavy Industries, Ltd. in Japan.

'Zero-molding

'Zero-molding by SPS (Setting system)

New functions

SPS simplifies operation while eliminating mistakes and oversights

Process up to mass-production start

Equipment checks → Conditions setting → Mold preparations and purging → Mass-production setup → Monitoring/Control setting → Mass-production start

Screen call key

SPS (Simple Process Setting) arranges settings by process from the operator's position.
Setting screens have been created according to process operations rather than the conventional setup of functions. A series of setting operations can be completed on a single screen.

1 process **1** screen
ONE   ONE

Comparison of screen operation 1 (Mold preparations and purging)

Conventional operation (Screens arranged by function)

Preparation for production ⟷ Mold opening/closing

Plasticizing ⟷ Temperature
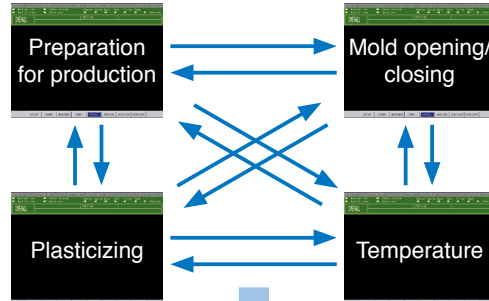
Whereas the conventional screens that were arranged by function required frequent switching between screens, SPS reduces operations to a minimum by arranging setting parameters according to process.
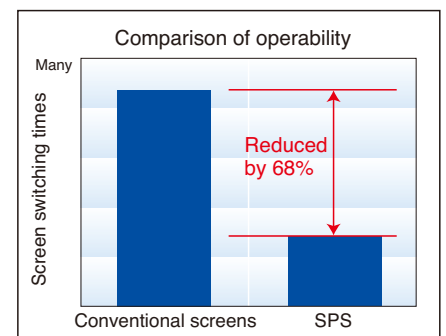
SPS (Screens arranged by process)

Mold installation → Mold setting → Protection setting → Purging

Example of improved operability
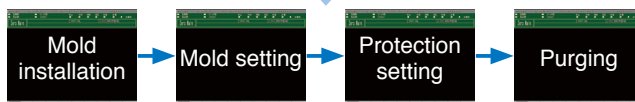SPS reduces screen switching for mold preparations and purging by 68%.

Comparison of operability

Many

Screen switching times

Reduced by 68%

Conventional screens   SPS

Comparison of screen operation 2 (Mass-production setup)

Conventional screens

Plasticizing ⟷ Temperature

Wave form ⟷ Preparation for production
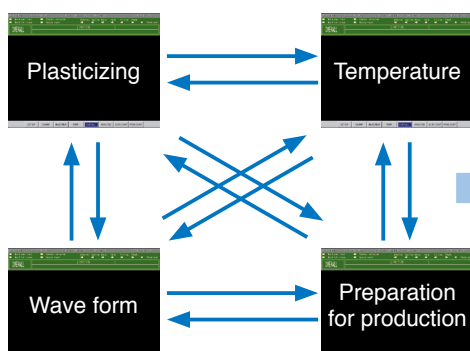
Z-Screen
Even the fine-adjustments used in mold changeover and parameter setting for production launches with new molds can be handled with this one Z-Screen.

makes innovative molding possible

Zero-molding backed by list of functions

1	Main	Zero-molding Main Screen : Simple Process Setting
2		Zero-molding Main Screen : Product Molding monitor (Product count,Process, Abnormal,Detect)
3	Check before molding	Mold condition change (Screw dia.,Unit, Add IL display)
4		Screen for comfirm Spec.Function (Main, Standard, Option, Abnormal transaction, Peripheral device signal)
5	Molding preparation	Minimum Clamp force detect
6		Setup guidance : Mold installation screen (Mold thickness, Mold contact, Clamp force, Mold open/close in preparations, Ejector)
7		Setup guidance : Teaching of mold opening limit and ejector protrusion point (Actual value input)
8		Setup guidance : Mold condition setting screen (Open/close, Ejector multi-step)
9		Setup guidance : Mold protection setting screen (Mold protection, Ejector protection)
10		Setup guidance : Multiple purge (Gate purge, Resin exchange, Moment stop, Low viscosity resin, Resin evaluation)
11		Setup guidance : Reference and calling for temperature conditions
12		Setup guidance : Supervise and warning for resin remaining
13		Setup guidance : Nozzle and heating cylinder heating-up mode (Step/Nozzle delay)
14		Setup guidance : Nozzle, heating cylinder, water cooling jacket temp. profile graphic display
15	Mold setups	Zero-molding : Molding condition setting screen Z-Screen (Fill.,HP, Plast.Time, TEMP, Clamp force)
16		Zero-molding : Flash Control <Mode setting: 10-mode>
17		Zero-molding : Flash Control <Mode setting: Thick-wall>
18		Zero-molding : Flash Control <Automatic setting: Filling time ratio>
19		Zero-molding : Flash Control <Automatic setting: Following to holding pressure>
20		Zero-molding : Flash Control <Time setting>
21		Zero-molding : Short shot mode (Confirmation of filling and short shot position by Flash Control)
22		Decomp. by Revers after plasticizing
23		Zero-molding : Clamp force feed back
24		Multiple clamp force control (Cross head position control)
25		Multi-toggle by objective (Gas release, Warping prevention)
26		Zero-molding : Molding condition guidance monitor (Peak clamp force, Clamp force at hold pressure end, Clamp force at cooling end, Pack Pres., Status display)
27		Detection monitor change (Detect, Detail, Process, Detect and real time, Wave form, Temp. graph)
28	Check before mass production	Monitor setting : Automatic group setting
29		Protection for molding condition (Condition range, Production support, Screen display, password)
30		Startup condition automatic change (By short shot mode)
31		Protection: Screw protection (Torque monitoring, Temp. output monitoring)
32		Process temperature control : Nozzle
33		Energy saving mode : Holding pressure
34	Aid to mass production	Wave form : Display by process (Injection,Hold prssure, Plasticizing,Mold open, Mold close, Ejector)
35		Wave form : Wave form preservation message
36		Quality Control : Wave form distinction
37		Quality Control : Molding process monitor logging (Temp., Temp. cont. output, Peak clamp force, Pack pres.)
38		Production control : Product amount (Number of cavities setting)
39		Production control : Operation status control (Operation time, Motor over load, Power consumption)

## Accuracy stability to improve productivity

High response performance

DD has the same injection power as a hydraulic machine with accumulator.
DD is suitable for thin wall parts, high viscosity resin and long flow length parts.

SE18DUZ (C30) Molding profiles
22ms(500mm/s)
13ms(300mm/s)
IJV actual (mm/s)
IJ set (mm/s)
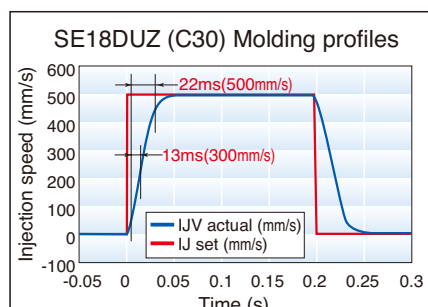
Low speed injection control performance

The injection unit of the SE-DUZ has a linear speed control profile. This enables a stable molding even for thick walled products.

SE-DU Heavy duty injection
Low-speed control characteristics
Measured value
Theoretical line
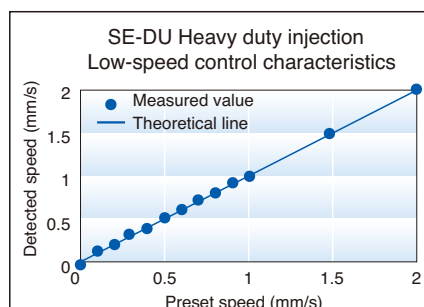
Product mass stability

ISC and the DD system provide an excellent accuracy to molding steps including mold opening/closing steps, implementing highly stable and accurate molding solutions.

Product mass stability
$\sigma / \overline{x} = 0.0094\%$ N=50

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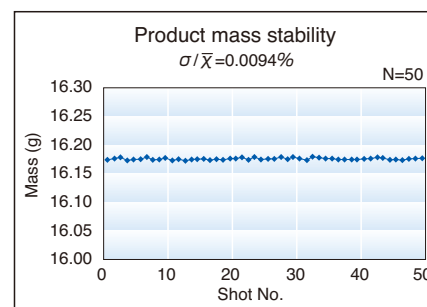
Main specification

●Clamp unit

Items	Unit	SE18DUZ
Clamp system		Double toggle (5 point)
Clamp force	kN {tf}	170 {18}
Clearance between tie-bars (L×H)	mm	260×235
Clamp platens max. (L×H)	mm	355×355
Daylight	mm	410
Mold opening stroke	mm	160
Platen speed max.	mm/s	MAX.1200
Mold installation height (min.~max.)	mm	130~250
Locating ring diameter	mm	φ26〔φ60〕
Ejector type		Electric (1 point)
Ejector force	kN {tf}	7.8 {0.8}
Ejector speed max.	mm/s	MAX.333
Ejector stroke	mm	50

●Injection unit

			Standard				Heavy duty Injection				High responsivity injection specification			
Plasticizing capacity			C30				C30				C30			
Screw diameter			—				—				—			
	mm		14	16	18	20	14	16	18	20	14	16	18	20
Injection pressure max. 【Note1, 2】	MPa		223	266	210	170	223	266	210	170	223	266	210	170
	{kgf/cm²}		{2280}	{2713}	{2144}	{1736}	{2280}	{2713}	{2144}	{1736}	{2280}	{2713}	{2144}	{1736}
Hold pressure max. 【Note1, 2】	MPa		223	212	168	136	223	266	210	170	223	212	168	136
	{kgf/cm²}		{2280}	{2170}	{1715}	{1388}	{2280}	{2713}	{2144}	{1736}	{2280}	{2170}	{1715}	{1388}
Theoretical injection capacity	cm³		6.2	11	14	17	6.2	11	14	17	4.6	6.0	7.6	9.4
Max. injected mass (GPPS)	g		5.9	11	13	17	5.9	11	13	17	4.4	5.8	7.3	9.0
	OZ		0.21	0.39	0.46	0.60	0.21	0.39	0.46	0.60	0.16	0.21	0.25	0.32
Plasticizing rate max. (GPPS) 【Note3】	kg/h		5.1	9.5	13	16	5.1	9.5	13	16	5.1	9.5	13	16
	(rpm)		(460)	(430)	(430)	(430)	(460)	(430)	(430)	(430)	(460)	(430)	(430)	(430)
Injection rate max.	cm³/s		77	101	127	157	77	101	127	157	154	201	254	314
Screw stroke	mm		40	55			40	55			30			
Injection speed max.	mm/s		500				500				1000			
Screw driving system			Electric				Electric				Electric			
Screw speed max.	rpm		460	430			460	430			460	430		
Number of temperature control zone			4				4				4			
Heater capacity	kW		2.3	2.7	2.7	3.1	2.3	2.7	2.7	3.1	2.3	2.7	2.7	3.1
Nozzle contact force 【Note7, 8, 9】	A / B / 〔OP〕	kN {tf}	2.9 {0.3}				2.9 {0.3}				2.9 {0.3}			
Moving stroke (protrusion)	mm		175 (65)				175 (65)				175 (65)			
Hopper capacity	ℓ		6				6				6			

●Machine dimension & mass

		Standard	Heavy duty Injection	High responsivity injection specification
Machine dimension (L×W×H) 【Note4, 10】	mm	2431×758×1531	2431×758×1531	2482×758×1531
Machine mass	t	1.2	1.2	1.2

Note1. The maximum injection pressure and hold pressure are calculated values, which are the outputs of the machine, but not the resin pressures.
Note2. The maximum injection pressure and hold pressure are no pressures that can be generated continuously.
Note3. The injection capacity is a value with the SD screw installed.
Note4. The total length of the machine is the value measured up to the advance position of the injection unit with a smallest screw installed.
Note5. The value in { } is given for reference.
Note6. Specifications subject to change without notice for performance improvement
Note7. Figure in 〔 〕 is option.
Note8. Selectable between A and B
Note9. High precision & power nozzle contact device is not applicable.
Note10. The dimensions are Jpanese specification.

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

SE18DUZ High responsivity injection specification
- High responsivity specification (mm/s)
- Standard (mm/s)
- 10ms at (1000mm/s)
- 6ms at (500mm/s)
- 22ms at (500mm/s)
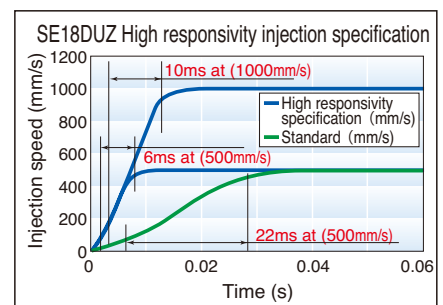
List of Preparation Items (Summary)

Main breaker capacity

Machine	SE18DUZ
Main breaker capacity	60A (20.8kVA)

● Voltage and frequency of main power source is applicable to the areas of AC200V-50Hz/AC200V-60Hz/AC220V-60Hz.
● Connect to the mating of 3-phases 3-wires, & grounding cable.

Spare sockets (Optional)

Machine	SE18DUZ
Maximum Amperage	40A

The increased number of power sockets are available for auxiliary equipment such as auto loader and mold temperature controller to flexibly meet the requirement for customer's molding systems, to which a necessary number of sockets can be added to connect their peripheral equipment.
● Selection of power outlet can be made from 4 locations, with maximum number of 7 units for SE18DUZ.
● SE-DUZ can be arranged with maximum Amperage of outlets in each area as follows:Each area of SE18DUZ has allow only one outlet.
※ The table shows the limit of total Amperage available at the same time when each type of molding machine runs.

Primary side in-line size, grounding cable size

Machine	SE18DUZ
Primary side power cable size	14mm^2
Primary side power terminal screw size	M8
Grounding cable size	above14mm^2
Grounding cable terminal screw size	M8

● The size of electric cables listed above is based on the allowable current when the ambient temperature of piping of a single core polyvinyl cable is 40℃.
● The values listed above are calculated base on the sum of load current listed in the item of main breaker capacity. When the power must be supplied in large quantities to auxiliary equipment from the molding machine, it is required to use a large size cable. However, there may be enough room for the size of the cable currently used depending on the selection of the options.
● Voltage fluctuation of the power source must be within ±10% of the rated voltage at the power source contact point (main breaker) on the molding machine side.
● Protection network against service interruption is not provided for the control circuit of the molding machine. When the instant interruption time exceeds one cycle, the molding machine may stop running in some cases. In an area where instant service interruptions are frequent due to thunderbolts, be sure to install an uninterruptive power supply system at the plant site.

Calculated values (ref. values) of cooling water

■Cooling water line of water jacket

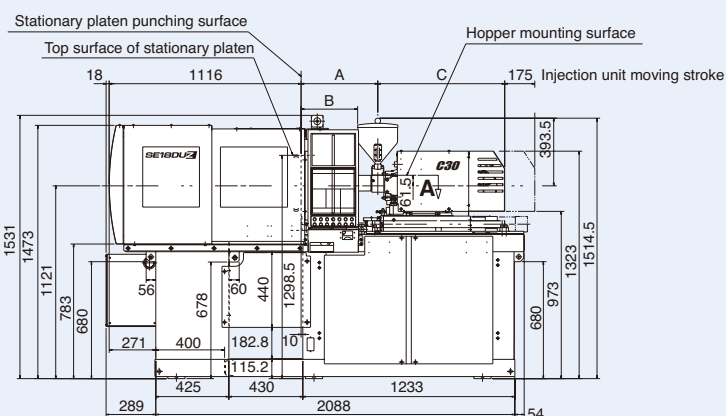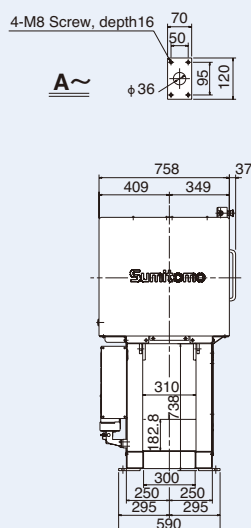| Machine	SE18DUZ
Band heater capacity	3.0kW
Required cooling water	0.6ℓ /min

■Mold cooling water line

All models	SE18DUZ
Total cooling water required for 2 lines.	10ℓ /min

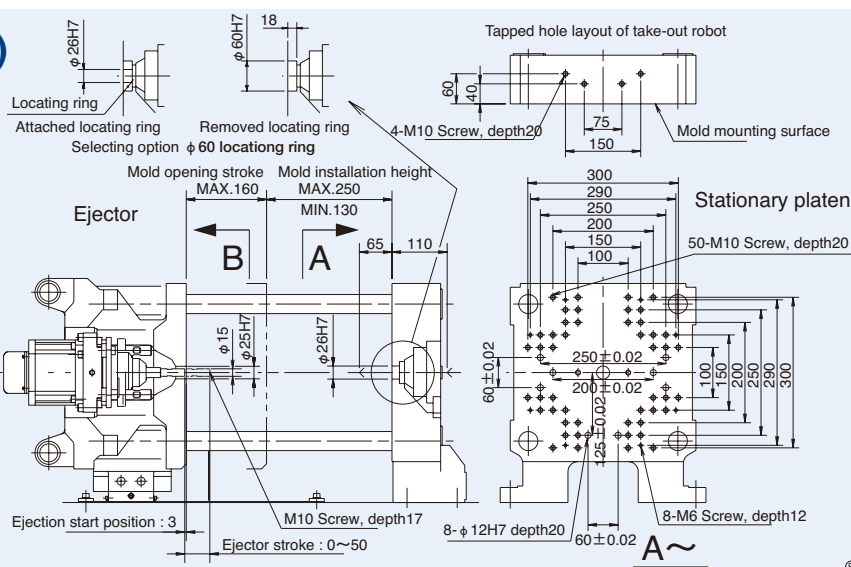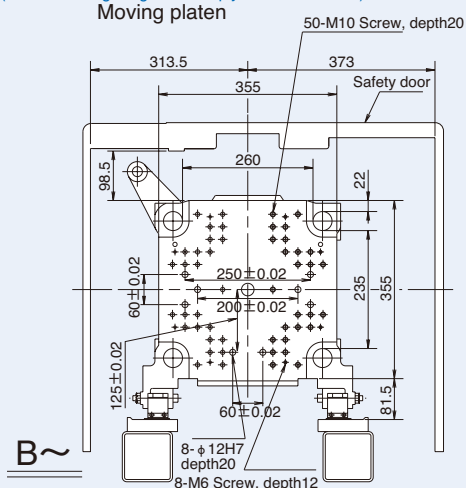＊Cooling water required for 1 line is approx 5ℓ /min.

SE18DUZ

The following drawing's dimensions are Japanese specification.

Dimension

Plasticizing unit	Screw Diameter / Type	A	B	C	Max. over all length of machine
C30	14	391	274	818	2518
	16, 18	446	329	738	2493
	20	496	379		2543

4-M8 Screw, depth16
70
50
95
120
A~
φ36

758 37
409 349
37
Sumitomo
310
38
182.8
300
250 250
295 295
590

Stationary platen punching surface
Top surface of stationary platen
Hopper mounting surface
18 1116 A C 175 Injection unit moving stroke
B
SE18DUZ
C30
A
393.5
61.5
1531
1473
1121
783
680
1298.5
56
678
60
440
973
680
1323
1514.5
271 400 182.8 10
115.2
425 430 1233
289 2088 54

Foundation Plan

A
Cooling water jacket
Supply
Rc1/2 FL.+※267
Drain
Rc1/2 FL.+※267
45
38
7
2
19

Optional : Compressed air supply
Cavity ventilator
Rc1/4 FL.+※1091
Pneumatic ejector
Rc1/4 FL.+※1091

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

409 800 980 183
391
25 152
A
409 590 540 245 270 25 500 521 95 759
349
75
125 800 980 188
850 1243

Power supply
IVCable : min.14mm²
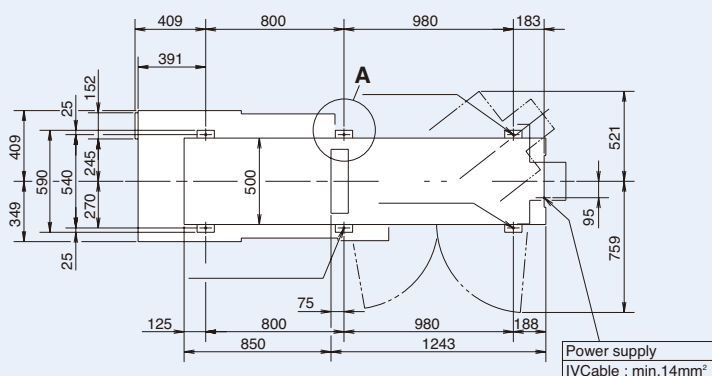
Platens (Clamp Dimension)
(Mold Mounting Diagrams comply with JIS B 6701.)

Moving platen
50-M10 Screw, depth20
Safety door
313.5 373
355
260
98.5
22
250±0.02
200±0.02
235 355
60±0.02
125±0.02
81.5
60±0.02
B~
8-φ12H7 depth20
8-M6 Screw, depth12

φ26H7
Locating ring
Attached locating ring
Selecting option
φ60H7 18
Removed locating ring
φ60 locationg ring

Tapped hole layout of take-out robot
60 40
4-M10 Screw, depth20
75 150
Mold mounting surface

Mold opening stroke
MAX.160
Mold installation height
MAX.250
MIN.130

Ejector
B A
65 110
φ15 φ25H7 φ26H7
Ejection start position : 3
M10 Screw, depth17
Ejector stroke : 0～50

300
290
250
200
150
100
Stationary platen
50-M10 Screw, depth20
60±0.02
250±0.02
200±0.02
100 150 200 250 290 300
125±0.02
60±0.02
8-φ12H7 depth20
8-M6 Screw, depth12
A~

8

Standard Equipment

Plasticizing & injection unit

#	
1	Standard screw assembly (open nozzle, ion-nitride)
2	Programming control of injection
3	Programming control hold pressure
4	Screw pull back (after screw rotating/after holding pressure)
5	Screw position digital indicator (0.01mm)
6	Step timer for hold pressure to 0.01 sec.
7	V-P switchover controller (pressure, position)
8	Injection start delay timer
9	Automatic purging program Interlock attaching (Select between nozzle touch and plasticizing unit withdraw limit)
10	Heater 5 division control (φ18 〜 φ20 : 4 division)
11	Zone 1 high capacity heater
12	2-modes temperature control (production/standby)
13	Cold screw startup protection (Interlock variable timer attaching)
14	Injection unit retraction delay selector (with delay timer)
15	Sprue break stroke remote setting (Detection of nozzle touch, Moving time)
16	Screw speed digital indicator
17	Protective purge shield (with limit switch)
18	Swivel injection unit (with nozzle core adjuster)
19	Remaining cooling timer indicator
20	Plasticizing start delay timer
21	Injection/Holding response 10-mode
22	Hold pressure speed setting
23	Pull back delay control
24	Synchro-plast control
25	SK-control
26	Temperature controlier for nozzle
27	Stepped heat-up operation
28	Energy-saving heating cylinder cover (2-layer structure)
29	Water cooling jacket temperature control device
30	Screw centering mechanism
31	Mold open operation during plasticizing (needle nozzle drive control)
32	Multi-step filling pressure control
33	Resin staying protection
34	Manual one-touch plasticizing

Control unit

#	
1	12.1 inch TFT Color LCD screen
2	Input setting device : Sheet-key and touch panel
3	Internal memory of mold conditions (200 conditions)
4	Operation guide for beginners
5	Production guide for beginners
6	Molding profiles display functions (mold profiles storage, cursor, display and so on)
7	Screen hard copy
8	Printer connection circuit
9	Take-out robot connection circuit — Note.3
10	Three languages screen changeover (Japanese/English/Chinese)
11	Operation guide for maintenannce
12	Automatic starting system (heater warming, heater start, machine stop)
13	Molding process indication
14	SSR control circuit for heater bands
15	Input expressed in industrial units of velocity, position, pressure & screw revolution
16	Signal output for machine condition (5ch)
17	USB connection circuit (printer, memory)
18	PC connection circuit (RS232C) — Note.3
19	Molding condition protection
20	Alarm sequence selection
21	Initial rejection + short stop rejection

Monitor unit

#	
1	Actual operating values indicator
2	Heater band burnout monitor
3	Auxiliary facility monitor (1ch)
4	Alarm monitor (6 items)
5	Automatic setting of monitor high/low value
6	Abnormal history (item and time)
7	Statistics product quality control (Actual value control, Quality transition graph)
8	Production control
9	Automatic starting system (heater + external output signal) — Note.3
10	Cylinder heater temperature monitor (all zones)
11	Self-diagnosis
12	Audible alarm
13	Shot counter
14	Molding cycle time monitor (attended/unattended selection)
15	All-in-one setting screen
16	Monitor setting fail protection

Clamp unit

#	
1	Programmed control of mold opening/closing speed (5-step/3-step)
2	Mold protection
3	Low pressure mold clamp
4	Temporary stop of mold opening/closing
5	Remote control of clamp force
6	Remote control of mold space
7	Ejector (with selective multi-functions & return check)
8	Ejector protrusion delay timer
9	Ejector remote control (speed, stroke and pressure)
10	Ejector 2-speed control
11	Interlock for ejector (In manual operation, only the mold open limit is available)
12	Ejector protrusion during mold opening
13	Ejector protrusion during mold closing
14	Ejector plate retun signal (Input signal for molding machine) Connecting by metal concent — Note.3
15	Mold close and mold opening signals (Spear control signal) No-voltage dry contact — Note.3
16	Valve gate drive circuit (control circuit only) — Note.3
17	Standby mode for mold mounting (low mold closing/opening speed)
18	Safety doors with clear PMMA windows
19	Emergency stop switch (on both sides)
20	Toggle covers with clear PMMA windows sides
21	Tapped hole for take-out robot installation
22	Grease central lubrication
23	Safety doors (interlocked electrically/mechanically)
24	Mold op/cl selection low vibration or high speed mode
25	Moving platen support (Sliding type)
26	Center press platen
27	Ejected products sensor circuit — Note.3
28	Multi-toggles

Miscellaneous

#	
1	Automatic centralized greasing device
2	3-way open space frame
3	Mold cooling water block (2 lines) (Sight flow indicator & valve are optional)
4	Standard spare parts (touchup paint, sling bolt, fuse)

Optional Equipment

Plasticizing selection
1 Wear & corrosion resistant screw assembly Ⅱ
2 High-temperature screw assembly (Max. temp. 450℃)
3 SF screw assembly
4 SK screw tip (Material : STD, MK, TiN)
5 Needle valve nozzle (pneumatic nozzle actuating cylinder) (unavailable for C50)
6 FTC Ⅰ nozzle
7 High capacity heater
8 Extension nozzle

Plasticizing & injection selection
1 Resin temperature finder (Only for needle type with thermocouple)
2 Standard type hopper
3 V/P switchover by mold cavity pressure
4 FTC nozzle electric control circuit (φ18 ～φ36 screw)
5 High temperature heater control circuit (Max. temp. 499℃)
6 Plating resin inlet of cooling water jacket
7 Heavy duty injection

Control & monitor unit
1 Leak circuit breaker (AC200V, 220V 3φ 3W+E Japan and Asia only)
2 Mold temperature monitor 2 zone (without thermocouple and type K)
3 Auxiliary facility monitor (STD.+2ch)
4 Analog circuit output for molding profile
5 Production control (2direction rejection chute)
6 Mold temp. controller (2 zone)
7 Automatic starting system (Heater+water supply+external output signal)
8 Revolving alarm lamp
9 Multi fanction 3 colors LED alarm lamp
10 4-Lines closed circuit cooling water piping connection (with flow detector, stop valve)
11 2-Lines closed circuit cooling water piping connection (with flow detector, stop valve)
12 Electric power supply socket
13 Electric power supply socket for tools (with transformer)
14 Lock-up key-switch for data input
15 Motion 07

Clamp unit
1 Pneumatic ejector
2 Cavity ventilator
3 Hydraulic core pull control circuit 1 lines (control circuit+Piping)
4 Pneumatic core pull circuit 1 lines
5 SPI take-out robot connection circuit   Note.3
6 Products chute
7 High precision heat insulating plate (5mm, cross type)
8 Valve gate drive circuit (control circuit & pneumatic circuit)
9 Cassette mold holder (Standard type)
10 Cassette mold holder (Side type)
11 φ60 attachment metal fitting correspondence
12 Full metallic toggle cover
13 Hydraulic driving unit (for core-pull & valve gate)
14 Ejector unit with brake

Spare parts & accessories
1 Spare parts (Mechanical parts : Brake lining, Lub. parts)
2 Spare parts (Electrical parts : Thermocouple)
3 Spare parts for export. (Encorder,Limit switch, and Inducjive proximity sensors)
4 Leveling pads (for one machine)
5 Anchor bolts (for one machine)
6 Tools A
7 Ejector rods
8 Grease gun
9 Grease cartridge for Automatic Lub (700cc)
10 Grease cartridge for Manual Lub (400cc) Plasticizing

Note.1／Specifications may subject to change without notice for performance improvements.
Note.2／The export of this product for use for or in development and/or production of massive destruction arms and weapons(nuclear weapons, biological 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.
Note.3／Input / output signals are provided with dry contact (zero voltage).
(If signal required voltage, please request for such option)

Screw assembly (Option)

Specification	Resin	Additives	Screw type				Material						Example
			SD Screw	SF screw	SM screw	Screw for connector	Plating	Optical spec	W/R Ⅱ	Connector spec.1 W/R Ⅱ	Connector spec.2	High temperature spec.	
Engineering resin	PA・PBT・PP・ABS・POM・PC	Glass fiber less than 30%,flame retardant	◎	△	△	○	●	●	◎	◎	◎	○	Mechanical parts, Electrical parts etc.
Super Engineering resin	LCP・PA9T	Glass fiber less than 35%,flame retardant	○	△	△	◎	●	●	○	◎	◎	○	Connector, Electrical parts etc.
	PA6T・PPS・PA46	Glass fiber more than 30%,flame retardant, Highly corrosion	○	△	△	◎	●	●	△	○	◎	△	Connector, Electrical parts etc.
Optical resin	Ring polyolefin、PMMA、PC	Without glass	△	◎	△	△	○	◎	△	△	△	△	Optical parts etc.
High temperature spec	LCP、PEI、PEEK	With/Without glass	◎	△	△	○	●	●	△	△	△	◎	Mechanical parts etc.

◎ : Combination of screw type and Assemblt material   ○ : Applicable   △ : Limited use   ● : Impossible to choose
note : These specification is not available for some machines.

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