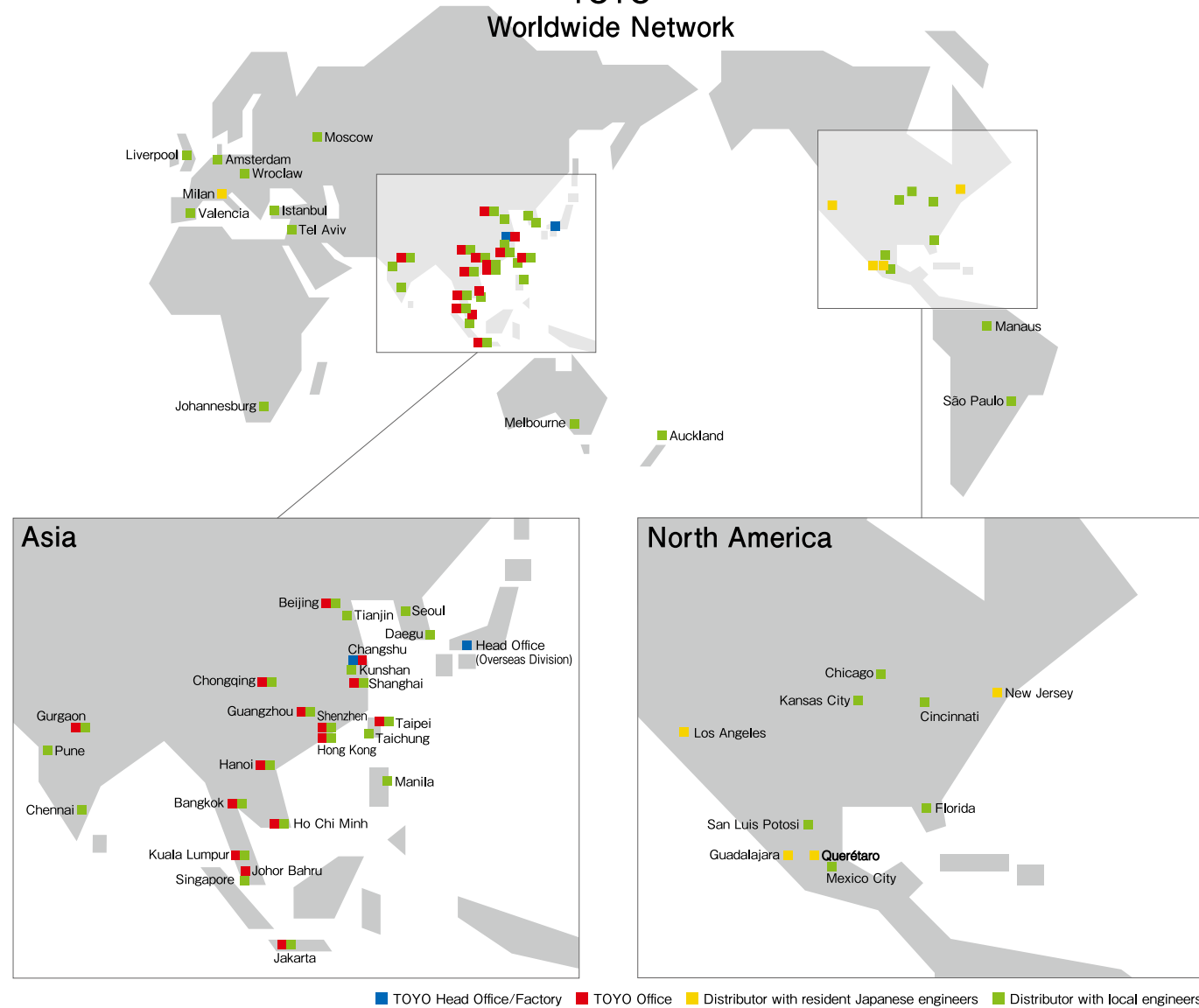


# Si-6S series

## TOYO Worldwide Network



## TOYO TOYO MACHINERY & METAL CO., LTD.



The products are produced at the factory certified with ISO14001.

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For safe use of the machine, please read the respective manual carefully, especially sections for operation and maintenance, and follow all the safety precaution instructions specified in the manual.

- ①Photographs in the catalog include optional devices.
- ②For the improvement of the product, the appearance and specification are subject to change without notice.
- ③If these products and technologies (including programs) are subject to the Japanese export control laws, including the Japanese Foreign Exchange and Foreign Trade Law, the products and technologies are required to obtain an export license of the Japanese government, when exported from Japan.
- ④Some machine pictures and images on the controller screen are superimposed.

URL <http://www.toyo-mm.co.jp/>

## Customer's Value Up

# TOYO

TOYO MACHINERY & METAL CO., LTD.

E U R O

## Fully Electric Injection Molding Machine

# Si-6S series

### Small-size models

Si-50-6S / Si-80-6S / Si-100-6S  
Si-130-6S / Si-180-6S / Si-230-6S



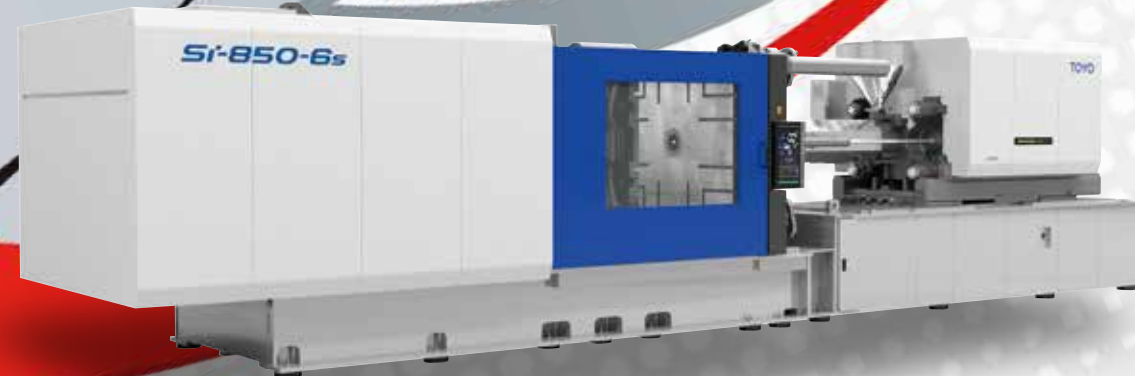
### Middle-size models

Si-280-6S / Si-350-6S / Si-450-6S



### Large-size models

Si-550-6S / Si-680-6S / Si-850-6S / Si-1000-6S





# SMART MOLDING

Powerful yet Simple Process Control

## Si-6S series

Based on previous Si-6 series, the Si-6S series is furnished with a renovated control system. The Si-6S is the latest electric servomotor-driven Injection Molding Machines versioned up from the user's perspective.



### Globally-uniformed specifications

Standardized multi-language screen and common safety specifications covering all the destinations of the machine.

- Japan (K1001: The Japan Society of Industrial Machinery Manufacturers)
- China (GB22530: National Standard)
- Europe (CE Mark)
- North America (ANSI/SPI)
- South Korea (KC Mark)
- Brazil (NR-12)

Safety specifications are available to meet the safety standards for each country.



### Carrying technology proven on Si-6 series

The Si-6S series carries the fruits of joint development with academic sector.

- V-shaped toggle mechanism, developed in collaboration with Kyoto University, evenly distributes clamping force over the mold thanks to the center-press effect.
- The mold-mounting die-plates, also developed under collaboration with Kyoto University, are slim and yet highly rigid.
- High speed toggle supports high cycle operation.

### New Control SYSTEM 800

#### New Control SYSTEM 800

Functional  
beauty

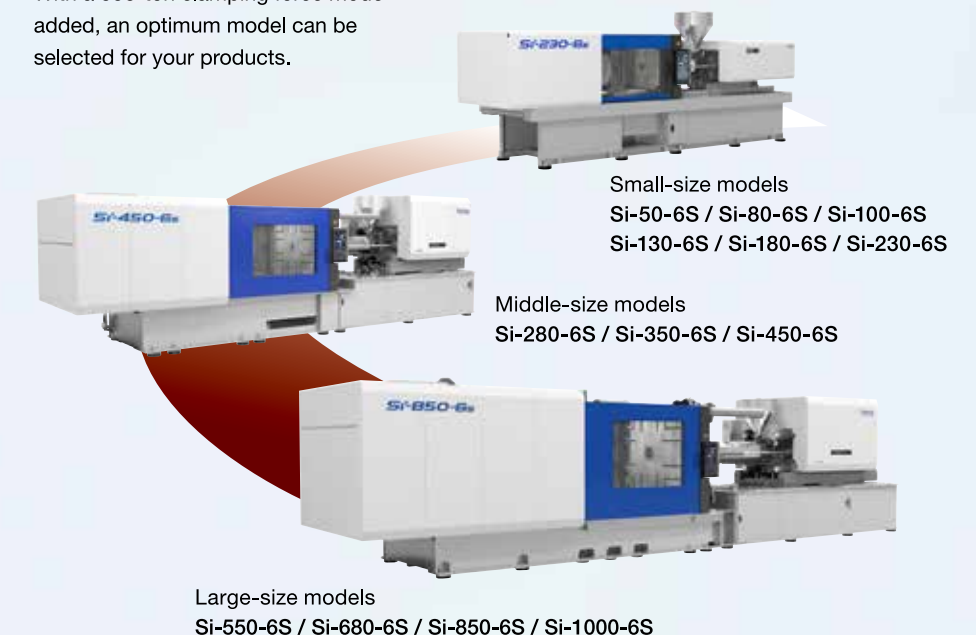
- |  |  |
|--|--|
| <b>Feature 1</b><br>High<br>visibility       | <b>Feature 2</b><br>High<br>operability      |
| <b>Feature 3</b><br>Customization<br>ability | <b>Feature 4</b><br>Operator<br>friendliness |

The superior HMI (Human-Machine Interface) with an 18.5-inch large color LCD screen allows you to operate the machine as if you were handling a smartphone.



### LINE UP

With a 550-ton clamping force mode added, an optimum model can be selected for your products.





# New Control SYSTEM 800

## Functional beauty

SYSTEM 800 for higher operator-friendliness and information integration

The HMI (Human-Machine Interface) with a 18.5-inch large color LCD screen is equipped with an electrostatic capacitance system multi-touch panel, so you can operate the machine as if you were handling a smartphone with a feeling of luxury. SYSTEM 800 boasts high visibility, high operability, customization feature, and operator-friendliness.



**Feature 1**  
High  
visibility

**Feature 2**  
High  
operability

**Feature 3**  
Customization  
ability

**Feature 4**  
Operator  
friendliness

Electrostatic capacitance system multi-touch panel is employed.

18.5-inch large color LCD screen

For higher information aggregation and operator-friendliness

Luxury feeling and smartphone-touch operability

## High visibility

All necessary information is in one screen so that you can grasp machine conditions at a glance.

A large 18.5-inch LED screen is laid vertically long, where all the necessary information can be displayed in a single screen. The machine status indicating screen in the middle part is for you to visually and intuitively grasp the current machine status, where strokes, pressures and torques are displayed on the numerical meters. Besides the meter display, you can choose small graph indication, cycle monitor indication, or the like at your convenience.

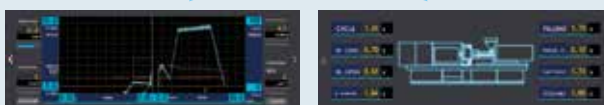
A large 18.5-inch LED screen is laid vertically long, where all the necessary information can be displayed in a single screen.



Present machine status is visually recognized by meter display.



Displayed contents can be switched.



## High operability

You can intuitively operate the touch panel like a smartphone.

You can operate the screen as if you were handling a smartphone.

### Smartphone-touch screen operation

#### Screen transition by flick operation

Changeover of contents of the machine status indicating screen can be made easily by right-left flick operation on the screen.



#### Letter entry by flick operation

Letter entry like name entry to the molding condition is also made by flick operation.



#### Item selection by drag and drop operation

Item selection is made by drag and drop operation.



#### Pinch-in, pinch-out operation in reading graph

The area in the graph you want to see in detail can be zoomed-in or zoomed-out by pinch-in or pinch-out operation, so that you can easily grasp and help adjust the molding condition.



#### Non-look operation

Operations such as injection, metering, and mold opening and closing are made by pushing respective tactile switches instead of conventional touch panel operation. You can operate the machine with a feeling of clicking.



Operation keys can be changed by swiping operation. Color indication of LED is different depending on the operated keys, so that wrong key operation can be visually warned. By changing programs, key application can be expanded to special requirements.

Respective machine operations are made by pressing tactile switches.

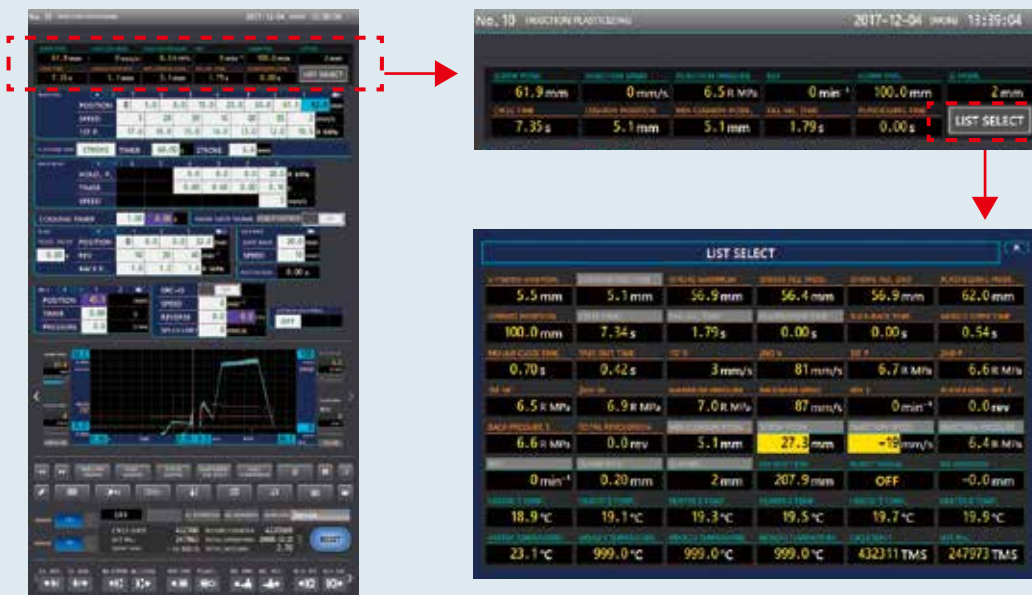


Customization ability

Displaying only chosen data for instant recognition of operating conditions.

Selectability of measured items that can be displayed

On the top part of each screen, monitored data of the ongoing molding cycle are displayed. You can choose the items that are displayed. To set the items, drag and drop the ones you want them to be displayed from the LIST SELECT.



You can set measured items that are displayed on the top of the screen by drag and drop operation of the items you choose from the LIST SELECT.

Three types of MENU screens

The machine is equipped with three kinds of screen-selecting MENU screens.

Screens list display

As with previous models, screens list is displayed in tiled manner.



Categorized display

Screens list is displayed in each category group. By conducting long tapping operation, you can move to an individual screen.



Customized display

You can design the layout of screen items for each log-in user.



Operator-friendliness

High information collecting and aggregating function for easy use as necessary.

Display of PDF file, movie file and image file

Files stored in the hard memory of the SYSTEM 800 or USB memories can be displayed on the screen. For example, you can read Instruction Manual or Operation Manual stored in a PDF file on the machine screen when necessary.

You can watch material or color changing procedures stored in movie files on the screen, so that you can conduct such work swiftly and correctly. Unlike paper manuals, you can easily convey highly skilled expertise including intuitive and secret knowhow on the work to the workers. This function helps workers raise their skill level.



PDF files  
Examples: Operation Manual and Instruction Manual



Movie files  
Examples: Educational movies showing molding procedure or maintenance procedure



Image files  
Examples: Images showing how to find defective products

Memo hand writing function

The memo hand writing function allows you to handwrite notes on the screen of the molding machine, and the screens can be captured and stored in image. For example, when you find something defective, you handwrite such information on the screen for record, and it can be helpful for future troubleshooting.



Hand-written memo  
Example: Record of defect location

Pop-up display of notice

Pre-registered text information can be popped up on the screen at a designated time. For example, messages in job handover or a meeting schedule can be displayed on the screen, so that the operator in the next shift can get to notice it without fail.



Notice on job handover  
13:58~22:00 Resin inside

Notice on meeting schedule  
13:56~15:00 Meeting

Camera image showing function

If you set a camera on the machine, pictures taken by the camera can be displayed on the screen, so that you can grasp in real time the conditions inside the mold at the time of taking out of products, and you can handle the situation promptly in terms of combination with the post-molding equipment.



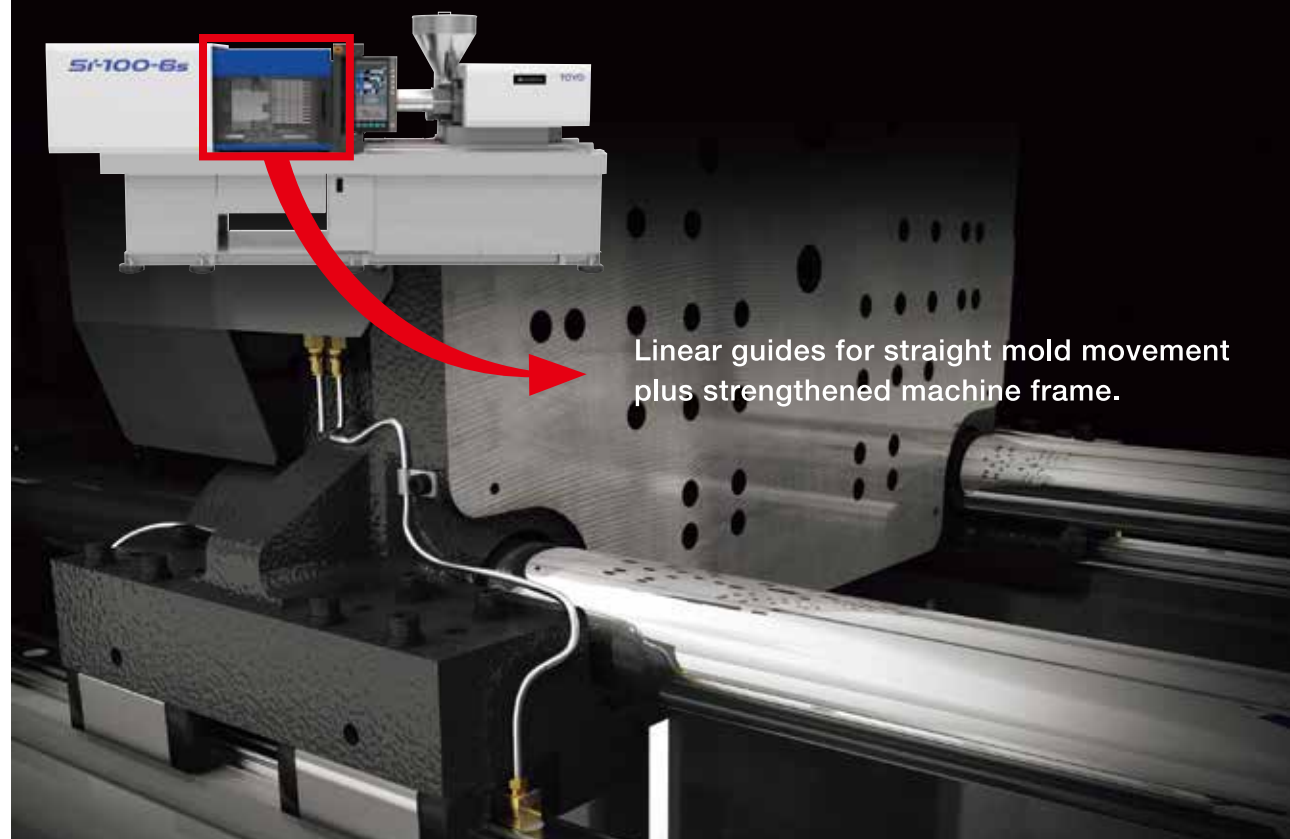
Display of camera image via USB  
Examples: Images for monitoring of molding conditions or post-molding process  
\*A camera is not included in the machine.

## Mold Clamping Mechanism

Si-50-6S – Si-100-6S

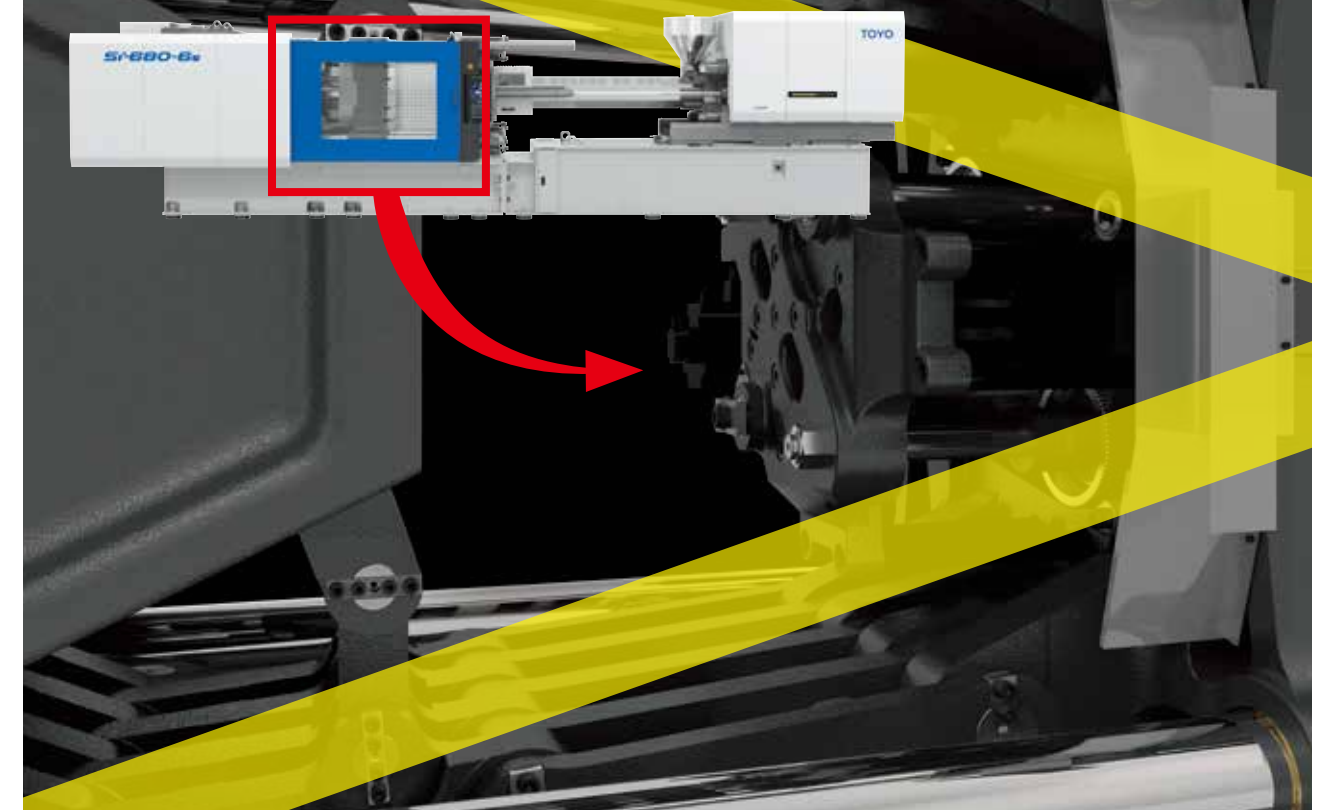
### High precision mold clamping mechanism to produce high grade products.

Combining the proven V-clamp mechanism and a newly designed guide structure, we have realized high precision clamping needed to produce small precision products.



### Optimum mold clamping is realized.

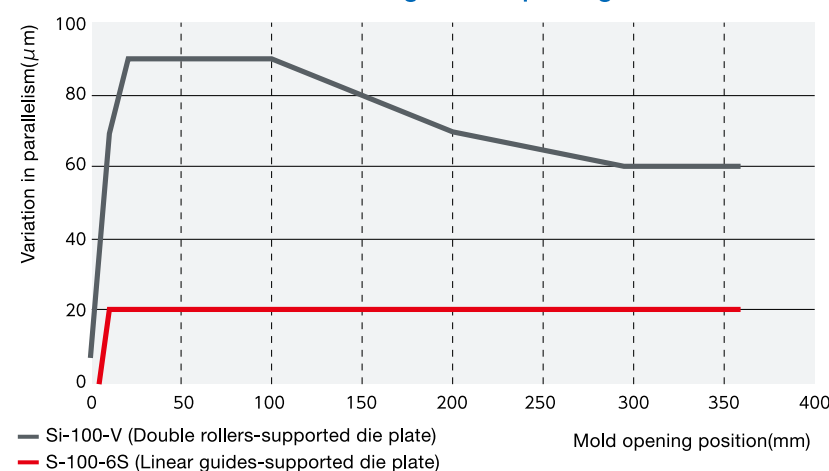
Carrying the fruit of the joint development with academic sector, the mold clamping device efficiently delivers the clamping force to the mold in even distribution. The clamping mechanism can be flexibly adapted to large molds in complex structure. The large model has adopted a clamping mechanism having higher rigidity.



### High precision mold clamping mechanism Small models (Si-50-6S – Si-100-6S)

- Straight mold movement along the entire stroke reduces uneven wear of mold guide pins to a minimum.
- Alignment and parallelism of the clamping component can be maintained for extensive years.
- No grease scattering over the mold thanks to eliminated tie-bar guides.

#### ■ Parallelism variation during mold opening



### Proven technology, 'V-clamp' mold clamping mechanism

The V-clamp mold clamping mechanism, which has been standard since the Si-IV series, effectively delivers the clamping force to the center of the mold owing to its "center press effect." And the high rigidity and yet slim mold mounting plates, which are also time-proven, evenly distributes the clamping force over the entire mold. Well-balanced even distribution of clamping force can be maintained without applying a clamping force beyond necessity.



# Easier maintenance and improved eco-efficiency

Reflecting desires from users, the Si-6 series is a practically easy machine to maintain. In addition, energy-efficiency and eco-friendliness are greatly increased.



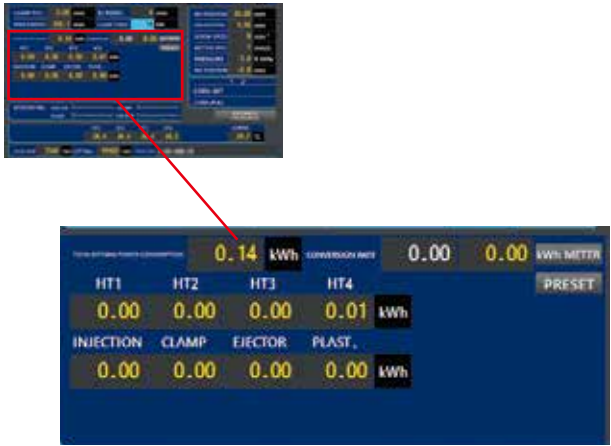
**Heat-insulating heat barrel cover**  
Heater's power consumption is greatly reduced.

**Increased cover opening**  
With this design, screw replacement work has become easier.

## Power consumption display

Visualization of power consumption promotes energy saving activity

Either integrated total power consumption from a preset point or hourly consumption can be displayed by switching. In addition, the consumed power can be displayed in the desired unit such as JP¥, US\$ or emitted amount of CO2.



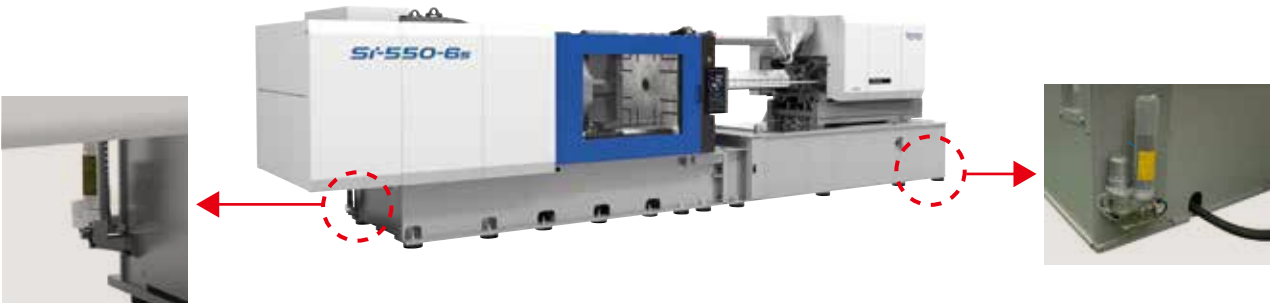
## Light weight splittable cover

The light weight and splittable cover design has eased removing or installing work of covers at the screw access area and the toggle area. This cover design facilitates maintenance work including screw maintenance work and toggle cleaning work. These covers also secure further safety.



# High degree of serviceability and safety, essential to the machine, are provided.

The fully automated lubrication control and the wide opening stroke safety door are among the features of the Si-6S series, which facilitate maintenance work and secure greater safety. These features reflect on comments and suggestions from customers who have been using our machines.



## Totally automatic grease-lubrication system as standard

Si-280-6S and more

The Si-6S series is equipped with the totally automatic grease-lubrication system as standard that covers not only ball screws, toggles, tie-bars and guide bars but also all other greasing points that were previously optional. In addition, the food-grade grease “H1-2”\* having the same lubrication property as that of our own “B3 No.2” grease can also be used for this grease-lubrication system. The food-grade grease “H1-2” is authorized by the U.S. public healthcare equipment accreditation body NSF International as “H1 grade grease” that can be used in molding of sanitary-controlled food-grade products. This system has greatly eased the burden in greasing work.

\* H1-2 grease is optional.



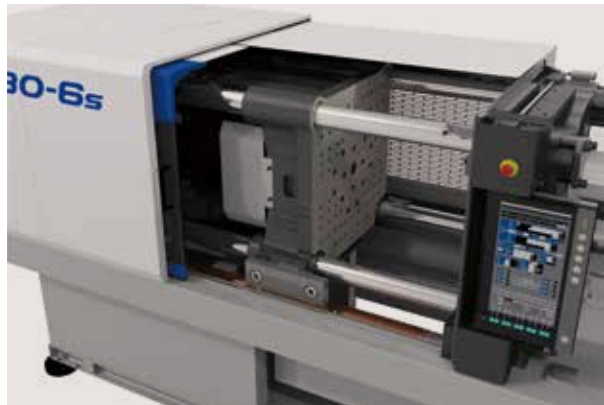
H1 lubricants may be used in applications where incidental food contact may potentially occur.

## Widely opening safety door

The Si-6S series is equipped with the widely opening safety door, which had been adopted on the previous Si-6 series. The widely opening safety door facilitates the mold changing work without taking unreasonable attitude, contributing to reduced work time and higher safety.

Table of safety door opening stroke by model

Model	Opening stroke
Si-50-6S	580mm
Si-80-6S	650mm
Si-100-6S	750mm
Si-130-6S	1000mm
Si-180-6S	1080mm
Si-230-6S	1250mm
Si-280-6S	1250mm
Si-350-6S	1285mm
Si-450-6S	1540mm
Si-550-6S	1750mm
Si-680-6S	1750mm
Si-850-6S	1900mm
Si-1000-6S	2490mm



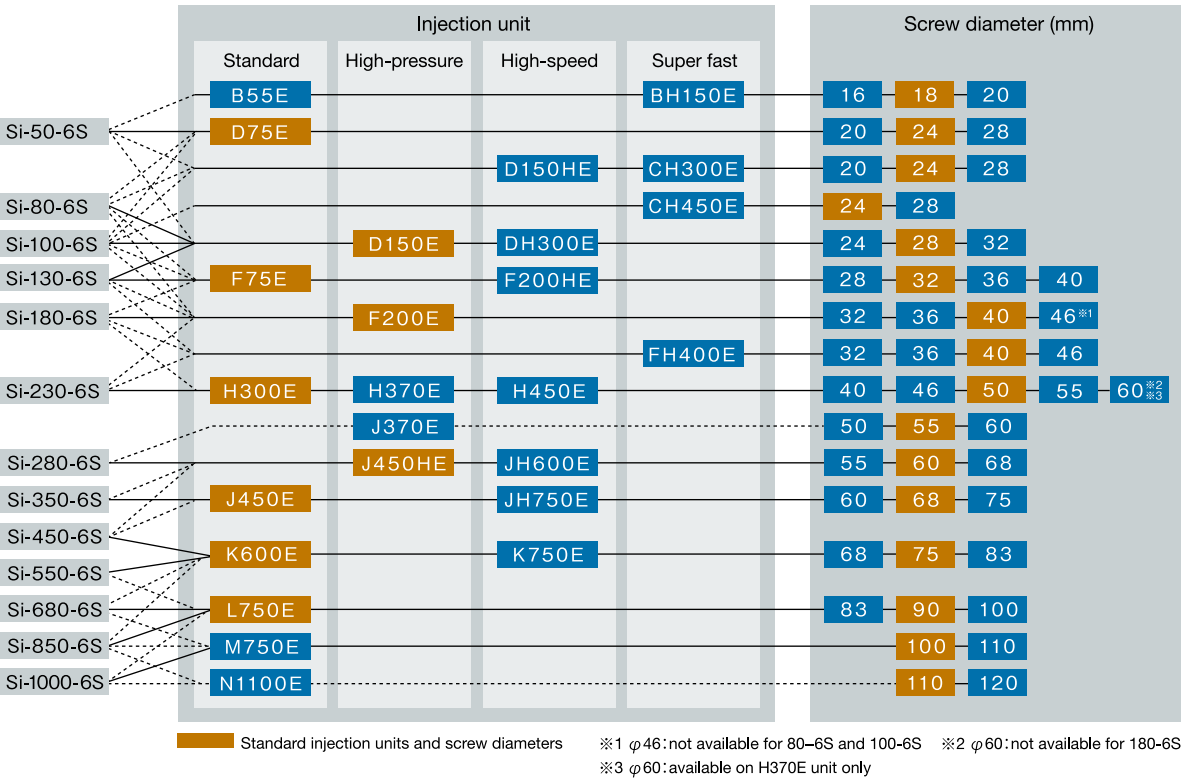
# Injection Mechanism

## Superior molding stability in high speed, high pressure, large volume and small volume injections

To cope with injection at an increasingly high speed and high pressure, the Si-6S series have a variety of injection units from large volume to small volume, so that the Si-6S series can address the demands from each customer. The injection controlling technology, utilizing accumulated expertise, realizes high precision injection, thus contributing to high molding stability and productivity.

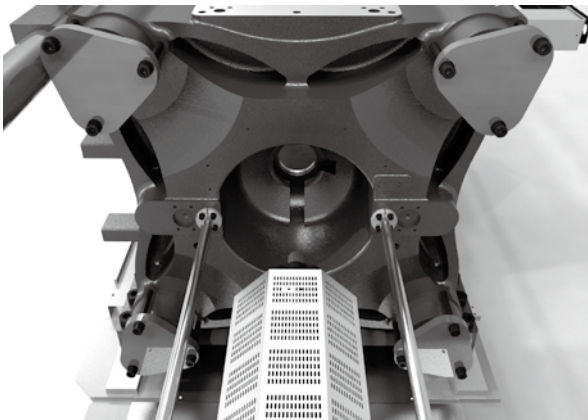
### Wide variety of injection units

The Si-6S series has newly added K750E high speed injection unit which achieves a maximum injection speed of 250 mm/s, 138% faster than that of the standard K600E. And the models of 680-ton or larger in clamping force can accommodate a one-size larger injection unit compared with the previous series. With 'standard,' 'high pressure,' 'high speed,' 'large volume,' and 'small volume' injection units, the Si-6S series can cope with various needs from each customer.



### Increased injection pressure

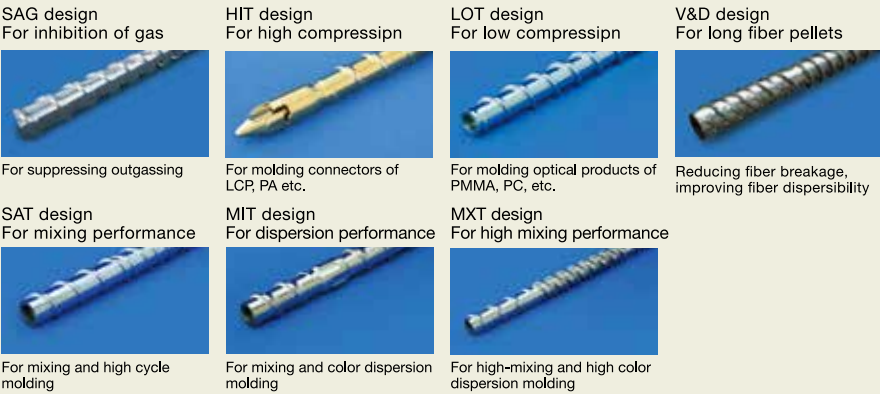
The increased rigidity of the injection unit allows higher injection pressures to be set. And the double nozzle-touch rods structure prevents the inclination of the stationary mold mounting plate.



# OPTION

## A great variety of plasticizing components to support SMART MOLDING

### Special screw lineup



### Screw check triplet

Standard / Option

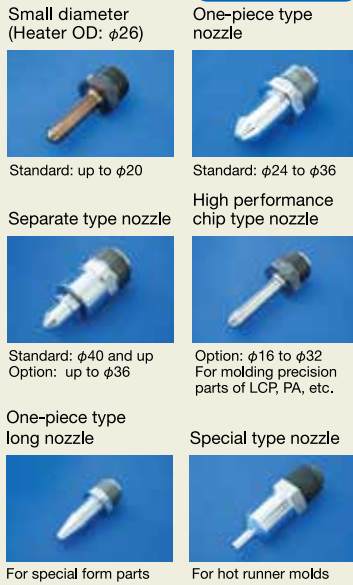
### Screw check triplet (non-rotation)



### Screw check triplet with CrN or C-TiN coating



### Nozzle lineup



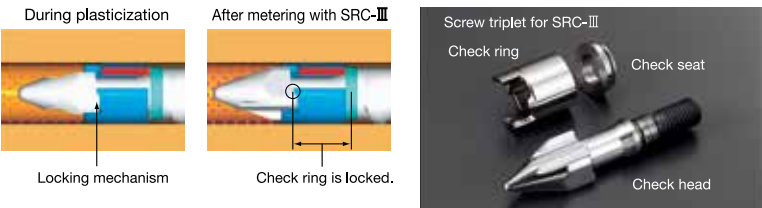
### Comparison of tie-bar clearances

Material		Standard	Wear-resistant I	Wear-resistant II	Wear-resistant III	Fluorine-resistant
		Nitriding	Wear-resistant I	Wear-resistant II	Wear-resistant III	Fluorine-resistant material
Available surface treatment	Heat barrel					
	Screw	Plating	Wear-resistant I	Wear-resistant II	Wear-resistant III	Fluorine-resistant material
	Check triplet		Wear-resistant I	Wear-resistant II	Wear-resistant III	Fluorine-resistant material
	Nitriding	●	—	—	—	—
Applicable resin	Plating	●	●	—	—	—
	CrN	—	●	●	—	—
	C-TiN	—	●	●	—	—
	With no GF, no inflammability		GF: 30% or less Inflammability HB~V1	GF: 30% or more	GF: 50% or more GF: 30% or more + Inflammability V0	Fluorine resin
Corrosion resistance	More ★ signs show greater performance	★	★★	★★★	★★★★	★★★★★
Wear resistance						★

### Other special options

#### The SRC-III metering system

The SRC-III eliminates an unstable factor of the check ring



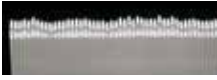
#### Evaluation of melt density stability by SRC-III metering

The condition of melt density was observed by checking the length of bar-flows that were molded with a constant injection stroke without using holding pressure control.

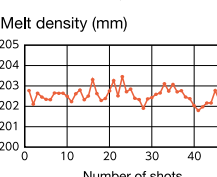
[Product: Bar-flow Material: GP-PS]



#### Conventional metering system



$\bar{X}=202.5\text{mm}$   $R=1.67\text{mm}$   $\sigma=0.3496\text{mm}$   $R/\bar{X}=0.825\%$



$\bar{X}=202.8\text{mm}$   $R=0.21\text{mm}$   $\sigma=0.0511\text{mm}$   $R/\bar{X}=0.104\%$

#### Expansion of temperature control circuit

By adding temperature controlling ATCS boards, mold and hot runner temperature controls can be performed at the molding machine.



ATCS board for heater control

Setting screen



# OPTION

## Remote operation

You can operate the control screen away from the control panel.

# T-Remote Web

Molding machine is connected with a smart device with Wi-Fi.



Available on models with SYSTEM500 or newer control system

### What remote operation can make

- Access to monitored information or changing of operating condition can be made on the back side of the machine.
- Captured screens can be stored.
- One can be connected with maximum 32 molding machines

### Screens are always with you

- Condition setting can be made referring to other machines.
- You can change condition setting while observing the molding machine or products on the back side of the machine.
- You can check I/O signals while observing machine motion at the time of maintenance.

### New functions

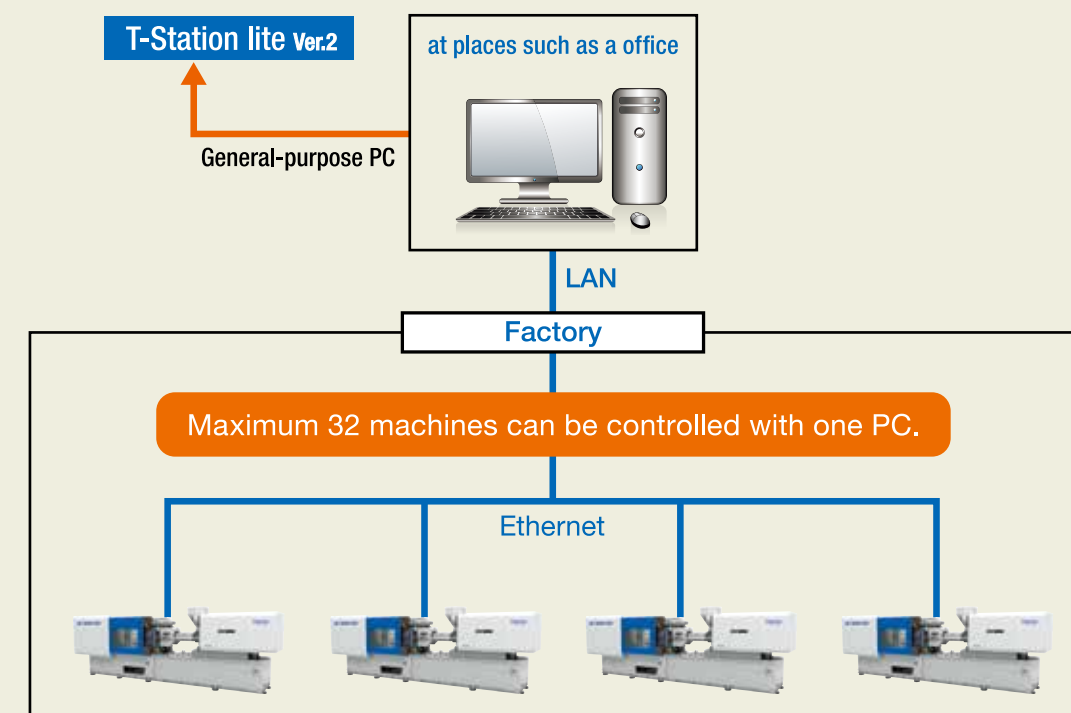
- ★ No need to install a special application to smart device.
- ★ You can easily operate the molding machine with Windows, Android, ios.

## Remote control

Contributing to improving efficiency, operation ratio and quality at the production site.

# T-Station lite ver.2

Control of multiple machines with a general-purpose PC.  
Control system can be established easily at a low cost.



### Integrated control of multiple machines

- Operation control
- Quality control
- Condition control
- Production control
- Remote diagnosis
- Screen control

### New functions

- ★ **E-mail delivery function**  
Machine defect information can be delivered automatically via e-mail.
- ★ **Graph display function**  
Injection and plasticization graph for every cycle can be sent to a PC.
- ★ **Various data output function**  
Output of Ras data, evacuation data and molding conditions to PC
- ★ **Available in various languages**  
Japanese, English, Chinese (simplified, traditional), Korean, Germany, Italian, Spanish