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Plastics Machinery Div.

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● Photographs of machines and details may differ from actual products.
● Specifications subject to change without notice for performance improvement.

SEEV-A All-electric Small-sized Molding Machine



All-electric Small-sized Injection Molding Machine

Lineup

SE50EV-A	(500kN)
SE75EV-A	(750kN)
SE100EV-A	(1000kN)
SE130EV-A	(1300kN)
SE180EV-A	(1800kN)



Sumitomo Heavy Industries, Ltd.

EVA(M)-en-1601-Hg

Further progress in injection molding.
The age of "A" begins.

SEEV-A

Lineage of Sumitomo all-electric injection molding machines "A"

Sumitomo's all-electric injection molding machines have undergone a synergistic evolution in hardware and software technologies. The SE-EV series debuted as the leader in the age of innovation and has evolved to the next stage, the SEEV-A series, which provides overwhelming advances in precision molding.



The motive force behind advanced molding technology

Zero-molding aims to bring loss, defects and fault vectors as close to zero as possible. We have pursued broader functioning and technological innovation that has enhanced the potential of our all electric molding machines. All of these technologies are taking you to Zero-molding.

'Zero-molding

Increased potential of the "A" line

- 1 Simple and Quick**
Speedy start up to mass production
- 2 Precise and Stable**
Precise, stable and high-quality production
- 3 Smart and Energy-saving**
Minimizing management and environmental loads

Be Comfortable.
Stress-free Molding and Optimized Production



Simple and Quick Speedy start up to mass production

SEEV-A

New! Links humans with machines quickly and gently NC-10 controller

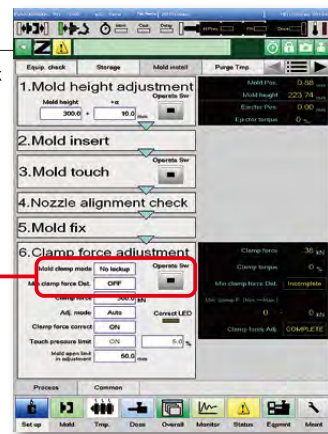
The new NC-10 controller in a human-centered design (HCD) housing has a large 15-inch color LCD panel that features high sensitivity for light-touch operations and a wide horizontal viewing angle. In addition, it employs a waveform display, quality control, and other functions for easy operations.

Simple and speedy start up

Mold install screen

Mold installation is completed quick and easily by procedures shown on screen.

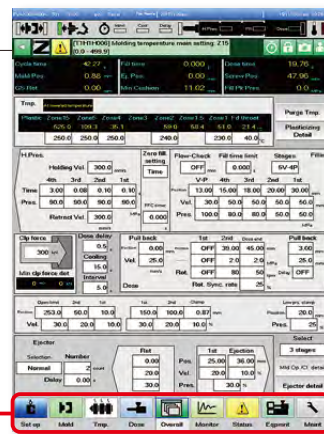
Minimum mold clamp force detection is available.



Overall screen

You can set setting after mold installation on ONE (1) screen.

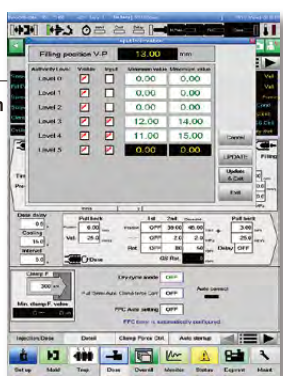
Easy-to-see icons for intuitive operations are used for tabs.



Versatile and advanced mass production management

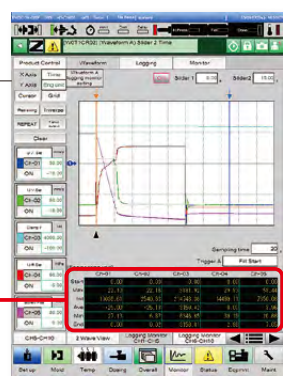
Molding condition protection function

Limits of condition protection can be set according to user levels to prevent incorrect settings.



Waveform displays and quality control

Waveform items can be logged to improve the accuracy of quality control judgments.



Statistical quantity of each item is calculated on the waveform screen.

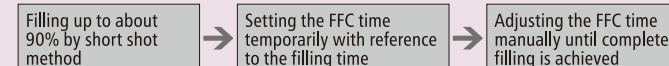
Enhanced judgment accuracy of monitored products on the logging window

New! Filling process is carried out by automatic setting FFC auto setting

FFC solves short shot and burrs at the same time and improves cavity balance. SEEV-A set FFC time automatically.

FFC is a part of the Zero-molding functions. See page 10 for details.

Conventional setting procedures

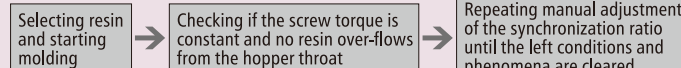


New! Utilizing new plasticizing system more simply Automatic SL Screw setting

You can use the advanced performances of the SL screw simply only by selecting resin and setting the synchronization ratio of the constant feeding system (GS Loader) automatically on the SL molding support screen.

The SL Screw is effective in preventing black spots/burning and good gas release. See page 11 for details. ● The SL Screw is option.

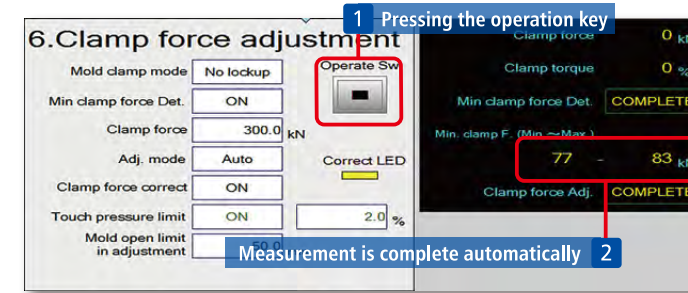
Conventional setting procedures



Finding minimum mold clamping force quickly Minimum mold clamp force detection

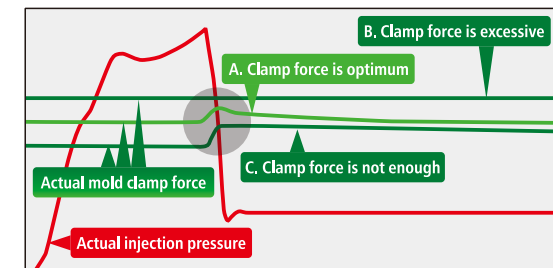
The minimum mold clamp force at mold surfaces contact completely is detected automatically. The necessary mold clamp force can be found from the waveform based on that value.

MCM reduces the clamping forces remarkably. See page 10 for details.



Measurement is complete automatically 2

- Judging necessary clamping force based on actual waveform -

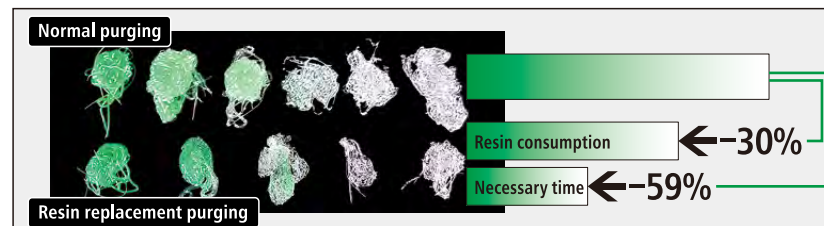


Even though the mold clamp force rises at the peak of the injection pressure, the actual clamp force goes down to setting value during holding pressure process (See waveform A). It can be judged that the set value of the mold clamp force is sufficient.

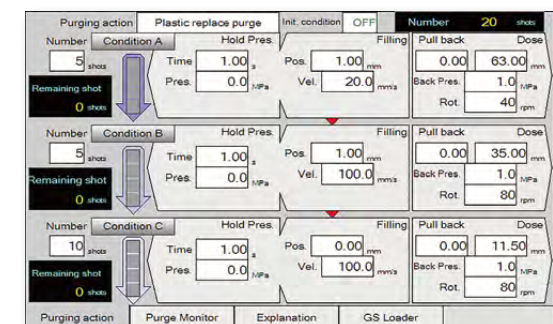
Speedy color and mold change Purging function for resin replacement

The SEEV-A has an automatic purging mode for resin color change. It saves valuable time and resin.

- Comparison of purge resin quantity and time -



● The above values are for reference only. The resin consumption and necessary time depend on molding conditions.



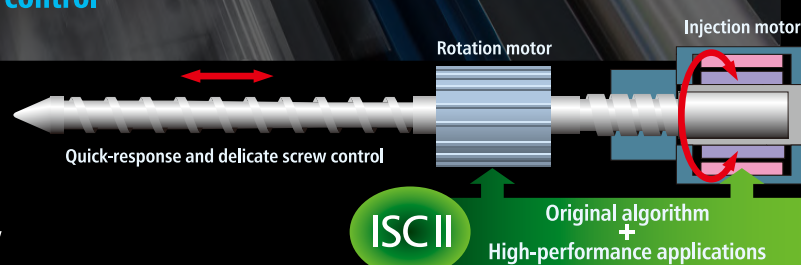
Purging conditions A to C are changed automatically.

Precise and Stable Precise, stable and high-quality production

High-precision and quick-response screw control

Direct drive system

Originally-developed low-inertia servomotor is controlled by an up-to-date control system ISCII (Intelligent Servo Controller II) for high-precision and quick-response screw control. They provides more precise and stable plasticizing, filling, and holding pressure.



Development to the third generation

The first-in-the-industry direct drive machine SE-S released in 1997 established the reputation of Sumitomo's all electric technology. Development of servomotors exclusive for injection molding machines has advanced to the third generation, and motor performances have been improved remarkably.

First-generation servomotor (stator)

- Progress of servomotor development -

Generation	Models	Max. injection speed (mm/s)	Rise time (ms)	Acceleration (G)
1	SE-S	200	70	0.233
	SE-D	300	30	0.816
2	SE-DU	300	25	0.980
	SE-DUZ	300	25	0.980
3	SE-EV	350	20	1.429
	SEEV-A	350	20	1.429

The value of each model is based on the C360 injection unit.

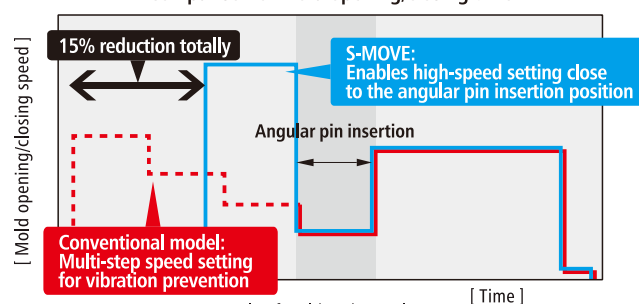
● The rise time is calculated by the time from 10% to 90% of the maximum injection speed.

More higher cycle molding

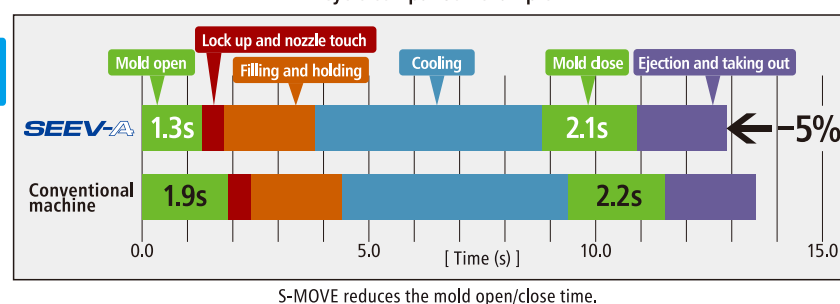
Damping acceleration/deceleration control S-MOVE

SEEV-A can open and close the mold more quickly with low vibration by generating smooth speed patterns in acceleration and deceleration.

- Comparison of mold opening/closing time -



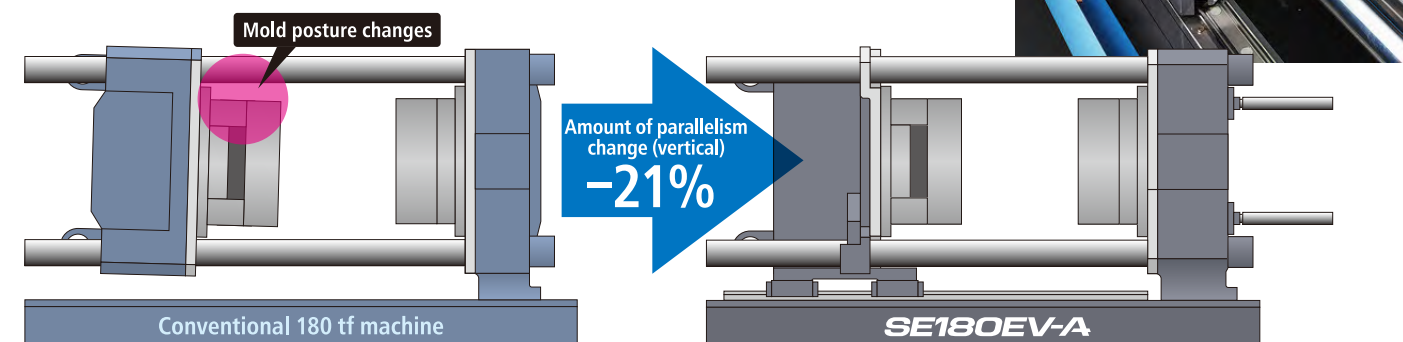
- Cycle comparison example -



Keeps linearity and parallelism of molds and prevents damages to the molds

Platen support and bush-less tie bar

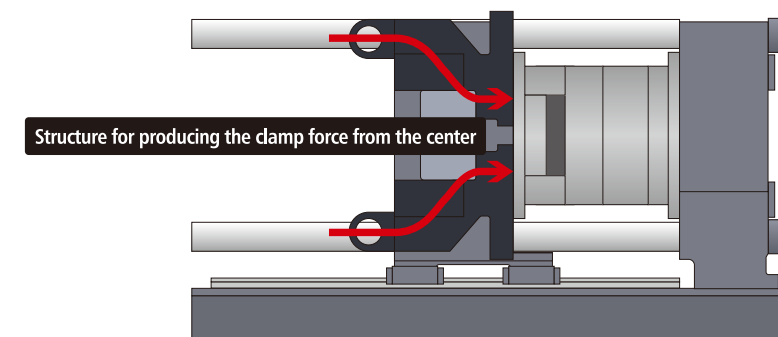
SEEV-A provides smooth mold open/close at heavy mold with accurate platen parallelism. This function demonstrates the mold accuracy 100% and prevents mold damage, such as pin stuck, etc.



Superior surface pressure distribution offers good gas vent and reduces the mold clamp force

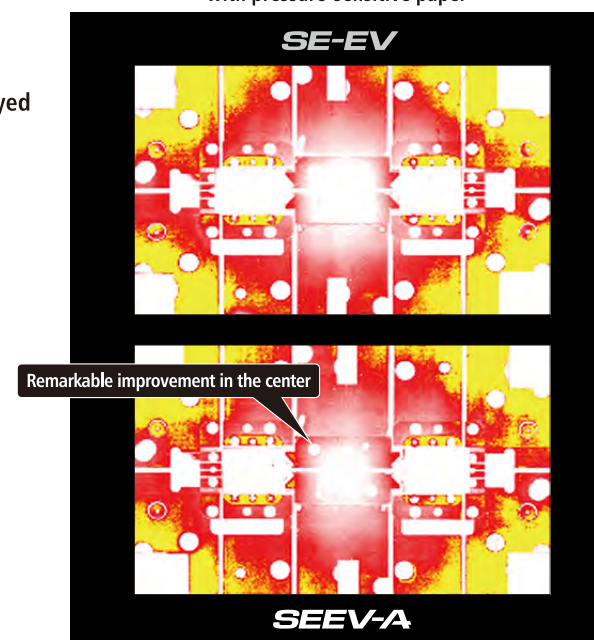
Center Press Platen

Center press platen that equalizes the surface pressure distribution is employed as the standard feature. New structure design reduces surface pressure unevenness at the center further.



● The optional Double Center Press Platens on the movable and fixed sides offer higher surface pressure evenness.

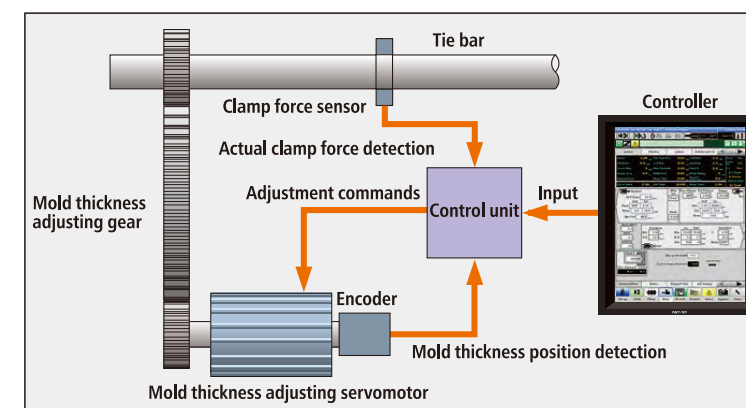
- Comparison of surface pressure distribution with pressure-sensitive paper -



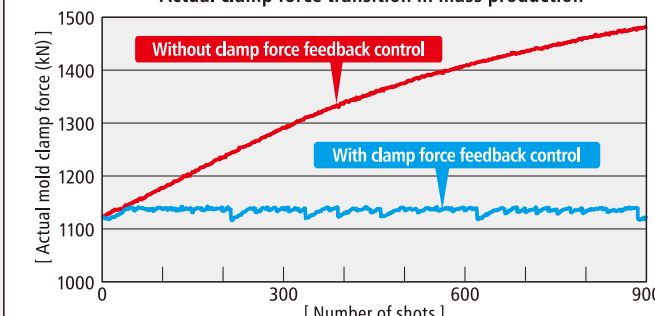
Keeping mold clamp force constant in mass production

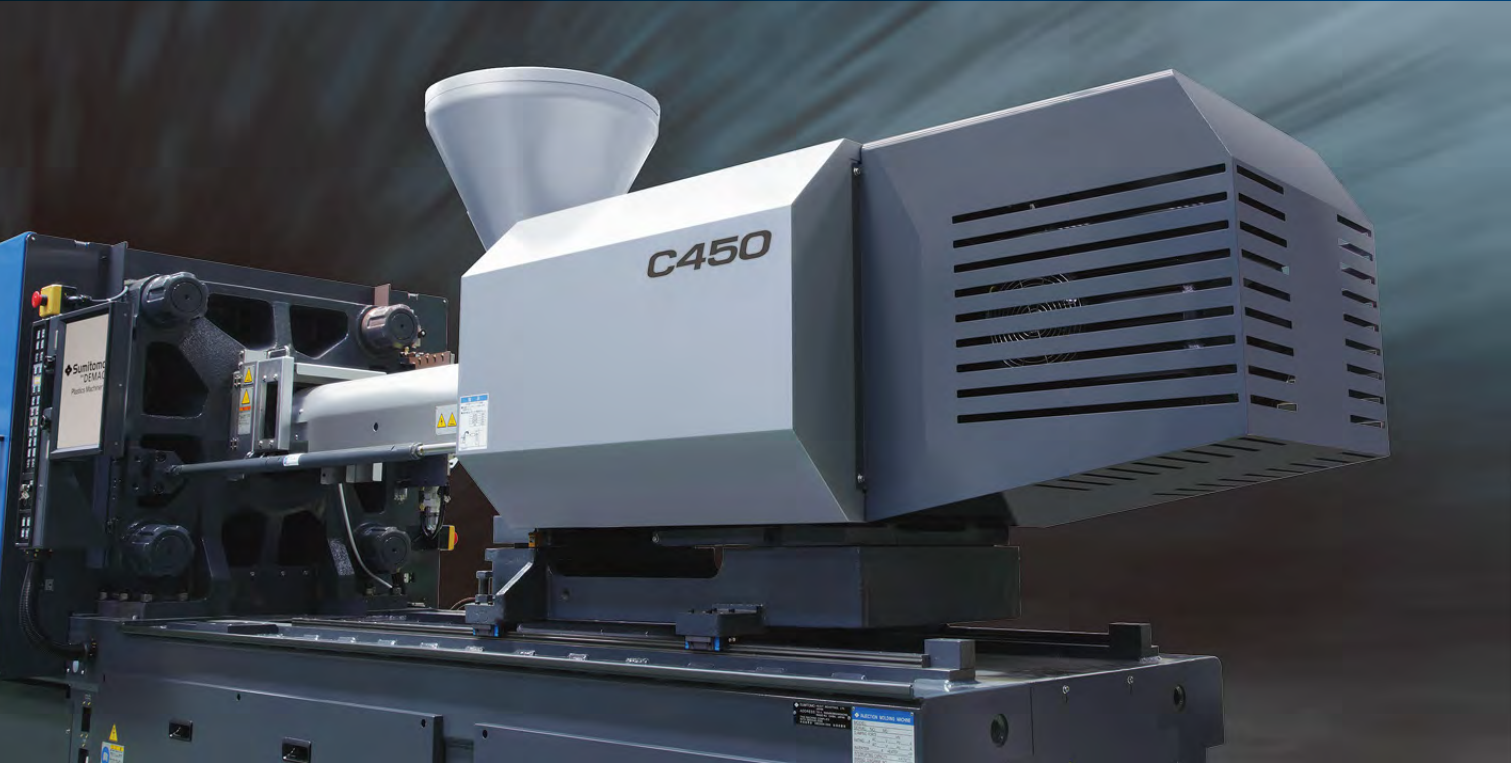
Mold clamp force feedback control

The mold clamp force tends to increase due to thermal expansion of molds in mass production. SEEV-A provides constant mold clamp force by correcting the mold thickness based on the actually value.



- Actual clamp force transition in mass production -



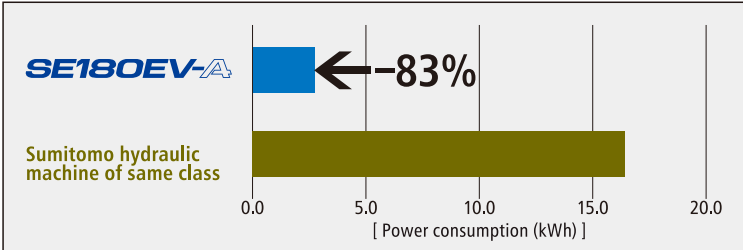


Reduces power consumption remarkably

Thoroughgoing energy saving performances

All electric machines feature outstanding energy saving performances overwhelming the hydraulic machines. Reduction of mold clamp force by Zero-molding and improvement of the mechanical efficiency by the low-friction mechanisms, such as the linear guide platen support, reduce power consumption further in comparison with the conventional machines.

- Power consumption comparison -

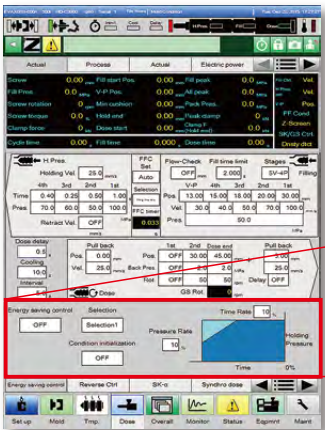


● The power saving effects vary with the molding conditions.

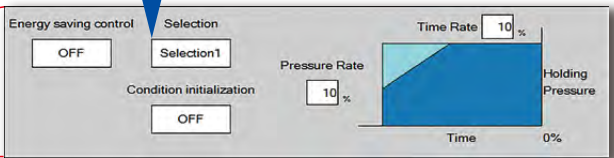
Power consumption reduction at holding pressure process

Energy saving control

If the initial large holding pressure need not be maintained, the motor load can be reduced by reducing holding pressure gradually. The reduction rate (slope) is set by selecting modes.

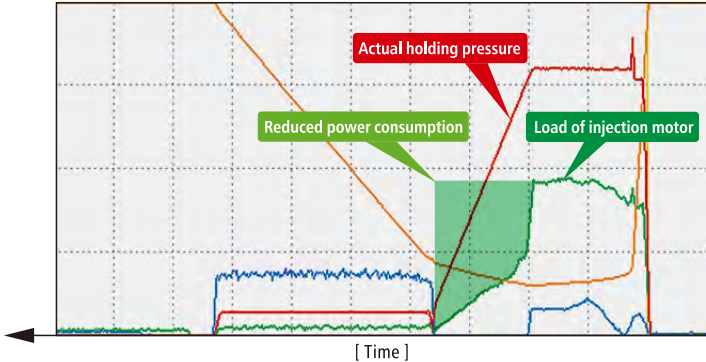


Energy saving control selection



Setting of the reduction rate can be changed by modes.

- Waveform example in energy saving control -

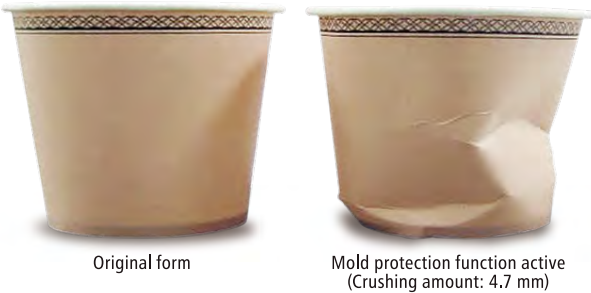


Protecting molds against accidents

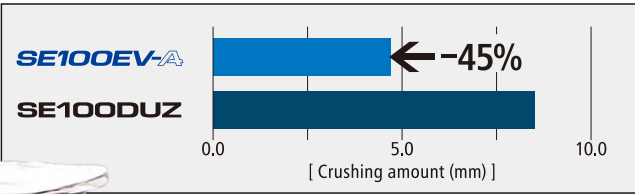
Mold protection function

SEEV-A has more accuracy mold protection functions than conventional machine. SEEV-A prevents mold damage, such as part remaining at parting line by sensitive monitoring.

- Operation verification with paper cups -



- Operation verification with paper cups -



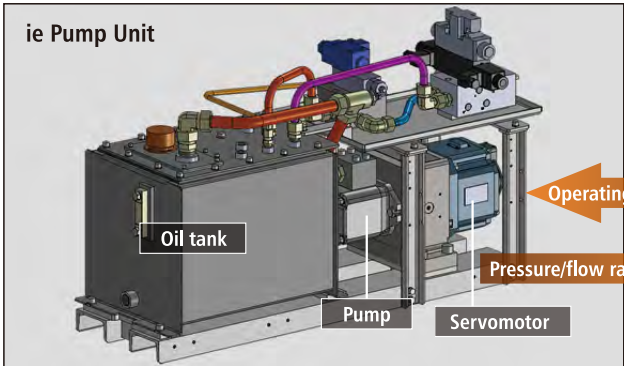
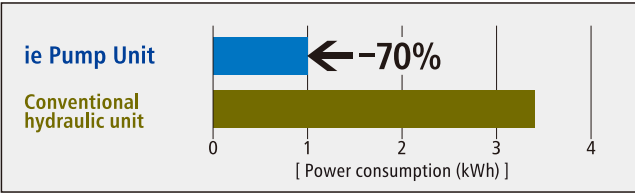
Comparison at 50% mold opening/closing speed

Power-saving type hydraulic unit

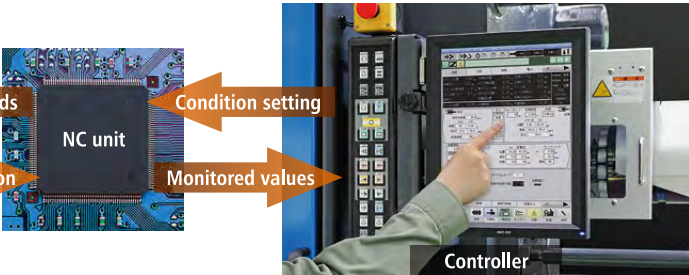
ie Pump Unit

The ie Pump Unit reduces power consumption much more than conventional general core-tractor-driven hydraulic units.

- Power consumption comparison -



● The ie Pump Unit is optional. A drive circuit to be used for the pump unit must be selected at the same time.



Prevents product and environment pollution with tie bar grease

Bush-less tie bar and tie bar plating

SEEV-A prevents cosmetic defect by grease scattering, since mold area is clean by grease free tie bar. Also you have comfortable work environments.



"Comfortable work without producing defects" is impossible in such environments.

Reducing defects, loss, and faults to zero whenever possible

'Zero-molding

Standard equipment



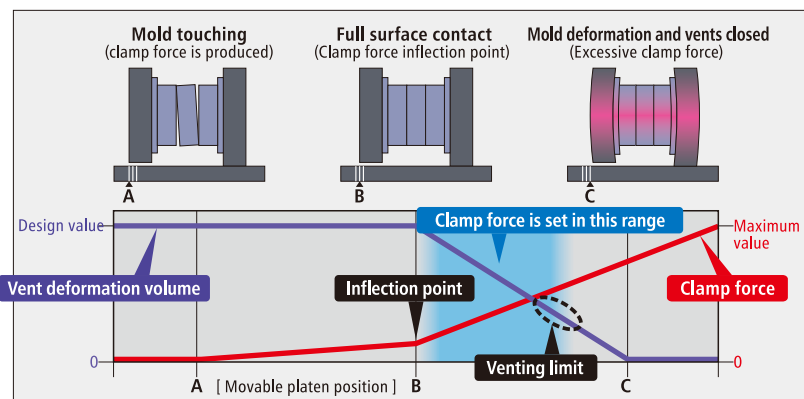
Zero-molding is an integrated application that reduces defects, loss, and faults to zero whenever possible. The product offers three elemental technologies of **MCM** related to clamping, **FFC** related to filling, and **SPS** related to operations.

MCM

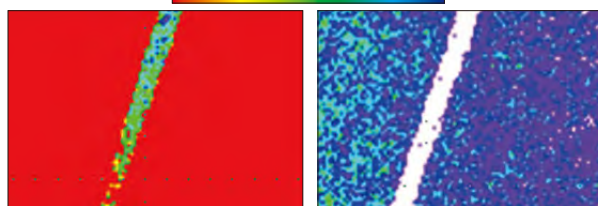
Minimum Clamping Molding

Making the best use of vent effects Less maintenance and longer mold life

Optimization of improved clamping accuracy and uniform surface pressure distribution yields the required minimum clamp forces with well-balanced surface pressure.



- Observation of vent deformation with pressure-sensitive paper -
Surface pressure—High Low



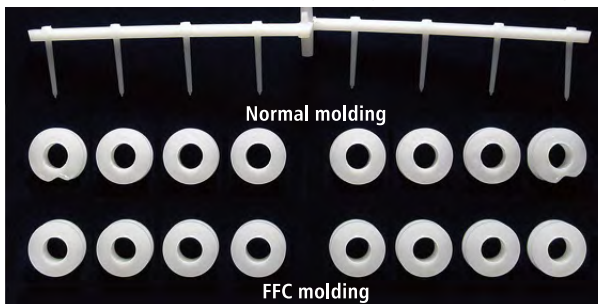
Excessive clamp force
Appropriate clamp force in MCM molding
A high clamp force causes vent deformation and impedes the exhaust functions.

- Example of mold clamp force set to 0 kN -



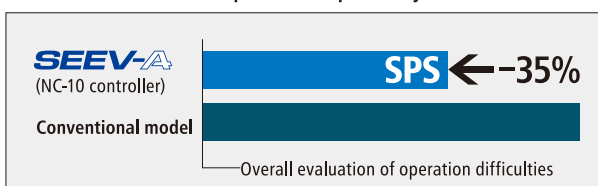
Stable molding is enabled for some products at the mold clamp force set to 0 kN.

- Example of mold clamp force set to 0 kN -
Coil bobbin / PBT / 8 cav. (Uneven runner layout) / Product mass: 4.8 g



In FFC molding, far cavity from sprue is filled completely.

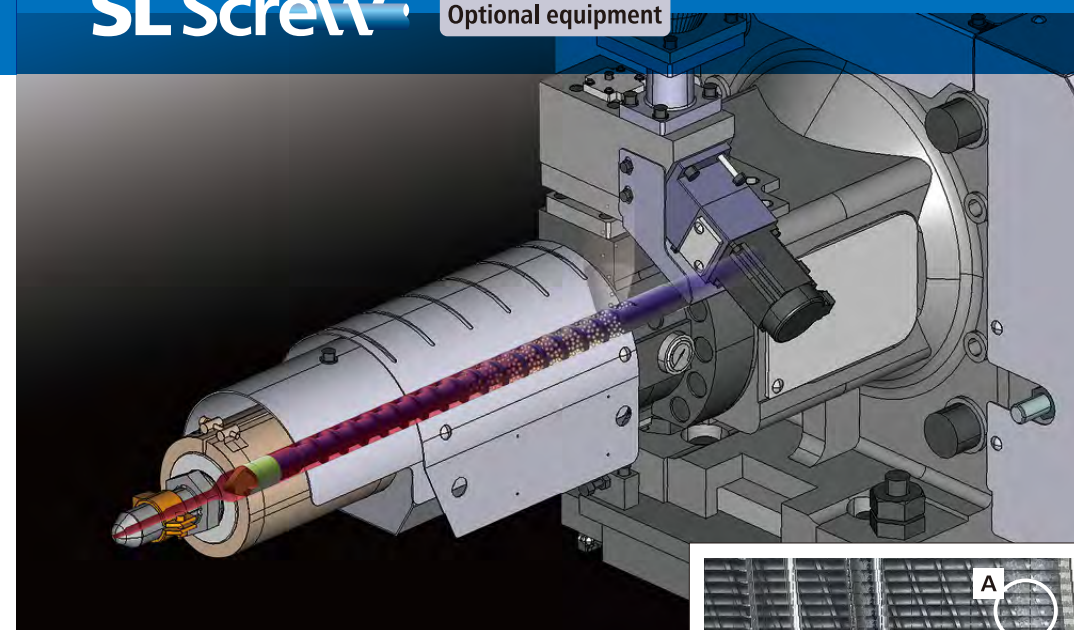
- Comparison of operability -



Dosing system based on a new theory that overturns the accepted ideas of screws

SL Screw

Optional equipment

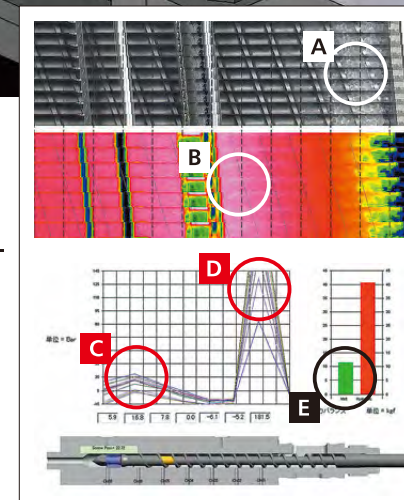


Dosing system based on a new theory that overturns the accepted ideas of screws

Melting process by the conventional screws are analyzed visually and in terms of the temperature and pressure. A screw designed based on the results is used as the core of this new dosing system.

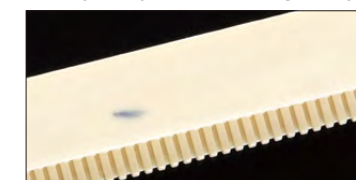
- Comparison of analyses of conventional screw (left) and SL Screw -

Pellet clogging (A), overshoot due to shear heat (B), pressure variation before the chip (C), abnormal pressure near the hopper are (D), and melting pressure lower than the back pressure (E) are observed in the conventional screw. The SL Screw clears all of these problems and enables stable and normal melting processes.



SL Screw provides stable dosing process by preventing black spot and good gas/water contents release.

The SL Screw improves and eliminates the following defective phenomena. It is especially effective for high-temperature engineering plastic, super engineering plastic and resins containing flame retardant, GF, etc.



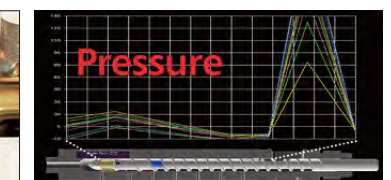
Black spots, burning, discoloration
Increased cosmetic defects and screw maintenance



Mold deposit by gas and water contents
Increased cosmetic defects and mold maintenance



Screw, screw tip and barrel wearing
Increased barrel maintenance



Unstable plasticizing
Unstable product accuracy and production efficiency

There are some instructions on the resin types, etc., when using the SL Screw. Refer to the catalog or make an inquiry for details.

Variable screw assemblies that meet all needs

Specifications	Nitride	Plating	Corrosion and wear resistant A	Corrosion and wear resistant B	Corrosion and wear resistant C	High temperature
Material						
Screw	Nitride coating	Plating	Corrosion and wear resistant A	Corrosion and wear resistant B	Corrosion and wear resistant C	Corrosion and wear resistant A
Barrel	Nitride coating	Nitride coating	Corrosion and wear resistant A	Corrosion and wear resistant B	Corrosion and wear resistant C	Corrosion and wear resistant A
Screw tip	Rotation type	Rotation type	Corrosion and wear resistant A Non-rotation type	Corrosion and wear resistant B Non-rotation type	Corrosion and wear resistant C Non-rotation type	Corrosion and wear resistant A Non-rotation type
Type						
SD Screw	○	○	○	○	○	○
SM Screw	○	○	○	—	—	—
Wear resistance	★	★	★★	★★★	★★★	★★
Corrosion resistance	★	★	★★	★★	★★★	★★
Applicable resins	Resin that is not wearing-resistant or corrosion-resistant	Likely to burn resin	Resin and flame-retardant resin containing GF less than 30%	Resin containing 30 - 40% GF or resin containing much filler (GB, CF, MR)	Resin containing approx. 40 - 60% GF and highly corrosion-resistant resin	Resin molded at high temperature

★★★Most suitable ★★Applicable ★Usable

Standard Equipment

Plasticizing and injection unit
1. SD ion-nitride screw assembly (Open nozzle)
2. Programming control of injection
3. Programming control of holding pressure
4. Screw pull back (Before dose start/after dose end)
5. Screw position digital display (Setting 0.01 mm)
6. Holding pressure time 0.01 sec setting
7. V-P switchover controller (Pressure, position)
8. Filling delay timer
9. Auto purging with IJ unit status confirmation (Nozzle touch or IJ unit retract end)
10. Cylinder temperature control 6 zones (φ18-φ20: 4 zones)
11. Cylinder temperature mode setting (Molding/Lowered/Purge)
12. Zone 1 high capacity heater (More than C250 is optional)
13. Screw cold start prevention with variable timer
14. Sprue break stroke remote setting (With Detection of nozzle touch, moving time and delay timer)
15. Digital indicator of screw rotation speed
16. Purging cover (With limit switch)
17. Swivel injection unit (With nozzle center adjust device)
18. Remaining cooling time indicator
19. Dose delay timer
20. Injection/Holding response 10-mode
21. Holding pressure speed setting
22. Pull back delay control
23. Synchro dose
24. Reverse control software
25. Temperature control for nozzle
26. Standard heated cylinder cover
27. Water cooling jacket temperature control device
28. Mold open operation during dose (Needle nozzle drive control)
29. Filling pressure multi-level control
30. Resin residence protection
31. One touch dose
32. High nozzle touch force and precision unit (Nozzle touch force: 3 stages changeable)
33. Stainless purge resin receiving tray
34. SL screw: Automatic synchronization ratio tuning (SL screw is option)

Control unit
1. 15 inch TFT Color LCD screen
2. Touch panel setting input device
3. Internal memory of molding conditions (200 conditions)
4. Operation support function
5. Forming support function
6. Molding profiles display function (Mold profiles storage, cursor, display and so on)
7. Screen snap shot function
8. Take-out robot connection circuit *1
9. 15 languages selection
10. Maintenance guide (Screen display of inspection timing, grease application timing, item, method)
11. Auto start/stop function (Lowered temp, heater on, machine shut down) *1
12. Process display function
13. SSR heater drive circuit
14. Input of industrial unit for speed, position, pressure and rotation rate
15. Machine status output signal (5ch) *1
16. USB connection circuit (Memory)
17. Protection for molding condition
18. Abnormal processing selection
19. Initial reject and interruption reject function
20. Screen color change
21. Number & character entry key layout change (Selection from two types)
22. Economical use of energy mode: Energy saving control
23. Signal for takeout robot during mold opening

*1 All input and output signals are no-voltage contact signals. (Power is not supplied with output signals.)
*2 The injection duty is 50%. The maximum injection speed is 350 mm/s for C160 only.
*3 All input signals are no-voltage contact signals. All output signals are 24 V DC signals.
*4 All input and output signals are 24 V DC signals.
*5 The overall machine length and maximum mold thickness are larger by 50 mm.
*6 The overall machine length and maximum mold thickness are larger by 100 mm.
*7 You cannot choose this option with 100 mm mold thickness extension.
*8 The compression time with above compression force is less than 20% of cycle time.
*9 Tie in rod type is the SHI type (bolt type).
● Specifications are subject to change without notice for performance improvement.

Monitor unit
1. Actual value display function
2. Heater breakage monitor
3. Auxiliary facility monitor (3ch) *1
4. Abnormal monitor (Max. cushion, min. cushion, filling pressure, mold protection, cycle time, dosing time)
5. Automatic setting for abnormality monitoring condition
6. Abnormality history display (Abnormal item, occurrence time display)
7. Quality control function (Actual value statistics function, various graphing function, 100,000 shots stored data check function)
8. Product control (Product quality control device, automatic production stop, stocker signal, logging, counter)
9. Auto start device (Heater, external output signal)
10. Cylinder heater temperature monitor (All zones)
11. Self diagnosis function
12. Alarm buzzer
13. Shot counter
14. Processing at cycle monitor abnormality (Heater processing mode change)
15. List setting screen
16. Function to prevent use of monitor
17. Ejector torque monitoring
18. Maintenance time notification (Shot number/Elapsed time)
19. Filling pressure monitoring function (5 points)
20. Cycle analysis

Clamp unit
1. Programming control of opening/closing speed (5 stages/3 stages)
2. Mold protection
3. Low pressure clamp unit
4. Mold opening/closing pause
5. Remote control of clamp force
6. Remote control of mold space
7. Ejector remote setting (2 speed control, pressure, stroke, delay timer, multiple time protrusions)
8. Current value input (Ejector protrusion limit position)
9. Current value input (Mold open limit position)
10. Mold clamp mode (Lock up)
11. Ejector protrusion interlock (Possible only at mold open limit during manual operation)
12. Ejector protrusion during mold opening
13. Ejector protrusion during mold dosing
14. Ejector plate return signal (Input signal to machine) Connected by metal consent *1
15. Mold opening/closing signal (Spear control signal) Dry A contact *1
16. Valve gate drive circuit (Control circuit only) *1
17. Stand by mode for mold installation (Low mold opening/closing speed)
18. Clamp cover with polycarbonate window
19. Emergency stop push button (Operation side and non operation side)
20. Safety door with polycarbonate window
21. Threaded holes for takeout robot mounting
22. Grease central lubrication for injection and damp unit
23. Mold dose interlock device (Electrical, mechanical type)
24. Mold opening/closing with low vibration or high speed mode
25. Moving platen support device – liner guide type
26. Center press platen
27. Ejected products sensor circuit *1
28. Multi-toggle
29. Tie bar plating
30. Ejector unit with brake
31. S-MOVE (Low vibration control)
32. Ejector stand by
33. Mold space control by servo motor
34. Dust prevention cover above toggle (Fixed type)
35. Dry cycle mode

Others
1. Auto grease supply unit (Cartridge grease type)
2. Three-directional ejection frame
3. Mold cooling water block (2 systems) (Flow indicator and valve are options)
4. Standard tool (Offset wrench for nozzle)
5. Standard spare parts (Hook for hosting machine, fuse, air filter)

Standard Equipment

Zero-molding features	
1. Zero-molding main screen: Simple process setting	17. Decomp. by Revers after plasticizing
2. Zero-molding main screen : Product molding monitor (Product count, process, abnormal, detect)	18. Zero-molding: Clamp force feed back
3. Screen for confirm spec. and functions (Standard, option, abnormal transaction, specification list, monitoring system)	19. MULTI clamp force control (X_head pos. control)
4. Minimum clamp force detect (Automatic)	20. Multi-toggle by objective (Gas release, deformation prevention)
5. Setup guidance: Mold installation screen (Mold thickness, mold contact, clamp force, mold open/dose in preparations, ejector)	21. Zero-molding: Molding condition guidance monitor (Peak clamp force, pack press., situation monitor)
6. Setup guidance: Mold condition setting screen (Open/close, ejector multi-step)	22. Detect monitor change (Detect, detail, detect+real time, wave, temp. graph)
7. Setup guidance: Teaching of mold opening limit and ejector protrusion point (Actual value input)	23. Protection for molding condition
8. Setup guidance: Mold protection setting screen (Mold protection, ejector protection)	24. Initial molding by auto change (Condition)
9. SET-UP guidance: Multi purge	25. Protection: Screw protection
10. SET-UP guidance: Reference & call temp. condition	26. Wave: Display by process (Injection, holding press., plasticizing., mold open, mold close, ejector)
11. SET-UP guidance: Supervise & warning remain resin	27. Wave: Wave preservation message
12. SET-UP guidance: Nozzle/Heating cylinder heated up mode (Step/Nozzle delay)	28. Quality Control: Wave distinction
13. Zero-molding: Molding condition setting screen Z-Screen (Filling, holding press., plast.time, temp.,clamp force)	29. Quality Control: Molding process monitor logging
14. Zero-molding: Flash control	30. Production control: Production count control (Cavity count setting)
15. Zero-molding: Flash control auto setting	31. Production control: Operation status control (Operation time, motor over load monitor, electricity consumption monitor)
16. Zero-molding: Short shot mode by Flash control	

Optional Equipment

Plasticizing selection
1. Hard chromium plating screw assembly
2. Wear & corrosion resistant A screw assembly
3. Wear & corrosion resistant B screw assembly
4. Wear & corrosion resistant C screw assembly
5. High-temperature screw assembly (Max. temp. 450°C)
6. SM screw assembly
7. SL screw assembly
8. Screw tip set - rotation type TiN coating
9. Needle nozzle (Needle is operated by pneumatic.)
10. FTCII nozzle (Open nozzle : ø18 -- ø36, Less than SE130EV-A)
11. High capacity heater
12. Extension nozzle
13. Cylinder nozzle
14. Zone 1 high capacity heater (Less than C160 are standard)
15. High insulated cylinder cover

Plasticizing and injection unit
1. Resin temperature sensing device (Only when needle valve nozzle is equipped)
2. Standard type hopper
3. V/P switchover by mold cavity pressure
4. Needle valve nozzle drive circuit
5. FTC nozzle electric control circuit (ø18 -- ø36 screw)
6. High temperature heater control circuit (Max. temp. 499°C)
7. Hopper swivel mounting plate
8. Plating resin inlet of cooling water jacket
9. High duty IJ unit *2
10. Pressure release control for nozzle touch

Control and monitor unit
1. Leak circuit breaker (AC200V, 220V 3ø3W+E) (Japan and Asia only)
2. Mold temperature monitor 2 zone (Without thermocouple and type K)
3. Mold temperature monitor 4 zone (Without thermocouple and type K) (Unavailable for SE50EV-A)
4. Auxiliary facility monitor (Standard+2 channels)
5. Production control (2-directional rejection chute)
6. Mold temp. controller (K=CA, 2 zone on Moving Platen)
7. Mold temp. controller (K=CA, 4 zone on Moving Platen) (Unavailable for SE50EV-A)
8. Automatic starting system (Heater+water supply+external output signal)
9. Revolving alarm lamp
10. Multi function 3 colors LED alarm lamp
11. Closed circuit type cooling water pipe 1 system 4 branches (With flow detector, stop valve)
12. Closed circuit type cooling water pipe 1 system 2 branches (With flow detector, stop valve)
13. Spare power supply outlet selection
14. Electric power supply receptacles (Installed on operation side)
15. iii-System Standard Edition
16. Motion07

Clamp unit
1. Core tractor control circuit 1 system (Control circuit+ piping) *3
2. Pneumatic core pull control circuit 1 system (Control circuit+ piping) *3
3. Rotating core control circuit (Motor: less than 1.5 kW)
4. SPI take-out robot connection circuit *4
5. Product chute
6. High precision heat insulating plate (5 mm/10 mm, cross type)
7. Mold clamp control unit
8. Valve gate drive circuit (Control circuit+pneumatic circuit) *3
9. Full metallic toggle cover
10. Hydraulic package
11. SPI pattern platen
12. EUROMAP pattern platen
13. Mold space extension 50 mm *5
14. Mold space extension 100 mm (SE100EV -- SE180EV) *6
15. Double center press platens (SE100EV -- SE180EV) *7
16. Ejector force power up (SE50EV-A/SE75EV-A: 50 kN, SE100EV-A -- SE180EV-A: 60 kN)
17. Ejector compression device (SE50EV-A/SE75EV-A: 50 kN, SE100EV-A -- SE180EV-A: 60 kN) *8
18. Ejector tie in rod *9
19. Ejector Stroke Extension (SE50EV-A/SE75EV-A: 100 mm)
20. Pneumatic control circuit
21. ie Pump power pack (For hydraulic core tractor/for valve gate)

Spare parts and accessories
1. Spare parts (Mechanical parts: Lub. parts)
2. Spare parts (Electrical parts: Thermocouple)
3. Spare parts for export. (Encoder, limit switch, and Inductive proximity sensors)
4. Leveling pads (For one machine)
5. Anchor bolts (For one machine)
6. Locating ring (Transition fit) Inner diameter: ø100/outer diameter: ø120 (Only for SE180EV-A)
7. Locating ring (Transition fit) Inner diameter: ø110/outer diameter: ø120 (Only for SE180EV-A)
8. Tool A
9. Ejector rods
10. Grease gun
11. Grease cartridge for automatic lub (700 cc)
12. Grease cartridge for manual lub (400 cc) plasticizing
13. Easy clamp
14. Box end wrench for open nozzles
15. Offset wrench for needle valve shut-off nozzle