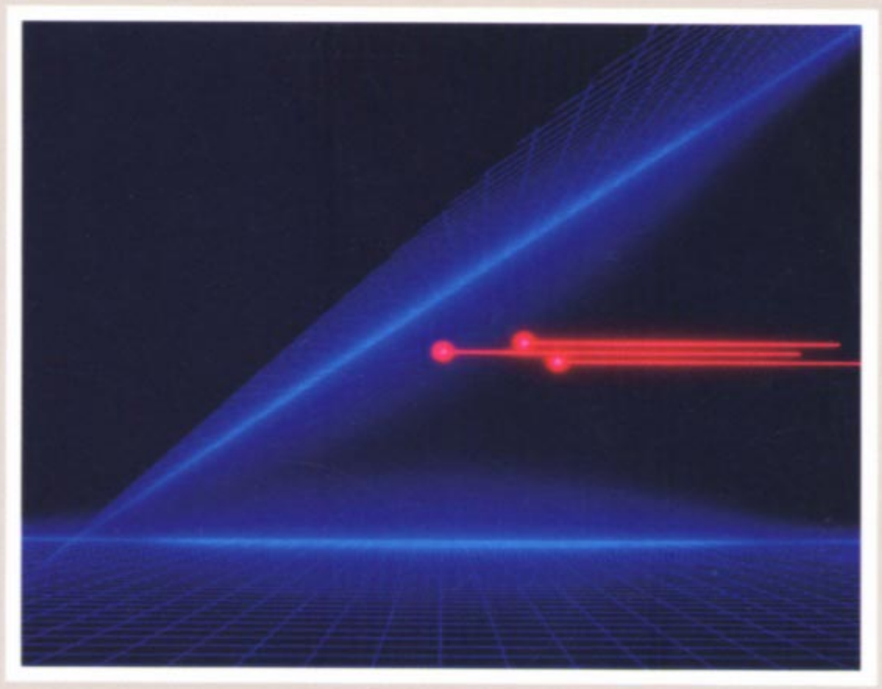
Electric
Servo
Drive

J-ELⅢ SERIES



Electric Servo Drive
Injection Molding Machine

JSW Hiroshima Plant

JSW

JSW Hiroshima Plant

JSW Presents The J-EL Ⅲ
Electric Servo Drive Molding Machine

The Japan Steel Works, Ltd., (JSW) is proud to present its new lineup of the electrically driven injection molding machines,
The J-EL Ⅲ Series.Developed through JSW's machine engineering expertise,
this next-generation series raises injection molding to a higher level of versatile function.
JSW's patented servo drive system and the new SYSCOM2000 controller system ensure eminently more stable, high-speed computing for precision, high-cycle molding.
The J-EL Ⅲ series also incorporates a newly developed screw cylinder into JSW's unique injection -compression molding function and high rigid mold platens significantly boosts the fundamental performance of our molding machines.
The J-EL Ⅲ series of injection-molding machines offers more user benefits than ever before.

1 Ability

- Extra rigid clamping mechanism.
- Fast responding injection.
- Increased mold open/mold close speed.
- Increased ejector speed.

2 Originality

- High performance injection feedback control.
- Servo driving system, custom built for injection molding machines.
- Soft—pack servo control.

3 Functionality

- Injection—compression molding.
- N2000F bimetallic cylinder, abrasion and corrosion resistant.
- Automatic central lubrication greasing.

4 Operation

- TFT color LCD with touch panel.
- SYSCOM 2000 controller mounted on stationary platen.
- High-touch operation keyboard.
- Maintenance display function.
- Alarm monitoring function.
- Feel of operation: same as that of hydraulic powered machines.

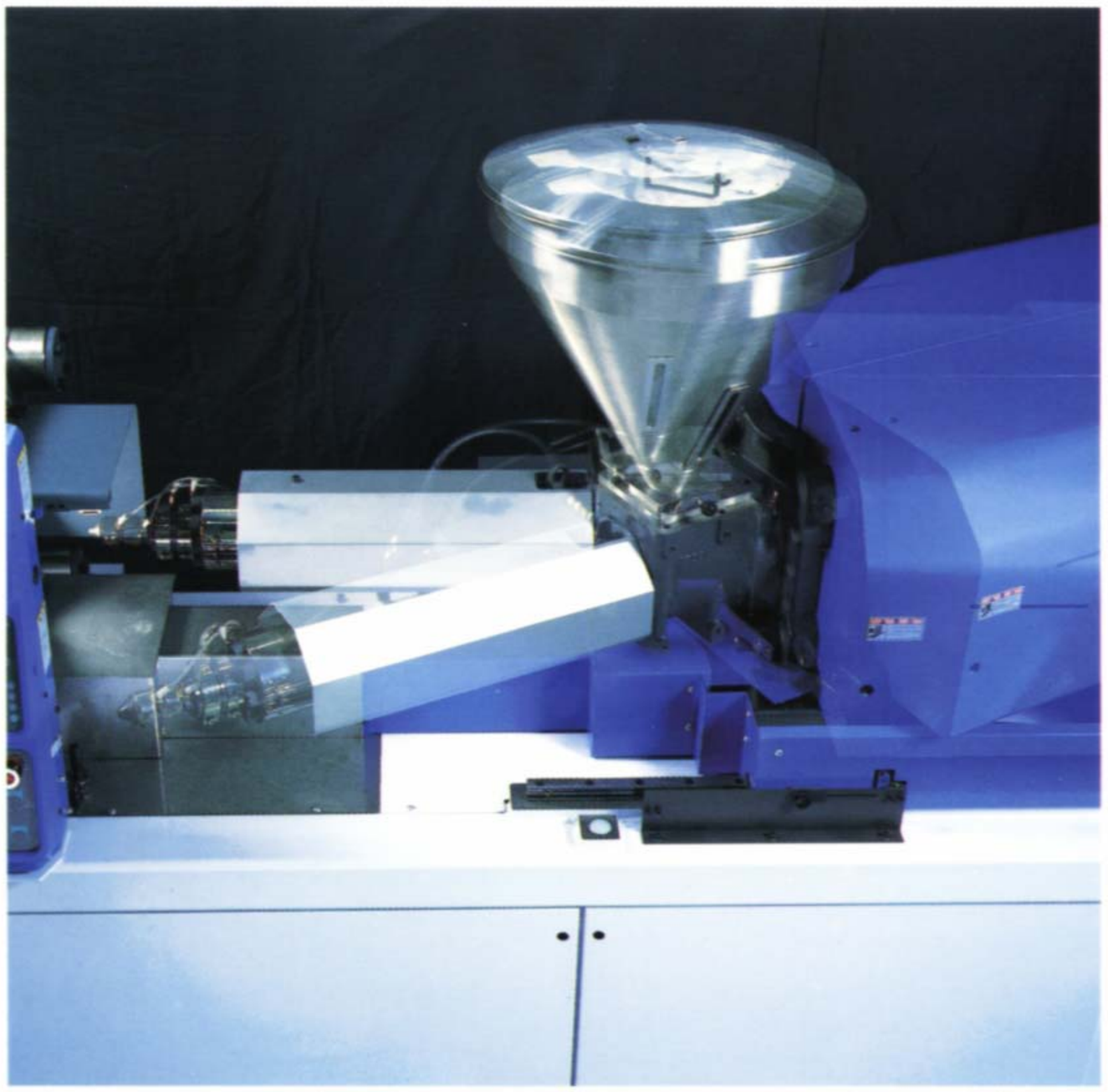
5 Price performance

Cost less to run every day

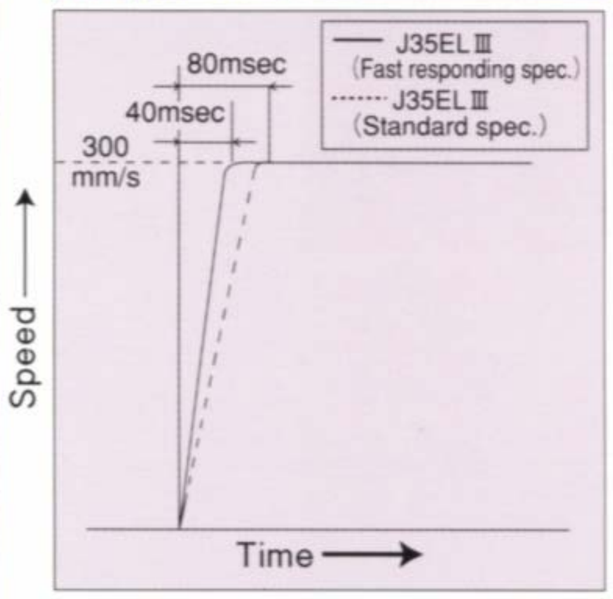
- Reduced power consumption.
- No hydraulic oil to buy.
- No heat exchanger, no cooling water.

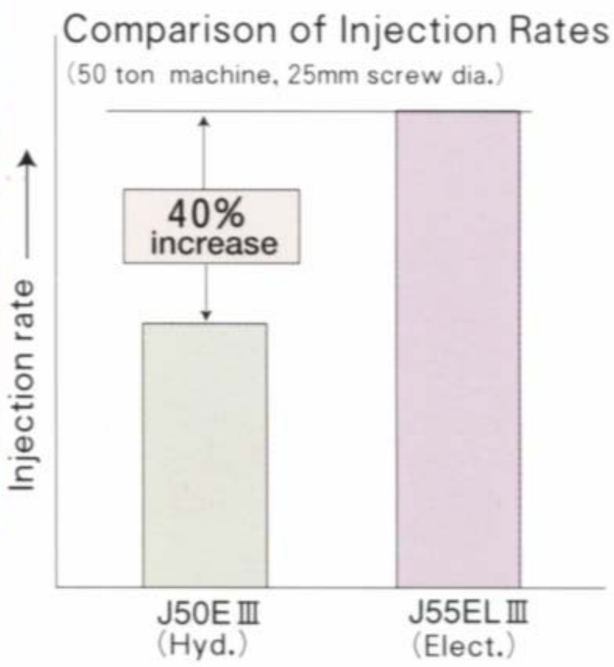
Ability 1

More Sophisticated and Powerful. The Injection Molding Technology Ahead of All Others.



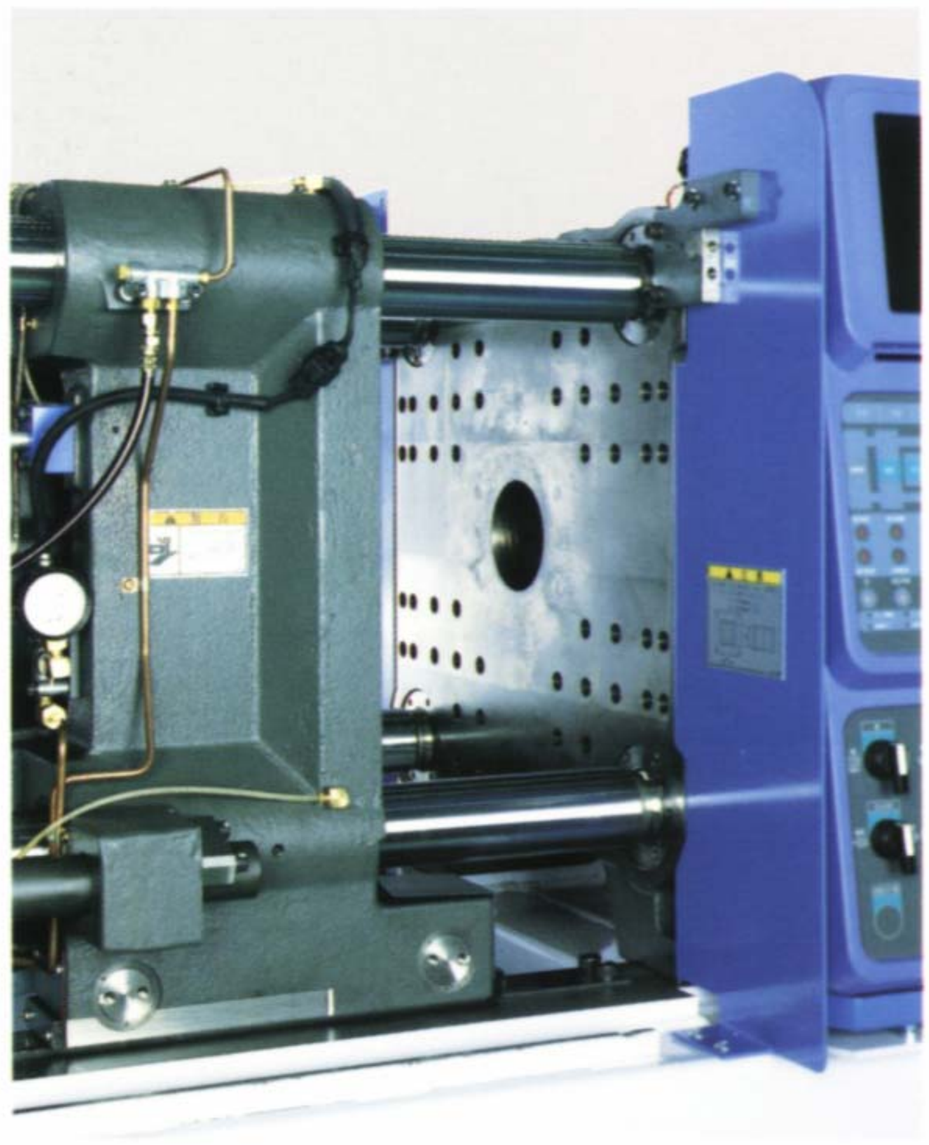
Fast Responding Injection Rate to meet Critical Requirements.





Extra Rigid Clamping Mechanism

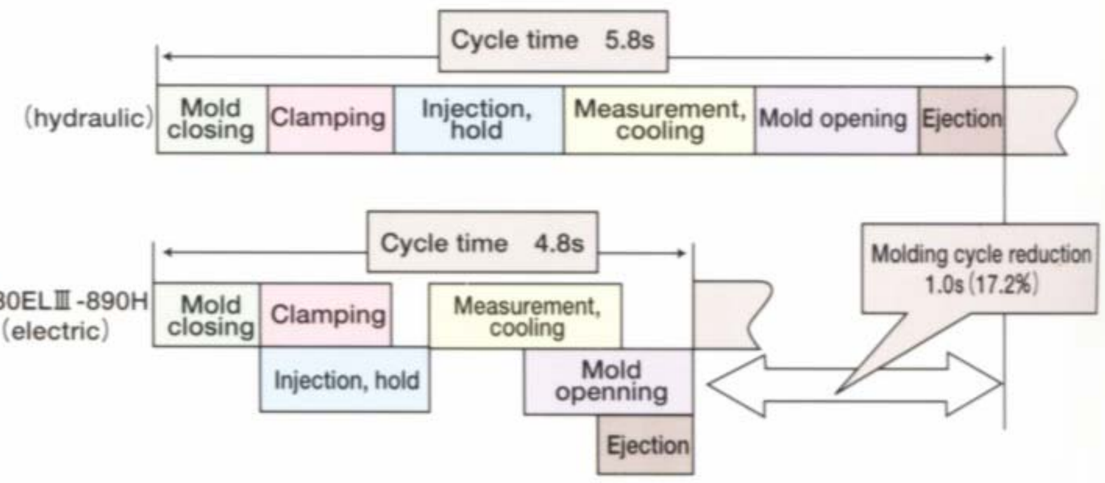
With the new toggle mechanism designed by FEM analysis, rigidity of platen and clamping force have been increased.



Dual Fanction for Cycle Reduction

The invividual control inherent to the electric servo-driven machine allows reliable composite operations functions which reduce the cycle time and expand the molding adaptability range of the gate cutting and other functions.

Operation Diagram for CD-P Case Molding (compared to hydraulic)



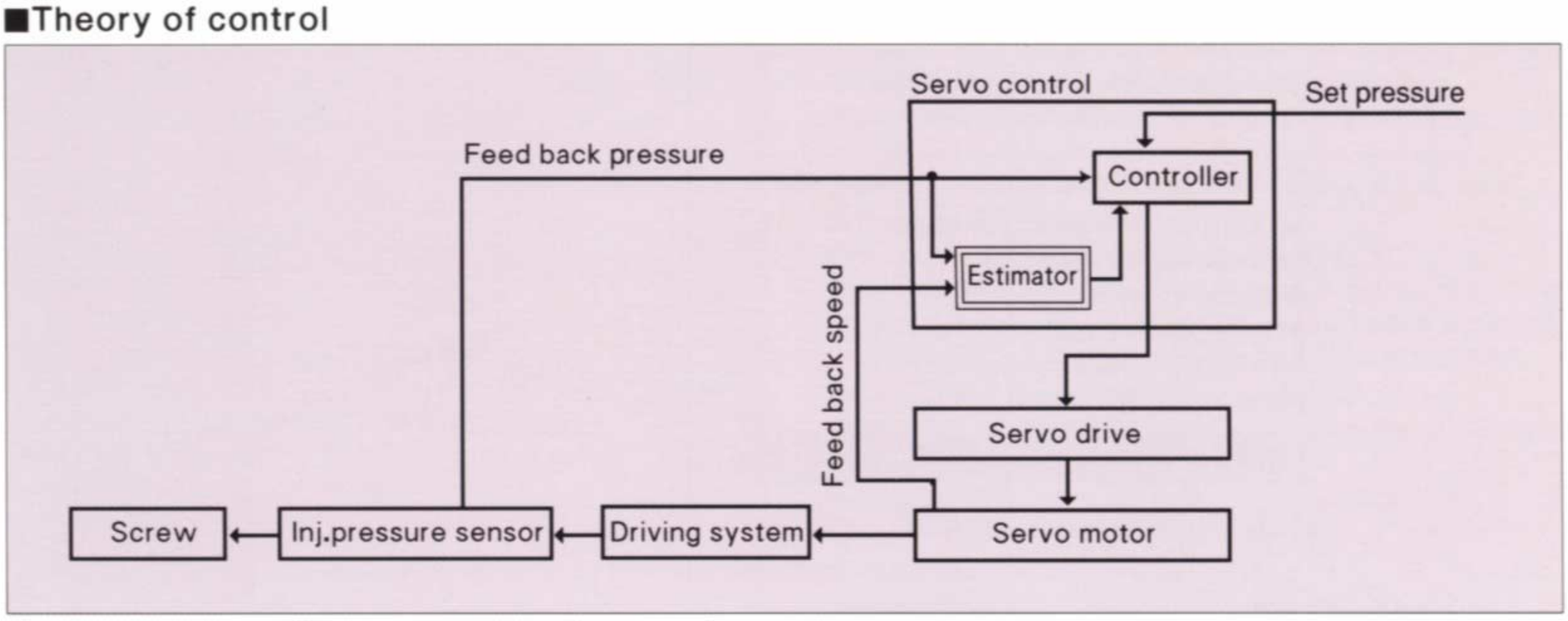
Originality 2

Unique Control System Delivers Ultimate Precision.

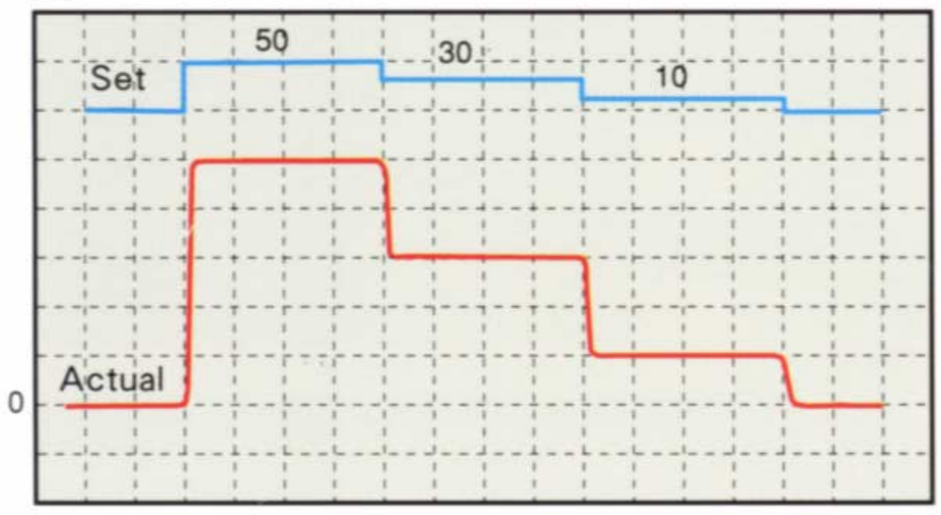
APC (High performance injection force feedback control) delivers high precision control.

The injection force sensor combined with JSW's high performance feedback control has realized a truly reliable pressure follow—up and shockless pressure control.

■Theory of control

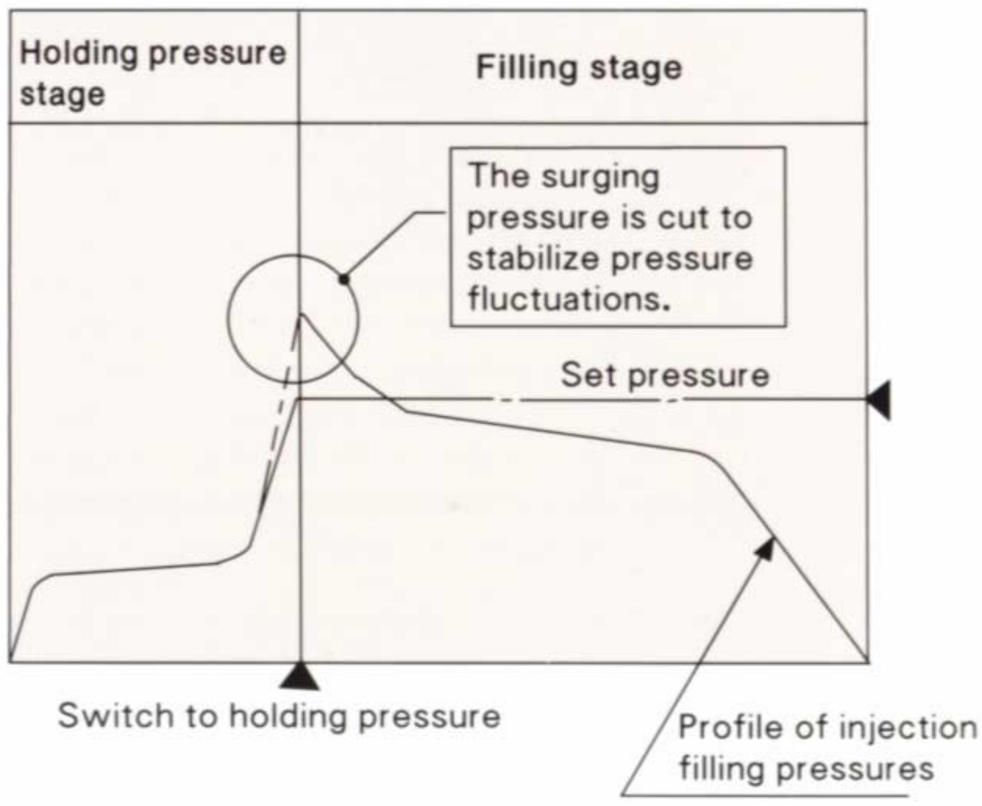


■ Holding Pressure Characteristics



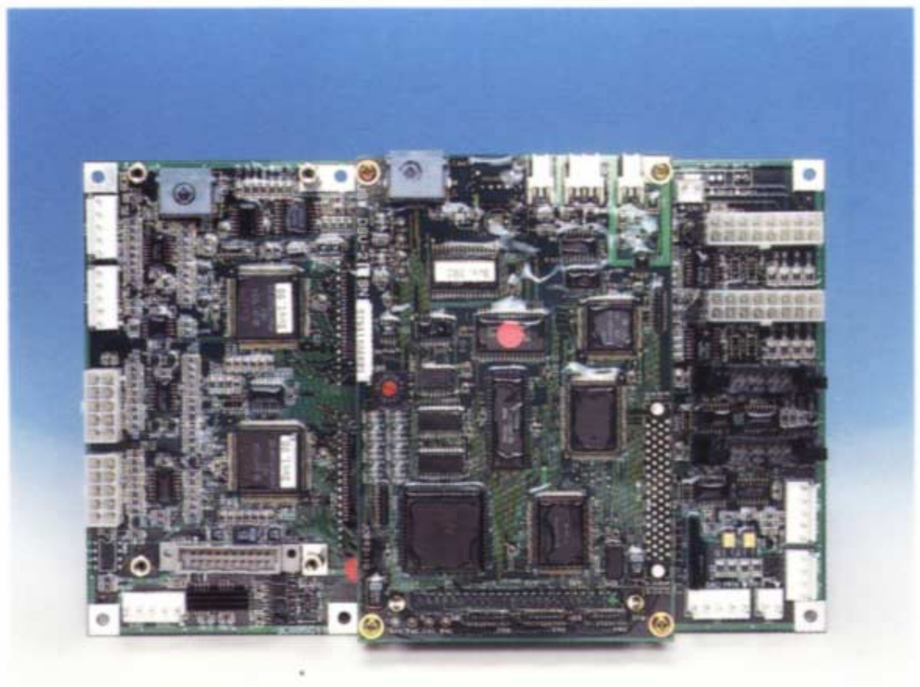
Soft—Pack Servo Unit for Setting Injection Pressures.

The optimum pressure molding (Soft—packservo) known for its performance in the hydraulic operated machines has been adopted for this electrically driven machine. Elminating the peak pressure immediately before switching to the holding pressure is effective for reducing flash and warp probiens.



Original Servo—Amplifier developed by JSW

A result of JSW's Research & Development Designed to be operated under severe conditions, the servo driving system is built exclusively for molding machines. A32 bit RISC chip delivers high speed processing, with a high degree of accuracy.



SSR control for Cylinder Heater

PID temperature controllers regulated by SSR (solid state control) for all zones, including nozzle section.
Note:Standard spec, for injection unit up to1400H

Functionality 3

Powerful, Efficient Equipment that delivers Greater Flexibility Creating Wider Processing Windows.

Unique Toggle Clamp Machine with Injection-compression (Coining) as Standard Spec (Pat.No.1744469)

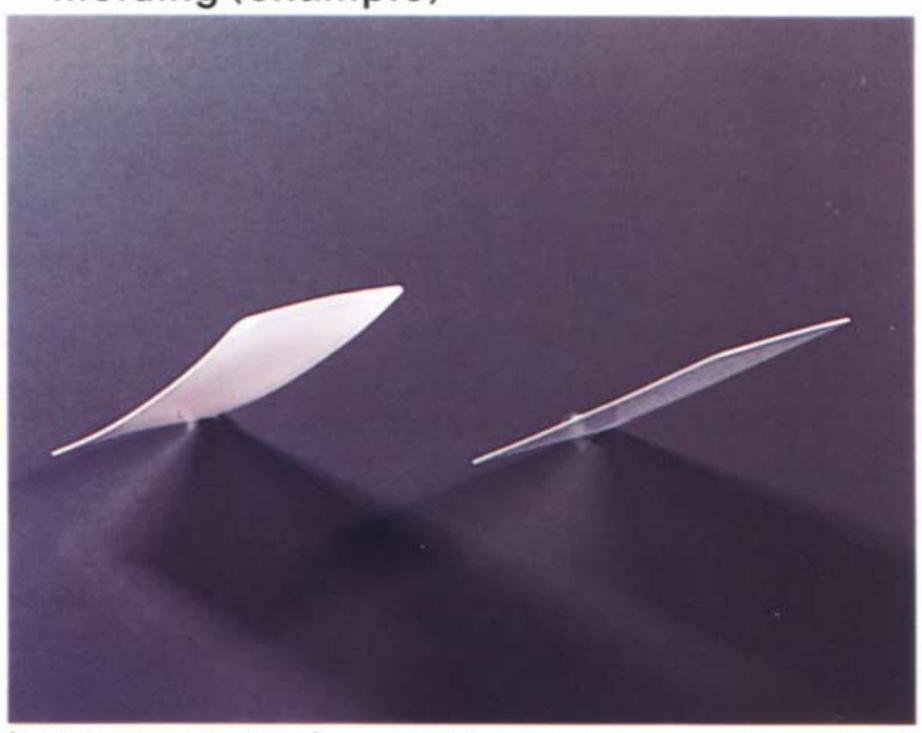
Fitted as part of standard specification is the injection—compression molding function with the built—in mold platen position control of high accuracy. This makes it possible to easily set the operation mode suitable for the product and the number of compression steps.

	Motions	Number of steps
Mode A	Mold close injection start compression.	Max.6 steps
Mode B	Mold open injection start compression.	

■Merits of injection—compression molding

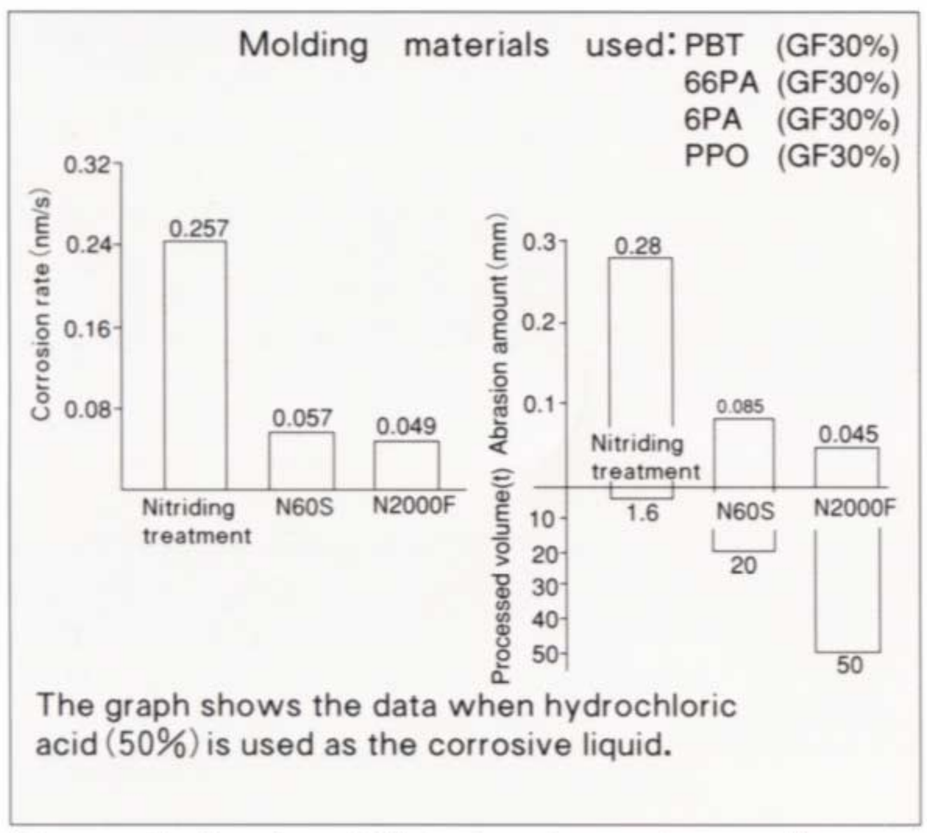
- ●Reduces molded-in stresses.
- ●Easier mold release.
- ●Improved pattern transfer.
- ●Reduction in molding cycle time.
- ●Reduction in mold clamping force (low pressure molding)
- ●Gas venting.

■Effect of Injection—Compression Molding (example)



(Left:Injection molding) (Right:Injection compression molding)
Molded product:IC card material:ABS

N—Aloy 2000F Cylinder as Standard Specs.



The graph shows the data when hydrochloric acid (50%) is used as the corrosive liquid.

The newly developed high abrasion and corrosion resistant cylinder N-Aloy 2000F has lining material made of high nickel alloy as the base in which is filled and dispersed a very hard tungsten carbide.
It has particularly a high resistance to abrasive action as compared with the conventional cylinders .
(Used for GF filled polymers, flame retardant polymers and many super engineering plastics, it assures high injection performance and extended service life of the cylinder.
Note:Standard spec. for injection units up to 1400H.

Automatic Central lubrication.

Automatic Central Lubrication of all moving parts, clamp, injection carriage and ball screws is standard spec. Any grease malfunctions cause an audible alarm.
(There are two Lines of automatic librication in the high-speed injection specifications for J180EL Ⅲ and up.)

Operation 4

SYSCOM 2000 Controller. Pictorial Display of Molding Machine Facilitates Ease of Operation.

SYSCOM2000

■TFT Color LCD with Touch Panel

A big TFT color LCD screen (10.4 inch) has been added.This provides a clear picture for operator-friendly viewing.
The dialog-type operation means that conditions can be set easily, simply by touching the location that requires setting.

■Easy touch panel uses a pictorial display

Molding machine for easy process parameter settings.User friendly design facilitaes learning,and daily operetion.
(Memorize 40 mold with inner memory and a data card.)

■Built-in Controller

Mounted on the stationary platen, the SYSCOM 2000 controller uses a large color liquid crystal display and operation keyboard eliminating unnecessary wasted space around the machine, giving the opreator easy access to all functions.

■Language Switching Function

In response to globalized needs, the screen can be switched from Japanese to English.
Also, other languages are available as options.
Note:Some languages are not available

■Print-out

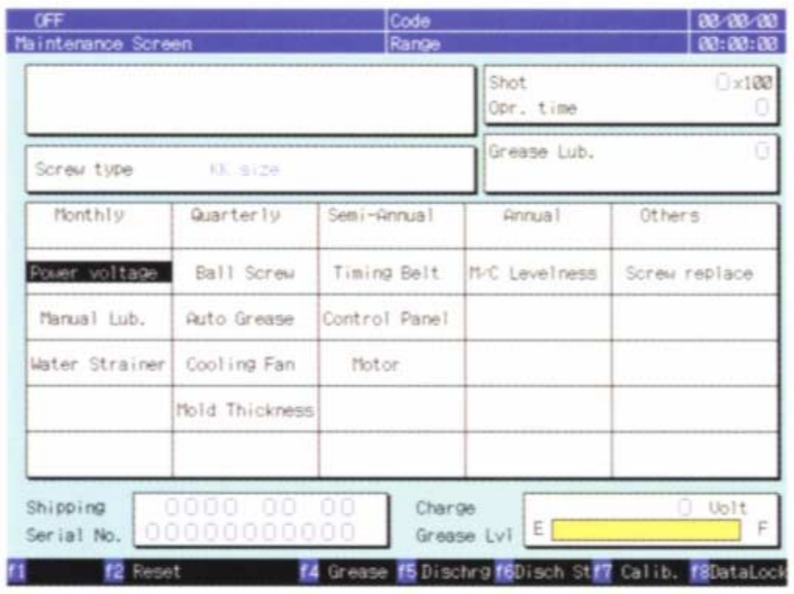
10 processing parameters, molding, conditions, are stored in the machine's memory. Sampling by shot or by time. Printer port is standard specification.

■Centralized Control System (option)

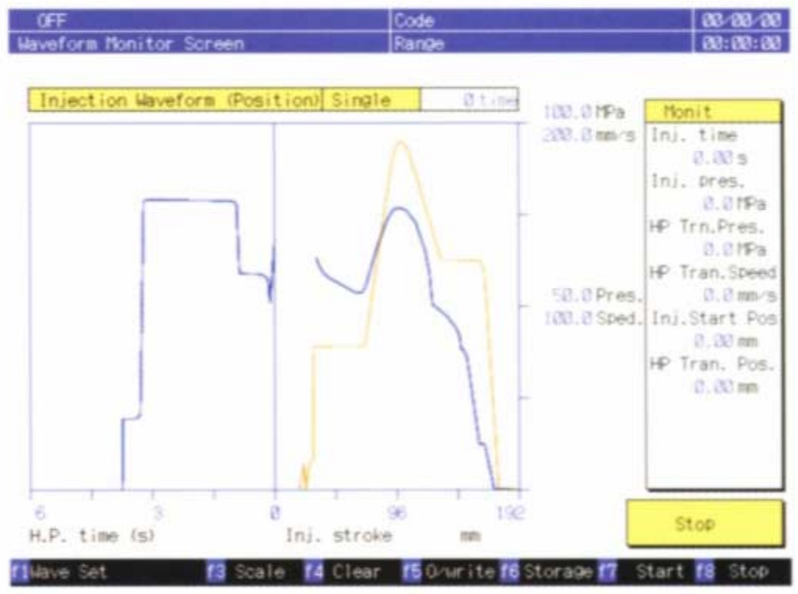
A network may be built with a host computer.

Display

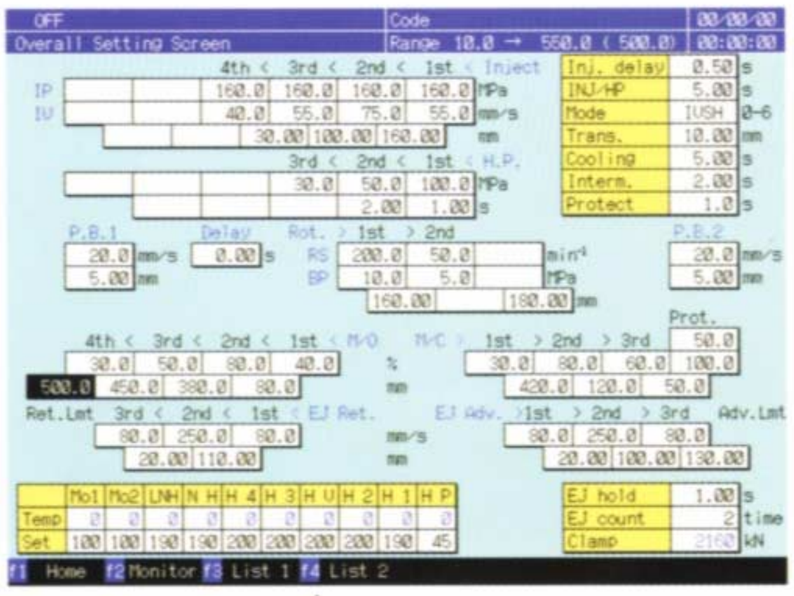
■Maintenance



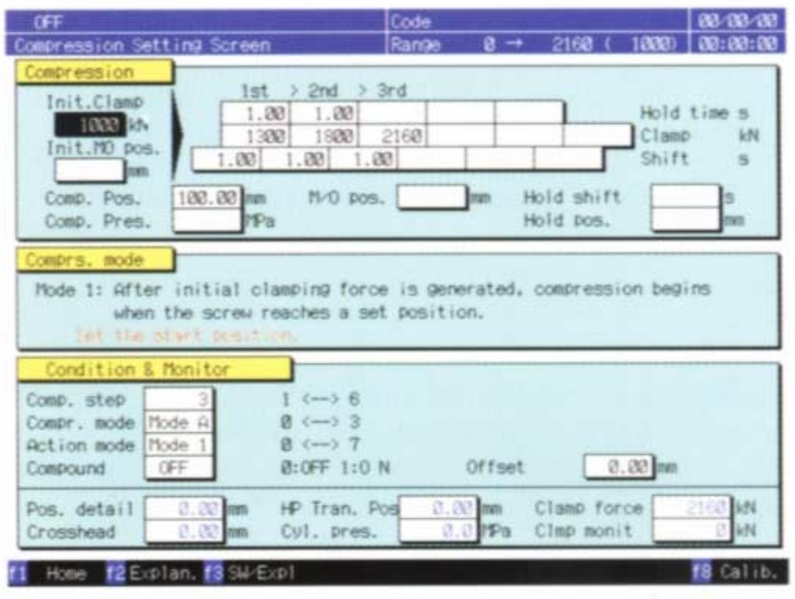
■Wave Form Monitoring



■Overall Set up



■ Injection-compression Set up



Price performance 5

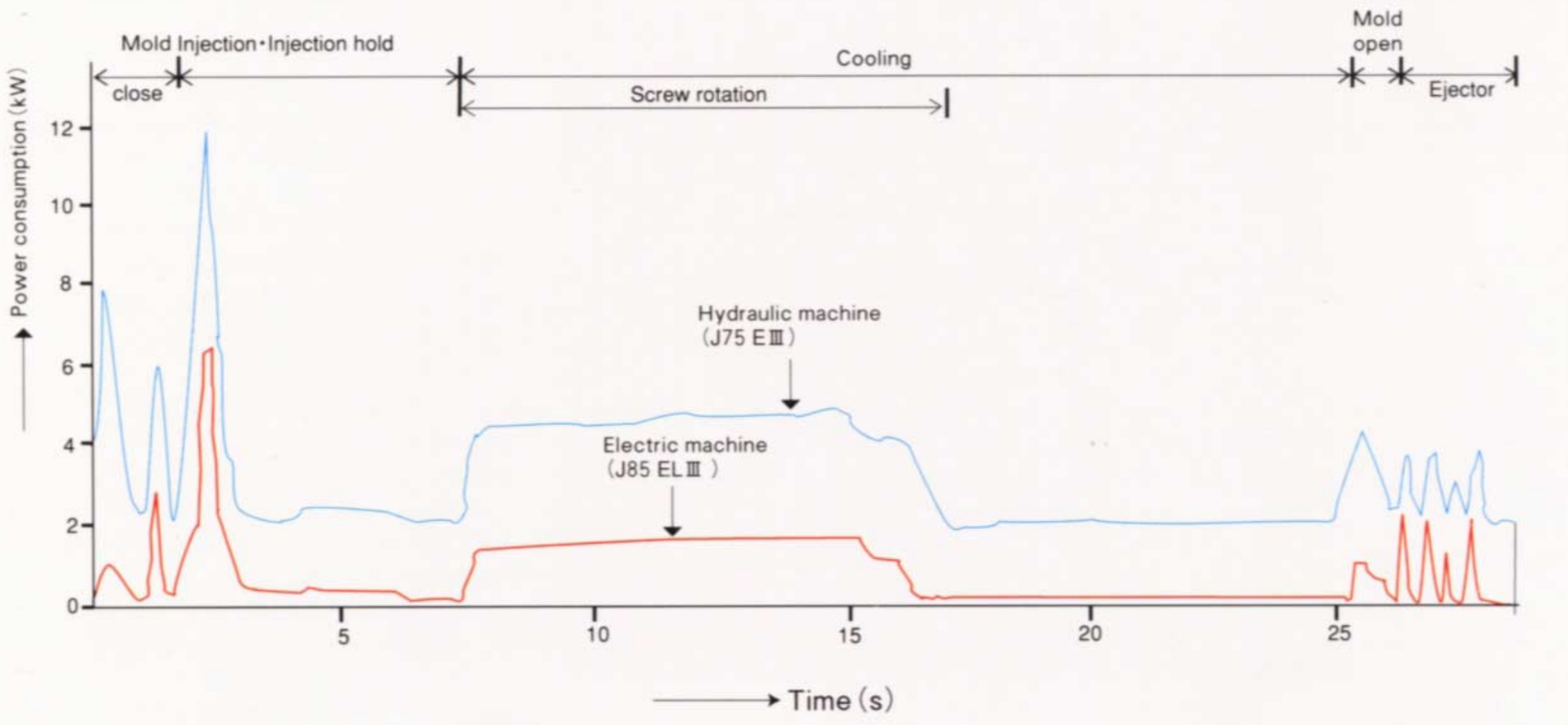
Cost less to run every day

Energy Consumption

Power consumption is saved by one third to one quarter, compared to hydraulic powered machines.

Comparison of power consumption

product weight 35g
product material PP
Cycle time 28.3



Comparison of energy consumption	Electric machine J85EL Ⅲ clamp	Hydraulic machine J75E Ⅲ clamp
kWh	0.879	3.816

(Note: Cylinder heater energy is not included.)

Consumption of Cooling Water

In the hydraulic machines, the cooling water is mostly consumed by the oil cooler,but in electric machines,there is no oil cooler,so water consumption is greatly saved.

Comparison of cooling water	Electric machine J85EL Ⅲ clamp	Hydraulic machine J75E Ⅲ clamp
m³/h	0.3	1.1

Molded Products

IC card (Injection compression molding)

J85ELⅢ　ABS (0.76㎜×54㎜×85㎜)

Lens prism

J35ELⅢ. J110ELⅢ　PMMA・PC

CD Case

J280ELⅢ－890H　PS

Light Guide Plate

J350ELⅢ－460H　PMMA

■Standard Equipment

Unit item		
Injection and Plasticating		
Standard open nozzle (chip type)		
N2000F Cylinder		1)
Screw suck back		
Purge cover (with LS)		
Swivel injection unit		
Cold start-up prevention		
Mold-Pause changeover function		
Automatic Purging Circuit		
Sprue break timing selection		
Suck back timing select		
Injection and recovering program control (Closed-loop control)	Injection speed	1～6 steps
	Injection pressure	
	Holding pressure	
	Screw speed	1～3 steps
	Screw back pressure	
Transfer to holding pressure by sensing Injection speed (IVS)		
Automatic greasing		
Cylinder temperature control (SSR)		
Cylinder temperature remote setting		
Soft pack servo control		
Mold Clamping Unit		
Self-lubricating toggle bushings		
Automatic greasing		
High performance mold platen support		
Remote setting of mold open-close speed		
Remote setting of moving Platen position		
Remote setting of ejector speed		
Remote setting of ejector point		
Automatic mold height adjuster		
Remote setting of mold height		
Automatic mold clamping force setting		
Compression molding (1～6 steps)		
Mold protection device		
Safety devices (electrical and mechanical)		
Take-out robot mounting holes		

Unit item	
Controller	
TFT color LCD controller with SYSCOM touch panel	
Memory of molding conditions	
Data card	
Soft touch start-up function	
Printer output terminal	2)
Self-diagnostic function	
Overall set screen	
Molder's assist-information (Basic system)	
Dual function	
Time clock	
Non attend operation switch	
Robot interface	
Japanese/English switching function	3)
Monitor	
Cylinder temperature monitoring function	
Heater circuit break	
Injection pressure monitor(IPM)	
Injection wave form monitor	
Injection wave form memory	
Statistical analysis function	
Table display	
Display of mold temperature	4)
Link and bushing greasing alarm	
Abnormal alarm buzzer	
Production monitoring	5)
Cycle monitor display	
Action monitor	
Alarm set screen	6)
Maintenance service	7)
History of alarm	
Set value history	
Servo alarm	
General	
Mold cooling water closed circuit (with flow indicator)	

■Optional Equipment

Unit Item
Injection
Long nozzle (chip type)
SVN shut-off nozzle (spring type)
KK size(245MPa)screw cylinder(for smaller than J180EL Ⅲ)
K size(216MPa)screw cylinder(for over J220EL Ⅲ)
Wear and corrosion-resistant screw
Screw for optical parts molding
High-melt M7 screw(except J35EL Ⅲ)
HT Screw head
High temperature molding device for super engineering plastics
Cylinder heater insulation cover
Cylinder module system
High-speed injection(standard for J35EL Ⅲ, J450EL Ⅲ)
Mold Clamping unit
Daylight extension
Mold platen heat insulation board
Air jet
Pneumatic core, puller circuit
Unscrewing motor control circuit
Gate-cut circuit
Photocell type product chute confimation
Product drop confirmation signal connection circuit
Ejector plate return confirmation circuit
Chute
Reject descriminating chute
Mold mounting preparation unit
2 lubrication lines for mold clamping and ejection
Controller and Others
Language switching function 8)
Alarm light
Communication function with host computar
Printer (with printer cable)
Printer cable (IBM interoperable)
Data card (40 sets mold/card)

Notes:

1) Either K or A is standard.(for smaller than J180EL Ⅲ)
(KK size is optional)
Either A or B is standard.(for over J220EL Ⅲ)
(K size is optional)
2) The printer. printer cable and receptacle are optional.
3) The Japanese/English switching function is standard equipment
4) Sensor and cable are not included.
5) Setting of production quantity and advance notice are possible and completion time is displayed.
6) Monitoring functions of the following particulars are equipped as standard.
(Cycle time, Injection time, Revolving time, Mold opening-closing time. Residual, Injection start point, Changeover point to holding pressure, Injection pressure,Changeover pressure to holding , Screw back pressure)
7) Maintenance service time and areas displayed.
8) One more language can be added, in addition to Japanese and English.

Utilities

■Total Power Capacity

Machine Model	Total power capacity (kVA)	
	Standard	Hi-speed
J35EL Ⅲ	5.3	—
J55EL Ⅲ	8.4	8.4
J85EL Ⅲ	12.0	12.0
J110EL Ⅲ	16.0	16.0
J180EL Ⅲ	15.8	25.4
J220EL Ⅲ	20.0	42.4
J280EL Ⅲ-460H	29.3	42.7
J280EL Ⅲ-890H	37.2	50.6
J350EL Ⅲ-460H	29.3	42.7
J350EL Ⅲ-890H	37.2	50.6
J450EL Ⅲ-890H	38.1	51.5
J450EL Ⅲ-1400H	68.4	—

Notes:Total power capacity do not include optional specifications.

■Required water quantity for Cyrinder hopper

Machine Model	Required Water Quantity for Cylinder Hopper (㎥/h)
J35EL Ⅲ	0.2
J55EL Ⅲ	0.3
J85EL Ⅲ	
J110EL Ⅲ	
J180EL Ⅲ	0.4
J220EL Ⅲ	
J280EL Ⅲ-460H	
J280EL Ⅲ-890H	
J350EL Ⅲ-460H	
J350EL Ⅲ-890H	
J450EL Ⅲ-890H	
J450EL Ⅲ-1400H	0.6

Notes:The above figures do not Include the quantity of water required for the mold temperature controller.